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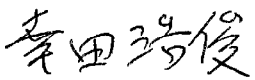
MINUTES OF MEETING
ON THE JAPANESE TECHNICAL COOPERATION PROGRAMME
BETWEEN THE JAPANESE PRELIMINARY STUDY TEAM AND THE
AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE UNITED REPUBLIC OF TANZANIA
FOR THE KILIMANJARO AGRICULTURAL TRAINING CENTRE PHASE II
PROJECT IN TANZANIA


In response to a request made by the Government of the United Republic of Tanzania for The Kilimanjaro Agricultural Training Centre Phase II Project in Tanzania (hereinafter referred to as "the Project"), the Government of Japan sent the preliminary study team (hereinafter referred to as "the Team"), headed by Mr. Hirotoshi Koda, from June 20th to June 30th, 2000. The Team was sent through the Japan International Cooperation Agency (hereinafter referred to as "JICA") for the purpose of clarifying the background of the request, identifying problems for the implementation of the Project and studying the feasibility of the proposed technical cooperation programme.

During its stay in the United Republic of Tanzania, the Team carried out field survey, exchanged views and had a series of discussions with the authorities concerned of the government of the United Republic of Tanzania through the Kilimanjaro Agricultural Training Centre (hereinafter referred to as the "KATC") in respect of various issues necessary for sharing understanding of the Project.

As a result of the discussions and the field study, the Team and the Tanzanian authorities concerned agreed to report to their respective governments the matters referred to in the document attached hereto.

Dar es Salaam, June 30th, 2000


Mr. Hirotoshi Koda
Leader of Preliminary Study Team
Japan International Cooperation Agency
Japan


Mr. Peter B. Barie
Permanent Secretary
Ministry of Agriculture and Cooperatives
United Republic of Tanzania

THE ATTACHED DOCUMENT

I. OBJECTIVES OF THE STUDY

The Team was dispatched by JICA for the following purposes:

- (a) To confirm the background and the content of the requested Project,
- (b) To hold a Project Cycle Management (hereinafter referred to as "PCM") workshop in order to conduct participation analysis, problem analysis and objective analysis for clearly defining the Project approach and formulating a draft of the tentative Project Design Matrix (hereinafter referred to as "PDM"),
- (c) To confirm the Project implementation arrangements of the Ministry of Agriculture and Cooperatives (hereinafter referred to as "MAC"), particularly the organization, budget, counterpart personnel, etc.,
- (d) Based on the results obtained by the above-mentioned studies, to confirm the feasibility of the Project,
- (e) To confirm the matters requiring further study and discussion for implementation of the Project, and
- (f) To sign the Minutes of Meeting that describe the results of the discussions

As a result of the field survey and discussions, this document has been prepared to summarize matters studied by the Team and the Tanzanian side.

II. BACKGROUND OF JAPANESE COOPERATION IN THE FIELD OF IRRIGATED RICE FARMING

Since the 1970s, the Government of Japan has been cooperating in a series of development programmes in the Kilimanjaro region, especially in the field of irrigated rice farming. The Kilimanjaro Agricultural Development Centre (hereinafter referred to as the "KADC") Project was implemented from September 1978 to March 1986. The Kilimanjaro Agricultural Development Project (hereinafter referred to as the "KADP") was carried out as the second phase of the KADC project from March 1986 to March 1993.

The Lower Moshi Irrigation Project consisting of 1,100 hectares of paddies and 1,200 hectares of upland crop fields was implemented in 1987 through loan, and the



Ndungu Irrigation Project consisting of 680 hectares of paddies was implemented through grant aid.

After the successful implementation of the KADP, the Government of the United Republic of Tanzania made a request to the Government of Japan for an extension of technical cooperation with the aim of disseminating the results obtained through past cooperation throughout the rest of Tanzania in September 1992.

The KATC was established in July 1994 after the Government of Japan responded positively to a request by the Government of the United Republic of Tanzania to fully exploit the existing potential for increased rice production in Tanzania. The Kilimanjaro Agricultural Training Centre Project (hereinafter referred to as "the KATC Phase I Project") commenced in July 1994 under the collaboration of MAC and JICA to carry out the training of field personnel and key farmers in contents of agricultural extension, rice cultivation, water management, agricultural machinery, etc.

III. RESULT OF THE PROJECT CYCLE MANAGEMENT WORKSHOP

1. Objectives

In order to create consensus among the project personnel towards a design and the direction of the Project, a series of workshops were conducted based on the PCM method. This time, two separate workshop sessions were organized.

- 1) First PCM workshop was held mainly for the purpose of identifying the existing conditions and the desirable situation that would be attained once problems have been solved.
- 2) Second PCM workshop was held mainly for the purpose of formulating a framework of the Project.

The outline of PCM workshop is shown in ANNEX I and the list of the PCM workshop participants is shown in ANNEX II.

2. Summary of the workshop result

The workshop was very successful due to active participation and kind co-operation of the participants, and understanding and supports by related personnel. It seemed to be



that, through this PCM workshop, the participants achieved their intended objectives. The participants analyzed the current status, identified the objectives and created consensus among the project personnel for the Project. And communication and mutual understanding on the framework of the Project were enhanced through this participatory workshop by those involved in the Project. Involving the representatives of the target group, relevant governmental and executing organizations in the project planning is also expected to make the project implementation process smooth.

3. Details of the Workshop Results

The PCM workshop was conducted in following five steps:

- 1) Participation Analysis,
- 2) Problem Analysis,
- 3) Objectives Analysis,
- 4) Alternatives Analysis, and
- 5) Tentative PDM formulation

In order to make farmers' views and aspirations visible, the participants of workshop formed two sub-groups: farmers and extension officers group (hereinafter referred to as "farmer's group") and implementing agencies group (hereinafter referred to as "implementing group"). The detailed result of the PCM workshop is shown in the attached report.

3.1 Participation Analysis

(1) Participation Analysis of the Farmer's Group

In order to grasp overview of all related groups in their villages, the farmer's group identified individuals, groups or organizations involved in some way in their village. Then related or similar cards were clustered in broad categories such as "Beneficiaries", "Implementing Agencies", "Supporting Agencies" and "Funding Agencies". After conducting the group categorization, the farmer's group discussed and picked up several "Key" stakeholders that they considered to be the major stakeholders with the serious problems. Then they analyzed main characteristics of each key stakeholder using such



criteria as "Needs", "Strengths", "Weaknesses", "Roles/Jobs" and "Prospects/Desirable Picture". In this analysis, "training" is regarded as their needs.

(2) Participation Analysis of the Implementing Group

Participation Analysis of the implementing group was conducted to grasp an overview of all parties directly and indirectly connected with the Project. Then the implementing group made a relational chart of major organizations of the Project. Through this formulation, the implementing group clarified that there is a sequence of benefits among each related stakeholder. After conducting the group categorization, the implementing group conducted detailed analysis of staff of the KATC and MAC.

3.2 Problem Analysis

(1) Problem Analysis of the Farmer's Group

In this analysis, the farmer's group analyzed the various problems of farmers'. Among several potential core problem cards, "Low yield per unit area" was chosen as a core problem. The problem analysis continued to find direct causes and effects of the core problem. With regard to the core problem, eleven direct causes were identified and one direct effect results. The ultimate problem was also identified as "Poor living standards of farmers".

(2) Problem Analysis of the Implementing Group

At the beginning of the analysis of the implementing group, "rice farmers in irrigation scheme" were selected as a target group. Through the Participation Analysis, the implementing group already identified there were several stakeholders connected with the Project area (irrigation scheme) and each stakeholder may have different problems depending on their organizations. Because of that, the implementing group selected three main stakeholders such as "rice farmers" from the beneficiaries group and "technical staff" and "managers" from the implementing agencies group for the further Problem Analysis. In this analysis, "Productivity of rice in irrigation scheme is low" was chosen as a common core problem of each group analysis. The problem analysis



continued to find direct causes and effects of the core problem.

(3) Joint Problem Analysis of the Farmer's Group and the Implementing Group

The results of the Problem Analysis of each group were presented and compared in a discussion with the farmer's group and the implementing group. Since there were several common problems in each analysis, all participants decided to combine each problem tree into a "Joint Problem Tree". In the Joint Problem Analysis, "Productivity of rice in irrigation scheme is low" was chosen as a core problem. The Problem Analysis continued to find eight direct causes and effects of the core problem.

3.3 Objectives Analysis

After completing the Problem Analysis, all workshop participants jointly conducted the Objectives Analysis. This exercise begins by replacing cause-effects relationship with positive means-ends ones. By doing so, the objective card reading "Productivity of rice in irrigation scheme is improved" replaced the core problem.

3.4 Alternatives Analysis (Project Selection)

The Alternatives Analysis started by identifying several approaches in the objectives tree and gave a name to each approach that clarifies the objectives of the approach. The results of the identified approaches are shown below.

Identified Approaches
- Rice Production Techniques Improvement Approach
- Human Resources Development Approach
- Rice Mechanization Improvement Approach
- Water Management Improvement Approach
- Inputs and Supply Improvement Approach

The workshop participants then compared and examined several components of each approach in accordance with the selection criteria such as "Target Group", "Priority of Government of Tanzania and Government of Japan", "Technical Aspects", "Cost", "Human Resources" and "Social Factors".



3.5 Tentative Project Design Matrix Formulation

Based on the result of the situation analysis in the workshop and also the findings of the study, the workshop participants formulated a tentative PDM, which summarized the outline of the Project. Since this workshop was conducted at preliminary stages of the Phase II Project, it was suggested to define only the main project elements (Narrative Summary) and the important assumptions of PDM at the present time. The duration of technical cooperation, target group, project area and the objectives and outputs of the Project were defined as follows (the draft of the tentative PDM is shown in ANNEX III).

1) Duration of Technical Cooperation:

Five (5) years from July, 2001 to June, 2006

2) Target Group:

Rice farmers in the irrigation schemes

3) Target Area:

The selected irrigation schemes (the target area will be selected later)

4) Objectives and Outputs of the Project:

• Super Goal:

Living standards of rice farmers in the selected irrigation schemes are improved.

• Overall Goal:

Agricultural income of rice farmers in the selected irrigation schemes is increased.

• Project Purpose:

Productivity of rice in the selected irrigation schemes is improved.

• Outputs:

1) The needs of farmers in the selected irrigation schemes are identified.

2) Technical/professional/pedagogical capabilities of KATC staff are improved.

3) Rice information centre at KATC is established.

4) Human resources for rice production in the selected irrigation schemes are



developed.

- 5) Rice production techniques in the selected irrigation schemes are improved.
- 6) Water management techniques for farmers, technicians and scheme managers in the selected irrigation schemes are improved.
- 7) Supply of inputs in the selected irrigation schemes is improved.
- 8) Rice mechanization techniques for farmers, technicians and scheme managers in the selected irrigation schemes are improved.
- 9) Gender aspects are adequately addressed in the selected irrigation schemes.

The team explained to the Tanzanian side that the PDM will be finalized during the first stage of technical cooperation through discussions on the detailed activity plan of the Project to be held between the Japanese experts to be dispatched and the Tanzanian counterparts. In the course of Project implementation, then, the PDM will be utilized for effective monitoring and evaluation of the implementation of the Project.

IV. TENTATIVE PROJECT FRAMEWORK

The Team and the Tanzanian side jointly formulated the following tentative framework of the Project based on the request made by the Tanzanian side, taking into account the findings of the Team, in particular the results obtained by the PCM workshop.

The framework that is shown below may be subject to change based on future discussions and studies.

A. NAME OF THE PROJECT

Kilimanjaro Agricultural Training Centre Phase II Project

B. TANZANIAN ORGANIZATIONS CONCERNED WITH THE PROJECT

- (a) Responsible public administrative organization of the Project

Ministry of Agriculture and Cooperatives (MAC)

- (b) Executing organization of the Project

Kilimanjaro Agriculture Training Centre (KATC)



(c) Partner organization of the Project

Kilimanjaro Regional Government

The Kilimanjaro Regional Government will provide necessary technical support for training of scheme managers, field personnel and farmers in the selected irrigation schemes through the Kilimanjaro Agricultural Development Project.

C. SITES OF THE PROJECT

(a) Project site

KATC, located in Chekereni Compound Moshi

(b) Liaison office

KATC Moshi Office, located in Moshi

(c) Target irrigation schemes

Several irrigation schemes will be selected.

1) The target irrigation schemes of the Project will be carefully determined by both the Tanzanian and Japanese sides, taking into account the following selection criteria:

i) Geographical conditions

- Conducive conditions including climate and soil
- Accessibility by vehicle from the KATC

ii) Infrastructural conditions

- Availability of irrigated land
- Availability of irrigation water to a certain extent
- Working irrigation system exists
- Availability of farm roads to introduce agricultural machinery

iii) Socio-economic conditions

- Farmers live in the area
- Farmers have a certain technical level in terms of rice production
- Field personnel and farmers cooperate with the Project
- There is potential economic impact on further agricultural development
- Existence of active farmers' organizations

iv) Other remarks in the selection



- To secure the security of Japanese experts and KATC staff members
- To avoid duplication with other bilateral and multilateral donors
- Lessons learned from past Japanese cooperation
- Potential effects on the training activities
- Potential for increased rice production
- Existence of Water right

2) The number of target irrigation schemes will be limited considering time limitations and limited input of human resources of the Project.

D. TERM OF COOPERATION

Five Years

E. MASTER PLAN

The Master Plan of the Project will be jointly formulated by both the Japanese and Tanzanian sides through the coming preparatory study, based on the draft of tentative PDM formulated.

(a) Activities of the Project Organizations

1) Project site

KATC, located in Chekereni Compound Moshi

- a. Experimentation on irrigated rice farming practices suitable for the selected irrigation schemes
- b. Development and implementation of training courses focused on developing the selected irrigation schemes for scheme managers, field personnel and key farmers on various aspects of irrigated rice farming improvement
- c. Seminars and workshops for government personnel on various technical aspects of irrigated rice farming improvement

2) Target irrigation schemes

The activities of the target irrigation schemes are as follows:

- a. Implementation of survey on farmers, farming systems and farmers' organizations




- b. Demonstration of the improved rice cultivation techniques on farmers' fields
- c. Collaboration and implementation of outreach training courses and follow-up guidance to ex-participants and other farmers

F. ORGANIZATIONAL SET-UP OF THE PROJECT

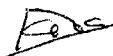
In order to implement the Project successfully and to ensure the sustainability of the Project, the Tanzanian side should have stronger 'ownership' of the Project. Tanzanian participation in both the project design and implementation processes is crucial to project success and impact. In short, KATC, as the executing organization of the Project, is responsible for the development and implementation of training activities for scheme managers, field personnel and farmers of the selected irrigation schemes. Japanese technical cooperation will focus on technical assistance in developing the above training courses.

Taking into consideration the importance of Tanzanian 'ownership' of the Project and smoother implementation of the Project, the following organizational set-up will be considered.

KATC should take greater initiative in the implementation of the Project and strengthen its relationships with district extension officer, non-government organizations, and agricultural research and extension institutions, in order to promote further improvement of training courses focused on developing irrigation schemes. Also KATC should strengthen linkages with farmers' organizations in the selected irrigation schemes for more effective and efficient dissemination of irrigated rice production techniques. Therefore, KATC should be strengthened technically and institutionally.

G. PREREQUISITES FOR THE TECHNICAL COOPERATION PROGRAMME

The Project will be implemented under stronger Tanzanian 'ownership' of the Project, and the Japanese side will assist the KATC with limited cooperation resources in accordance with the framework of the Project. In this context, the following measures are to be agreed upon by the Tanzanian side as prerequisites for the technical cooperation programme:



- (a) The Project Framework will be formulated based on mutual agreement
- (b) Assignment of personnel for managerial, technical and clerical positions who are dedicated to work in the fields of irrigated rice farming improvement on a full-time basis;
- (c) Allocation of enough fund to carry out the Project activities described in the tentative framework of the Project;
- (d) Provision of the buildings, facilities and office space for the Project; and
- (e) Coordination and collaboration with related institutions.

H. OUTLINE OF JAPANESE ASSISTANCE

"Project-type Technical Cooperation" is JICA's most comprehensive scheme to assist development projects at the national level. Under the scheme, the Government of Japan will provide, through JICA, the services of Japanese experts, technical training of Tanzanian counterparts in Japan, provision of equipment, and other necessary support. Japanese cooperation under the Project-type Technical Cooperation Scheme will be possible if the framework for the Project (including all the elements discussed above) is refined and found to be effective through the coming preparatory study.

I. IMPLEMENTATION ARRANGEMENTS OF THE KATC FOR THE PROJECT

Based on the results obtained through a series of discussions with officials of the KATC and field survey on the selected irrigation schemes, the Team confirmed the necessity of JICA's technical cooperation and the feasibility of the Project. The Team also studied the KATC's implementation arrangements for the Project (meaning both "hard and soft" infrastructure: facilities and equipment being the "hard" aspect; and policy, budgeting management, and personnel being the "soft" aspect).

The Team and Tanzanian side considered that technical cooperation in the field of farmers survey would be necessary for grasping the current conditions of farmers in the selected irrigation schemes and for developing the appropriate training courses.

It was agreed by the Team and Tanzanian side that a more detailed study on the KATC's implementation arrangements for the Project would be carried out by the coming



preparatory study.

J. MEASURES TO BE TAKEN BY BOTH THE JAPANESE AND TANZANIAN SIDES

The Team explained detailed matters of JICA's Project-type Technical Cooperation Programme to the Tanzanian side (mainly KATC staff and officials of MAC) in order to deepen understanding of the Tanzanian side for the above-mentioned modality of the technical cooperation programme. The Tanzanian side is enthusiastic to undertake its responsibilities to secure the sustainability of the Project activities, as well as to ensure smooth implementation of the Project.

The Team and the Tanzanian side confirmed the following measures to be taken by the Japanese and Tanzanian sides in implementing the Project effectively and efficiently:

J-1. MEASURES TO BE TAKEN BY THE JAPANESE SIDE

(a) Dispatch of Japanese Experts

Qualified Japanese experts in the following fields will be dispatched:

1) Long-Term Experts

- a. Chief Advisor
- b. Coordinator
- c. Other long-term experts

The fields of long-term experts will be determined through the careful consideration to be carried out by the preparatory study team.

2) Short-Term Experts

A certain number of short-term experts will be also dispatched to supplement the activities of long-term experts, when necessity arises, for the smooth implementation of the Project.

(b) Acceptance of Counterparts in Japan for training

Acceptance of counterparts to the Japanese experts for training in Japan shall be arranged during the cooperation period. The Tanzanian counterparts will be



accepted for training in Japan to supplement the technology transfer.

(c) Provision of Machinery and Equipment

Necessary machinery, equipment and other materials (hereinafter referred to as "the Equipment") for the implementation of the Project will be provided within budgetary limitations.

(d) Special Measures for Supplementing Expenditure for Local Costs

The Team considered that it would be preferable for the Japanese Government through JICA to supplement a portion of the local cost expenditures necessary for the execution of the middle level technicians' training programmes within budgetary limitations in order to proceed smoothly with the Project.

J-2. MEASURES TO BE TAKEN BY THE TANZANIAN SIDE

(a) Security of the Japanese experts to be dispatched and Tanzanian counterpart personnel

(b) Provision of buildings and facilities necessary for the implementation of the Project

The following land, buildings and facilities will be provided by the Tanzanian side for the implementation of the Project. Electricity, water supply and telecommunication facilities will be also secured.

- 1) Land, buildings and facilities needed for the implementation of the Project
- 2) Rooms and space necessary for installation and storage of the Equipment
- 3) Office space and necessary facilities for the Japanese Chief Advisor, Coordinator and other Japanese experts
- 4) Other facilities mutually agreed upon, if necessary

(c) Assignment of the necessary number of full-time counterparts to work with the Japanese long-term and short-term experts

A sufficient number of qualified full-time counterparts, at least three per each



Japanese expert, will be assigned for the smooth implementation of the Project. A Project Manager, who is also the Principal of the KATC, will be assigned. A sufficient number of qualified administrative staff and supporting staff will be assigned for the smooth implementation of the Project.

(d) Sound budgetary allocation for the smooth commencement and successful implementation of the Project

- 1) Expenses necessary for domestic transportation of the Equipment in the United Republic of Tanzania, as well as for its installation, operation and maintenance.
- 2) Customs, duties, internal taxes and other charges imposed on the Equipment in the United Republic of Tanzania
- 3) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment
- 4) All operating expenses necessary for the implementation of the Project

(e) Coordination and collaboration with related institutions

K. ADMINISTRATION OF THE PROJECT

(a) The Permanent Secretary of MAC, as the Head of the Project, will provide the overall direction for the administration and implementation of the Project.

(b) The Director of Training Institutes, as the Project Director, will bear overall responsibility for the administration and implementation of the Project in collaboration with the Director for Policy and Planning in matters of aid coordination and the Director of Crop Development in the field of extension services of Project achievements.

(c) The Principal of the KATC, as the Project Manager, will be responsible for the managerial and technical matters of the Project, in consultation with the Director of



the KADP on matters related to the activities to be conducted jointly with the KADP.

(d) The Japanese Chief Advisor will provide necessary recommendations and advice to the Project Director and the Project Manager on matters pertaining to the implementation of the Project.

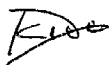
(e) The Japanese experts will provide necessary technical guidance and advice to the Tanzanian counterpart personnel on technical matters pertaining to the implementation of the Project.

L. JOINT COORDINATING COMMITTEE

(a) Function

The joint coordinating committee, composed of those members as listed in (b) below, will meet at least once a year and whenever the need arises to:

- 1) formulate the Annual Work Plan under the framework of the Record of Discussions,
- 2) review the overall progress of the technical cooperation programme as well as achievements of the Annual Work Plan of the Project,
- 3) review those measures taken by the Government of Japan:
 - a. Dispatch of Japanese experts
 - b. Acceptance of Tanzanian counterpart personnel in Japan for training
 - c. Provision of machinery and equipment,
- 4) review those measures taken by the Government of the United Republic of Tanzania:
 - a. Allocation of necessary budget (including local cost expenditures)
 - b. Allocation of necessary counterpart personnel
 - c. Utilization and administration of machinery and equipment provided by the Government of Japan
- 5) make recommendations to the respective governments on:
 - a. Budgetary matters
 - b. Recruitment and appointment of the Tanzanian counterpart personnel



- c. Selection and effective utilization of machinery and equipment
- d. Appropriate dispatch of Japanese experts
- e. Acceptance of Tanzanian counterpart personnel in Japan for training
- f. Others

(b) Committee Composition

1) Chairperson: Permanent Secretary, MAC

2) Members:

(i) Tanzanian side

- a. Director of Training Institutes
- b. Director for Policy and Planning in matters of aid coordination
- c. Director of Crop Development
- d. Assistant Director of Training Institutes (vacant)
- e. Assistant Director for Crop Research
- f. Head of Farming Systems Research
- g. Assistant Director for Extension Services
- h. Assistant Director for Research and Development
- i. Assistant Director for Irrigation
- j. Assistant Director for Machinery and Input
- k. Director for Administration and Personnel
- l. Principal of the KATC (Secretary)
- m. Representative from the KADP
- n. Representative from Kilimanjaro Region
- o. Representative from the Ministry of Finance
- p. Heads of Department of the KATC

(ii) Japanese side

- a. Chief Advisor
- b. Coordinator




- c. Experts assigned to the Project
- d. Other Japanese experts and personnel concerned, dispatched by JICA if necessary.
- e. Resident Representative of the JICA Tanzania Office

Notes:

- 1. Officials of the Embassy of Japan may attend the Joint Coordinating Committee meeting as observers.
- 2. Persons who are nominated by the Chairperson may attend the Joint Coordinating Committee meeting.

M. STEERING COMMITTEE

The Steering Committee will be responsible for the planning, management, monitoring, coordination and evaluation of the Project activities, in particular the training courses focused on developing selected irrigation schemes, outreach training courses and follow-up guidance, and will meet twice a year in principle. The composition of the Steering Committee will be determined through the coming discussion.

V. ISSUES TO BE FURTHER DISCUSSED

Both the Team and Tanzanian side agreed that the following issues must be further discussed in order to implement the Project more effectively. The Japanese side explained necessity to dispatch a Preparatory Study Team for the following purposes:

- (a) confirm the Project Administration (Head of the Project, Project Director, Project Manager, Counterpart Personnel, Joint Coordinating Committee, and Steering Committee);
- (b) define the activities of the respective Project organizations, and establish the concrete cooperation system between the executing organization and partner organization;
- (c) determine the criteria for selecting the target irrigation schemes of the Project;
- (d) design a detailed activity plan which will be implemented at the KATC and the respective Project sites;



- (e) define the fields of long-term Japanese experts;
- (f) formulate a draft of the Tentative Schedule of Implementation that is composed of an Annual Programme and a Technical Cooperation Programme;
- (g) discuss the Regional Technical Cooperation Promotion Programme;
- (h) confirm the Project implementation arrangements on the Tanzanian side; and
- (i) other necessary matters for the implementation of the Project.

The schedule and composition of the Preparatory Study Team will be made available by JICA in due course.

The Tanzanian side will prepare for the coming preparatory study by appointing counterpart personnel corresponding to each member of the Preparatory Study Team.

VI. SUGGESTIONS AND COMMENTS MADE BY THE TEAM

- (a) The Team and the Tanzanian side recognized future possibilities for regional technical cooperation concerning irrigated rice farming in the eastern and southern African countries, by disseminating the results obtained by the KATC Phase I Project and the outcomes to be obtained during the Project, thus contributing to food security in the region.
- (b) The Team believes that Human Resources development is one of the cornerstones of a strong developed nation. The main purpose of JICA's Technical Cooperation Program is to assist the development of appropriate technologies necessary for achieving the Project purpose. In this sense, assignment of capable and enthusiastic counterparts is necessary for the technical cooperation programme, in order to accomplish the aims of the Project at an early stage and to secure the sustainability of the Project activities. Therefore, MAC, through the KATC, should allocate a sufficient number of capable and enthusiastic counterparts, and take suitable steps to retain them in the KATC over the course of the Project.
- (c) In order to disseminate irrigated rice farming techniques suitable for the selected irrigation schemes in a timely manner, the KATC's technical and organizational



capacities must be strong and efficient. The training courses focused on developing the selected irrigation schemes will be formulated based on the results obtained through the farmers survey. Further, the training courses will be implemented at the KATC. The outreach training courses will be implemented in the selected irrigation schemes in cooperation with scheme managers, technical personnel, district extension officers, farmers organizations and communities leaders. For better implementation of the training courses focused on the selected irrigation schemes, the KATC and MAC must give full attention to the following points during the cooperation term:

- 1) the assignment of staff members in the field of Rice Information System;
- 2) the internal cooperation among related departments of KATC;
- 3) the internal cooperation among related departments of MAC;
- 4) the maintenance of strong relations with the KADP;
- 5) the improvement of linkages with farmers' organizations as well as the relevant institutions such as district extension officers, NGOs, agricultural research and extension institutions, etc.

(d) The Team understood the KATC Phase I Project is being implemented under the difficult financial conditions of the Tanzanian side. The Team requested MAC through the KATC to take necessary measures to secure ample funding for the successful implementation of the Project in terms of the travel expenses of counterparts, water supply and electricity, and provision of agricultural materials for the smooth administration of training courses, outreach training courses in the selected irrigation schemes and follow-up guidance for ex-participants and other farmers. The Tanzanian side stated to make the utmost efforts to allocate the budget necessary for the Project activities.

(e) Project activities will concentrate on training courses focused on developing the selected irrigation schemes which can be applied to farmers, taking into consideration the possible progress within the limited cooperation term and the



potential impact upon the rice production. The specific activities corresponding to those of the Project defined in the tentative Project Framework will be further studied and conducted based on the farming systems and farmers' technical needs.

- (f) The Team advises the strengthening of the Tanzanian's agricultural training and extension systems, which will provide support to the Project. In this sense, the active involvement of district extension officers in the selected irrigation schemes and their cooperation are crucial for effective and efficient implementation of the Project. Therefore, the Team proposes to strengthen Tanzania's agricultural training and extension system.
- (g) The active involvement of farmers will be crucial to set up and administrate the demonstration plots on the farmers' fields in the selected irrigation schemes smoothly. The irrigated rice farming techniques to be disseminated by training courses are expected to be adopted by farmers to obtain the positive effects of training similar to the Lower Moshi Irrigation Project. Therefore, KATC is expected to develop farmer's capabilities in setting up and administering demonstration plots in the selected irrigation schemes.
- (h) Taking the local government reform into consideration, the major part of extension activities of MAC had already been transferred to local governments. Thus, the KATC should strengthen the relations with local governments for disseminating the training effects in the selected irrigation schemes.
- (i) KATC is expected to make further efforts to expand the training courses entrusted by local governments. Since there are several training institutes under MAC apart from the KATC, KATC is expected to maintain closer relations with other training institutes in order to meet the technical needs of farmers in the irrigation schemes.



(i) KADP is expected to collaborate with the KATC on rice variety selection, rice seed multiplication, rice mechanization, ordinary crops' cultivation techniques, as well as farmers' organization activities, development of irrigation associations, irrigation planning, and irrigation scheme management for rice farmers in the selected irrigation schemes.

(k) KATC is expected to make efforts to provide training on utilization of locally available resources to field personnel and farmers in rice growing areas throughout Tanzania.



ANNEX

ANNEX I. Outline of the PCM Workshop

ANNEX II. List of Participants of the PCM Workshop

ANNEX III. Draft of Tentative Project Design Matrix (PDM) of The
Kilimanjaro Agriculture Training Centre Phase II Project in
Tanzania



ANNEX I. Outline of the PCM Workshop

The PCM workshop was held at KATC from 20 to 24 June 2000 with the following schedule.

1) First Workshop

Date and Time	Tuesday, 20, Wednesday, 21, Thursday, 22 (9:00-12:30/ 13:30-16:30) and Friday, 23 (9:00 – 12:30)
Participants	Total number of participants was 28 as follows: 1) 2 Extension officers from Mombo irrig. Project and Ndungu Project 2) 4 Farmers from Mombo irrig. Project and Ndungu Project 3) 3 Staff of the Ministry of Agriculture and Co-operatives 4) 1 KATC Principal 5) 3 Heads of Department of KATC 6) 6 Japanese experts of KATC 7) 4 Members of JICA study team 8) 1 Moderator (JICA study team member) 9) 1 Co-moderator (KATC staff) 10) 2 Interpreters/ card translators/ co-moderators (English/Swahili)/ receptionist (KATC staff)
Language	Spoken and written in English (interpreted/translated to Swahili)
Main Program	<ul style="list-style-type: none"> - Introduction - Participation Analysis - Problem Analysis - Objectives Analysis

2) Second Workshop

Date and Time	Friday, 23 (13:30-17:00) and Saturday, 24 (9:00-12:30/ 13:30-17:00)
Participants	Total number of participants was 25 as follows: 1) 3 Staff of the Ministry of Agriculture and Co-operatives 2) 1 KATC Principal 3) 3 Heads of Department of KATC 4) 6 Japanese experts of KATC 5) 4 Members of JICA study team 6) 1 Staff of JICA office 7) 1 Japanese expert of Ndungu Irrigation Project 8) 1 Japanese expert and 1 officer of KADP 9) 1 Moderator (JICA study team member) 10) 3 Co-moderators (KATC staff)
Language	Spoken and written in English
Main Program	<ul style="list-style-type: none"> - Alternatives Analysis - Tentative Project Design Matrix (PDM) formulation

ANNEX II. List of Participants of the PCM Workshop

A total number of 31 participants had attended the workshop as shown below.

Tanzania Side

KATC:

Mr. Richard J. Shayo	Principal
Mr. Adam G. Pyuza	Deputy Principal
Mr. E.S. Massawe	Head, Administration Department and Extension and Training Section
Mr. G. Maregesi	Head, Water Management Section
Mr. N. Nkondora	Head, Agricultural Machinery Section
Ms. Grace G. Mshanga	Head, Production Department
Ms. Mary Mtika	Tutor, Extension and Training Section

Ministry of Agriculture and Co-operatives:

Mr. R.S. Kapande	Director Training Institutes
Mr. M.W. Misabo	KATC Desk Officer
Ms. M.J.Z. Ndaba	Policy & Planning Dept, External Assistance Co-ordination

KADP:

Mr. J.S. Mwafuililwa	Agric. Officer II
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Mombo irrg. Project

Mr. Charles Z. Kweka	Project Manager
Mr. Ibrahim Athumani	Farmer
Ms. Rehema Mohamedi	Farmer

Ndungu Project:

Ms. H. Herriel Semadio	Extension Officer
Ms. Rebeka I. Kabalo	Farmer
Mr. John R. Mjema	Farmer



Japanese Side

KATC:

Mr. Noboru Koibuchi	Team Leader
Mr. Takashi Nakagawa	Coordinator
Mr. Kiyoshi Shiratori	Expert (Extension and Training)
Mr. Yoshinori Satomi	Expert (Water Management)
Mr. Shoji Abe	Expert (Rice Cultivation)
Mr. Nobuyuki Abe	Expert (Agricultural Machinery)

KADP:

Mr. Kenji Tamura	Expert (Agricultural Co-operative)
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Ndungu Project:

Mr. Hideo Okada	Expert (Agricultural Co-operative)
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JICA Tanzania Office

Mr. Takehiro Susaki	Assistant Resident Representative
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JICA Preliminary Survey Team:

Mr. Hirotooshi Koda	Leader (Agricultural Extension and Training), Rector, Ibaraki Agricultural College
Mr. Hiroshi Tottori	Expert (Farming System), Ministry of Agriculture, Forestry and Fisheries
Mr. Shinji Tomita	Expert (Irrigation Scheme), Section Chief, Ministry of Agriculture, Forestry and Fisheries
Ms. Chiaki Nakamura	Expert (Participatory Planning), Researcher, Global Link Management, Inc.
Mr. Kenji Kaneko	Expert (Technical Cooperation), Deputy Director, JICA



**ANNEX III. Draft of the Tentative Project Design Matrix (PDM):
The Kilimanjaro Agriculture Training Centre Phase II Project In Tanzania**

Duration : July 2001 to June 2006

Target group : Rice farmers in the irrigation schemes

Project Area : Selected irrigation schemes

Version 0 (June 24, 2000)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Super Goal Living standards of rice farmers in the selected irrigation schemes are improved			- There are no major policy changes
Overall Goal Agricultural income of rice farmers in the selected irrigation schemes is increased			- Income is used for better living standards
Project Purpose Productivity of rice in the selected irrigation schemes is improved	- The rice yield per unit area of target farmers groups increase 50% by 2006 compared to 1996-2001	- Reports from planning commission - Reports from the field (Farmers coop. Societies) - Bureau of statistics - Reports of Ministry of Agr.Coops - Reports on base line survey - Reports of VEOs - Information/Interview with farmers and VEOs	- No agricultural policy changes - The price of rice is not going down seriously
Outputs 1 The needs of farmers in the selected irrigation schemes are identified 2 Technical/professional/pedagogical capabilities of KATC staff are improved 3 Rice information center at KATC is established 4 Human resources for rice production in the selected irrigation schemes are developed 5 Rice production techniques in the selected schemes are improved 6 Water management techniques for farmers, technicians and SMs in the selected irrigation schemes are improved			- The trained field staff and VEOs remain in the irrigation scheme - District levels recognize the importance of improved rice farming and implement extension activities

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Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
7 Supply of inputs in the selected rice irrigation schemes is improved			
8 Rice mechanization techniques for farmers, SMs and technicians in the selected irrigation schemes are improved			
9 Gender aspects are adequately addressed in the selected rice irrigation schemes			

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Narrative Summary	Inputs		Important Assumptions
<p>Activities</p> <p>(Output 1: Identification of the needs of farmers)</p> <p>1-1 Conduct survey on farmer's organizations and farmers.</p> <p>1-2 Conduct survey on farming system</p> <p>(Output 2: Improvement of technical capabilities of KATC)</p> <p>2-1 Ensure technology transfer to counterparts through on-the-job training</p> <p>2-2 Conduct seminars and workshops on teaching methodology curriculum development and teaching materials development for KATC staff</p> <p>2-3 Conduct further studies in degree courses for some staff</p> <p>2-4 Conduct various short courses in and outside the country for KATC staff</p> <p>2-5 Participate in technical exchange programmes with other relevant organizations within and outside Tanzania</p> <p>2-6 Disseminate the results obtained from Phase I to other training institute.</p> <p>2-7 Train KATC staff on gender issues</p> <p>(Output 3: Establishment of rice information center at KATC)</p> <p>3-1 Prepare a database plan</p> <p>3-2 Collect data and information</p> <p>3-3 Analyze and process data</p> <p>3-4 Disseminate information to farmers, VEOs, policy makers and other stakeholders</p> <p>(Output 4: Development of human resources)</p> <p>4-1 Exchange staff between KATC and other irrigation schemes</p> <p>4-2 Conduct scheme management courses for scheme managers of the selected irrigation schemes</p> <p>4-3 Conduct training courses for co-op law for farmer's leaders</p> <p>4-4 Conduct accounting courses for leaders in the selected irrigation schemes</p> <p>4-5 Conduct farmers mobilization courses for VEOs, farmers and farmers leaders</p> <p>4-6 Conduct leadership skills training courses for farmer's leaders in the selected irr. schemes</p> <p>4-7 Develop the simple accounting system for farmer's co-op in the selected irr. schemes</p>	<p>Japanese side</p> <p>1 Dispatch of experts (Long term and/or short term)</p> <p>-Chief Advisor</p> <p>-Coordinator</p> <p>-Experts related fields mutually agreed upon as necessary</p> <p>2 Training of a certain number of Tanzanian counterpart personnel in Japan</p> <p>3 Provision of machinery and equipment</p> <p>4 Local cost sharing</p>	<p>Tanzanian side</p> <p>1 Assignment of counterpart personnel and administrative personnel</p> <p>2 Arrangement of land, buildings and facilities</p> <p>3 Sharing of expenses for project implementation</p>	<p>- No policy changes on irrigation schemes</p> <p>- High inflation do not occur</p> <p>- Trained technical staff are not transferred from the selected irrigation schemes</p> <p>- Security of property is assured</p> <p>- Continued flow of fund</p> <p>- Farmers in the selected rice irrigation schemes continue to grow rice</p> <p>- Custom regulations ensured</p> <p>- No natural disasters</p> <p>- No destruction of transportation(*)</p> <p>Pre-conditions</p> <p>- Rice farmers in the selected irrigation schemes agree with the objectives of the project</p> <p>- Security situation of the country does not become worse</p>

Narrative Summary		
<p>Activities</p> <p>(Output 5: Improvement of rice production techniques)</p> <p>5-1 Conduct rice cultivation courses for key farmers in the selected irrigation schemes</p> <p>5-2 Conduct rice cultivation courses for technical staff in the selected irrigation schemes</p> <p>5-3 Conduct rice seed production courses for key farmers in the selected irrigation schemes</p> <p>5-4 Conduct rice seed production courses for technical staff in the selected irrigation schemes</p> <p>5-5 Conduct seminars and workshops for rice researchers and technical personnel</p> <p>5-6 Conduct studies on specific problems identified in rice production</p> <p>5-7 Conduct outreach and follow-up guidance for farmers and technical staff</p> <p>5-8 Conduct technical exchange programmes for farmers and technical staff in the irrigation schemes</p> <p>(Output 6: Improvement of water management)</p> <p>6-1 Conduct water management courses for irrigation technicians and farmers in the selected irrigation schemes</p> <p>6-2 Conduct scheme management courses for irrigation scheme leaders and managers in the selected irrigation schemes</p> <p>6-3 Conduct seminars and workshops on the formation and strengthening farmer's organizations in the selected irrigation schemes</p> <p>6-4 Conduct out reach and follow up guidance to ex-participants in the selected irrigation schemes</p> <p>6-5 Conduct studies on water management aspects in the selected irrigation schemes</p> <p>(Output 7: Improvement of inputs and supply)</p> <p>7-1 Conduct courses for farmer's leaders on cooperative knowledge</p> <p>7-2 Conduct training to stockiest in relevance inputs handling and management</p> <p>7-3 Conduct marketing courses to scheme managers, farmers and farmer's organizations leaders</p> <p>7-4 Conduct seminars to farmers on saving credit modalities/approaches</p> <p>7-5 Conduct training to farmers on business plan</p>		



暫定プロジェクト・デザイン・マトリックス(PDM): タンザニア国キリマンジャロ農業技術者訓練センターフェーズII計画

期間: 2001年7月～2006年6月 (5年間)

ターゲットグループ: 灌漑農業地の稲作農民

対象地域: 選択された灌漑農業地

PDM、0版 (2000年6月24日作成)

プロジェクトの要約	指標	指標データ入手手段	外部条件
スーパーゴール 選択された灌漑農業地の農民の生活水準が改善される	(今回は未設定)	(今回は未設定)	- 主要政策に変更がない
上位目標 選択された灌漑農業地の農民の農業生産所得が増加する	(今回は未設定)	(今回は未設定)	- 収益が生活改善のために使用される
プロジェクト目標 選択された灌漑農業地の稲の収量が向上する	- 灌漑農業地の稲作収量が1996-2001年に比較して2006年までに50%増加する	- レポート (planning commission) - レポート (農民組織) - 統計資料 (Bureau of statistics) - レポート (Ministry of Agr.Coops) - レポート (ベースライン調査) - レポート (普及員) - インタビュー結果 (農民及び普及員)	- 農業政策に変更がない - 米の価格が大幅に下落しない
成果 1 選択された灌漑農業地の農民のニーズが把握される 2 KATCの研修指導教官の技術面の専門的、実践的訓練能力が向上する 3 稲作情報センターがKATCに設置される 4 選択された灌漑農業地の人的資源が開発される 5 選択された灌漑農業地の稲作生産技術が向上する 6 選択された灌漑農業地の事業管理者、スタッフ、農民の水管理技術が向上する 7 選択された灌漑農業地における営業資金・資材が供給される 8 選択された灌漑農業地の事業管理者、トラクタ・オペレーター、農民の稲作作業が改善される 9 選択された灌漑農業地においてジェンダー配分が適切になされる	(今回は未設定)	(今回は未設定)	- 研修を受けた者が灌漑農業地で勤務を続ける - 郡の普及担当者が改良された稲作経営及び普及活動に努める

プロジェクトの要約	投入		外部条件
活動	日本側	タンザニア側	
<p>(成果 1: 農民のニーズの把握)</p> <p>1-1 農民組織及び農民関連調査を実施する</p> <p>1-2 営農調査を実施する</p> <p>(成果 2: KATCの研修指導教官の能力の向上)</p> <p>2-1 実務研修による技術移転を行なう</p> <p>2-2 KATCの研修指導教官のための教授法・教材開発、カリキュラム開発に関するセミナー及びワークショップを開催する</p> <p>2-3 KATCの研修指導教官の上位資格取得のための手法の開拓を行なう</p> <p>2-4 KATCの研修指導教官の国内外短期研修への派遣を行なう</p> <p>2-5 国内外の関連機関との技術交換を実施する</p> <p>2-6 フェーズ1事業で得られた成果の他機関に対する情報提供を行なう</p> <p>2-7 KATCの研修指導教官へのジェンダー研修を実施する</p>	<p>1 専門家派遣 (長期/短期)</p> <p>- チームリーダー</p> <p>- 調整員</p> <p>- プロジェクト関連分野の専門家</p> <p>2 研修員受入れ</p> <p>3 機材供与</p> <p>4 ローカルコスト支援</p>	<p>1 人員配置</p> <p>2 土地、建物、施設の供与</p> <p>3 必要運営経費負担</p>	<ul style="list-style-type: none"> - 灌漑農業に関して政策が変更しない - 大幅なインフレーションが起こらない - 研修を受けたスタッフが灌漑農業地から異動しない - 資機材が盗難に遭わない - 財政支出が継続する - (灌漑農業地の農民が継続して稲を生産する) - 資機材の通関が円滑に行なわれる - 大規模な自然災害 (病虫害の発生、天候不順等) が起こらない - 交通網が破壊されない
<p>(成果 3: KATCにおける稲作情報センターの設立)</p> <p>3-1 データベース計画を構築する</p> <p>3-2 情報を収集する</p> <p>3-3 情報の分析、処理を行なう</p> <p>3-4 農民、普及員、政策立案者、その他関連機関に対して情報を発信する</p> <p>(成果 4: 人的資源開発)</p> <p>4-1 KATCと他の灌漑農業地スタッフ間の技術交換を実施する</p> <p>4-2 選択された灌漑農業地の事業管理者に対して事務事業研修を実施する</p> <p>4-3 農民指導者に対して協同 (組合) 法に関する研修を実施する</p> <p>4-4 選択された灌漑農業地の指導者に対して財務会計研修を実施する</p> <p>4-5 農民、普及員、農民指導者に対して人材活用に関する研修を実施する</p> <p>4-6 選択された灌漑農業地の指導者に対してリーダーシップ研修を実施する</p> <p>4-7 選択された灌漑農業地の農民組織のための簡易会計システムを開発する</p>			<p>前提条件</p> <ul style="list-style-type: none"> - 選択された灌漑農業地の稲作農民がプロジェクトの目的に合意をする - タンザニアの治安状況が悪化しない
<p>(成果 5: 稲作生産技術の向上)</p> <p>5-1 選択された灌漑農業地の中核農民に対して稲作研修を実施する</p> <p>5-2 選択された灌漑農業地のスタッフに対して稲作研修を実施する</p> <p>5-3 選択された灌漑農業地の中核農民に対して優良種子増殖技術研修を実施する</p> <p>5-4 選択された灌漑農業地のスタッフに対して優良種子増殖技術研修を実施する</p> <p>5-5 稲作に関する研修員、スタッフに対してセミナー、ワークショップを開催する</p> <p>5-6 稲作の主要な問題に関して検討を行なう</p> <p>5-7 農民及びスタッフに対して巡回指導と現地研修会を実施する</p> <p>5-8 選択された灌漑農業地において農民とスタッフによる自主的に普及活動を実施する</p>			

プロジェクトの要約

活動

(成果 6: 水管理技術の向上)

- 6-1 選択された灌漑農業地の水管理スタッフ及び農民に対して水管理研修を実施する
- 6-2 選択された灌漑農業地の灌漑事業管理者に対して事業管理研修を実施する
- 6-3 選択された灌漑農業地の水利組合の形成及び強化のためのセミナー及びワークショップを開催する
- 6-4 選択された灌漑農業地の研修修了者に対して巡回指導と現地研修会を実施する
- 6-5 選択された灌漑農業地の基礎調査（減水深、河川流量等）を実施する

(成果 7: 資金・資材の投入の改善)

- 7-1 農民指導者に対して組織化、組織運営に関する研修を実施する
- 7-2 資材供給業者に対して財務管理に関する研修を実施する
- 7-3 事業管理者、農民、農民指導者に対してマーケティング研修を実施する
- 7-4 農民に対して資金の貯蓄、運用に関するセミナーを開催する
- 7-5 農民に対して生産物の販売計画に関する研修を実施する

(成果 8: 稲作作業の改善)

- 8-1 選択された灌漑農業地の稲作作業の現状に関する調査を実施する
- 8-2 研修プログラム、カリキュラム、教材を開発する
- 8-3 選択された灌漑農業地のスタッフに対して稲作作業技術研修を実施する
- 8-4 選択された灌漑農業地のトラクター運用管理者に対して運用方法研修を実施する
- 8-5 スタッフ及び農民に対して農具製作研修を実施する
- 8-6 選択された灌漑農業地のトラクター運用管理者及びトラクタ・オペレーターに対して現地研修会を実施する
- 8-7 トラクタ・オペレーター研修、稲作農業機械化研修、農具製作研修終了者へ巡回指導を実施する

(成果 9: ジェンダー配慮)

- 9-1 選択された灌漑農業地を対象としたジェンダー関連調査を実施する
- 9-2 農民及び農民指導者に対するジェンダー・イシューに関する研修を実施する
- 9-3 女性農民を対象とした稲作作業の改善に関する研修を実施する

資料 3. 各地の灌漑稲作概要

(1) ムトワンプ

Mto-wa-Mbu (ムトワンプ) の灌漑稲作の概要

資料提供者：R.M.ワダリナ氏 G.マラギヤ氏 及び幸田の観察

日曜日の視察であったため、現地 officer の対応はなかった。

位置：

アリューシャ州モンズリ県（アリューシャ市の南西約 120km、北はマニヤラ湖国立公園に接する標高 750m の平地）

自然条件：

年間降水量 450～600mm、気温 18～27℃、三本の小川（ムトワンプ川・シムバ川・キルルモ川）が流れ、耕作可能面積は 4,178ha（内水田として利用可能な面積は最大限 1,300ha）

人口：

1 万 4 千人、バラバラニ・ミゴムバニ・マジェンゴ・セレラ・ロシリワの 5 つの集落より成るが、水田は前 4 つのみに存在する。

灌漑稲作の歴史：

当初はバラバラニ集落の沼沢地で散播栽培が行われていた。

1980 年 ILO の主導するプロジェクトが導入され、バラバラニ・ミゴムバ・マジェンゴの灌漑レイアウトが決定され、簡単な頭取工・水路・分水工・橋と畦を伴った水田が整備された。歴史的に私有地であるため、配分は地元の昔からのルールに従って配分された（この地域では男系家族と女系家族とが共存している）。整備された面積は約 1,000ha であった。

しかし、水不足で水田に出来ない年のトウモロコシ栽培のため、畦は壊され、畦で囲まれた水田が残っているのはマジェンゴのミワレニ地区だけになっている。

稲作技術：

品種はかつて在来種が多（育苗日数 40～45 日、栽培日数 160 日）だったが、現在では IR-54 の 21～35 日育苗が主になっている。播種量 5kg/10a 分をペットに播く水苗代で育苗している。本田施肥量は尿素のみで 50kg/ha（N として 2.5KG/10a）を施用、列植（20～30cm）しているのは 30%の農家で、まだ乱雑植えが主流であった。

収量は 25～30 袋（85kg 入り）=2.1～2.6t/ha で、ha 当たり 5 袋を自家消費と来季の種子用として保存する。

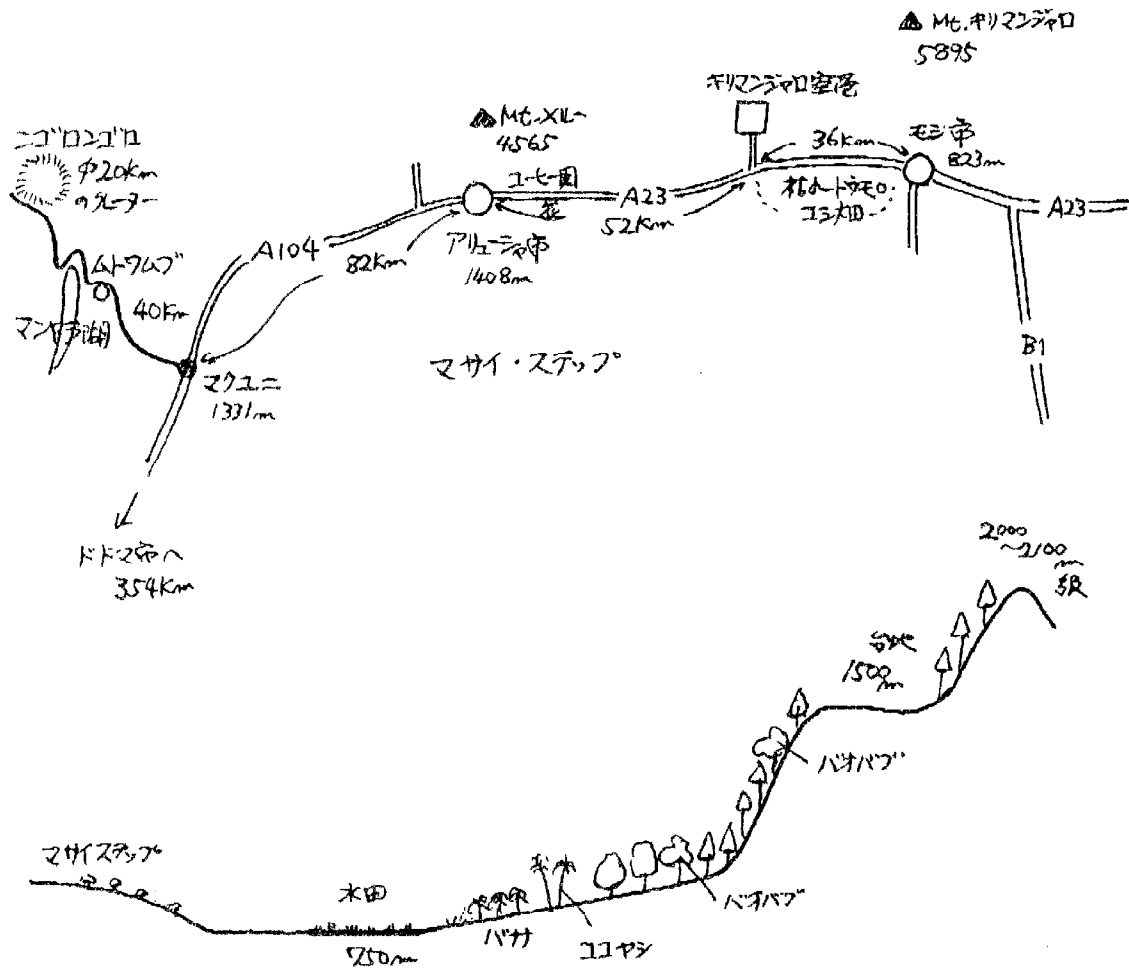
この地域の問題点として、イモチ病・クエラクエラの鳥害をあげている。

この地域の指導体制：

県の作物指導官 1 名、灌漑指導官 2 名、普及員 3 名、三者揃って研修済みトラクタ利用耕作面積は 500ha で、トラクタハイヤサービス 5 台と NGO の

農場にある5台の10台が稼働中

周囲にいた農民からの聞き取りでは、例年は「オレは上手だから14~15袋収穫していたが(3.0~3.2t/ha)、今年は雨が少なくて5袋(1.1t/ha)も穫ればいいとこだ。」とのことであった。



ムトワムツの地形と植生

Rice Farming and Agricultural Extension in Monduli District Arusha Region

Wadarina R. Mero
P.O. Box 94, Mto wa Mbu, Arusha

1. General Information

Mto wa Mbu division is found in Monduli district, Arusha region which is in the northern part of Tanzania. It is situated at the foot of an escarpment, north of Lake Manyara, approximately 120 km from Arusha town. The altitude of the area is about 750 m above the sea level. The area is composed by flat land, crop land and to the western part is bordered by Manyara National Park.

1.1. Climate

The climate consists of two main seasons, long rain season (February to May) and dry season (June to January). However during October and November there is short rains which in most cases it is not reliable. The average rainfall ranges from 450-600 mm/year. Temperature ranges from 18-27°C in cold and warm seasons respectively. Relative humidity exceeds 70% towards the rain season. The soil is clay sand loam fertile due to deposition of alluvial soil from Mbulumbulu escarpment.

1.2. Population

The area has a population of approximately 14,000 (1988 census). But by computation using population increase rate of Arusha region, which is 2.8%, the present population can be estimated to be around 17,136. The economy of the people depends much on agriculture activities i.e. crops and livestock, where few depends on business.

2. Agricultural Production

About 95% of Mto wa Mbu inhabitants are engaged in agriculture production. agriculture in the area mostly depends on irrigation and partly on rainfed. Mto wa Mbu is composed of three rivers (Mto wa Mbu, Simba and Kirurumo) which make the agriculture more reliable compared to other areas in Monduli district. The food crops grown in this area include rice, maize, beans, bananas, finger millet, cassava, sweet potatoes and yams. The area is also famous for horticultural crops i.e. vegetable and fruits. Vegetables include tomatoes, cabbages, carrots, onions, spinach, green pepper, egg-plant, okra, chinese cabbage, amaranthus, etc. Fruits are bananas, mangoes, lemons, custard apple (sweet and sour), papaya, avocado, etc.

2.1. Source of income

Apart from crop production, some farmers keep few number of animals like cows, sheep and goats. In every family at least 5-10 chicken in average are kept as source of income by selling eggs so as to earn cash to meet some home management responsibilities such as buying salt, sugar and soap. Usually poultry are owned by women and youth. Farmers under irrigation area are practising mixed farming. The Masai tribe is covering the high plains (Losirwa village) where they are pure pastoralists. The area under cultivation for the whole Mto wa Mbu division is about 4,178 ha.

Area under cultivation:

Village name	Rice (ha)	Maize (ha)	Banana (ha)	Others (ha)
Barabarani	350	320	100	80
Majengo	400	720	120	60
Migombani	250	224	500	100
Selela	300	200	30	24
Losiriwa	-	-	-	400 (beans)
Total	1,300	1,464	750	664

N.B: The 400 ha of beans in Losiriwa village is not cultivated by Maasai but by the people from the other village of Mto wa Mbu division.

Livestock population:

Beef cattle	Goats	Sheep	Dairy cattle	Donkeys
15,300	10,500	7,200	37	1,300

2.2. Farm mechanisation

Most of farm practices are done manually except land preparation which is done by tractors. Transporting farm produces is mostly done by tractors but in few cases is done by lorries. Draft animals are not used in the area. Labour is provided by the family members of the household. In the case of more than 2 ha where family members are few, then hired labour is required.

3. Rice Farming Practices

Rice farming started gradually in the dumpy areas especially in Barabarani village. There was no planned canals and irrigation structures, farmers were just farming by using traditional canals. In 1980 the ILO (International Labour Organisation) under UNDP Project started working by reclaiming the Barabarani village dumpy areas and put layout of irrigation systems in three villages i.e. Barabarani, Migombani and Majengo. Various structures were constructed during ILO Project which are on use up to now. The farmers are allocated land according to their customary rules of land tenure. There is no land belonging to the government that could be distributed freely to the people for farming. Normally land is owned by man in the case of female headed household (M.H.H.). In the case of female headed household (F.H.H.) the land is owned by a female. F.H.H. occurs where a man has died or where a woman is not married. But in a case where a man is still alive in African culture it is not possible for a female to be the head of the house. There are very few farmers who have lease on their land.

3.1. Irrigation systems

Mto wa Mbu is composed of three rivers which are water sources in the area. These include Mto wa Mbu river, Simba river and Kirurumo river. Other water sources are seasonal springs which are not dependable. There are number of irrigation structures which were constructed during ILO Project. Present structures include canals, culverts, drifts, division boxes, aqueduct, bridges, turnouts, and intakes. By the use of mentioned structures, farmers are capable of tapping amount of water which he/she requires. The rice fields are divided into bunds which make irrigation more easy and convenient. These bunds are not permanent since after harvesting rice the field is cultivated other crops such as maize, beans or vegetables. Rice is cultivated twice per year in very few fields of Miwaleni area in Majengo village. These areas are very dumpy in such a way that the water is not drying up to give a way for other crops to be planted.

3.2. Nursery preparation and seeding

Nurseries are prepared at the main field to avoid damages and expenses of transporting seedlings from far away. Very few farmers prepare nursery out of the main field e.g. at their house compound etc. Sunken beds 1-2 m wide and long enough according to farmers wishes are constructed. Number of seedbeds to be raised depend on the area to use transplanted. After beds have been prepared and levelled, the seeds are broadcasted and covered by a thin layer of soil of about 0.5 cm. Then the beds are mulched to prevent birds from taking the seeds away. The beds are irrigated once per 2 days and after two weeks the mulch is removed. After removing the mulch then irrigation is done when it found there is a need. Since the seeds are not soaked before planted it takes long time to germinate and even to attain the seedling age. That's why in this area it takes 40-45 days from the day of seeding up to the day of transplanting. The common seed rate used in the area is about 20 kg/acre.

3.3. Land preparation

Land preparation starts during the month of December up to mid-January. farmers start by ploughing the land using tractors, others using hand-hoe. After ploughing they water the land for puddling and at this time seedlings are ready for transplanting. Puddling is done manually by using hand-hoe. Puddling is followed by making bunds in the whole field for easy watering.

3.4. Management of main plots

Transplanting starts in mid-January up till early March. This is done when the seedlings are 40 to 45 days old and they have reached the thickness of pencil and height of 15-20 cm. It is transplanted at the space of 15-20 cm in-rows and inter-rows, after the bunds have been watered. After transplanting bunds are irrigated to make sure that always there is water. Three weeks after transplanting the water is drained and fertiliser is applied. The common fertilisers used in the area are urea and sulphate of ammonia (SA). Urea is applied at the rate of 50 kg/ha while SA is 75-100 kg/ha. Just after application of fertiliser the field stays for 1-2 days without irrigating the field to let it dissolve and be absorbed by the plant. Afterwards the field is irrigated as usual. Under the case where water is not a problem weeds are very few and they are picked when they are seen, In the case of water scarcity, weeding is done just before fertiliser application. About 30% of the farmers are transplanting in straight lines.

3.5. Harvesting

It is done from late May until early July when about 80% of the crop has changed colour to brownish. The harvesting vary depending on different factors such as variety, time of transplanting, water availability etc. Harvesting is done manually by using sickles and sharp knives where a plant is cut at the base about 5-10 cm above the ground. The floor is prepared and the harvested plants are gathered in heap at that floor. Then threshing is done by handling a bunch of plants and smash or bit it down on the floor. After threshing the rice is winnowed by wind and pack into bags, ready for transporting. Sometimes the produce is carried home without winnowing and this has to be done at home. At home rice is packed into the bags and stored into the prepared room. The varieties which are commonly cultivated in the area local. These include Shingo ya Mwali, Kula na Bwana, Kahogo red and Kalunde.

Most of operations under rice farming are shared both by family members and hired labour. this also depends on how big the family is. If the family is big enough to combat all operations, in this case there is no need of hiring labour, but if the family is small then labour is hired in all operations. In most cases operation such as winnowing which need no hurry it is done by family members only especially women.

4. Economy of Rice Farming

This has been taken from 2 common rice farmers. They have the area of 1 acre each, where they plant one of the local varieties i.e. kula na bwana. they all practice transplanting method.

4.1. Inputs and outputs

Inputs	T.Shs.
Land preparation (ploughing)	20,000/=
Puddling	9,600/=
Seedling	1,500/=
Transplanting	12,000/=
Weeding	12,000/=
Fertiliser 91 bag of urea - 50 kg)	12,000/=
Birds scaring (for 2 months)	20,000/=
Harvesting	12,000/=
Storing bags 25 @ 900/=	22,500/=
Transportation (hiring tractor/lorry)	7,800/=
Total inputs per acre	129,400/=

4.2. Out puts

Under proper rice management, production per one acre ranges from 25-30 bags of 85 kg each. Assuming production of 25 bags where 5 bags is kept for home consumption and seeds. That amount for home consumption is quite enough because the family is growing other crops such as maize, beans and vegetables. The remaining is for marketing. To get the actual costs the all yields taken into account.

Thus: Yields obtained - 25 bags
 Price/bag at harvesting period was 10,000/=

Then, $25 \times 10,000/= = 250,000/=$

Net income: $250,000 - 129,400 = \text{T.Sh.}120,600/=$

In the case where produce is stored and sold at the peak price:

Thus: $25 \text{ bags} \times \text{T.Sh.}15,000/=$

$= \text{T.Sh.}375,000/=$

Net income will be $\text{T.Sh.}375,000 - \text{T.Sh.}129,400/=$
 $= \text{T.Sh.}245,600/=$

4.3. Marketing

The marketing is mostly done through middlemen than Manyara Rural Co-operative Society. This is because of less pay in the co-operative compared to the middlemen. For example this year, the co-operative was buying at T.Sh.9,000/= per 1 bag of 85 kg while the middlemen were buying the same at T.Sh.10,000/=. The following table shows the prices of paddy and white rice in last five (5) years through middlemen at harvesting period:

Year	1992	1993	1994	1995	1996
Paddy (T.Sh/bag)	4,500	5,000	7,000	9,000	10,000
White rice (T.Sh/bag)	150	180	200	250	300

5. Problems in Rice Farming

- (1) High price of inputs e.g. fertilisers, pesticides, etc.
- (2) Poor drainage system results into water lodging which causes other farmers not to use fertiliser
- (3) Diseases especially rice blast. This is encouraged by use of the same plot excessively.

(4) Pests - the most dangerous ones are birds (quelca quelea). In some areas the stem borers are found, but the case is very minimal

6. Agricultural Extension Services

It is a government policy and is offered free to farmers, farmers are required to pay for inputs. It works under training and visit approach. The objective of the extension service is rural development. Farmers are developed to recognise and utilise the available resources efficiently so as to maximise and hence raise their standard of living.

6.1. Extension organisation

At district level, there is District Agricultural and Livestock Development Officer (DALDO) who is the administrator. Also there is District Extension Officer (DEO) who co-ordinates agricultural extension services. Under the DEO there is a team of subject matters specialist (SSMs) who are in charge of various sections. Also there are extension officers in division and village level. One Village Extension Officer is responsible for one village.

As a Divisional extension Officer (DIVEO) my roles are:

- (1) Supervision of extension activities within the area
- (2) Compilation of reports from the villages and submit to the DEO
- (3) Take over the extension activities in the village where Village Extension Officer (VEO) is absent.
- (4) Reporting emergencies to the DEO immediately e.g. armyworm outbreak, etc.
- (5) Attending Monthly Training Sessions (MTS) where impact points/technical skills from regional workshop are released and problems/needs from the farmers are discussed. The skills taught relating with the operations proceeding in the farmers fields e.g. transplanting in rows, proper spacing, fertiliser rate and way of application, time of weeding, etc.
- (6) Attending farmers problems faced while on supervision e.g. effect of diseases and pest etc.
- (7) Attending Ward Development Committee (WDC) meetings where I am answerable for all agriculture issue and contribute ideas on development of the ward.
- (8) Linkage between DEO and VEO.

7. Farmers Organisation

In the area there is one Primary Rural Co-operative Society, Water Users Association and four (4) Women's Groups.

7.1. Manyara Rural Co-operative Society

This is a primary rural co-operative society which is supposed to offer services to farmers such as supply of farm inputs and buying farmers produce. Sometimes it is not managing its tasks because of lack of capital, poor leadership and bureaucracy.

7.2. Water Users Association (WUA)

Before the phasing out of the ILO Project in 1991, the organisation was formed to take over all water issues within the valley. Water Unit Committees were formed at farmers level and this was done by the farmers of the area. Forty (40) Water Unit Committees were formed under which 60% are performing well while the rest are under difficulties due to:

- (1) Increase of intruders which results to expansion of agriculture area hence water scarcity
- (2) Most of these areas are lacking irrigation structures hence poor water management
- (3) Wrong selection of the committee members, sometimes this is rectified by electing new members of a good quality.

One committee has 5 members i.e. Chairman, secretary, Treasurer and 2 farmers' representatives. the roles of the committee are:

- (1) Water distribution
- (2) Supervision on operation and maintenance of the irrigation structures within the area.
- (3) Conducting farmers meeting when necessary e.g. fund raising for repairs, maintenance of the canal, election when one member of a committee misbehave
- (4) Inspecting the canal when water seems to be cut-off somewhere.
- (5) To deal with water defaulter e.g. water thieves, those refuse to attend in canal cleaning, those who refuse to contribute money for some repairs of the structures, etc.

7.3. Women's group

The women groups are located in different villages and are performing different activities. The members are not more than 10 in each group except for "Embesi" group which has more than 10 members due to polygamist way of their life. The general objective of these groups is to generate income to the group members and mobilise women to come together to address their problems where they can be tackled easily. Terms of membership differs from one group to another depending on the type of business a group is doing. The table below clarify the groups:

Village	Group name	Tasks performing
Migombani	Umoja	Gardening, cookery, oil pressing, buying rice at harvesting period and selling at the pick price and they have machine for maize milling
Migombani	Tupendane	Needlework and cookery
Majengo	Sisi kwa sisi	Grafts and cookery
Losirwa	Embesi	Making clay pots.

8. Field of Interest to study

Proper rice management at field level.

Question/answer

Q1: If the paddies can be drained, why can't floods be drained so that seedlings can be transplanted earlier?

A1: There are small drains and the rivers also act as drains during paddies drainage, but during floods, the condition is so severe that even rivers are not seen where they are passing during floods.

Q2: In your report you have mentioned a Kula na Bwana variety, but in many rice growing areas this is a nick name for a certain variety. Will you please name the real name of this variety instead of Kula na Bwana?

A2: That is how it is called in my area so I can not tell more about it, or give another name.

Q3: Are the bunds made permanent or temporary?

A3: Bunds are temporary because after rice harvesting the field is planted maize, beans or vegetables in the dry season (July-January)

Q4: You told us that at least 40% of the farmers has adopted transplanting by straight lines using ropes; Now my question is what effort have you taken to rise the percentage from 40% onwards?

A4: Negotiations are still going on with farmers who are not using ropes although this is a slow moving action. Comparison of yields and facilitation of operations like weeding are factors where efforts are made to change farmers attitude.

Q5: According to the report you told us about a certain group who are dealing with livestock (pastoralism) so, to what extent have you tried to convince these farmers to deal with rice farming in the area.

A5: They are living in high plains where rice production is impossible. These Masai are not living in the paddy area but because they are belonging to my area of work (division).

Situation of Agricultural Mechanisation in Mto wa Mbu, Monduli District, Arusha Region

by
Gift Mayagila

1. Background

1.1. Introduction

The Mto wa Mbu lies on the foot of the escarpments of the Great Rift Valley, about 750m above sea level, while its head (of the Valley) is of over 1,100m ASL, crosses by the dusty road going to the Lake Manyara National park, up to Ngorongoro conservation area and the Serengeti National Park. With the climate of average temperature of 27°C, annual rain distribution of 600mm, high on moderately high water table, soil pH of 7.5 - 8.5, the valley seems to be favourable for the cultivation of the rice. Land topography promises the use of machinery due to its flatness in most areas, major soil which are clay, and clay loamy gives a convenience soil draft for using both, oxen and tractor powers. About 30% of the 12,000 people who are living in the valley are cultivating rice.

1.2. Total Area Covered

Less than 2,000 acres is under cultivation using machinery on rather under mechanisation.

1.3. Number of Employees

Agromechanization Technician: 1

Irrigation Technicians: 2

Extension Workers: 3

The station so far hasn't yet established the mechanisation department due to the fact that the government/ministry hadn't impound any machine on tools/implements at the moment. Whatever it is discussed in here concerns the machinery which are possessed by the private firms or farmers individually. Moreover there is not any area set specifically by the government for the mechanisation activities, like site for workshop or a garage.

There's a Private firm, the ACT (NGO) which owns 2 medium, sized workshops within the ward (valley) and caters major services to their own tractors and implements, and also to that which owned by the individual farmers. In total there are about 10 working tractors and a few oxen Ploughs, 5 of them are owned by the ACT.

2. Agriculture

2.1. Total Area under Cultivation and Types of Crops

There's about 4,000 acres under cultivation in which crops like rice (1270), maize (770), beans (150), banana (1,500), vegetable, fruits and other (50).

NB: Less than half of the mentioned acreage can be put under mechanisation (causes have been

discussed at the end of this report) . The listed down are the causes.

- * Shape and sizes of most fields -
- * Existing irrigation system
- * Inconvenience of keeping oxen.

2.2. Area under Rice Cultivation

There are about 1270 acres, in major two swampy farms (1220 acres) plus smaller sporadic swamps.

2.3. Cultivation Method

The Valley receives bimodal rains a year (the long and shot rains) and this lets the farmers grow different types of crops according to amount water which will be available in that particular season, e.g. rice can be grown during long rain and other crops in short rain season supplemented with irrigation water.

- Hand tools and tractor are commonly used.
- To all farmers, method of cultivation especially by the machines is almost the same ie. the land is cleared from the previous stalks and residues, then the first ploughing is done a day or so often, a second ploughing is done to a new farm, but to an old farm only harrowing is done. Sowing follows immediately after harrowing.
- In case of the rice, the harrowed farm is flooded and puddling follows and further cleaning.
- The transplanting follows and from there no machine is involved until the next ploughing season.

2.4. Variety

All are local variety seeds, the commonly grown are "Kula na Bwana", Shingo ya Mwali" and "Kahogo", seeds normally are taken from the previous crop.

2.5. Transplanting

3 - 5 weeks from sowing, even more, seeds are randomly planted at 20 - 30cm x 20 - 30cm.

2.6. Weeding

Is carried out by hands, i.e grass picking and later the plot on boarder is flooded to control weeds.

2.7. Fertiliser Application

Fewer farmers make use of farm yard manure as basal dressing, and even fewer uses S/A and UREA as top dressing but the number of users is negligible.

2.8. Harvesting

It is done by cutting down a group/station of tillers, when brown (about 80%), they are threshed, winnowed and transported off-the farm in sacks.

2.9. Storage

The threshed rice is dried for 2-3 days under the sun and then packed in the sacks, and stacked in the store. Piling the rice in the store floor is also used.

AVERAGE YIELD: FIZOM RECORD/HARVEST EST-REP.

Year	Bags/Acre(est)	Price/bag
1994	25	7,000/
1995	26	9,000/
1996	Not yet harvest	-

3. Agricultural machinery**3.1. Machinery and Implements in the Area for Rice Cultivation: Type, Power/Implement**

As stated before, there are about 10 tractors in the valley owned by the individual farmers. Common implements are disc harrows, disc plough, tine harrow, rotavator harrow and trailers.

- Disc ploughs are, the smaller ones 3 - discs
- Smaller size 1.5-3 ton trailers are used here

Tractors

4- Valmets (604) - 35 hp

2- Massey Fergusons - about 35 hp

1- Ford - Pulls the trailer of about 3 ton capacity, it has no hydraulic system therefore not used for ploughing purposes

3- Valmets (604-5)- 50hp

1- Valmet 50 hp

3.2. Management Method of Agricultural Machinery

- Most of machine owners are not acquainted with the management of their properties, instead they hire or employ operators to do for them.

- Some owners are managing the use of their machinery by counting hours i.e. tractor hours, this is counted from the time the tractor has been released and other by calculating the fuel used, i.e. a tractor leaves at home with a certain known amount of fuel for a particular job to be done, then the fuel remained after the work will be used as the determination factor, though this, is not commonly used.

- A daily service carried out, includes check for water level in the radiator, tyres for flatness, impacts of battery terminals, fuel level, engine oil level and loose or lost bolts and nuts.

- Most farmers/owners don't carry the planned in recommended time services, and for the few who are doing they check and change engine - oil, or apply grease and clean or change fuel filters. Other operation are engine overhauling etc., and are done at workshop.

- NO shade is provided to most machines and no services or maintenance are carried out after operation (season), only that service is done prior to operation after a deficit or loss is found in a machine or implement.

3.3. Utilization Rates for Tractors Only

Ploughing new farm: - 15,000/= acre

old farm: 10,000- 11,000/= acre

Harrowing - 10,000/= acre

*Hauling, per trailer of crops: - 10,000/= trip

sand and stones: 7,000 - 78,000/= trip

*Distance estimated is not more than 10 km.

OWNERSHIP

- Individual = About 5 tractors are owned by individuals. All of them are operated by operator-cum-technician
- Co operatives and associations
The existing co operative society (rural level) can not own a tractor, but it own a milling machine and a filling station.
- A NGO firm, ACT own 5 tractors with its complete implements.

3.5. Size of Workshop and Type of Workshop, Tools and Equipment available

- Act - Belgium firm have 2 medium size workshop which undertakes small to medium jobs like, arc-welding, engine overhauling, panel beating, grinding of simple parts, and battery changing
- The tools and equipments available is from different types of spanners, wrench's, jack, diesel electric generator and the checking - pit.

3.6. Repair and Maintenance: Procedure

- Mainly carried out when fault cropped, e.g. breakage, jam or part or machine malfunctioning due to wear etc. For this case the part or whole machine is taken to the workshop.
- Technicians upon narrated on the problem will check the machine (effects) and explain to owner the requisites and service or maintenance charge.
- Service or maintenance is mostly done at the workshop where a team of mechanics works together or on individual part. Procedurally they'll carry the repair/maintenance: by firstly, open or detach the part.
- Clean it and look/search for the fault e.g. jam, breakage, wear, dirtiness or blockage.
- Correction, fixing, verification or cleaning any other remedy action is taken there, however it will involve amending, filling, regrinding, cleaning, welding or replacing with the new part
- After service/maintenance the machine will be taken for test for few minutes or even hours.

3.7. Major Problems Encountered and Countermeasures

3.7.1. Punctures

Important problem especially in new farms where there is thorns and stumps, countermeasure is by replacing with the spare tyre or/and amending the flattened tyre.

3.7.2. Electricity

At Mto wa Mbu there is no electricity. So in the available workshops there is a diesel engine generators which are expensive to run especially when a work is a time consuming, countermeasure to this problem is to take the job to Arusha town in the big workshops.

Total area under utilization and types of crops grown (in the early pages) where I stated that only less than half the area mentioned can be mechanized, here are the causes:

3.7.3. Shape and Size of Most Fields

Irregular shapes and smallness of the farm sizes hinders the application of the machines in most farms; average land size owned by the farmers is 2 acres while many have even less than 1/2 an acre.

3.7.4. Cropping patterns

Farmers cultivated their preferred crops elsewhere regardless of the advice by the extension staff on the cropping calendar, water availability, type of soil, rain or dry season etc which in turn hinders the usage/application of machinery.

3.7.5. Existing System of Irrigation

The existing irrigation system here can be termed as a semi traditional, because the old traditional scheme had been a little but improved and added with nothing at all than one or two drainage canals. The previous plan had no feeders roads for the to and from of machinery to operate in the farms during ploughing and hauling (farm operations).

3.7.6. Inconvenience of Keeping Oxen

People around here are afraid of keeping draft animals especially cattle in the sense that the Masaai (the neighbour pastoralists living on outskirts farm areas) will come and take them away. This has caused a detriment as to why oxenisation in the valley is regarded as impossible dream.

4. Future Prospect

Efforts are there to write a paper to encourage the SASAKAWA GLOBAL 2000, a NGO which have recently started the OXENISATION TRAI"G CENTRES in some district in Arusha region, in order to establish such a CENTRE in Monduli district particularly in Mto wa Mbu ward where there's more animals to be used. This of course, will be done after the completion of this course.

I'm also look for the possibility of District Agriculture administrative to find a means whereby the district and the ACT people would work together on the mechanisation (esp. oxenisation). The ACT is interested in helping small farmers and pastorals to increase their income by improving their ways of fanning and use of appropriate technology they even put back to life a many years damped dip-tank.

It is proposed that the valley should be reclaimed to enable most of land to be mechanized and hence increase current rice production.

5. Information

The NGO, ACT firm which is aiming at the development of the human and natural potential of the valley of Mto wa Mbu, especially on the sector of agriculture, among others their objectives are:

- Start up (already installed two of them) of a "farm-workshop" for repairing and maintenance of agriculture machinery and tools used in the valley.
- Distribution of inputs to the farmers and support extension activities/services.

(2) ンドウング

Ndungu (ンドウング：バレ族の言葉で「食糧倉庫」の意味) の概要

聞き取り相手：NDUNGU 派遣 JICA 専門家（稲作組合育成）岡田秀雄氏

位置：

キリマンジャロ州サメ県（モシ市よりセゲラに向かう国道を 85km 南下、サメ市を左折して旧国道に入りキシワニ村・川のそばの意味 とゴンジャ村・人の名 を通過し約 60km の地点にある旧宿場町で、ザイザル麻の産地でもある。）

施設の概要：

- 日本の無償援助で人口 1 万人（3 集落、2,000 戸中農家は 1,400 戸、宿場町のためイスラムも在住している）の村に、頭取工を含む水田基盤整備 684ha を実施、同時に電気・電話も施設
- ブルドーザ、トラック、トラクタ、作業機は KR-II 援助で整備
- 整備終了：1990 年頃（日本工営施工）プロジェクト終了 93 年

運営：稲作組合による自主運営を目指している。

- 賦課金：1 プロット 30a 当たり 30,000Tsh の出資金（220 戸加入）+ 入会金 3,000Tsh+耕耘料 1 プロット 2,000Tsh
 - ◆これで 6 名の政府職員の時間外賃金（基本給とほぼ同額になる）と用水路の清掃施設の電気料トラクタオペレータ/ゲートキーパの賃金、トラクタ等の燃料代、トラクタ等の修理費の一部をまかなっている。
 - ◆トラクタの部品代は KR-II のタンザニア側見返り資金で購入できることになった。
- 農家の所得の 90%は稲作から得ている。

問題点：

- 電話線が 40km にわたって盗難にあい不通状態
- 自力更新の見込みがないため更新分まで含めて 27 台と多く導入したトラクタとブルドーザが国政府や州政府の役人の口利きによって流用され、催促しても戻してくれないし、戻ってきたときには壊れている有様で、農民から「おれたちの金で奴らが壊した機械の修理までしなければならぬのか」と大きな不満が上がっている。
 - ◆トラクタの稼働台数は 10 台以下
- 僻地であることもあろうが、6 名の政府職員（MANAGER1/機械 3/普及 2）が働かない。普及員は女性 1 名（この人はまあまあ）と、山でコーヒーの栽培指導をしていた人
 - ◆背景に部族問題もある。NDUNGU はバレ族（タンザニアでは No.2）であるため、チャガ族（モシ市に多いタンザニア No.1 の部族で公務員に

多い) はここに転勤したがない。

◆これら職員の日本留学経験は 0

◆KATC との人事交流がない (1 週間の短期交流があるのみ)。

- 政府職員は水門管理が出来ない。岡田専門家が参加する周辺地区との調整会議で大筋を決定し、岡田専門家が計算し、水利用計画を立て、組合雇用のゲートキーパが自転車を貸与されて全ての水門を管理している。

◆特に scheme manager である Mr.ハンギに対する信頼がない。

- IR-54 に RYM-V が発生している。
- 今年はとりわけ水不足で、大雨季に 200mm の降雨しかなく、ユンゴガ川の水量も例年の 1/3 程度のため、昼間は山の上の野菜農家が、夜は下の水田農家が、土日は隣村へ水を流す約束で水田耕作を開始
- 稲作組合長も自己利益追求意識が強く、水不足で 2000 年の乾季作は 4 ブロック分の水しかないのに、組合総会で自分や役員の水田を含む 7 ブロックを耕作することを決定してしまった。(理由はトラクタの作業料金を稼ぐため)
- 稲作技術については、KADP のまねをしているが、技術スタッフの力が弱いため組合せ力が不十分で、代掻き時の均平が不十分であった。
- 岡田専門家の任期が間もなく切れる。

対応状況：

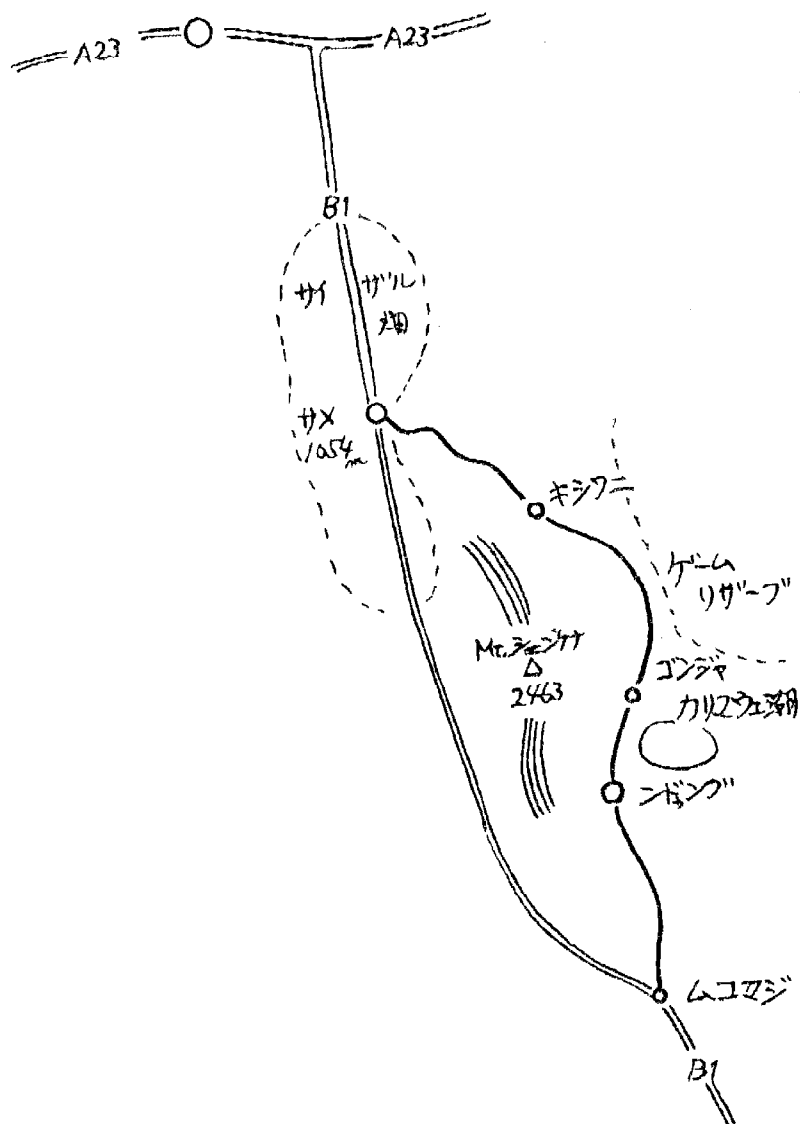
- トラクタのスベアパーツの購入・ブルトーザの修理及び洪水防止対策で約 600 万円かかるが、前二者については、KR-II のタンザニア側見返り資金で実施出来ることになった。
- RYM-V の対策はソコイネ農業大学の教授・院生(短期専門家として JICA が雇用) らによる品種比較試験が行われていた。達観したところでは強い抵抗性を持つ品種は見あたらなかったが、ブロックローテーションによる 1 年間の休作や、水田に残っている稲藁や籾を焼却すればなんとか防げるようであった。
- 水不足に対しては 1 週間間隔で各ブロックごとに給水する節水栽培で対応しようとしていた。確実に実施するため、ウォーターマンが各ブロックの給水口を管理するシステムを採用していた。

幸田の所見：

岡田専門家の任期延長を願うとともに、Phase II における最重点濃密指導地と位置づけ、KATC の指導陣と人的交流を深め、特に灌漑計画担当官の能力(応用力)向上と、RYM-V 対策を図ること (KATC の圃場には持ち込まない) が必要である。この地域はワミ川中流域の小規模開発の典型になりうる。

岡田専門家は、スワヒリ語に堪能であるばかりでなく部族語のバレ語をも理

解しており、KATC Phase IIでの大きな課題となる現場適応性のある研修カリキュラムやスワヒリ語の稲作読本を作る上で欠くことの出来ない人材である。個々の現場に最も良い結果を残す上で、極めて貴重な人材であり、継続して派遣されることがPhase IIプロジェクトの成否の鍵の一つである事を強く感じた。



ヌドゥング地区農村開発計画概要

1. 実施までの経緯

ヌドゥング地区農村総合開発計画(Ndungu Agricultural Development Project,NADP と称す)は、1970年2月、タンザニア政府からのキリマンジャロ州総合開発計画策定要請に始まる。1977年JICAによるキリマンジャロ州総合開発計画が取りまとめられ、要請された14件の内6件に協力することが決定された。6件の内の1つ、ムコマジ川流域地域に関する農業用水開発調査がNADPへと発展した。1990年1月、無償資金協力(17.25億円)により工事は完成した。翌年、KR-II援助により27台のトラクターが供与された。

NADPに対するJICAの人的協力は、当該専門家が初めてである。(1998年10月赴任)このため、以前までは、兄弟プロジェクトであるKADPと比べ、「親無し子」と言われていた。

2. プロジェクトの内容及び目的

ヨングマ川を水源として680haの灌漑事業などの土地基盤整備、収穫後処理関連施設整備、O&M(維持管理)関連施設整備、研修・集会施設整備、給水施設整備から成り立っている。それによって、地区内農業生産性の飛躍的増大を図り、農民生活の安定・向上に寄与するとともに、タンザニア国の食糧自給の達成に貢献することを目的としている。

3. プロジェクトの運営

実施機関はキリマンジャロ州庁であり、最高責任者は州行政長官(RAS)であるが、実質的にはサメ県行政長官(DED)を中心にNADP職員が運営にあたっている。現在、NADP職員は農業普及、灌漑、農業機械の6名のシニアスタッフと警備員など7名が配置されているが、僻地に位置することもあり年々削減傾向にある。活動予算(政府予算)はゼロである。予算面はNADP内に結成された稲作組合(CHAWAMPYO)が全額負担しており、政府職員の車輛燃料代、出張費、残業代、事務所電気代等も負担している。1989年から2000年の12年間で稲作8,792ha,46,206ton、トウモロコシ栽培1,104ha,1983tonの実績を上げている。

4. 稲作組合(CHAWAMPYO)の活動

1993年6月、NADP内(農家戸数は1,386戸)に稲作組合が結成された。結成の理由は1)プロジェクト成果の継続。2)タンザニア政府の厳しい予算事情から運営予算を農民自身で負担する必要がある。3)農民自身による自助努力の向上である。

稲作組合の主業務は、最大の事業であるトラクターによる起耕・代掻きを円滑に実施し、近代的稲作栽培を継続することである。結成以来、全額農民負担により、燃料、農業機械・水路・道路の補修、人件費等が賄われている。1999-20シーズンでは、1プロット(30a)当たり30,000Tshの機械代・水利代を徴収し、総額9.4千万Tshの予算計画である。

稲作組合の問題点は、任国の慢性的な汚職体質が農民の政府、組合に対する不信感に繋がっていることである。組織率は、組合結成7年目に入るが、組合員数228名(1999年12月末)であり全体の16%と少数である。対策として、稲作栽培の基本技術指導、財務管理の強化、組合セミナーの実施、員外格差の実施(99-20年雨季作より)により徐々に改善する傾向にあるが、まだかなりの時間を要する。

5. その他

- 1) KR-II見返り資金によるトラクター部品等の購入及び排水路の浚渫工事等、総額4億8千万Tshを承認された。トラクター部品は入札済み、浚渫工事は入札待ちの状況である。
- 2) 1999年乾季作よりRice Yellow Mottle Virusが急激に拡大したため、KATC,KADP,ソコイネ農業大学と協力し、抵抗性品種試験を実施している。

岡田 秀雄(稲作組合育成指導)

(3) モンボ

MOMBO (モンボ) の灌漑稲作の概要

資料提供者：S.M.ムウェンデ氏と現場での聞き取り

位置：

タンガ州コログエ県

自然条件：

ルシヨトを含むインド洋に面したタンザニア東北のウサンバラ山脈の麓に開けた標高 400m の平原で、集水域は広く水量も豊富である。年間降水量は 1,100mm 平均気温は雨季（夏）で 26～28℃、乾季（冬）で 20～22℃、土壌は重粘土～埴壌土でタンザニアの中では最も水稻生産に適した土である。河川はルシヨトに山塊に源を発するソニ川で、モンボの下流でムコマジ川に合流する。

農家の営農形態：

低地にあるため、稲作専作農家が多い。

灌漑農業地の概況：

ドイツの技術援助で、ソニ川に頭取工、導水路、水田基盤整備（220ha）を実施した。A ゾーン（100ha）と B ゾーン（120ha）に分かれている。灌漑農業地の農家数は 429 戸（1 戸の耕作面積は 50a）、2000 年乾季作の作付け面積は A ゾーンの 60ha。

現在、洪水により頭取工が破壊されたため、世銀の資金を導入し、頭取工とファームボンド（33,000t 容量）、主導水路（ストーンライニング：施工料金は作業員の賃金を含めて 4m 長で 8,000Tsh）を再整備中であった。農家の負担は工事費の 20% とのこと。

稲作技術の概要：

トラクタプラウ耕の後入水+人力代掻き+手植え体系で、品種は IR-54 を用い（種籾は普及員が農家組合から金を預かり KADP の優良農家に買い付にきている）21 日～35 日育苗で定植（20cm×20cm の KATC 標準技術）、除草は田植え後 14 日～65 日の間に手除草、施肥量は尿素を 200kg/ha を除草終了後に施用（N 換算で 10kg/10a）、平均収量は 3.2～4.7t/ha（78 年～98 年）

トラクタは 2 台のハイヤーサービスに依頼。

幸田の見た問題点と特徴：

問題点：

- ファームボンド（40m×200m）の容量はあるが、水路の方が護岸壁面より低く、本当に 33,000t 貯まるのか？日本の基準（常用水量 2.5l/sec.ha）

- 雨季作より乾季作の方が稲の栽培環境としては適しているのに、また水は十分にあるのに水量調節ダムがないため、洪水の被害を受けている。ルシヨトにダムを造れないものか。
- 開田可能面積はかなりあり、220ha は少なすぎる。
- 事務所の施設があまりに貧しい。（テーブルと椅子があるだけ・・・。でも、あるだけよいのかもしれないが・・・。）

- 技術的にはタンザニアの中では高いレベルにある。(78年～98年迄の平均収量の変化のグラフが事務所に張ってあった。)
- KATC で研修を受けた職員が地元の人であることもあり、努力していること、村人に信頼されていることと、非常に強い村落共同意識がこれを支えていることが見てとれた。
 - ◆村の cooperative staff=農民組合の決定に従わないものは、除名処分にされ耕作権がなくなる。
 - ◆村長・普及員や灌漑計画担当官・農民組合の会長など、村落の全スタッフが揃って出迎え、彼らのリードで会議が行われたのはここだけであった。
 - ◆現地圃場を見に行ったときも、そこの耕作者(おそらく Key farmer であろう)が、「どうだ、オレの稲は良くできているだろう。」と自慢げに話しかけてきたのも、ここだけであった。
 - ◆視察後の話し合いで、農民組合の会長が「生活をもっと良くしたい。より広い農地を改良したい。もっとチャンスがほしい」と訴えていたことが耳に残っている。



Rice Farming and Agricultural Extension in Mombo Irrigation Scheme, Korogwe District, Tanga Region

S. M. Mwen'de
Mombo Irrigation Scheme, P. O. Box 157, Korogwe, Tanga

1. General Information

1.1. Location

Mombo Irrigation Scheme is located in the north-eastern corner of Tanzania. Its boundaries are Lushoto District the east, Same District the north, Handeni District in the west and Muheza District in the south. Mombo lies at the latitude 4° 45' S and the longitude 38° 17' E.

1.2. Topography

Mombo is lowland area with elevation of 400 m ASL.

1.3. Climate

As it should be expected from its location few degrees south of the equator, temperatures are fairly high throughout the year. It receives the average temperatures of 26-28°C during the hot season (November-March) and 20-22°C during the cool season (April-October). Mombo receives a good amount of rainfall of about 1,100 mm per year. There are two distinct rainy seasons: the first one from November to January and the second one from March to June (main rainy season).

1.4. Soils

The area has fertile soils of heavy clay and clay loam.

1.5. Water sources

Mombo Irrigation Scheme receives water from Soni river. It extends from Lushoto District and joins to Mkomazi River.

1.6. Land use

In Mombo Irrigation Scheme, the farmers are engaged in irrigated rice cultivation only.

1.7. Population

Mombo Irrigation Scheme has a total number of 429 farmers: 233 of them are women and 196 are men.

1.8. Income sources

Most of the farmers depend on agriculture. They normally divide their product into two parts: (1) home use as food and (2) sell in order to get cash for other necessity.

2. Rice Farming Practices

2.1. Farming area

Mombo Irrigation Scheme has 220 ha, which is divided into two areas i. e. A and B. The farm A covers 100 ha and the farm B cover the rest (120 ha).

2.2. Cultivation season

The farmers cultivate paddy in three seasons in rotation: the 1st season (December-May), the 2nd season (March-August) and the 3rd season (August-January).

2.3. Land tenure system

Farming areas are distributed to the farmers in equal portion-, each household has 0.5 ha. Owner of the land of Moinbo Irrigation Scheme is a cooperative society.

2.4. Irrigation method

Flooding

2.5. Land preparation

Paddy plot preparation is undertaken by tractor (ploughing) followed by puddling by hand.

2.6. Seeds and seedlings

IR54 variety is used. The seedlings are transplanted at 21-35 days at a spacing of 20 cm x 20 cm.

2.7. Weed control

Hand weeding is the common method used in the scheme. The farmers are encouraged to weed from 2 weeks to 65 days after transplanting.

2.8. Fertiliser application

Fertiliser is applied when irrigation water is dried. Urea is used at the rate of 200 kg per ha and applied into two splits.. (1) 2 weeks after transplanting and (2) 65 days after germination.

2.9. Harvesting

Harvesting is done by hand sickles. The farmers cut the paddy plant at the base and thresh them by beating so as to separate rice grain from the panicles.

2.10. Storage

After threshing and winnowing, the farmers pack paddy into the sacks and each farmer has own store at home.

3. Economy of Rice Farming

Although the cost of rice farming is increasing day by day, demand for rice is also increasing. The situation forces the Price of rice increasing. As a result, rice farming is still profitable to the farmers.

Paddy prices per bag (80kg)

Year	T.shs.
1993	6,500
1994	8,000
1995	10,000

Average paddy yields

Year	t/ha	Year	t/ha
1978	4.34	1987	2.40
1979	3.25	1988	3.50
1980	3.00	1989	3.00
1981	3.50	1990	3.20
1982	4.65	1991	3.20
1983	3.66	1992	3.00
1984	4.14	1993	3.20
1985	3.70	1994	3.20
1986	3.21		

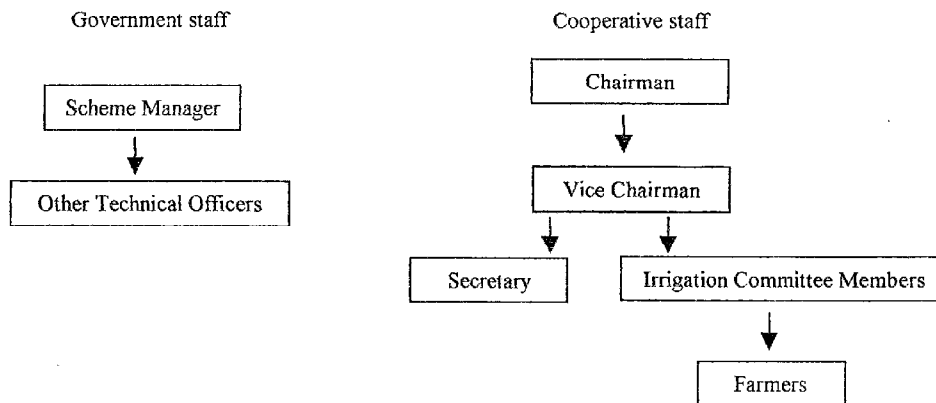
4. Problems in Rice Farming

(1) Insufficient irrigation water. This is a problem during the dry season when there is no rainfall to supplement irrigation.

(2) Lack of inputs (e. g. fertiliser). The farmers can not afford to meet required amount due to high price; it causes low yield.

5. Agricultural Services

All the technical services in the Scheme are carded out by extension officers as the organisational structure shown below.



Major activities of concerned people are:

Scheme manager: management of all technical activities carried Out in the Scheme.

Irrigation technician: deal with water management.

Agricultural officer: deal with crop husbandry.

6- Activities of Farmers' Organisation

- (1) The cooperative is responsible for collection of revenues such as seasonal charges.
- (2) They supervise operation and maintenance of canals. In this case, they have responsibilities of supervision of self-help work "msaragambo" and make sure that those who not attended would be punished.
- (3) They organise means of transport for inputs such as fertiliser from the industry to the office.

7. Fields of Interest to Study

Crop protection (pests & diseases of rice)

Questions and Answers

Q1- About seed collection from farmers, does it not bring any variation in the fields after using the seeds collected by the cooperative?

A1: The extension officer is always there for supervision of seed.

Q2: Why are seed brought to the cooperative to be stored and not in the farmers, houses.

A2: This is done in order to maintain the variety and also to make sure that the farmer is not Suffered from the shortage of the seeds.

Q3: Do you work for rice production aspect only or including rice marketing?

A3: Marketing is not a problem since the traders come to the farmers to buy; I am only dealing with crop production aspect.

Q4: You said that those who do not attend "masaragambo" are being punished. How ?

A4: According to the by-law of the cooperative society, the farmers are given three warning, if any member receive the forth one, he/she looses the membership.

(4) クエマザンドゥ

Kwemazandu (クエマザンドゥ) 灌漑稲作の概要

資料提供者：カサマラ E.A.シモンと現地での聞き取り

位置：

タンガ州コログエ県（国道沿いにあるコログエ町を左折し、泥道を 24～28km 走った所）

自然条件：

ルシヨトとおなじウサムバラ山塊の懷に抱かれた標高 800m の広大な低地で、全体が沼沢地である。中央をルシヨト県のブムダリに源を発するヴェンゲーラ川が流れ、年間降水量は 1,000～1,400mm と多い。土壌は暗褐色土で、腐植に富む粘土が低地に、砂壤土が畑地に分布している。

営農形態：

畑地ではトウモロコシ・マメ・キャッサバ・棉が栽培され、家畜も多い。低地では水稻が栽培されているが、面積は少ない。クエマザンドゥ村の人口は 1,678 人、農家戸数は 200 戸

灌漑農業地の概況：

1985 年ドイツの援助でヴェンゲーラ川の頭首工と導水路・100ha (50a の水田 200 枚) を整備した。耕耘方法は牛耕（カバー出来る面積は 10ha 位で、料金は 2,000～3,000Tsh/10a）と人力耕で、品種は IR-54 の他に香り米として高く取り引きされるアフア、アラリー、ウェヒ、スパインデア等が栽培されている。

施肥基準を決めるための窒素施肥量試験が行われており、収量はアフアでは N2.0kg/10a 程度で 3.5t/ha、IR-54 では N6.0kg/10a 程度で 6～7 t/ha であるが、農家は資金がなくそこまで投入できないため、現実には香り米の系統で 2.5t、IR-54 で 4t のレベルである。

灌漑農業地の整備によりこの村では米が主たる収入源に変わり、自転車を持ち良い服を着、良い家を建てられるようになった。

稲作技術の概要：

key farmer が長靴を履いて田圃に入ってスワヒリ語で説明してくれた。「麻袋に入れて 24hr 浸種し催芽した種粃を KATC の定法に従って苗床に播種、播種量は 5kg/10a、育苗日数は 21～35 日間、これは 7 日目の苗」「灌漑は 5 日間の間断灌漑」「粃の売値は収穫始めが 9,000Tsh/bag、収穫盛期が 8,000、収穫が終わると高くなって 9,000～15,000 Tsh/bag」「イモチ病がでるが、IR-54 は

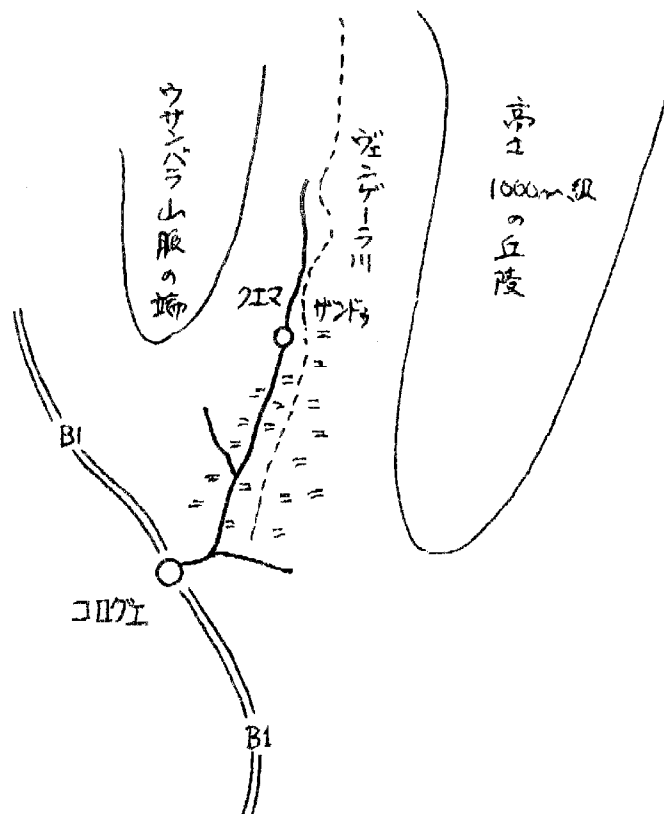
抵抗性があるので助かっている。しかし香り米に比べて値段が安い。」等
幸田の見た問題点と特徴：

問題点：

- 炭酸塩の塩害がでている。
- ゴマハガレ（日本では、痩せた湿田地帯にでる根腐れによる症状で、生育後期に根の活力が弱くなり秋落ちの原因となるが、排水の改善と土壌改良で常発地帯は減少した。）がでていた。
- 導水路が低いところを通っているため用水の有効利用がしにくい。トラクタハイヤーサービスに耕耘代掻きを頼めないか。（交通不便地なので無理かもしれないが・・・）

特徴：

- モンボと同様に村の cooperative staff が強力である。水田を貸す場合の料金は 4,000～5,000Tsh/10a であるが、cooperative committee の承認が必要であることは当然として、村人の様々な個人的問題の解決にも当たっている。3 年任期で 12 名のスタッフが選出され、水管理も彼らの仕事となっている。



Rice Cultivation and Agricultural Extension in Kwemazandu and Makorora Villages, Korogwe District, Tanga Region

Kasamala E.A. Simon
P.O. Box 172, Korogwe, Tanga

1. General Description of the Area

The area is located 24-28 km east of Korogwe Town in Tanga Region. The villages can be reached using muddy road from Korogwe to Tanga via Mgoma and Mramba. In the west, the villages are surrounded by Usambara mountains of 1,500-2,000 above the sea level. On the other side of these villages, there is Lwengera river and the valley of Lwengera where rice cultivation activities are carried out.

The area is dominated by the single main feature; it is lowland which contributes to the weather conditions of the area. The area is made up of two types of rains per year. There are two rainy seasons: one starts between August and September and ends in December or January and one another starts between mid-March and early April and ends May or June. Normally these rains are not sufficient for the crops in the area. The average rainfall ranges 1,000- 1,400 mm per year. And the altitude of the area is 900-1,500 m above the sea level.

There are three types of soils. dark brown clay soil which is found in the Lwengera valley. Sandy clay soil is found in upland areas. Clay loam soil is also found.

Lwengera river is the major source of water for rice production in the area. The river originates from Bumdali in Lushoto District and also is joined by the distributary known as Nkole which is also originating in Usambara mountains.

Major part of the area is used for farming activities. There are upland crops (maize, cotton, cassava, beans, etc.). The villages have the area which are used for grazing animal. Other areas are kept for forest and small part of the area is for human settlement.

Table 1. Production levels(average)of crops in Makorora and Kwemazandu villages, Korogwe District, Tanga Region (t/acre).

	1990	1991	1992	1993	1994
Maize	0.5	0.5	0.5	0.8	0.8
Paddy	2.0	2.0	2.0	2.0	2.0
Beans	0.3	0.3	0.3	0.3	0.3
Cassava	5	5	5	5	5
Cotton	0.8	0.8	0.8	0.8	0.8

Table2. Livestock and poultry in Makorora and Kwemazandu villages

	Makorora village	Kwemazandu village
Cattle	840	500 (8 improved)
Goats	600	473
Sheep	100	85
Chicken	1,205	

Makorora village has an area of about 2,458 ha in total (469 ha for upland crops, 336 ha for grazing, 460 ha for forest, the rest for human settlements). There are about 1,187 people living in the village (1988 census); out of them, 557 males, 630 females living in 302 family houses. About 45% of the population of Makorora engage in the rice farming. There are 1,678 people in Kwemazandu village (764 males and 914 females).

The major source of income generating activities of the two villages is agriculture. Various crops are cultivated in the areas for both cash and food crops. These include maize, beans, cassava, groundnuts, cashew nuts, cotton and rice which is now gaining popularity to the residents of the villages. Other activities for generating incomes are making local beer from sugar cane (known as Boha) and small shops. Table 1 and table 2 indicates the production levels of different crops and domestic animal kept in the villages, respectively.

2. Rice Farming Practices

2.1. Farming area

For Makorora, the area is found alongside Lwengera valley which covers 551 ha (potential area) but only 85 ha is utilized at the moment. There are about 100 ha of paddy area in Kwemazandu; the area under paddy cultivation is 87.5 ha (the rest is salt affected area). Each farmer owns about 1-1 and 1/4 acres, and about 45% of the farmers plant rice.

2.2. Water users' association

At Makorora, the plots are owned permanently by farmers. For Kwemazandu Irrigation Scheme, there is a water users' association with the committee which operates under the village government. They also have village by-laws authorised by DED of Korogwe. Under the by-law, everybody is supposed to follow the advice of field agricultural officers to get good production. Once one disobeys, he/she is sacked by the committee from the association after being authorised by the village government.

2.3. Land tenure

In Makorora, there are some people who rent paddy plots. Rental fee of 1/4 acre was T.Shs.3,000/= in 1994 and T.Shs.4,000/= in 1995. For Kwemazandu Irrigation Scheme, each individual farmer could hire from others for T.Shs.4,000/= in 1994 and T.Shs.5,000/= for 1/4 acre in 1995; it is done confidentially. Reasons for hiring confidentially is that the village government is the overall supreme body responsible for all matters related to the scheme i.e. serious conflict between water users and the committee or water users and agricultural extension worker can be solved by the government. If there is any need to re-allocate the land, then it is the task of the village council to direct the issue to the irrigation committee to fulfill the task. The job description on the task of the committee is explained clearly in the by-law.

2.4. Irrigation system

Kwemazandu Scheme is gravitational irrigation. The main channel from the intake is lined and conveying water from the intake to the diversion box. From the diversion box to the farm turnouts (lateral channel) or tertiary channel. There are also drainage channels. The distribution of water in the farmers' plots is by rotation according to water time table which every member of the water users' committee is being provided a copy and is responsible to his zone. Farmers are responsible for operation and maintenance of the irrigation facilities such as small repairs and for fund contribution for the repair and other activities. At the end of the season, they

contribute fee which keeps the scheme to operate without difficulties and keep the scheme in a better conditions.

In Makorora village, the rice farming practices depend mostly on the rain/flood of Lwengera river. The rainy season starts in March and end in June. The farmers start preparation of land in June and transplant seedlings in July. There are short rains in September and November.

2.5. Cultivation season

There is only one season of rice cultivation in Makorora village. The operation starts by cutting down grasses which takes place in June. Soon after the process is followed by the seedbed preparation, then seed sowing operation is done early in June. Tools which are used here are pangas and slashers. These processes are followed by removing those unrotten grasses for a month and half. After the land preparation, they start transplanting in the end of July.

At Kwemazandu Scheme, there are two rice cultivation seasons: the first season starts early June and ends in December; the second season starts in January and ends in June. However, the first season is more favourable for farmers because of better paddy price.

2.6. Planting method

Only transplanting method is practised in both villages. This method is useful to the farmers in the area because they say that it uses small amount of seeds per unit area as compared to other methods (broadcasting, dibbling, etc.). It also controls the plant population per unit area.

2.7. Land preparation

All the farmers in Kwemazandu Scheme plough their farms by either oxen or by hand hoe. There are only two pairs of oxen and they plough about 20-30 acres per season. The price of ploughing one acre is about 10,000- 12,000 T.Shs depending on the condition of the agreement.

2.8. Nursery preparation and management

The operation begins by selecting good area for it. The area is prepared by cutting grass and burn it followed by thorough ploughing, removing all grasses and roots of the shrubs. Then prepared seedbed of one meter width and any length. Then they sow seeds and irrigate the nursery for most of the time. While the seedlings are in the nursery they are treated by insecticide about 1-3 weeks after the emergence to control pests like stalk-eyed flies which is gaining popularity in the area. They treat by Sumithion 50%EC. The insect lays eggs in the seedlings, the eggs hatch larvae or maggot which penetrate into the heart of the plant causing dead heart by their feeding activities.

2.9. Variety and Plant spacing

The commonly applied spacing is 10" x 10" (sometimes 12" x 12") between row to row as well as plant to plant for tall local varieties (e.g. Supa India, Afaa Mwanza, Moshi wa Sigara, Wahi). The spacing is 8" x 8" for short varieties (Katrin, 1R54); these varieties are planted in very small areas. Although they produce more as compared to the tall varieties, due to poor taste (palatability) and aroma, their prices are lower. The farmers prefer local varieties rather than improved ones. Supa is the variety which dominates the area for about 85% of rice cultivated area. Depending of the soil fertility and spacing, 3-4 seedling transplanted hill produce about 10-15 tillers.

2.10. Seedling age

Because of lack of manpower for transplanting, work, most of farmers transplant aged seedlings. It is advised to transplant seedlings of the age of 21-35 days, but some transplant

even the seedlings of about 2-3 months old which results to low yield.

2.11. Weed control

There are weeds in both areas. Common ones are nut grass, cyprus spp. wondering jews (comelina spp.), the African couch grass, digitaria, scalarum, etc. The farmers control weeds by hand which is very laborious. They are also trying to control by the use of water management which suppresses weeds. This method is possible for the farmers of Kwemazandu Irrigation Scheme where water is kept at 1/3 of the rice crop height. There is an introduction of herbicides from last season (1994). The chemical (2,4-D) is selective and is sprayed pre-transplanting or post transplanting (1-3 weeks after). It is showing a good outcome.

2.12. Transplanting

The time of transplanting is from middle July up to middle August, at 9 am to 4 PM time, depending, on when seeds were sown on the nursery. For Makorora farmers, who depend on the floods, when the land become dry. For Kwemazandu irrigation Scheme, it starts after puddling.

2.13. Fertiliser

Fertiliser is used by some few farmers of Kwemazandu irrigation Scheme. It is advised by the agricultural extension officer that all the farmers apply it, even the by-law of water users' association insists on it. However, because of lack of money, only few farmers use it. The application rate depends on the variety used. For local or tall varieties, nitrogen rate of 40 kg is applied for 1 and 1/4 acres per season for splits. The first split is applied 3 weeks after transplanting and the second split 80-90 days after the date of seed germination. So it is important to all members of the Scheme to know date of seed sowing which is announced at the seasonal assembly meeting of water users. The application is done by removing all water for about a week. Another type of fertilizer used at Kwemazandu is urea; one bag of 50 kg is used for 1 and 1/4 acres. The price of SA and urea at TFA Tanga branch was T.Shs.6,500/= and T.Shs.7,000/=, respectively. The time of application is during sunny hours(c.o. 10am-5pm). This time is preferable because no dews on the leaves (which can cause fertilizer burn on rice leaves).

2.14. Harvesting

It is done when 80-90% is ripe, its colour is brown for Afaa Mwanza and whitish for Supa. Farmers cut heads of the rice by domestic knives; this is known as selective harvesting which is practised by many farmers in both Kwemazandu and Makorora. Another method practised is cutting stalk/stem down by sickles or sharp knives. The cuts are collected on one heap where mat or carpet is used for threshing.

2.15. Storage

No storage is practised for both villages. This is because its market is readily available within the Region (Tanga).

2.16. Marketing

Middle men are always going around the area during the harvesting period looking for paddy. They transport to Korogwe or Tanga. Some farmers tend to transport by themselves to get good prices. Nowadays rice farming is becoming very popular to the area of Makorora and Kwemazandu. The crop has been started to gain popularity in 1988. At the moment, about 200 farmers in Kwemazandu and 300 farmers in Makorora are engaged in this business.

2.17. Impact of rice farming

The crop has raised the standard of living of the two villages. Some physical changes observed are: good houses with iron sheets, improvement of diet and new bicycles. Even they cloth well as compared to the days when they did not cultivate rice. The farmers are required to put more efforts to ensure that they get good yield which is the target of every farmer in getting more income.

3. Economy of Rice Farming

3.1. Inputs

The total amount of inputs necessary for 1 and 1/4 acres rice cultivation is about T.Shs. 104,500/= or T.Shs. 101,500 (depending on the kind of fertiliser used). They are for cutting/slashed grasses and burn them (7,500), ploughing by oxen (10,000), harrowing/pudding by hand hoe (10,000), transplanting by hand (10,000), two bags of SA (16,000) or one bags of urea (9,000), first weeding (10,000), second weeding (5,000), bird scaring for 1 and 1/2 months (9,000), harvesting activities (12,0,00), and 25 bags of empty bags (12,000).

3.2. Outputs

The expected yield from the plot is 25-30 bags of paddy (from 1 and 1/4 acres). The price for each bag has been T.Shs. 10,000/= and T.Shs. 12,00/= for 1993 and 1994, respectively. The production level is 25-30 bags of paddy per 1 and 1/4 acres for Supa Indica. For Katrin and 1R54, more fertilizer is applied (60 kg of nitrogen) and produce 30-40 bags per same area (0.5 ha).

3.3. Marketing situations

There is no problems in marketing of rice in the villages. This is because the time when rice from this area is available, no other parts are producing rice. The farmers sell it to the middleman coming from either Tanga or Korogwe town. There is scarcity of rice while it's demand is high. Individual farmers sell rice to middleman, the price depends on the agreement between the farmer and buyer.

Some farmers sell paddy immediately after harvesting time at the price of T.Shs.8,000-10,000 per bag. At the peak of harvesting, it was between T.Shs.7,200-9,000 per bag, but at the end of harvesting, they sell between T.Shs.9,000-15,000 per bag.

Some farmers prefer to transport their paddy to either Tanga or Korogwe town to fetch better price than selling to the middleman within the area. There at Korogwe, they bring paddy to milling machines where they get white rice and sell it at the price of T.Shs.300-350/= per kg. Transport charge for each bag is T.Shs. 1,000/= to Tanga or Koroowe. The charge of milling is T.Shs. 1/= per kg of paddy.

4. Problems in Rice Farming

- (1) Pests: Stalk eyed flies are the major problem of rice cultivation in the area.
- (2) Diseases: Rice blast is getting popularity in Kwemazandu Irrigation Scheme. They are advised to use 1R54 because it has resistance. Brown spots are also observed, and fertilizer application shows some improvement.
- (3) Rats: This is the problem which makes farmers lose their production by about 10%.
- (4) Saline soils: This problem is of importance at Kwemazandu Irrigation Scheme where some areas are not cultivated due to this problem. We advise farmers to make sure that they flooded with water for 2 days and drain it, but the problem is not solved yet.
- (5) Azolla: This is a new weed known as Chantende by Sambara tribe. It spreads widely in the plots hence weeding and fertiliser application become difficult. It also hinders tillering process.

It was observed since 1994 season. (I came to learn that azolla fixes nitrogen so it is no longer a problem).

5. Agricultural Extension Services

There is a field extension worker responsible to advise farmers on good methods and principles of both agricultural and livestock activities in the area and whole rural development. He also acts as a linkage between stations of research and the farmers in the area (and water users' group).

(1) He gives directions to village council/government.

(2) There are also influential farmers and farmer groups (e.g. animation groups for Makorora).

(3) Individual farmers.

6. Farmers' Organisation

Animation groups are those which have been formed in order to solve problems concerning with their lives. They are first animated by the animators by creating awareness among the village people on prevailing problems in the village. After finding some solution measures available within the village either as a group or individuals. They plan to implement and do evaluation. The programme is assisted by the village development programme (VDP) of Tanga.

At Kwemazandu Irrigation Scheme, there is one water users' association. It is operating under the village council. There are 12 committee members with the secretary who is elected by assembly of the water users' association every 3 years. It's responsible to execute day to day activities of the committee such as channel cleanness and water distribution according to the water users' time table. It's also responsible for cash collection and saving it in a NBC branch. The association has its by-law which was prepared and agreed by the water users' association and authorised by DED of Korogwe District.

7. Fields of Interest in the Course

Breeding, variety and fertilizer application

Appendix Table: Yield responses of different rice varieties to different nitrogen levels at Kwemazandu Irrigation Scheme, Korogwe, Tanga in 1989/90.

	Afaa Mwanza	Selemwa	Kahogo Red	Katrin	Supa India
0 (ko N/ha)	1,669	3,650	2,076	3,060	2,073
20	3,631	3,874	2,441	3,064	3,221
40	2,436	3,932	2,690	4,289	3,553
60	3,577	3,708	2,810	4,049	2,542
50	3,470	4,128	2,610	3,313	2,864
100	2,451	3,544	2,920	3,609	3,559
120	2,850	3,924	2,818	4,073	3,270

Questions and Answers

Q 1: What was the production in 1992/93 when Kwemazandu Irrigation Scheme used animal power in land preparation?

A 1: I appreciated the increase of paddy production at the scheme when drought animal ploughed for 36 acres in 1992/93. The yield level of about 2.5-3.0 ton per 0.5 ha was obtained with the additional of good management as compared to 2.0 ton per 0.5 ha for local varieties (e.g. Supa India, Afaa Mwanza, Kahogo Red). It was 3.0-3.5 up to 4.0 ton per 0.5 ha for IR54 variety which proved to do well with the rate of 60 kg of Nitrogen per ha together with good management (e.g. weed control work).

Q2: What are you doing to convince farmers to cultivate improved variety of rice which they consider unpalatable?

A2: I am preparing a demonstration plot where the farmers can learn based on the observation and report comparing the yield and economics of improved and local varieties.

Q3: If the price of local varieties of rice is higher compared to improved ones, can you still convince farmers to increase their acreage on improved varieties?

A3: Although local varieties have higher prices as compared to the improved one, there is still a chance of convincing them to cultivate the improved one. For example, Supa, with all good crop management, produces 2.5-3.0 ton per ha, while with the same management and addition of nitrogen fertilizer, the improved one produces 3.6-4.0 ton per ha.

PRELIMINARY STUDY TEAM
ON
THE KILIMANJARO AGRICULTURAL TRAINING CENTRE
PHASE II PROJECT
IN THE UNITED REPUBLIC OF TANZANIA

PROJECT CYCLE MANAGEMENT
WORKSHOP REPORT

20 - 24 JUNE 2000

1. INTRODUCTION

1.1 Workshop Objectives

Project Cycle Management (hereinafter referred to as “PCM”) is a procedure to manage planning, implementation and evaluation of a development project more efficiently and more effectively.

In order to create consensus among the project personnel towards a design and the direction of the KATC Phase II Project, a series of workshop was conducted based on the PCM method. This time, two separate workshop sessions were organised.

- 1) First PCM workshop was held mainly for the purpose of identifying the existing conditions and the desirable situation that would be attained once problems have been solved.
- 2) Second PCM workshop was held mainly for the purpose of formulation of a framework of the Project.

1.2 Workshop Outline

The PCM workshop was held at KATC from 20 to 24 June 2000 with the following schedule.

1) First Workshop

Date and Time	Tuesday, 20, Wednesday, 21, Thursday, 22 (9:00-12:30/ 13:30-16:30) and Friday, 23 (9:00 – 12:30)
Participants	Total number of participants was 29 as follows: 1) 2 Extension officers from Mombo irrig. Project and Ndungu Project 2) 4 Farmers from Mombo irrig. Project and Ndungu Project 3) 3 Staff of the Ministry of Agriculture and Co-operatives 4) 1 KATC Principal 5) 3 Heads of Department of KATC 6) 6 Japanese experts of KATC 7) 4 Members of JICA study team 8) 1 Moderator (JICA study team member) 9) 1 Co-moderator (KATC staff) 10) 2 Interpreters/ card translators/ co-moderators (English/Swahili)/ receptionist (KATC staff)
Language	Spoken and written in English (interpreted/translated to Swahili)
Main Program	<ul style="list-style-type: none">- Introduction- Participation Analysis- Problem Analysis- Objectives Analysis

2) Second Workshop

Date and Time	Friday, 23 (13:30-17:00) and Saturday, 24 (9:00-12:30/ 13:30-17:00)
Participants	Total number of participants was 25 as follows: 1) 3 Staff of the Ministry of Agriculture and Co-operatives 2) 1 KATC Principal 3) 3 Heads of Department of KATC 4) 6 Japanese experts of KATC 5) 4 Members of JICA study team 6) 1 Staff of JICA office 7) 1 Japanese expert of Ndungu Irrigation Project 8) 1 Japanese expert and 1 officer of KADP 9) 1 Moderator (JICA study team member) 10) 3 Co-moderators (KATC staff)
Language	Spoken and written in English
Main Program	- Alternatives Analysis - Tentative Project Design Matrix (PDM) formulation

The list of the PCM workshop participants is shown in Annex I.

2. SUMMARY OF THE WORKSHOP RESULTS

The workshop was very successful due to active participation and kind co-operation of the participants, and understanding and supports by related personnel and above all, excellent co-moderation done by Ms.M.Mtika, Mr.G.Maregesi and Mr.N.Nkondora of KATC. The moderator believes, through this PCM workshop, the participants achieved their intended objectives. The participants analysed the current status, identified the objectives and created consensus among each project personnel for the Project. And communication and mutual understanding on the framework of the Project were enhanced through this participatory workshop by those involved in the Project. Involving the representatives of the target group, relevant governmental and implementing agencies in the project planning is also expected to make the project implementation process smooth.

3. DETAILES OF THE WORKSHOP RESULTS

The PCM workshop was conducted in following five steps:

- 1) Participation Analysis,
- 2) Problem Analysis,
- 3) Objectives Analysis,
- 4) Alternatives Analysis and
- 5) Tentative PDM formulation

In order to make farmer's views and aspirations visible, the participants of workshop formed two sub-groups: farmers and extension officers group (hereinafter referred to as "farmer's group") and implementing agencies group (hereinafter referred to as "implementing group").

3.1 Participation Analysis

On the first day, each group conducted "Participation Analysis" as follows.

1) Participation Analysis of the Farmer's Group

The Participation Analysis of the farmer's group was conducted by farmers and extension officer of Ndungu Project, since only they participated in the workshop on the first day and the second day.

In order to grasp overview of all related groups in their villages, the farmer's group identified individual, groups or organizations involved in some way in their village (especially related to agricultural sector). Then related or similar cards were clustered in broad categories such as "Beneficiaries", "Implementing Agencies", "Supporting Agencies" and "Funding Agencies" (the result of group categorization of farmer's group is shown in Annex II- 1).

After conducting the group categorisation, the farmer's group discussed and picked up several "Key" stakeholders that they considered to be the major stakeholders with the serious problems. Then they analyzed main characteristics of each key stakeholder using such criteria as "Needs", "Strengths", "Weaknesses", "Roles/Jobs" and "Prospects/Desirable Picture" (The results shown in Annex II - 2).

In this analysis, "training" is regarded as their needs shown in below.

- Training needs of farmers:
 - 1) General management skills
 - 2) Water management skills
 - 3) Rice cultivation techniques
 - 4) Machinery and maintenance of skills
 - 5) Marketing skills, micro enterprises, basic business skills, income generation
 - 6) Leadership training

- Training needs of extension officer:
 - 1) Rice production skills
 - 2) Group dynamics

2) Participation Analysis of the Implementing Group

The Participation Analysis of the implementing group was conducted by the participants of KATC, Ministry of Agriculture and Co-operatives (hereinafter referred to as "MAC") and JICA experts of KATC.

Participation Analysis of the implementing group was conducted to grasp an overview of all parties directly and indirectly connected with the Project. This analysis began with listing all individuals, groups, organizations and institutions connected with the Project and categorized them by certain characteristics such as “Beneficiaries”, “Implementing Agencies”, “Supporting Agencies” and “Funding Agencies” (the result of group categorization of the implementing group is shown in Annex II- 3).

Then the implementing group made a relational chart of major organizations of the Project. Through this formulation, the implementing group clarified that there is a sequence of benefits among each related stakeholders, namely, KATC benefits first by receiving training, equipment and technology transfer, then the technical staff with training, and training/research institutes with technical information and training and in the long run, farmers with improved agricultural techniques and skills (The results shown in the Annex II - 4).

After conducting the group categorisation, the implementing group conducted detailed analysis of staff of KATC and MAC. The implementing group analyzed main characteristics of the different groups using such criteria as “Needs”, “Strengths”, “Weaknesses”, “Roles/Jobs” and “Prospects/Desirable Conditions” as same as the analysis of the farmer’s group (The results shown in Annex II – 5 and 6).

3.2 Problem Analysis

On the second day, each group separately conducted “Problem Analysis”. From the second day, the JICA Preliminary Study Team members joined the analysis of the implementing group.

Problem analysis visually represents the causes and effects of existing problems pertaining to the project area or sector in the form of a problem tree. This analysis begins with selecting a “Core Problem” which is a starting point (problem) for analysis and is usually selected among many problems faced by the target group. The problem analysis continues to find direct causes and effects of the core problem and develops a problem tree downwards (seek causes) and upwards (seek effects).

1) Problem Analysis of the Farmer’s Group

In this analysis, the various problems of farmer’s were analyzed. At the beginning, several problems were listed and related or similar problems were then clustered. Among several potential core problem cards, “Low yield per unit area” was chosen as a core problem. The problem analysis continued to find direct causes and effects of the core problem. With regard to the core problem, eleven direct causes were identified and one direct effect results. The ultimate problem was also identified as “Poor living standard (of farmers)” (The results shown in Annex III – 1).

2) Problem Analysis of the Implementing Group

At the beginning, the implementing group discussed “who is the target group of the Project” and selected “Rice Farmers in irrigation scheme” accordingly. Through the Participation Analysis, the implementing group already identified there were several stakeholders connected with the Project area (irrigation scheme) and each stakeholder may have different problems depending on their organizations. Because of that, the implementing group selected three main stakeholders such as “Rice Farmers” from the beneficiary group and “Technical Staff” and “Managers” from the implementing agencies group for the further Problem Analysis.

In this analysis, “Productivity of rice in irrigation scheme is low” was chosen as a common core problem of each group analysis. The problem analysis continued to find direct causes and effects of the core problem, and the result is shown in Annex III – 2, 3 and 4.

3) Joint Problem Analysis of the Farmer’s Group and the Implementing Group

On the third day, the result of the Problem Analysis of each group were presented and compared in a discussion with the farmer’s group and the implementing group. From the third day, farmers and extension officer of Mombo irrigation Project also participated in the analysis of the farmer’s group.

Contrast comparisons served as eye openers on high abilities of the farmer’s group in their analysis. Since there were several common problems in each analysis, all participants decided to combine each problem tree into a “Joint Problem Tree”. In the Joint Problem Analysis, “Productivity of rice in irrigation scheme is low” was chosen as a core problem. The problem analysis continued to find eight direct causes and effects of the core problem. All workshop participants jointly developed the problem tree carefully examining the proper wording, adequacy of cause and effect relationship and comprehensiveness of the problem tree. (The results of the Joint Problem Analysis is shown in Annex III – 5).

3.3 Objectives Analysis

After completing the Problem Analysis, all workshop participants jointly conducted the Objectives Analysis on the forth day. From the forth day, JICA expert and a staff of KADP, JICA expert of Ndungu Project and a JICA staff from Dar es Salaam newly joined in the analysis.

Objectives Analysis is a process for identifying the desirable situation that would be attained once problems have been solved, and clarifying the means-ends relationships required for attaining such conditions. This exercise begins by replacing cause-effects relationship with positive means-ends ones.

objective card starting “Productivity of rice in irrigation scheme is improved” replaced the core problem. During the process, the objectives cards, which appeared unrealistic or unnecessary were deleted or revised the statement and some necessary “means” were added. The result of the Objectives Analysis is shown in ANNEX IV.

3.4 Alternatives Analysis (Project Selection)

From Alternatives Analysis, the participants of KATC, MAC, KADP, JICA experts and JICA Preliminary Survey Team conducted the analysis.

The Alternatives Analysis is also called as Project Selection process to identify project components and feasibility, and to select specific project strategies based on the information obtained in the Objectives Analysis.

The Alternatives Analysis started by identifying several approaches in the objectives tree and gave a name to each approach that clarifies the objectives of the approach. The result of the identified approaches is shown in below.

Identified Approaches	
-	Rice Production Techniques Improvement Approach
-	Human Resources Development Approach
-	Rice Mechanisation Improvement Approach
-	Water Management Improvement Approach
-	Inputs and Supply Improvement Approach

The workshop participants then compared and examined several components of each approach in according to the selection criteria such as “Target Group”, “Priority of Government of Tanzania and Government of Japan”, “Technical Aspects”, “Cost”, “Human Resources” and “Social Factors” (the result of this analysis is shown in Annex V).

3.5 Draft of Tentative Project Design Matrix Formulation

Project Design Matrix (hereinafter referred to as “PDM”) is a summary table of the project that incorporates key elements such as Overall Goal, Project Purpose, Outputs, Activities, Inputs, Indicators, Means of Verifications, Important Assumptions and Preconditions. A brief definition of each box is described in shown in below.

Definition of PDM

Overall Goal	A long-term development effect expected as a result of the achievement of the Project Purpose.
Project Purpose	A medium-term objective that is expected to achieve by the time the project is completed. The Project Purpose should be selected among direct benefit or impact given to the target group.
Outputs	Immediate and short-term objectives to be realized by the project in order to achieve the Project Purpose.
Activities	Specific actions conducted during the project implementation to produce the Outputs by effective use of Inputs.
Objectively Verifiable Indicators	Indicators which enable to measure degrees of progress and achievements of Outputs, Project Purpose and Overall Goal.
Means of Verifications	A data source to verify indicators such as statistics, reports or surveys results.
Important Assumptions	Conditions required achieving objectives but that exist outside the control of the project.
Preconditions	Requirements needed to initiate a project.
Inputs	Necessary personnel, equipment, fund for project activities.

Since this workshop was conducted at preliminary stages of the Phase II Project, it was suggested to define only the main project elements (Narrative Summary) and the important assumptions of PDM at the present time.

Based on the result of the situation analysis, the workshop participants formulated a draft of tentative PDM as shown in ANNEX VI. In defining the objectives of the PDM, the participants were requested to consider several points. For instances, the objectives were defined with taking into consideration of the essential characteristics, that is any objectives should be Specific, Measurable, Achievable, Relevant and Time-Bound (SMART). The duration of technical co-operation, target group, project area and the objectives and outputs of the Project were defined as follow.

1) Duration of Technical Co-operation

Five (5) years from July, 2001 to June, 2006

2) Target Group

Rice farmers in the irrigation schemes

3) Target Area

The selected irrigation schemes (the target area will be selected later)

4) Objectives and Outputs of the Project:

- ◆ Super Goal: Living Standards on rice farmers in the selected irrigation schemes are improved.

- ♦ Overall Goal: Agricultural income of rice farmers in the selected irrigation schemes is increased.
- ♦ Project Purpose: Productivity of rice in the selected irrigation schemes is improved.
- ♦ Outputs:
 - 1) The needs of farmers in the selected irrigation schemes are identified.
 - 2) Technical/professional/pedagogical capabilities of KATC staff are improved.
 - 3) Rice information centre at KATC is established.
 - 4) Human resources for rice production in the selected irrigation schemes are developed.
 - 5) Rice production techniques in the selected schemes are improved.
 - 6) Water management techniques for farmers, technicians and scheme managers in the selected irrigation schemes are improved.
 - 7) Supply of inputs in the selected irrigation schemes is improved.
 - 8) Rice mechanisation techniques for farmers, technicians and scheme managers in the selected irrigation schemes are improved.
 - 9) Gender aspects are adequately addressed in the selected irrigation schemes.

4. WORKSHOP EVALUATION

4.1 Evaluation by the workshop participants

Before closing the workshop, the moderator asked the participants to write their impressions or comments according to the following three questions.

- “What was good during the PCM workshop?”
- “What was unsatisfactory?”
- “Recommendations”

The following comments were received from the workshop participants as an evaluation of the PCM workshop (The sentence is original and not edited).

1) Farmers Group

What was good during the PCM workshop are:

- ♦ Selection of workshop participants was excellent.
- ♦ Facilitators lead the participants to reach/attain the objective of the workshop.

What was unsatisfactory during the PCM workshop are:

- ◆ Delay of the invitation letters for some participants.
- ◆ Missing the attendance of targeted participant (of Mto Wa Mbu).

Recommendations are:

- ◆ Seminar of this kind should be organised frequently.
- ◆ Time schedule for the workshop should increase.
- ◆ Participants should be availed with a copy of their works.

2) Implementing Group

What was good during the PCM workshop are:

- ◆ Time is not enough but generally it is very good.
- ◆ All success. But lack of time.
- ◆ I learn a lot from this PCM workshop. I like to use this method in my work.
- ◆ This workshop is my first time real workshop.
- ◆ PCM is very useful.
- ◆ Well done.
- ◆ Well organised.
- ◆ PCM is one of the participatory approaches.
- ◆ PCM encourages participation work.
- ◆ Farmer's opinions have been interested.
- ◆ We could know the farmer's problems and needs through PCM workshop.
- ◆ Involving the target group, implementators makes in the project planning will smooth the project implementation process and should be encouraged.
- ◆ Facilitator was good and experienced. Encourage participatory approach.
- ◆ You are very good moderator. Keep it up.
- ◆ A strongly appreciate your patience, guidance which made it easy to accomplish the task in time
- ◆ Your activities

What was unsatisfactory during the PCM workshop are:

- ◆ Not enough time to deepen the analysis.
- ◆ Time was too short (3)
- ◆ The workshop was time some as it went beyond the normal working time.
- ◆ Time schedule was too long.
- ◆ Time schedule was not adhered to.
- ◆ Covered too fast.
- ◆ Not all the invited problem attended due to communication problem.
- ◆ Repetitions of expression of intended purposes made the workshop boring.
- ◆ I need more big cards.

Recommendations are:

- ◆ More time is provided so that all tasks could be accomplished.
- ◆ No time allocation.
- ◆ More time for preparation and more necessary discussion time.
- ◆ Such a workshop should take at least two weeks.
- ◆ This kind of analysis should be done before official request of technical co-operation.
- ◆ JICA's procedure of project formulation should be explained at early stage.
- ◆ I should attend workshop from the beginning. I can not understand why the strong and big possibilities to co-ordinate with other donors, NGOs and JICA's other program were eliminated in the planning of this project. Everything by this workshop seems to concentrate on what KATC should do in the project.
- ◆ I can not understand differences between "precondition" and "important assumptions".
- ◆ The participants of the workshop should be reduced.

4.2 Evaluation and Recommendation by the Moderator

According to the evaluation by the workshop participants, they assured PCM methods highly and satisfied with the result of the works. The moderator is under the impression, however, the time for the preparation was too short for the smooth procedures and the duration of the workshop was also too short for deepen discussions and complete analysis. Then due to time constraints, the objectively verifiable indicators, means of verifications and inputs of PDM were not defined at this time. For the reflection of the workshop results, the moderator recommends as follows.

- ◆ Since this workshop was conducted at preliminary stages of the Phase II Project, the PDM formulated during this workshop is regarded as the tentative version. This means this PDM should be reviewed regularly and revised when necessary.
- ◆ The PCM method is a usable tool for the entire cycle of the Project – from formulation, implementation, monitoring and evaluation. Therefore it is recommended that the PDM should be reflected to the Project implementation, monitoring and evaluation.
- ◆ For the success of the PCM workshop, good preparation is essential. Therefore, more time for the preparation of the workshop should be provided for the smooth accomplishments of works.

ANNEX

I. List of Participants of PCM Workshop

II. Participation Analysis

- II - 1. Group Categorization by the Farmer's Group
- II - 2. Detailed Group Analysis by the Farmer's Group
- II - 3. Group Categorization by the Implementing Group
- II - 4. Regional Chart of Major Organizations by the Implementing Group
- II - 5. Detailed Group Analysis of KATC by the Implementing Group
- II - 6. Detailed Group Analysis of MAC by the Implementing Group

III. Problem Analysis

- III - 1. Problem Analysis by the Farmer's Group
- III - 2. Problem Analysis of Farmers by the Implementing Group
- III - 3. Problem Analysis of Technical Staff by the Implementing Group
- III - 4. Problem Analysis of Managers by the Implementing Group
- III - 5. Problem Analysis by the Farmer's Group and the Implementing Group

IV. Objectives Analysis (by the Farmer's Group and the Implementing Group)

V. Alternatives Analysis (Comparison of Each Approach)

VI. Draft of Tentative Project Design Matrix for the Project (version 0)

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List of Participants of PCM Workshop

A total number of 31 participants had attended the workshop as shown below.

Tanzania Side

KATC:

Mr. Richard J. Shayo	Principal
Mr. Adam G. Pyuza	Deputy Principal
Mr. E.S. Massawe	Head, Extension and Training Department
Mr. G. Maregesi	Head, Water Management Department
Mr. N. Nkondora	Head, Agricultural Machinery Department
Ms. Grace G. Mshanga	Tutor, Catering Officer
Ms. Mary Mtika	Tutor, Extension and Training Department

Ministry of Agriculture and Co-operatives:

Mr. R.S. Kapande	Director Training Institutes
Mr. M.W. Misabo	KATC Desk Officer
Ms. M.J.Z. Ndaba	Policy & Planning Dept, External Assistance Co-ordination

KADP:

Mr. J.S. Mwafuliwa	Agric. Officer II
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Mombo irrg. Project

Mr. Charles Z. Kweka	Extension Officer
Mr. Ibrahim Athumani	Farmer
Ms. Rehema Mohamedi	Farmer

Ndungu Project:

Ms. H. Herriel Semadio	Extension Officer
Ms. Rebeka I. Kabalo	Farmer
Mr. John R. Mjema	Farmer

Japanese Side

KATC:

Mr. Noboru Koibuchi	Leader
Mr. Takashi Nakagawa	Coordinator
Mr. Kiyoshi Shiratori	Expert (Extension and Training)
Mr. Yoshinori Satomi	Expert (Water Management)
Mr. Shoji Abe	Expert (Rice Cultivation)
Mr. Nobuyuki Abe	Expert (Agricultural Machinery)

KADP:

Mr. Kenji Tamura	Expert
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Ndungu Project:

Mr. Hideo Okada	Expert
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JICA – Dar es Salaam

Mr. Takehiro Susaki	Assistant Resident Representative
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JICA Preliminary Survey Team:

Mr. Hirotooshi Koda	Leader (Agricultural Extension and Training), Rector, Ibaraki Agricultural College
Mr. Hiroshi Tottori	Expert (Farming System), Ministry of Agriculture, Forestry and Fisheries
Mr. Shinji Tomita	Expert (Irrigation Scheme), Section Chief, Ministry of Agriculture, Forestry and Fisheries
Ms. Chiaki Nakamura	Expert (Participatory Planning), Researcher, Global Link Management, Inc.
Mr. Kenji Kaneko	Expert (Technical Cooperation), Deputy Director, JICA

Participation Analysis – Group Categorization by Farmer's group

The result of Group categorization is shown in below.

Beneficiaries	Implementing Agencies	Supporting Agencies	Funding Agencies
<ul style="list-style-type: none"> • Rice farmers • Middle men • Stockiest • Laborers 	<ul style="list-style-type: none"> • Farmers organizations (CHAWAMPYO) • Operators • Gate keepers for water distribution • Rice farmers • Rice middle men • Labors for transplanting and harvesting • Stockiest • Tractor operators 	<ul style="list-style-type: none"> • Government employee; -Irrigation technicians -Agricultural machinery, -Mechanics, -VEOs, -KATC staff, -SUA, -JICA experts 	<ul style="list-style-type: none"> • JICA • Tanzanian government • Rice farmers

Detailed Analysis (by farmers group)

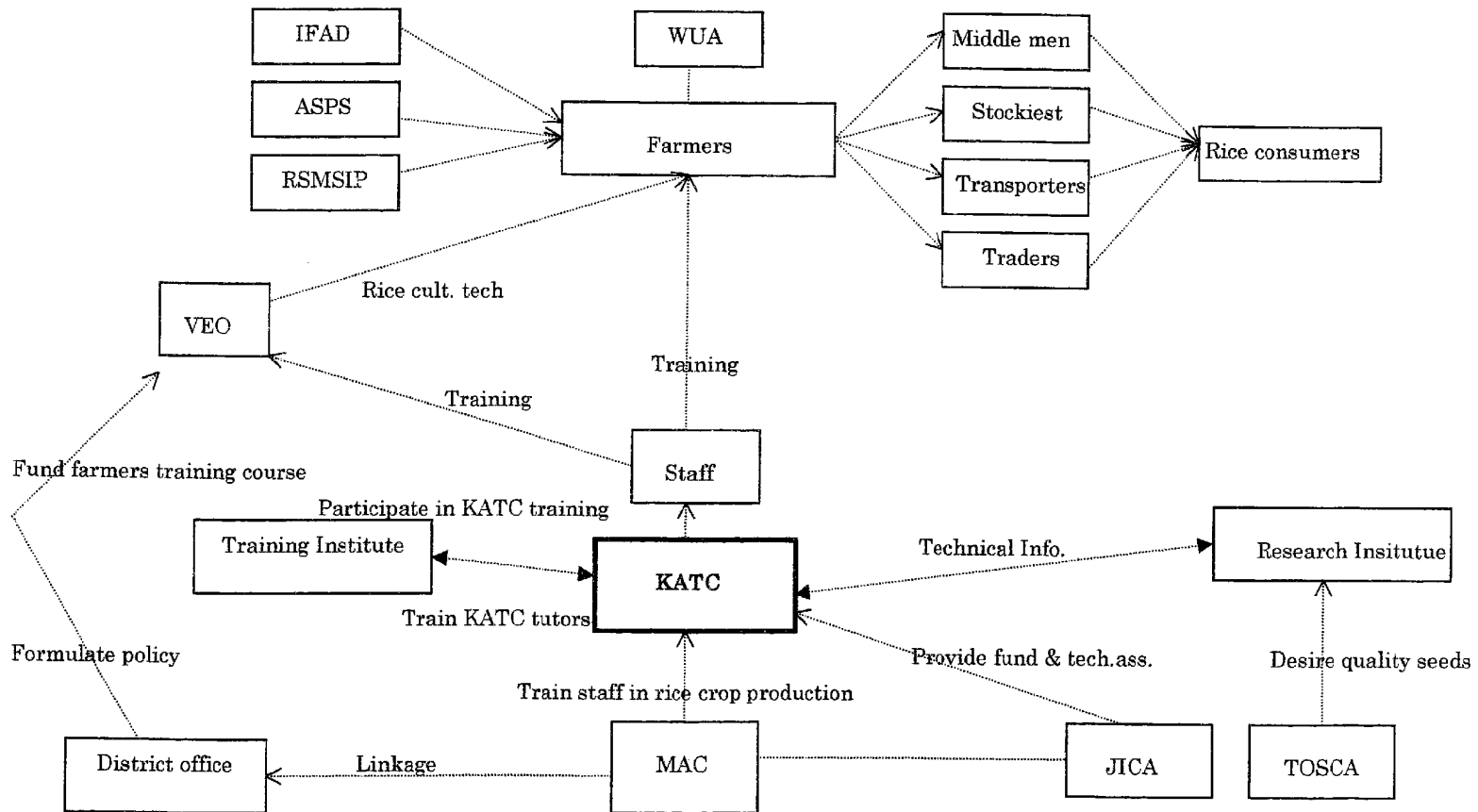
	Rice farmers	Farmers Organization	Tractor operators	Rice buyers/middle men	Stockiest	Extension officer
Needs	Training(*)	Training	Training	To get profit	To get profit	To attend seminar/ workshop
Strengths	High ability of working	Collection of charges from farmers	Field working ability (working hard in difficult condition)	Buy farmer paddy in cash	Ability to bring inputs near to farmer's	To mobilize group and train farmers
Weakness	Low capital	Poor coordination with farmers	No working gears	Low price of paddy	Few kind of inputs	Low agricultural skills
	Low education levels	Poor management skills	Cannot perform trouble sheeting		Expired inputs	Low motivation
	No cooperation among farmers					Shortage of VEO's
	Some farmers do not follow VEO's advice					
Roles	Paying tractors and water charges	To give service farmers	To maintain agricultural machinery	To buy farmers paddy	To distribute inputs to farmers	To provide advises to farmers
	To implement good crop husbandry					Monitoring and evaluation of farmers activity
Prospects	Improve living standard	Provision of credit facility	Good field operation technique	To get big profit	Good profit	Farmers to increase yield / areas
		To control rice marketing	To get basic needs			

Participation Analysis – Group Categorization by Implementing group

The result of Group categorization by implementing group is shown in below.

Beneficiaries	Implementing Agencies	Supporting Agencies	Funding Agencies
<ul style="list-style-type: none"> • Rice Farmers - out of irrigation scheme - in rainfed - Owner farmers - Agricultural labors - Tenant farmers - Women farmers - Men farmers - State farmers • Farmers' cooperatives • CHAWAMPU • Water Users Association • Irrigation Association • Farmer leaders • Rice market • Machinery dealer • Tractor operator • Project leader • Scheme managers 	<ul style="list-style-type: none"> • TZ Government • MAC • NAEPII • KATC • KATC tutors • KADP • JICA experts • ASPS • IFAD • Irrigation department • Regional government • Local irrigation office • District councils • District crop officer • MRALG 	<ul style="list-style-type: none"> • NGO • White Smith • Black Smith • Local artisan • TIP • ADB • Rice researcher • Research institutes • TPRI • TOSCA • Machinery dealer 	<ul style="list-style-type: none"> • Japanese Government • Japanese tax payers • TZ Government • SUA • Tractor operator • Rice research center • Training Institute • Scheme managers

Relational chart of major organizations

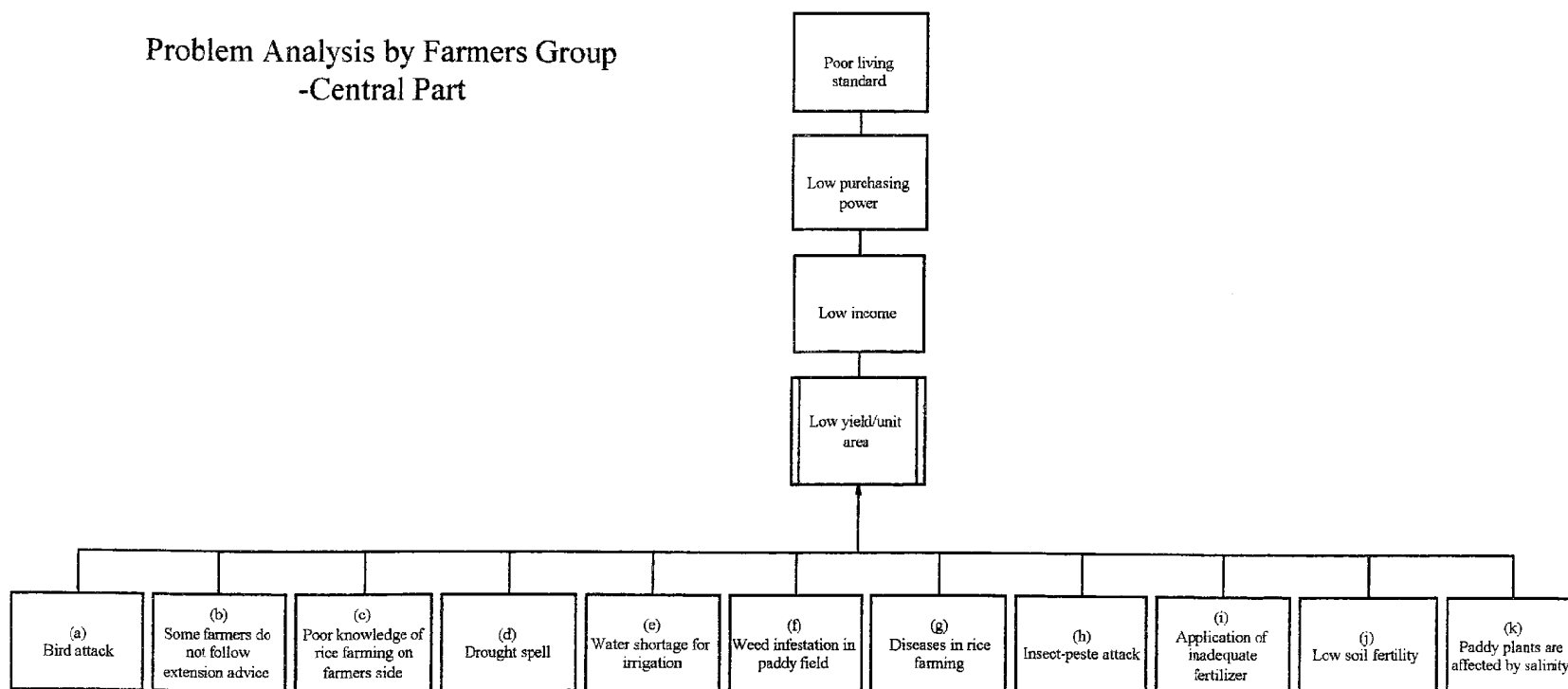


Detailed Analysis (KATC)

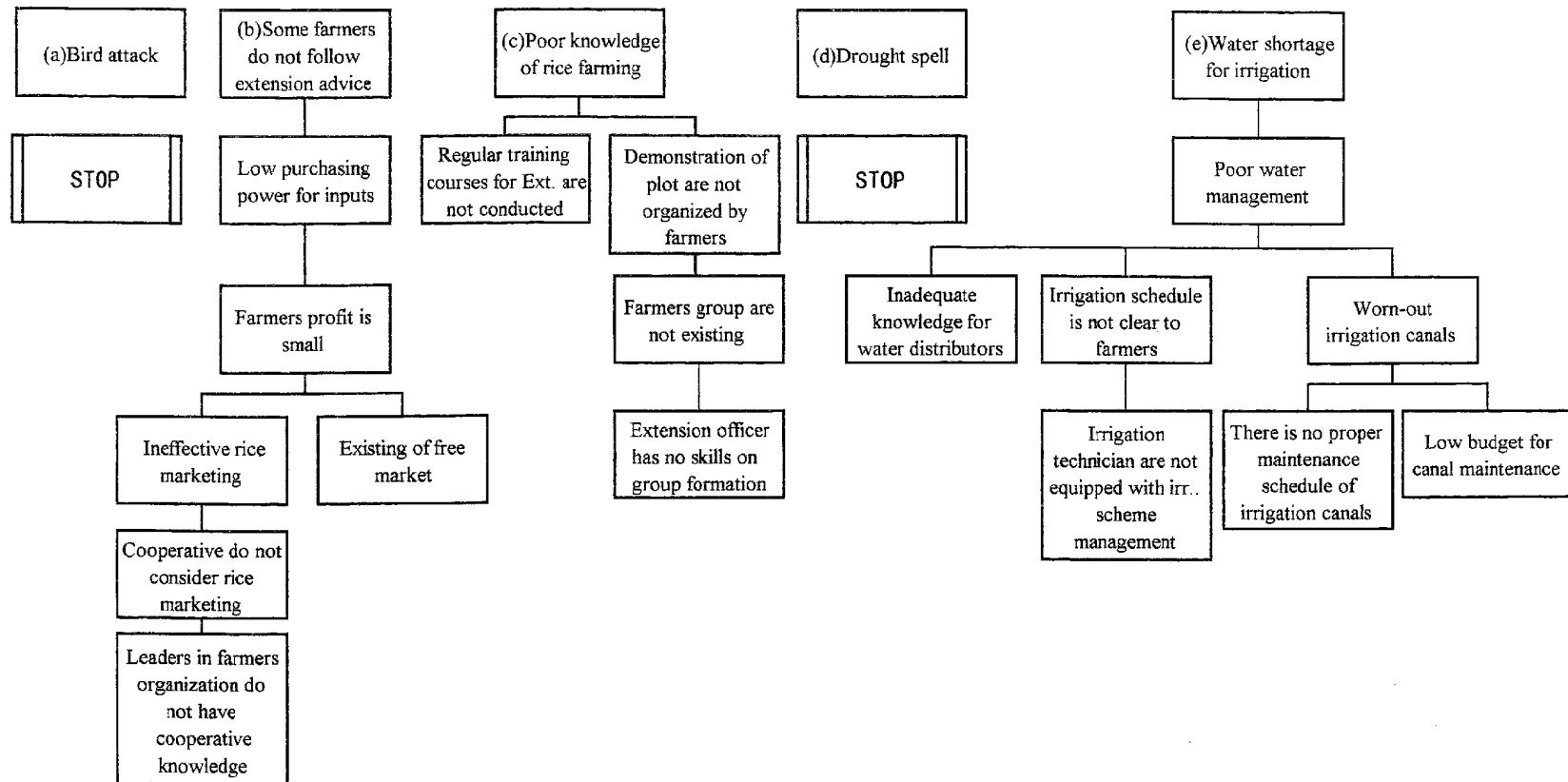
Needs	Strengths	Weaknesses		Roles	Prospects
Practical technical training for KATC tutors	Existing courses well known and accepted	Shortage of training funds	The progress of the staff is slow	Training for operation of machinery	Well managed irrigation scheme
More qualified trainers needed	Conduct VEO-Key farmer course	Lack of practical skills of tutors	? Low sense of responsibility of tutor	Training for irrigation officers	Increase irrigated rice farmers living standard
Use limited fund effectively	Specialized in improved rice farming	Donor dependence	Not completing task by staff	Planning training	Enhancement of technical/ financial capabilities
Sustainable budget from TZ government	Conduct training to farmer's directly	Tutor's motivation is low	? Worship of money	Training for farmers and VEO	More team work
Supporting staff	We have better teaching facilities	Not enough goods handling , equip, vehicles, machinery, etc.	Far from DSM	Training for rice farmer's	Well organized farmers group
KATC have more paddy field	Capacity to disseminate modern rice culti. tech.	Lack of technical information of irrigation	The effect of training is not shown easily	Training for mechanization officer	Demand-oriented training
Professional and progressive staff	Presence of donor support	Poor staff understanding between J&T	↑ Inadequate contents of training	Training for mechanized rice farming	Africa No.1 training institute for rice cultivation
Facilitation of staff by JICA possible (allowance)	Ability to develop & conduct new short courses	Little resource base for income generation		Preparation/ review of curriculum	A sustainable self supporting training center
To give motivation to staff	Reasonable tuition fee	Weak advocacy		Publication	Improvement irrig.rice farming
Telecommunication improvement		Less training for rainfed rice cultivation		Survey	Improvement of food security for TZ

Detailed Analysis (MAC)

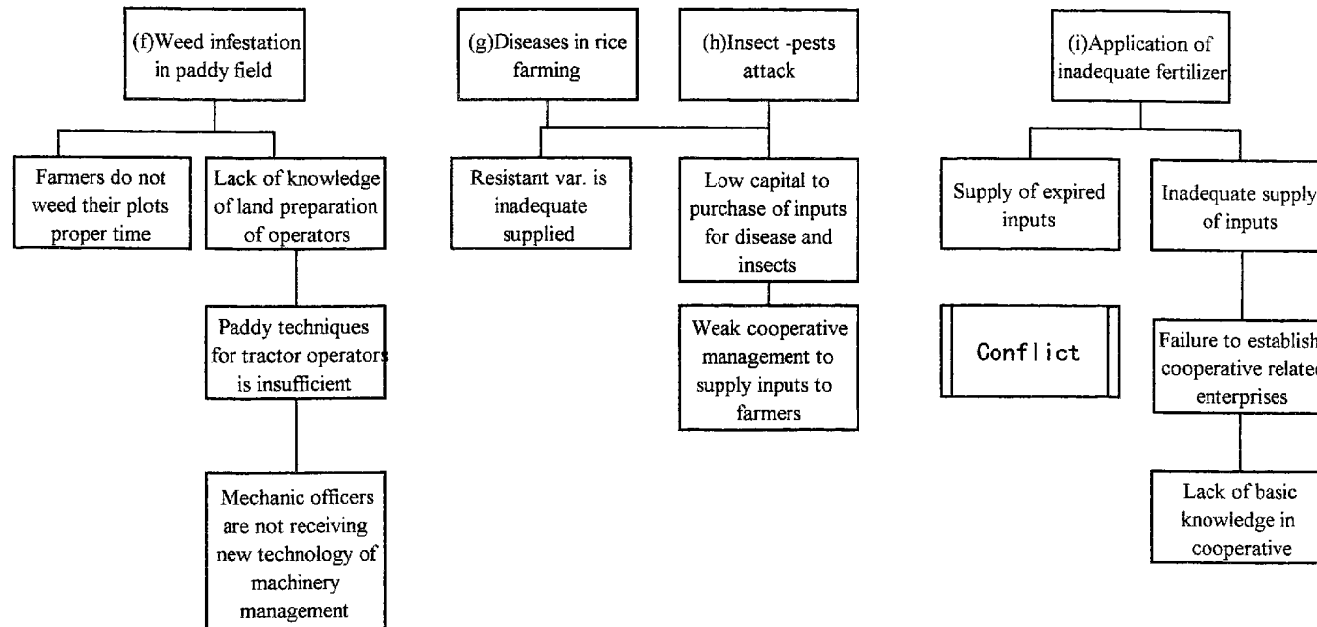
Needs	Strengths	Weaknesses	Roles	Prospects
Financial assistance	Well established organization structure	Poor communication network	Regulatory	Clear vision
Technical assistance	Capable leadership	Weak research - ext-farmer linkages	Monitoring	Full supporting budget
Capacity building in retraining staff	Qualified staff in training, extension, research & plan	HIV/AIDS threat	Guidance	Efficient and effective communication system
Training	Support programs/projects	Inadequate working facilities	Linkage	Motivated workers
Sensitizing farmers and tutors in HIV/AIDS issues	VEOs deployed to district	Weak M&E system	Supervisory	Full enrollment of students in MATI and LITIs
Facilitation of MAC communication	Research network	Donor syndrome	Research	Capacity to delivery quality public services
Facilitation of MAC transport	Natural resources available; land, irrigation areas	Limited finance from GVT	Policy formulation and monitoring	
Strengthening farmers organizations		Frequent institutional changes	Training	
Review of Policy (rice)		Inadequate no. of extension personnel	Natural resource management	
		Inadequate research in irrigated agriculture		



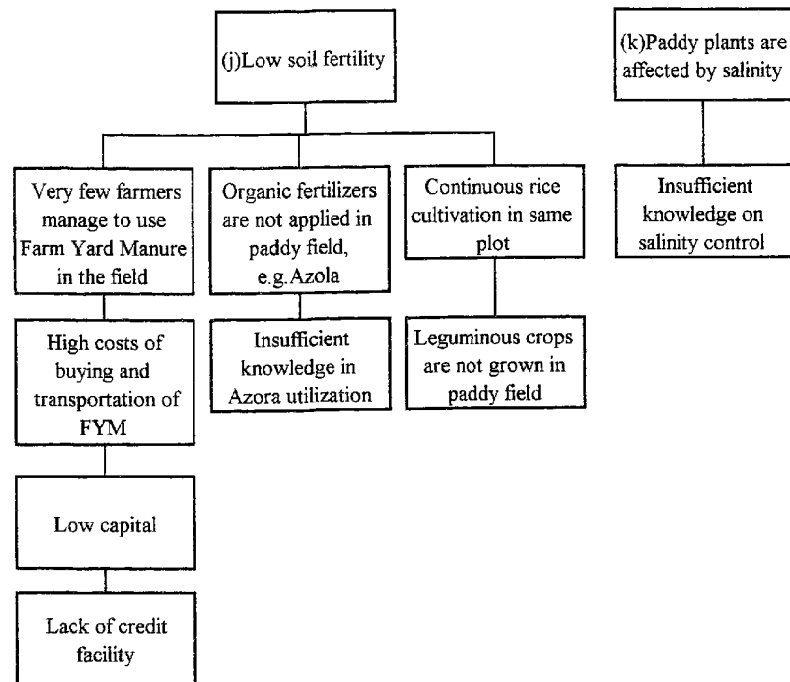
Problem Analysis by farmer's group (Lower Part 1)



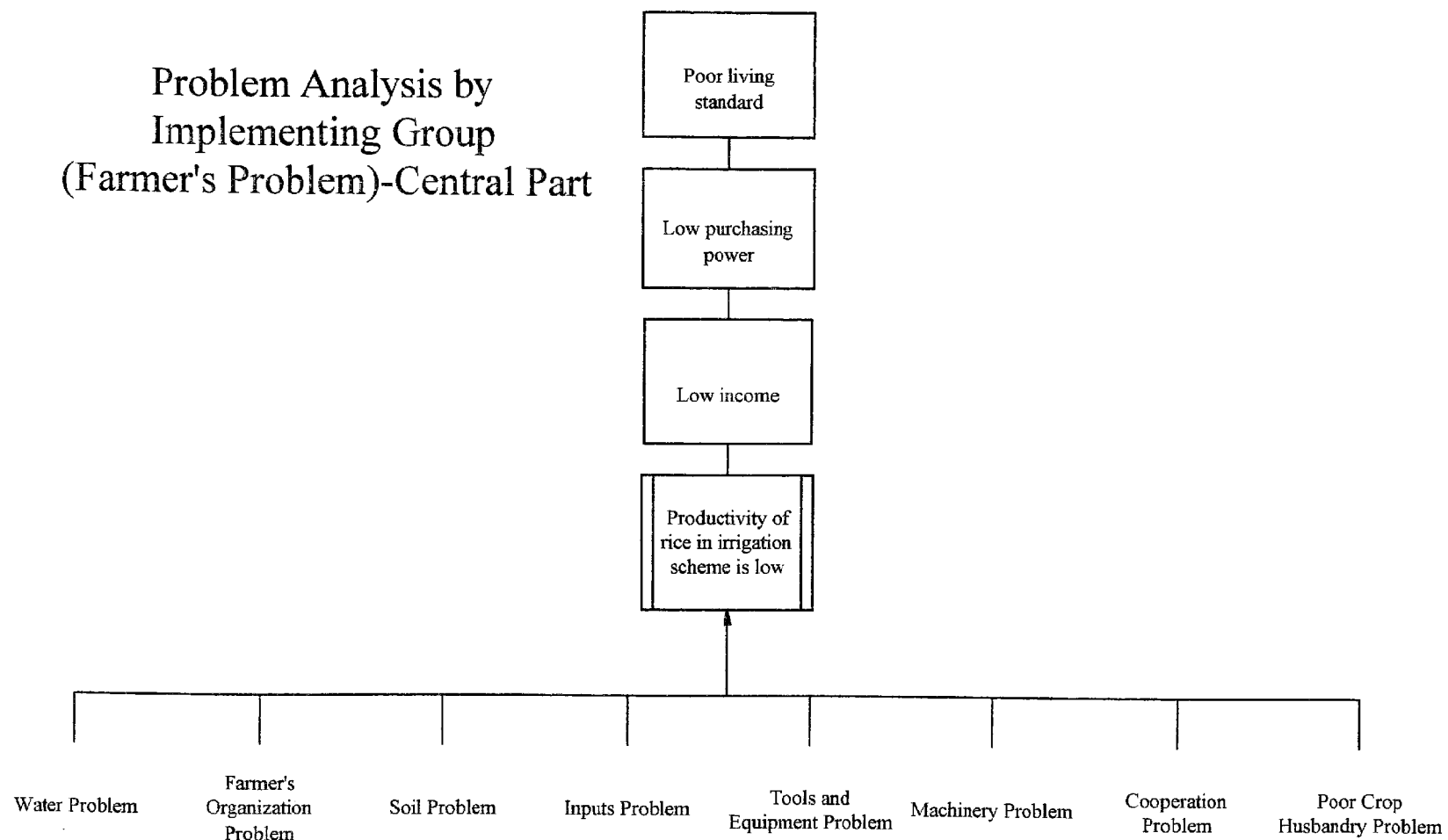
Problem Analysis by farmer's group (Lower Part 2)



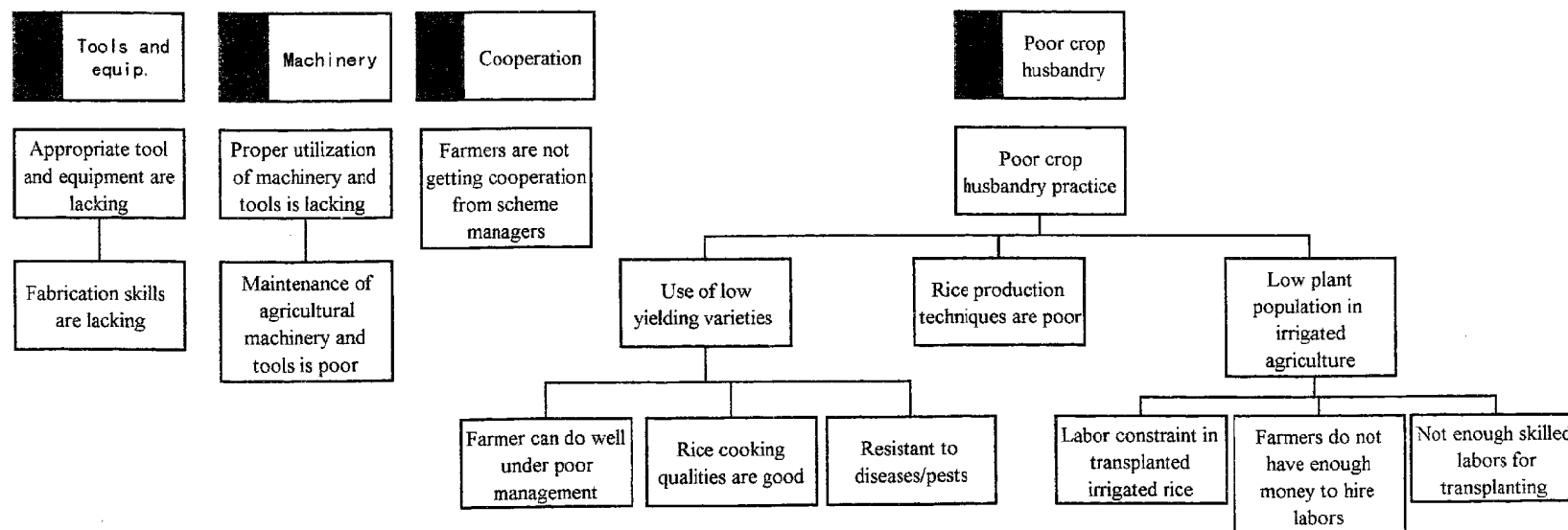
Problem Analysis by farmer's group (Lower Part 3)



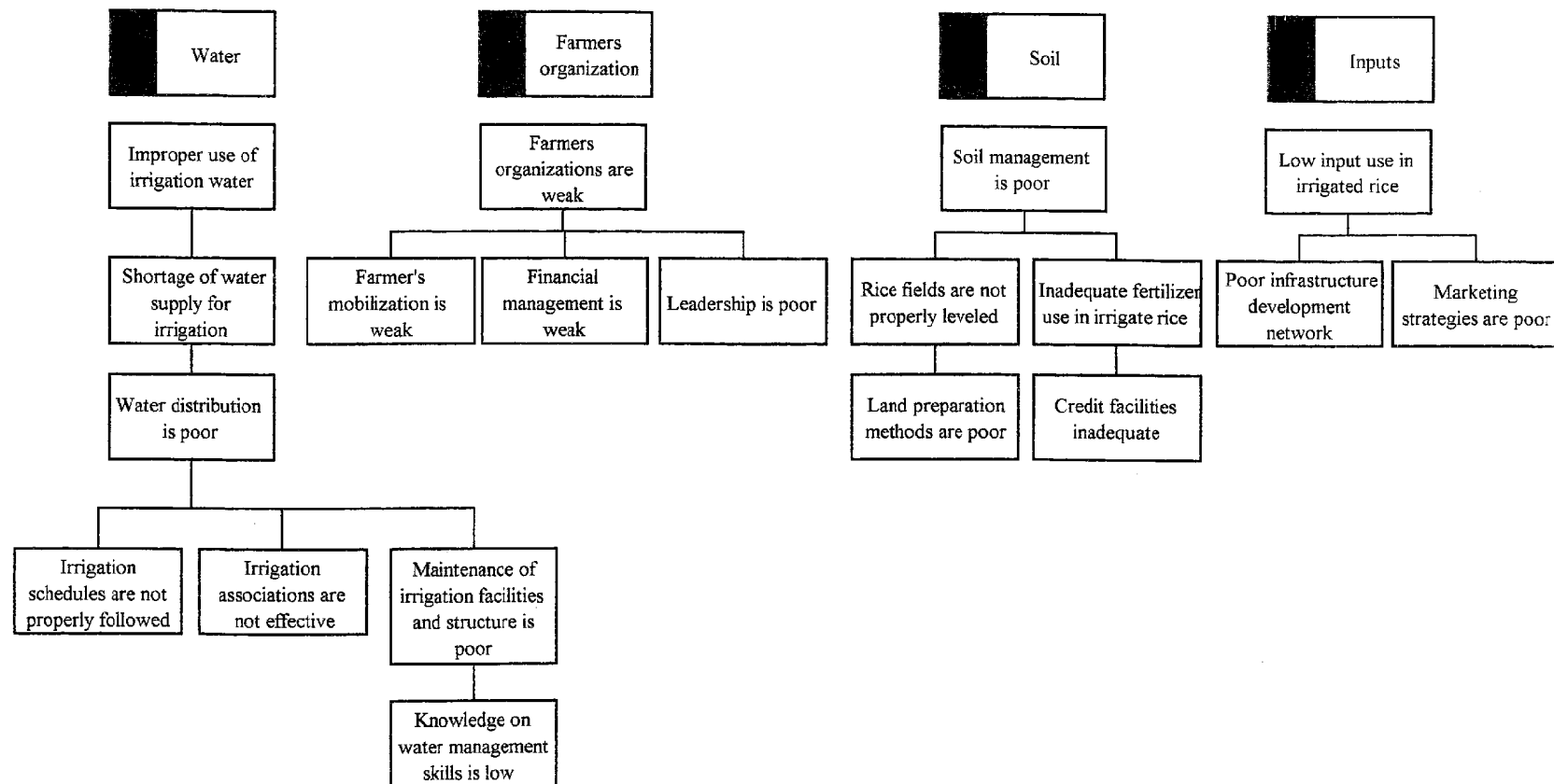
Problem Analysis by Implementing Group (Farmer's Problem)-Central Part



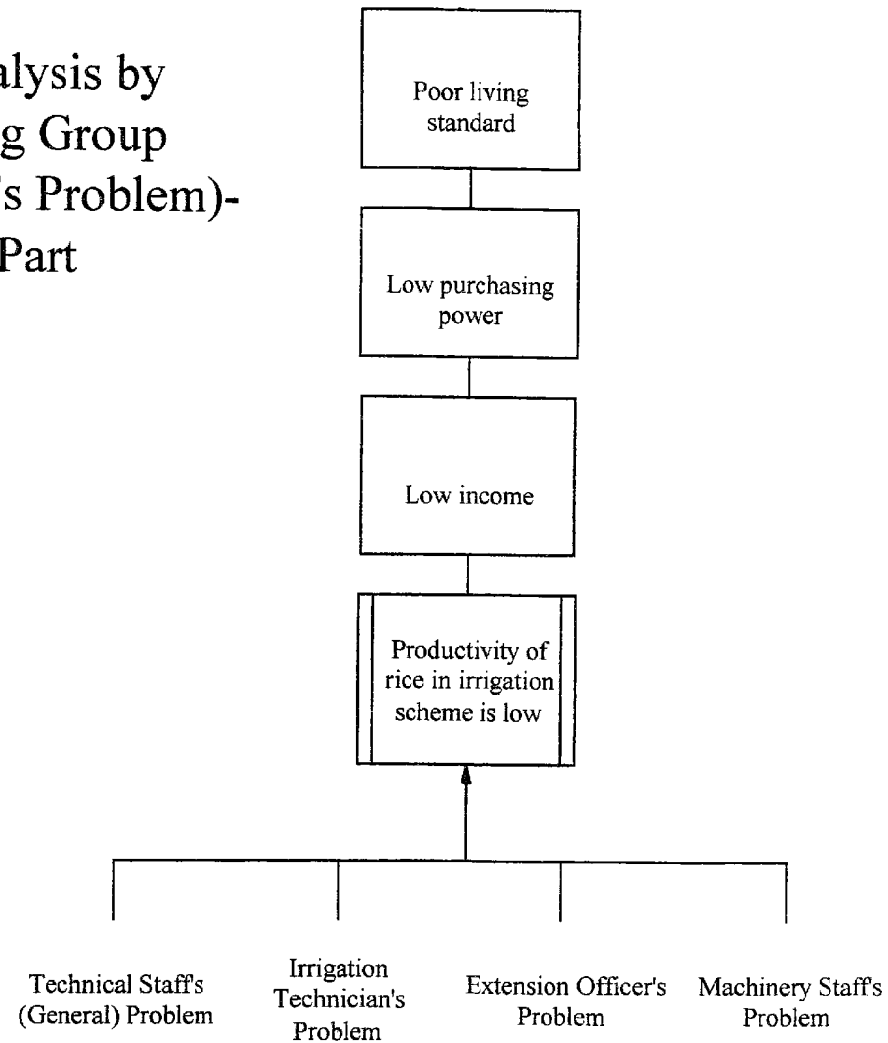
Problem Analysis by implementing group (Lower Part 1; farmer's problem)



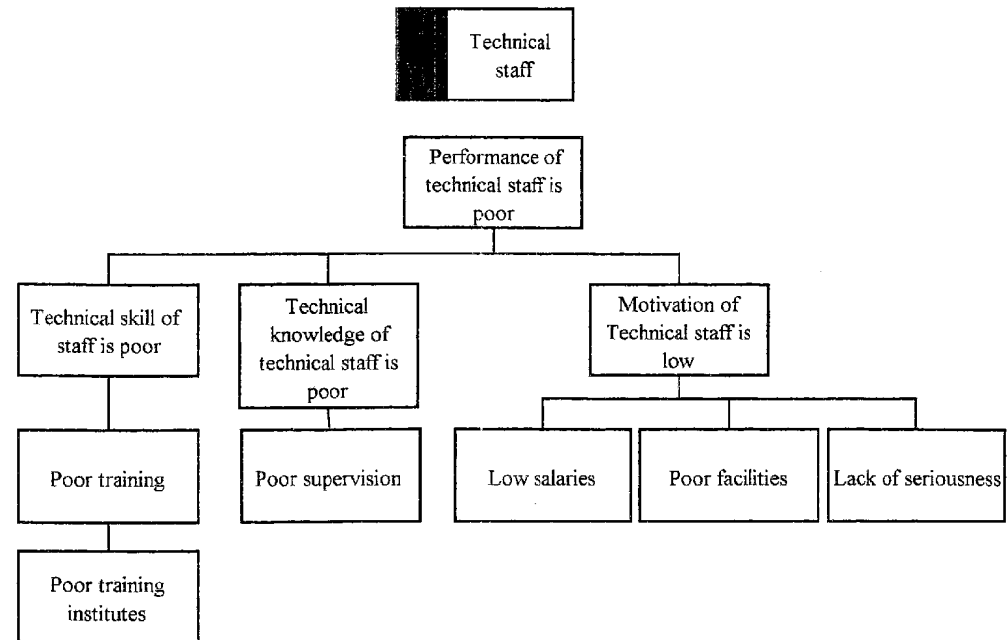
Problem Analysis by implementing group (Lower Part 2; farmer's problem)



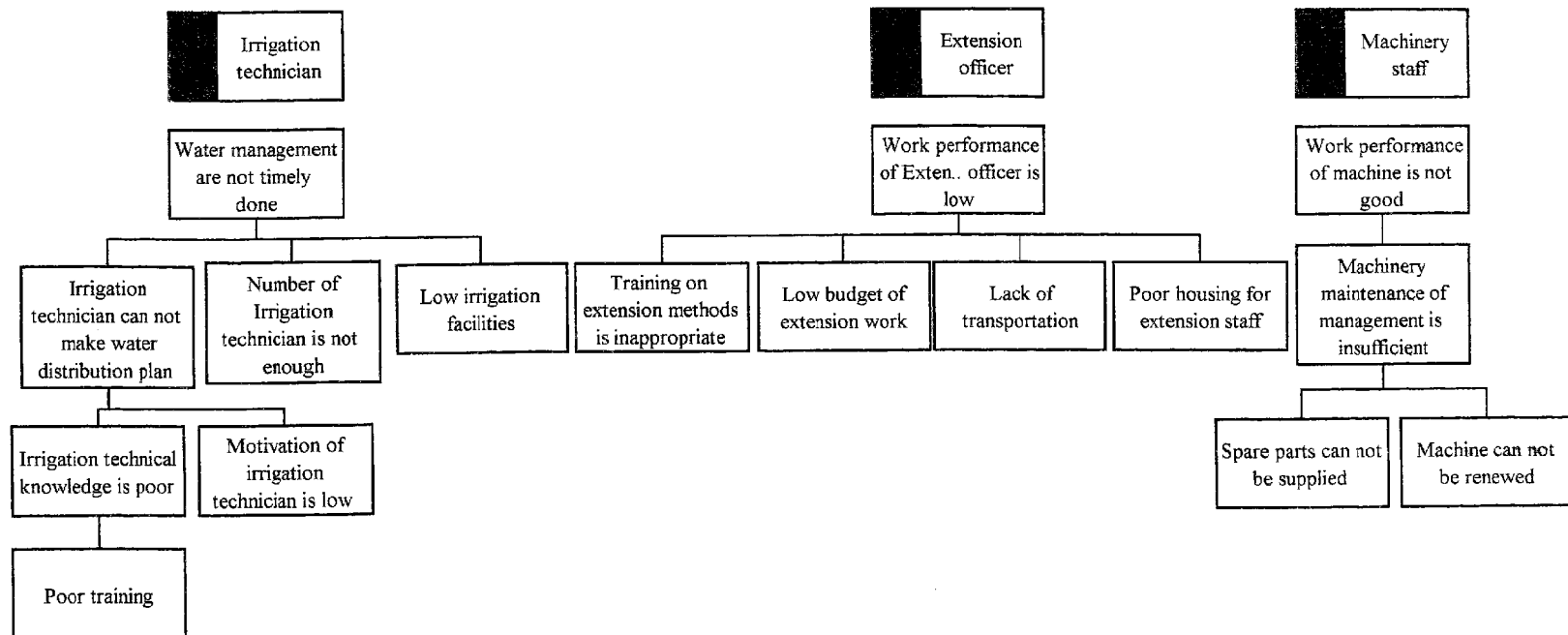
Problem Analysis by
Implementing Group
(Technical Staff's Problem)-
Central Part



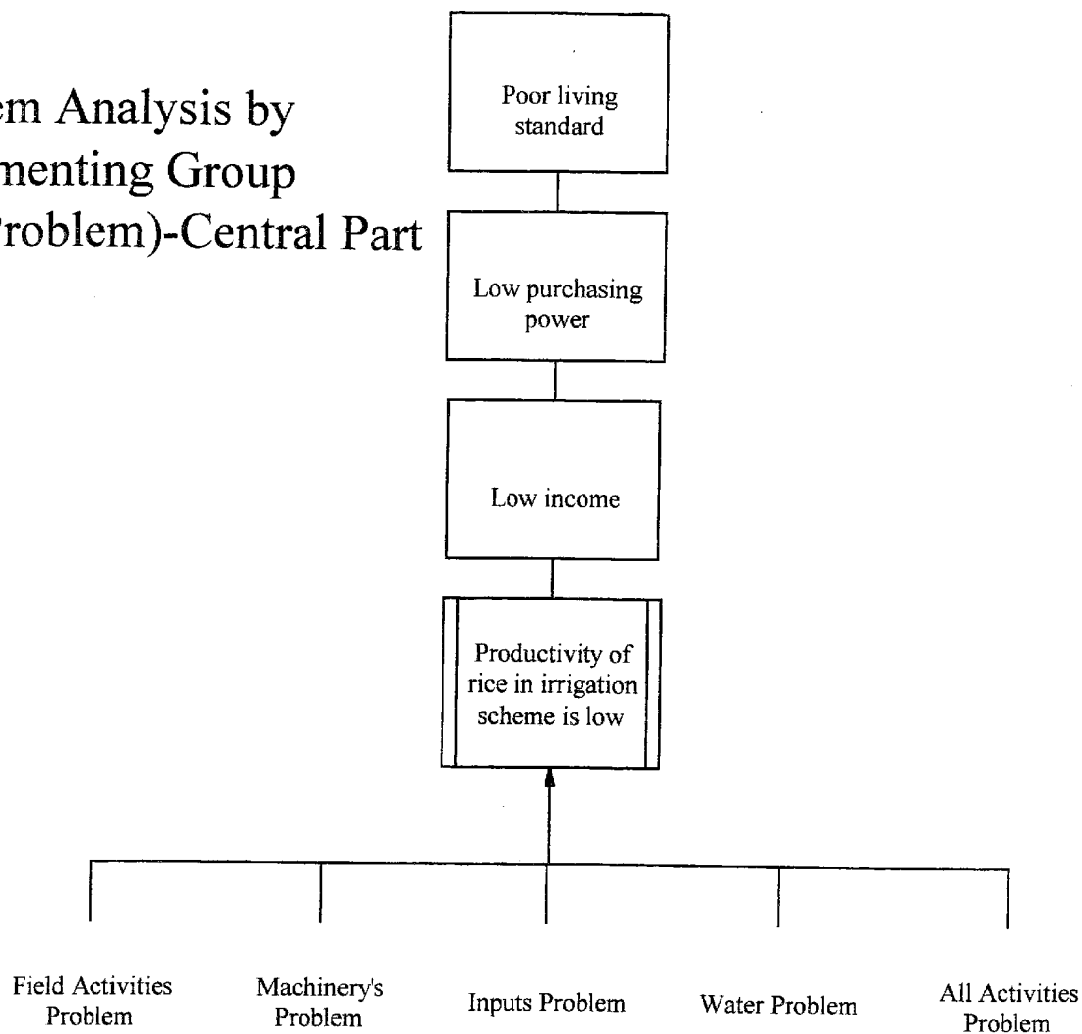
Problem Analysis by implementing group (Lower Part 1; technical staff)



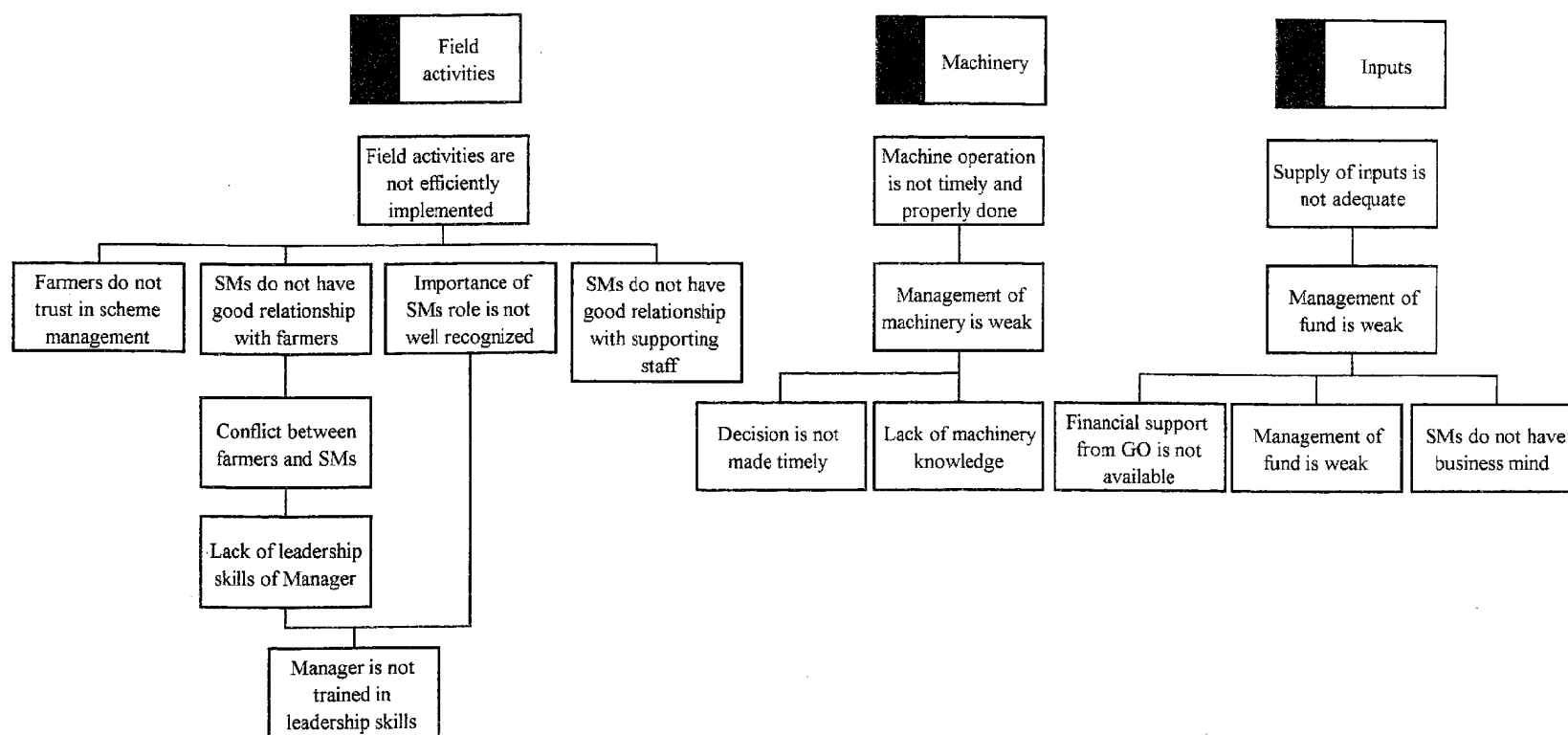
Problem Analysis by implementing group (Lower Part 2; technical staff)



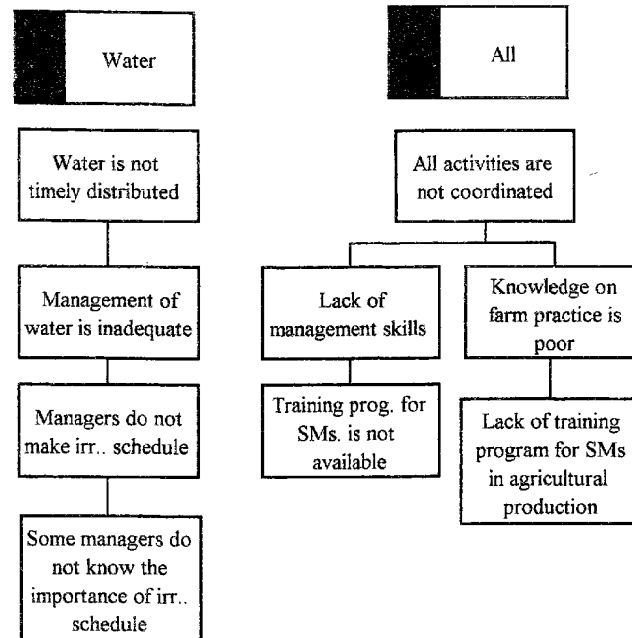
Problem Analysis by Implementing Group (Manager's Problem)-Central Part



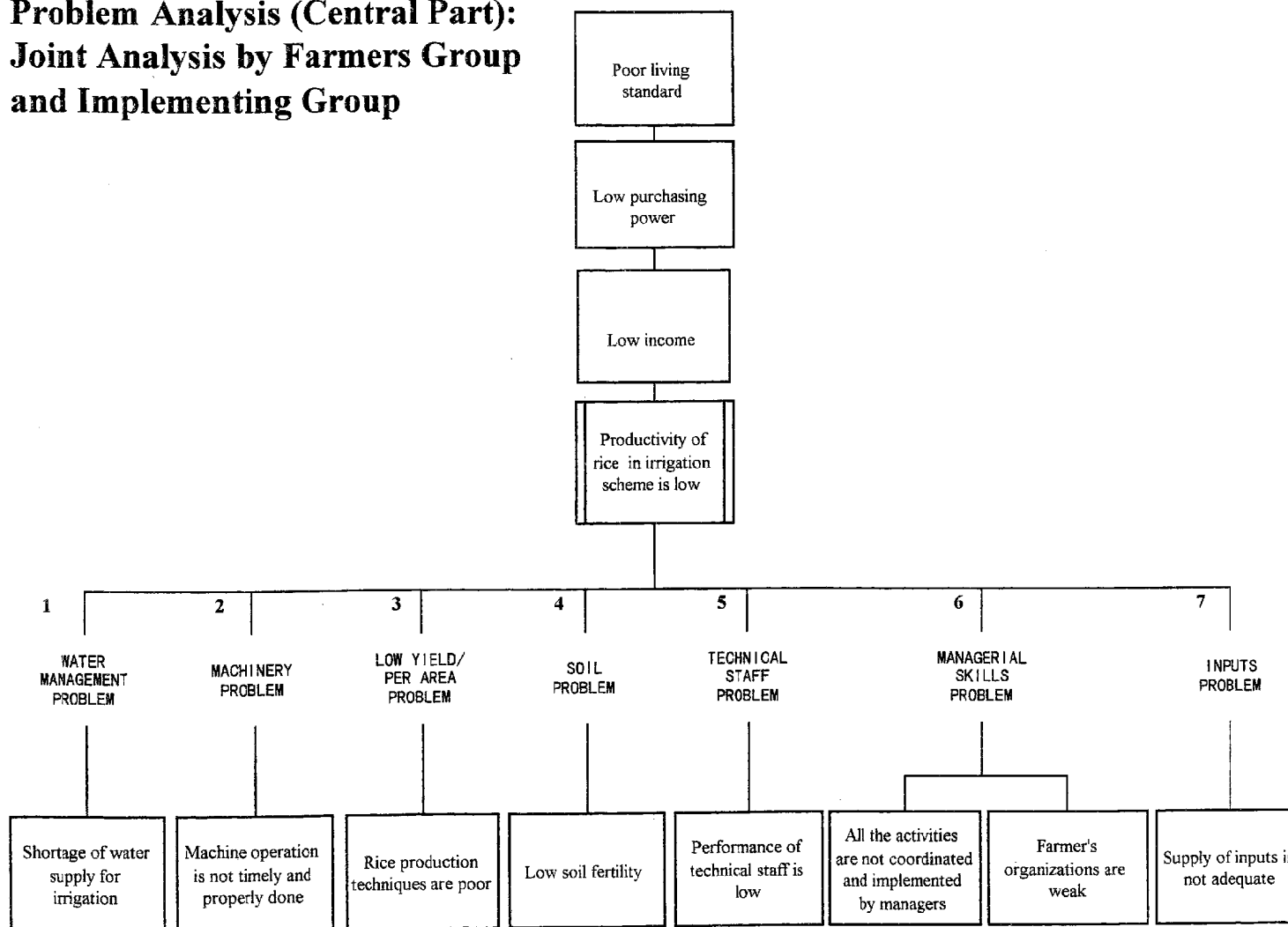
Problem Analysis by implementing group (Lower Part 1; managers)



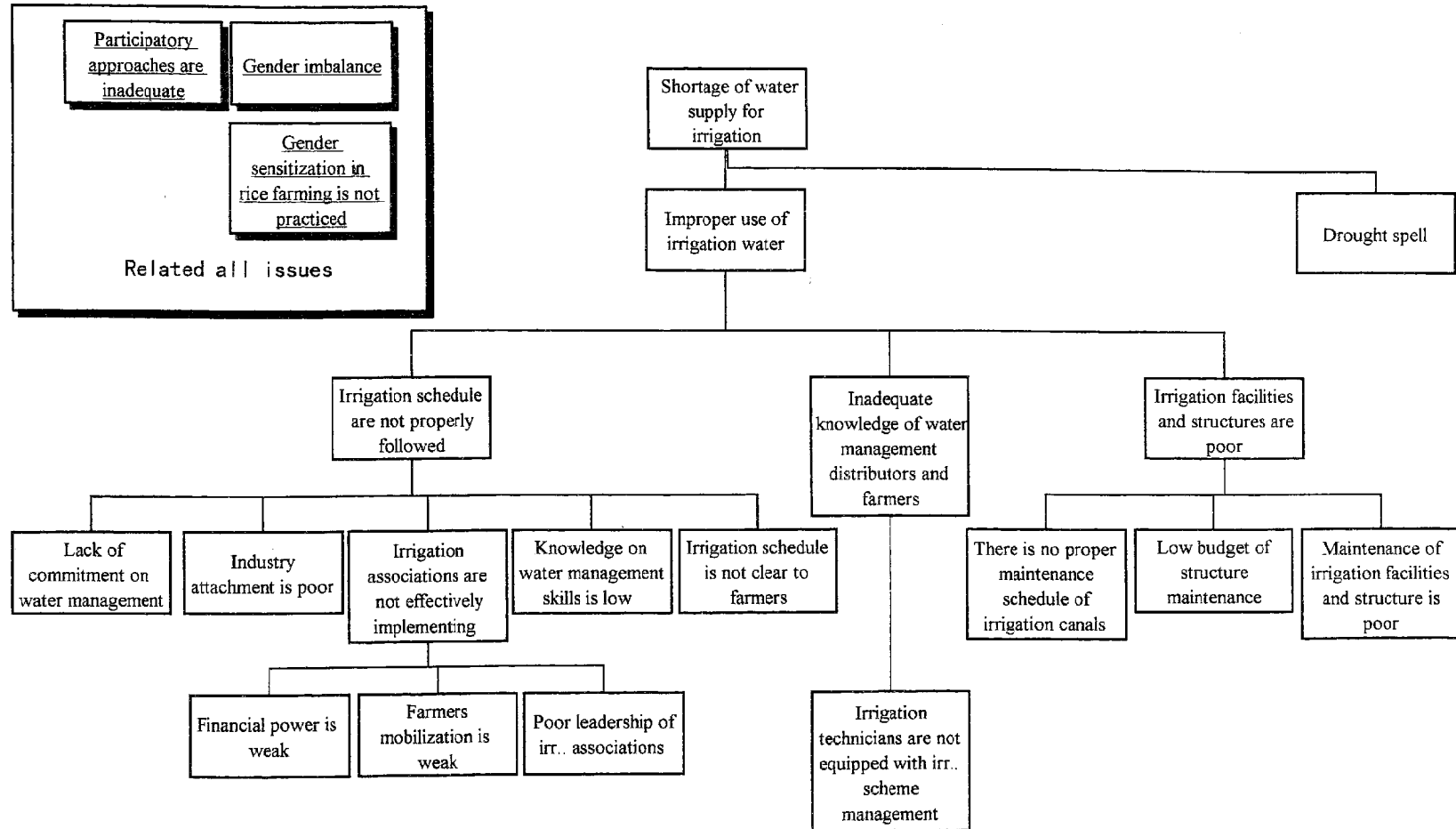
Problem Analysis by implementing group (Lower Part 2; managers)



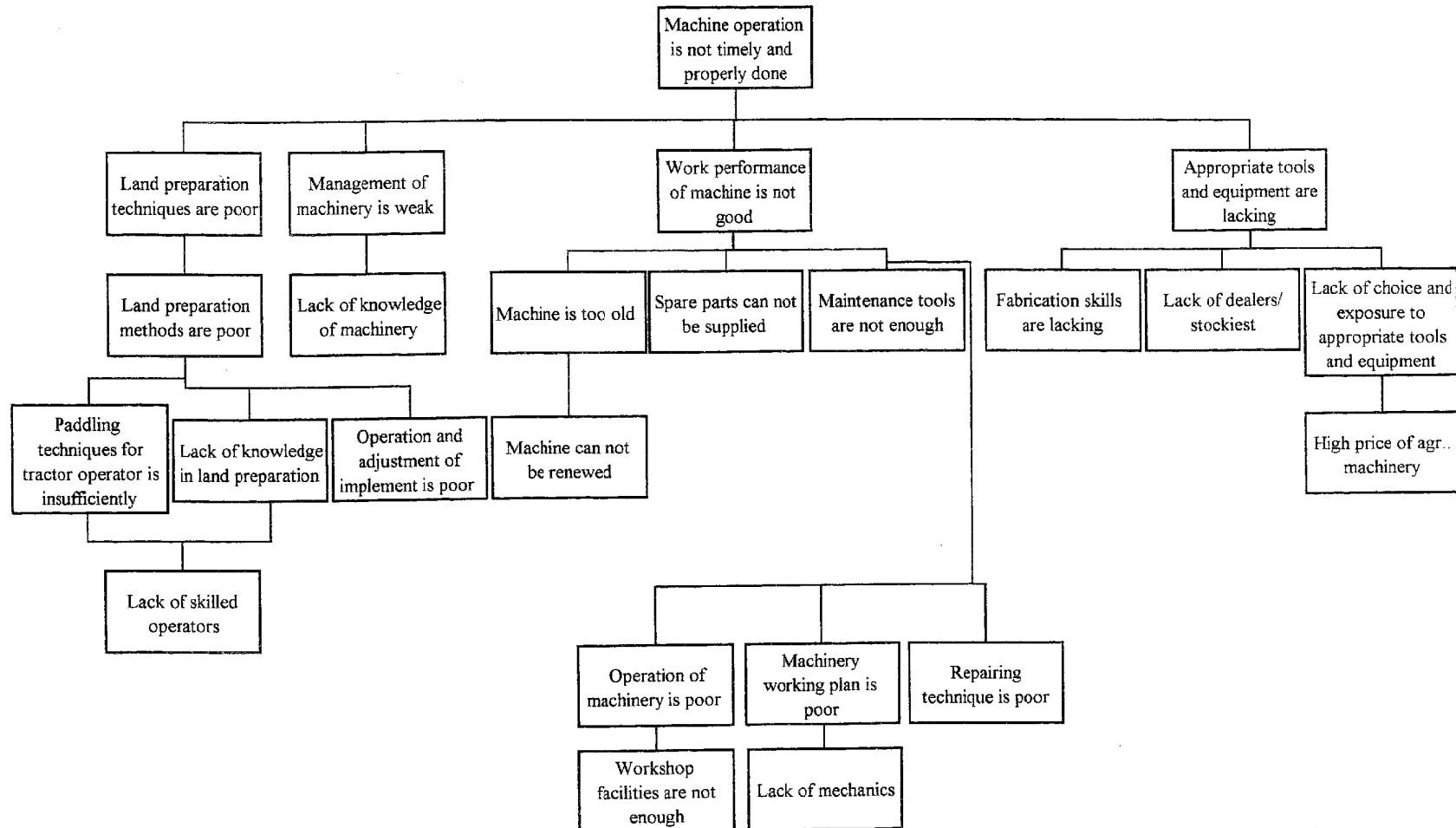
Problem Analysis (Central Part): Joint Analysis by Farmers Group and Implementing Group



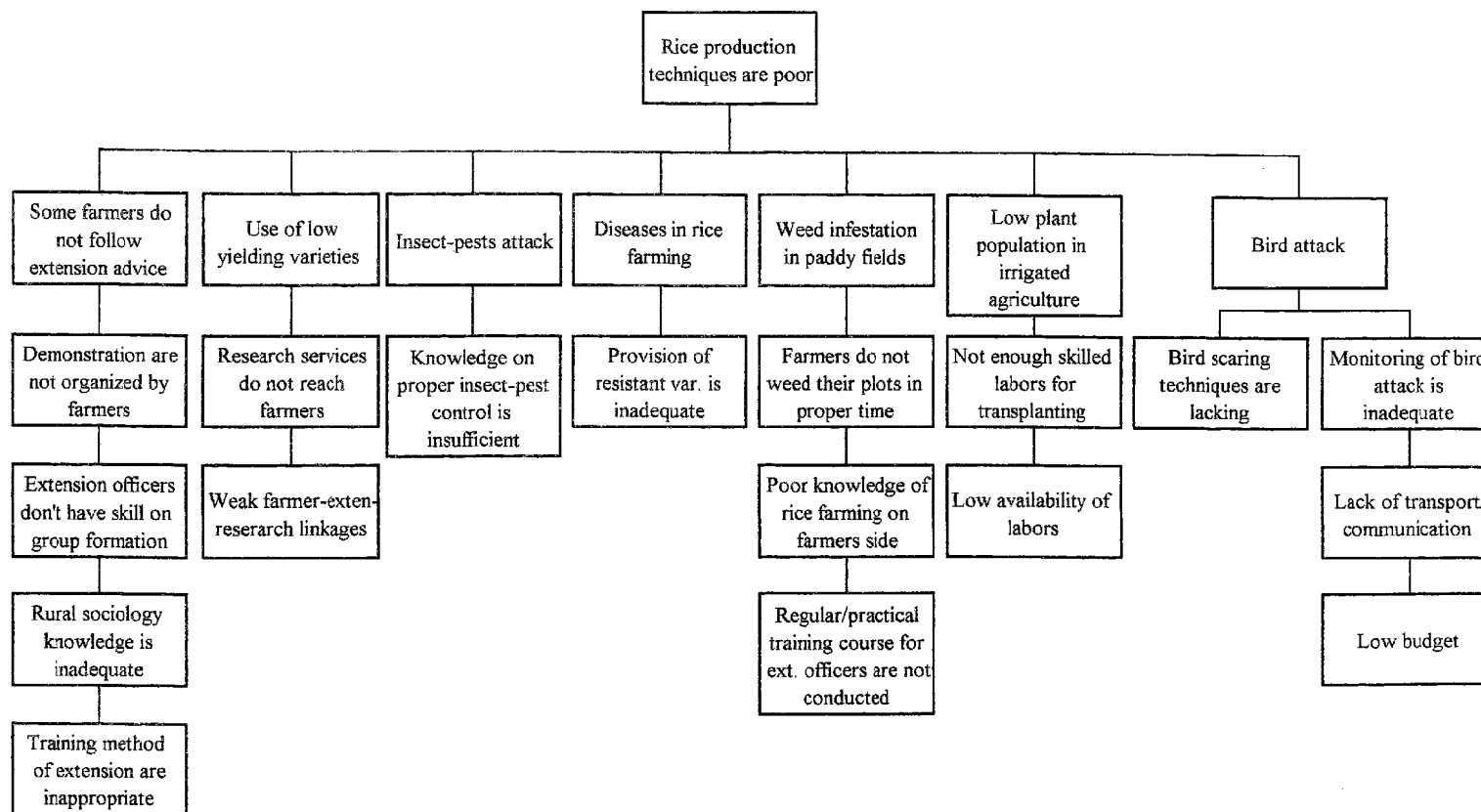
Problem Analysis (Lower Part 1); Water Management Problem



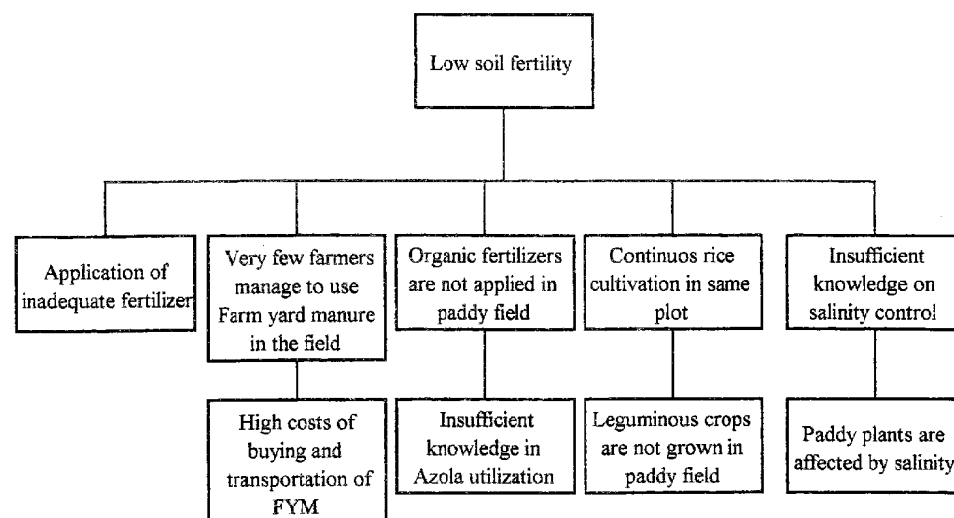
Problem Analysis(Lower Part 2); Machinery Problem



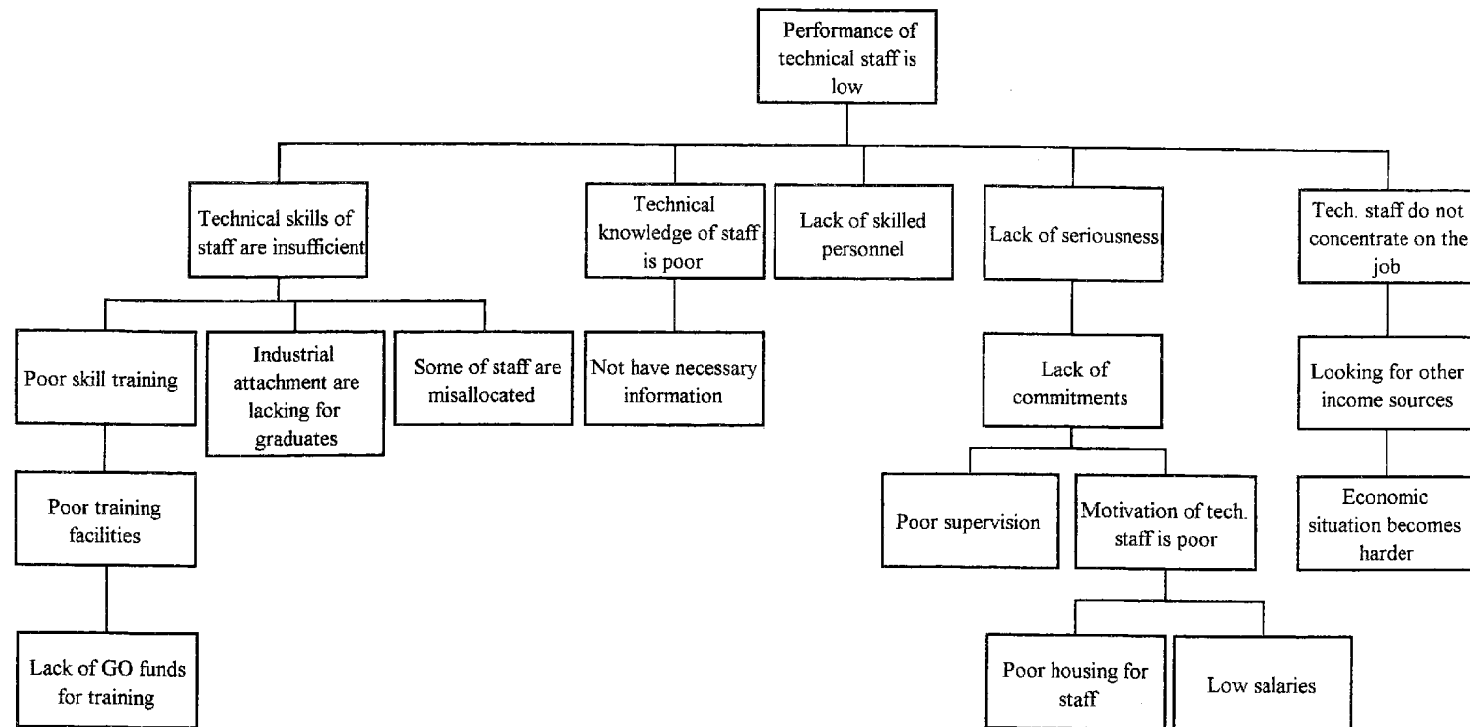
Problem Analysis (Lower Part 3); Low Yield Per Area Problem



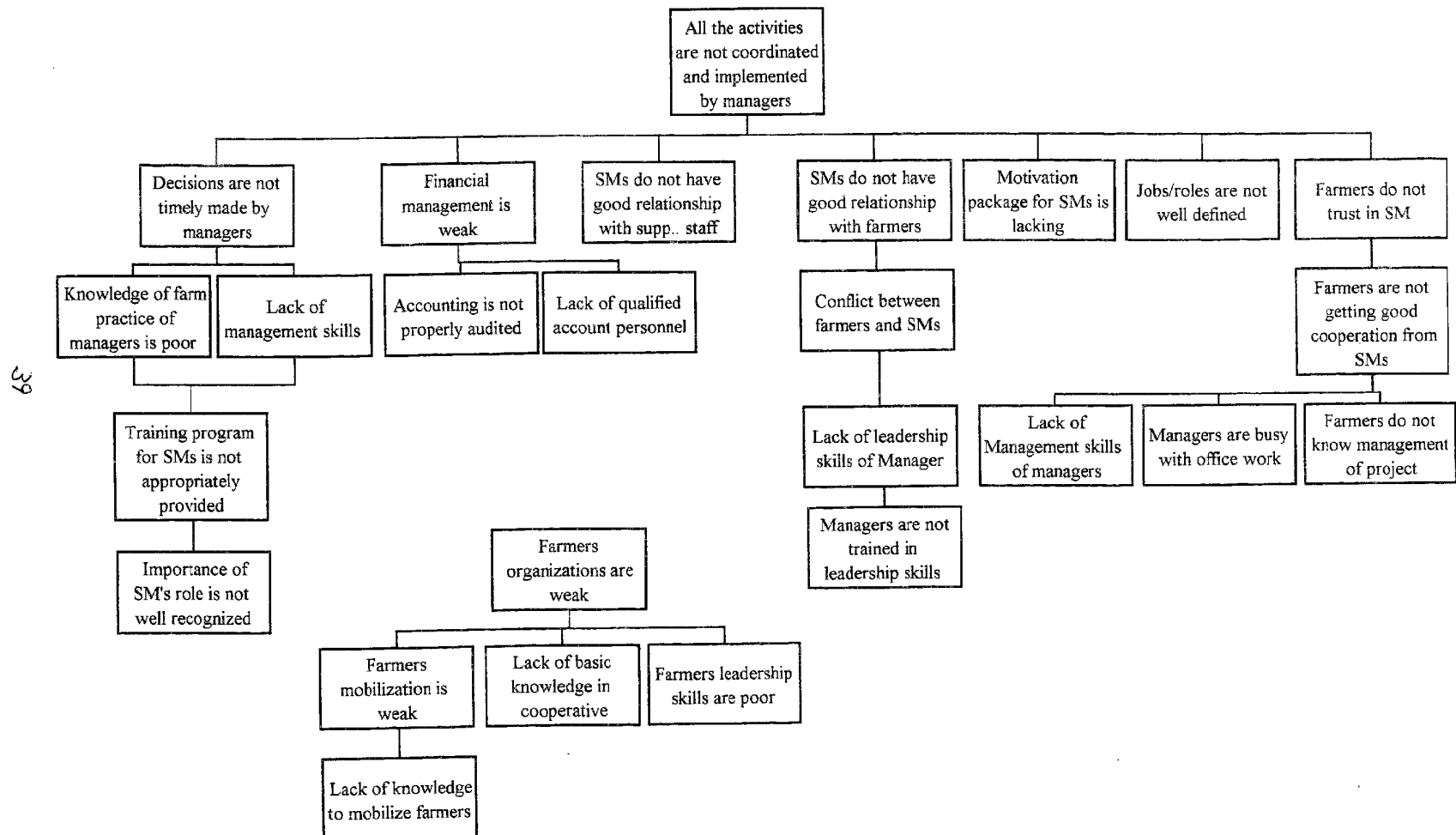
Problem Analysis (Lower Part 4); Soil Problem



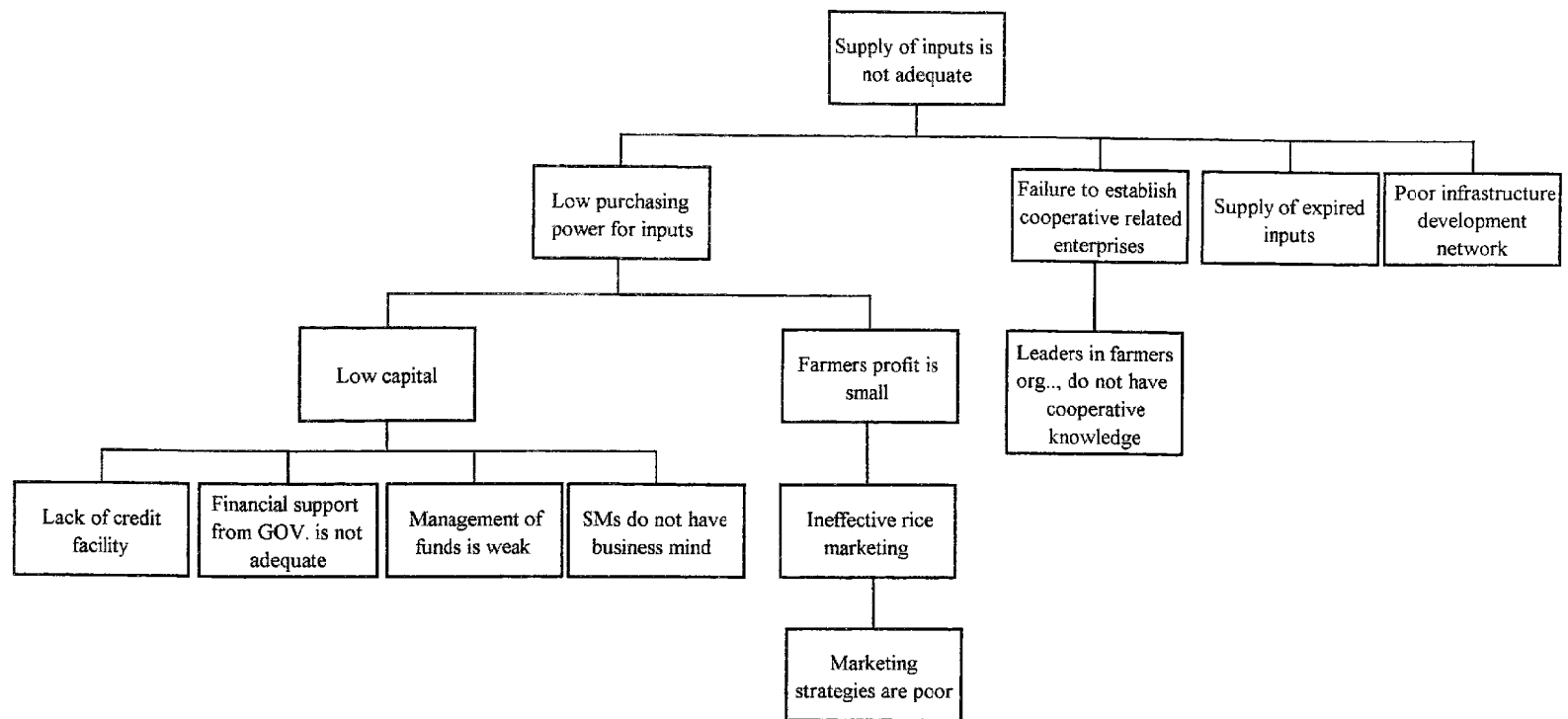
Problem Analysis (Lower Part 5); Technical Staff Problem



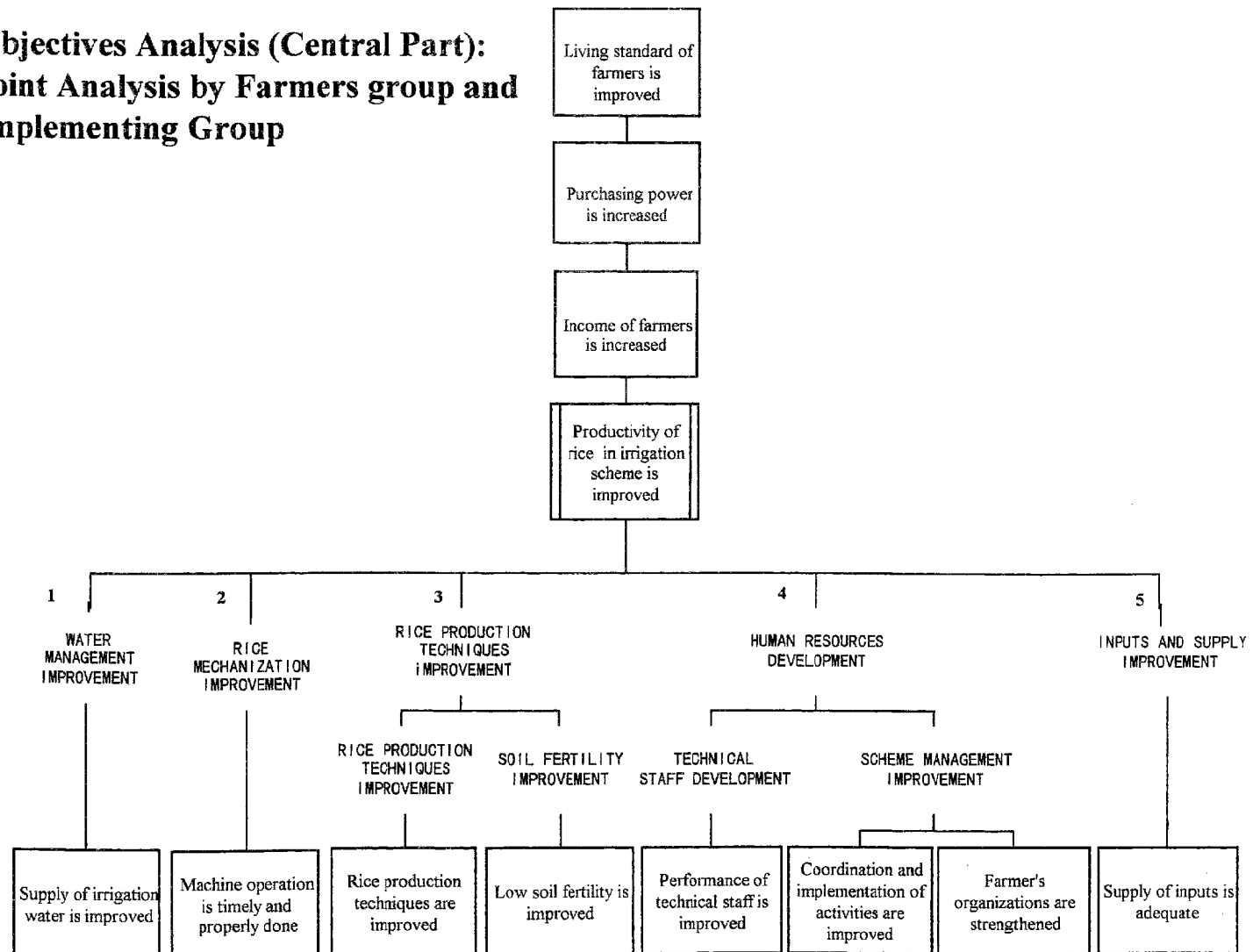
Problem Analysis (Lower Part 6); Managerial Skills Problem



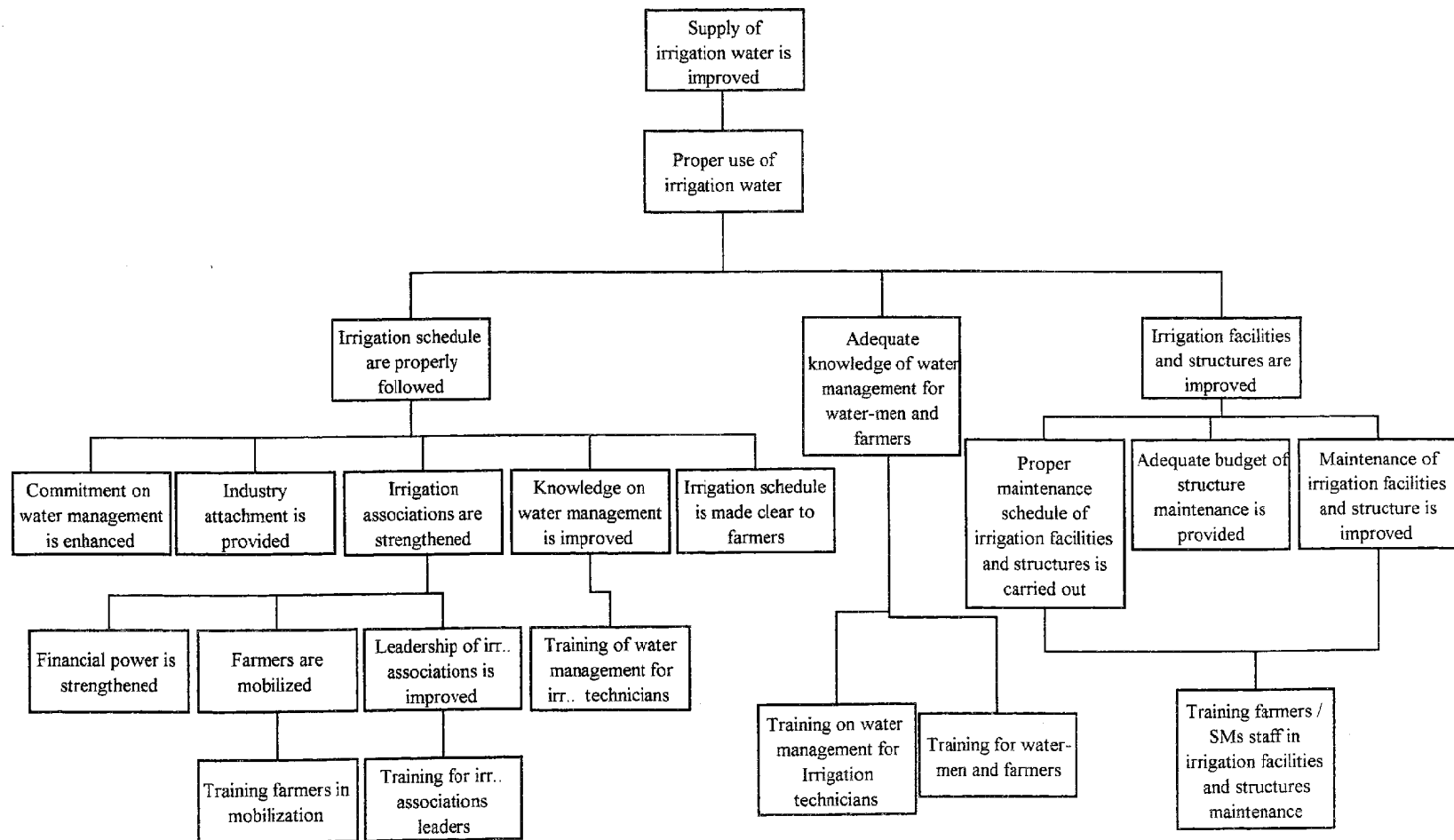
Problem Analysis (Lower Part 7); Inputs Problem



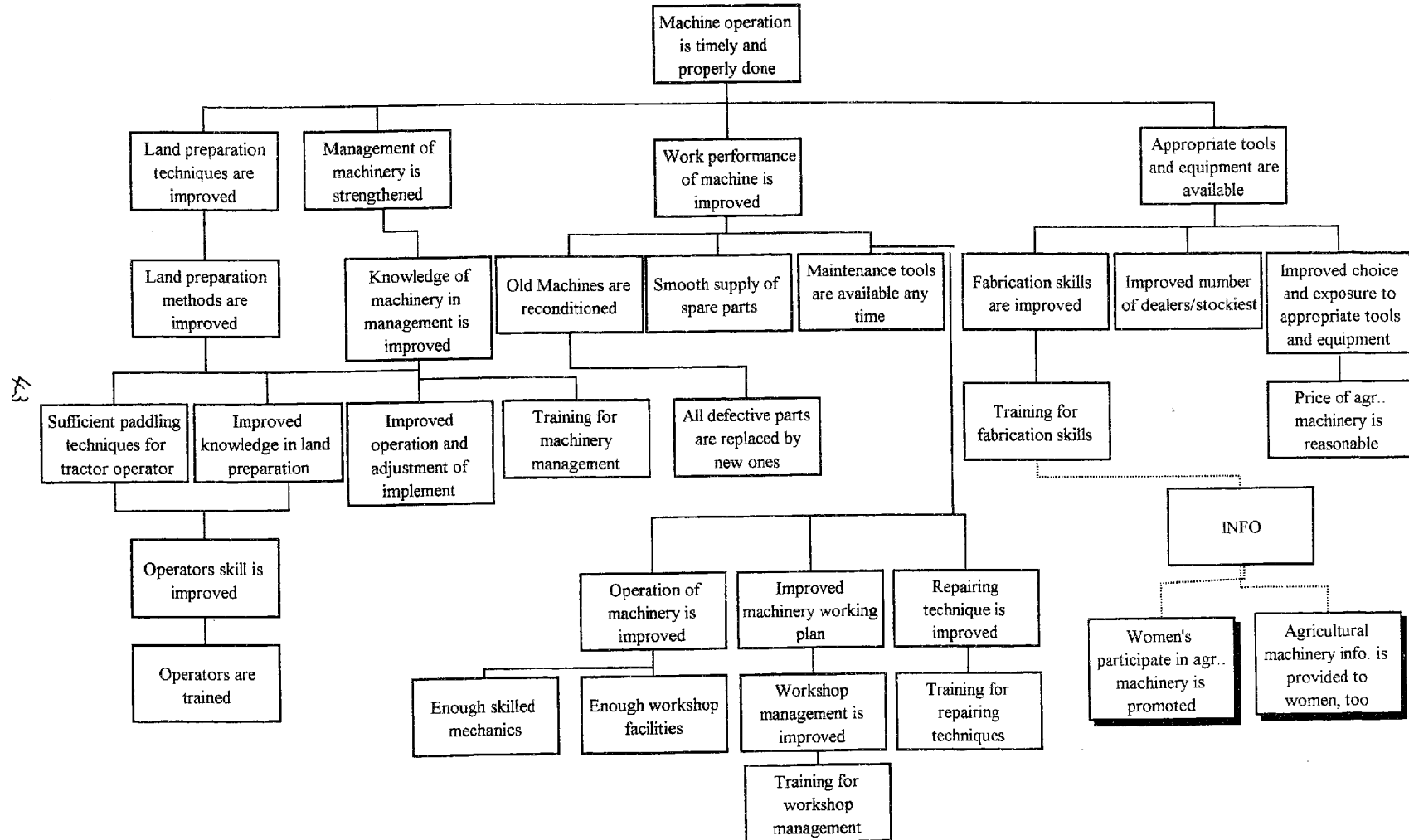
**Objectives Analysis (Central Part):
Joint Analysis by Farmers group and
Implementing Group**



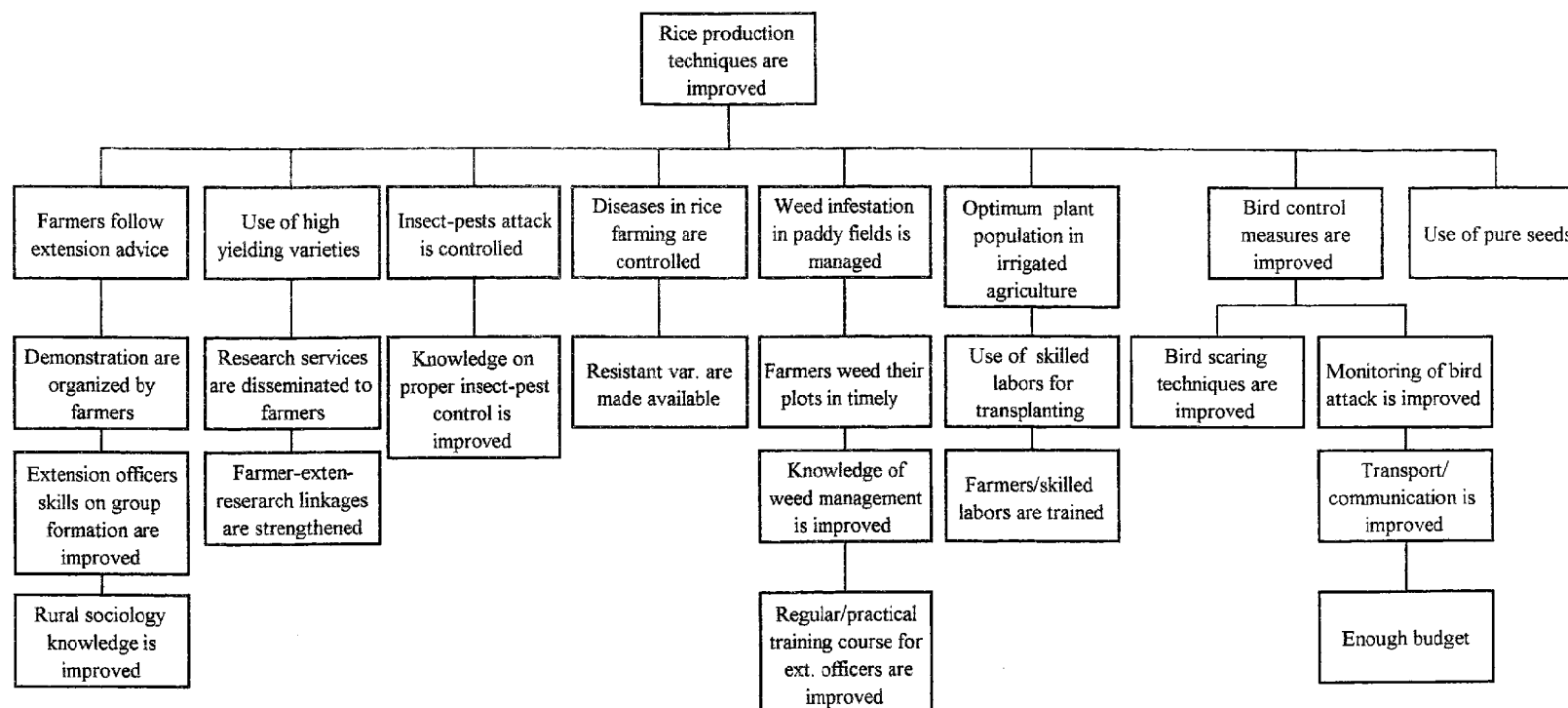
Objectives Analysis (Lower Part 1); Water Management Improvement



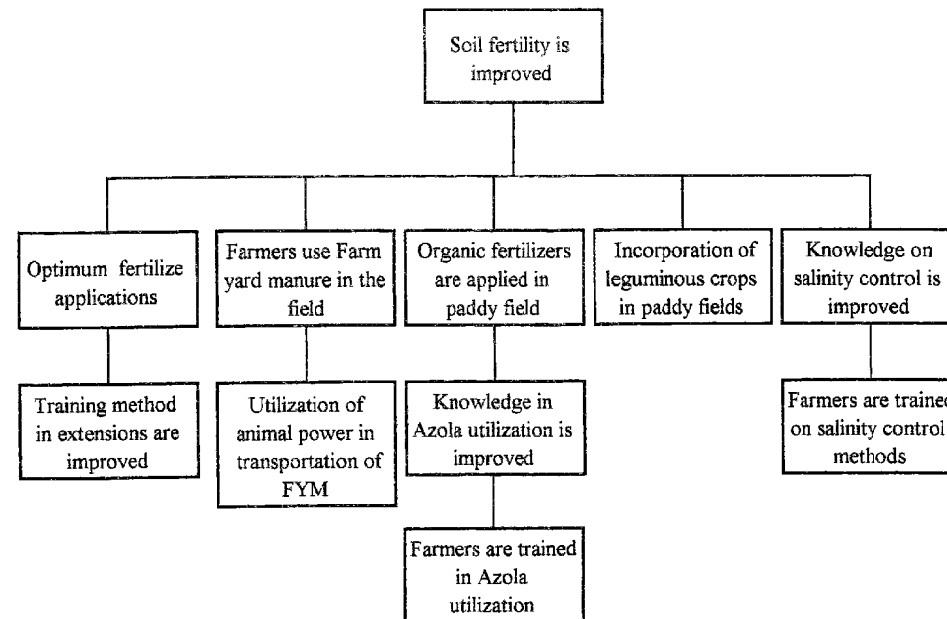
Objectives Analysis(Lower Part 2); Rice Mechanization Improvement



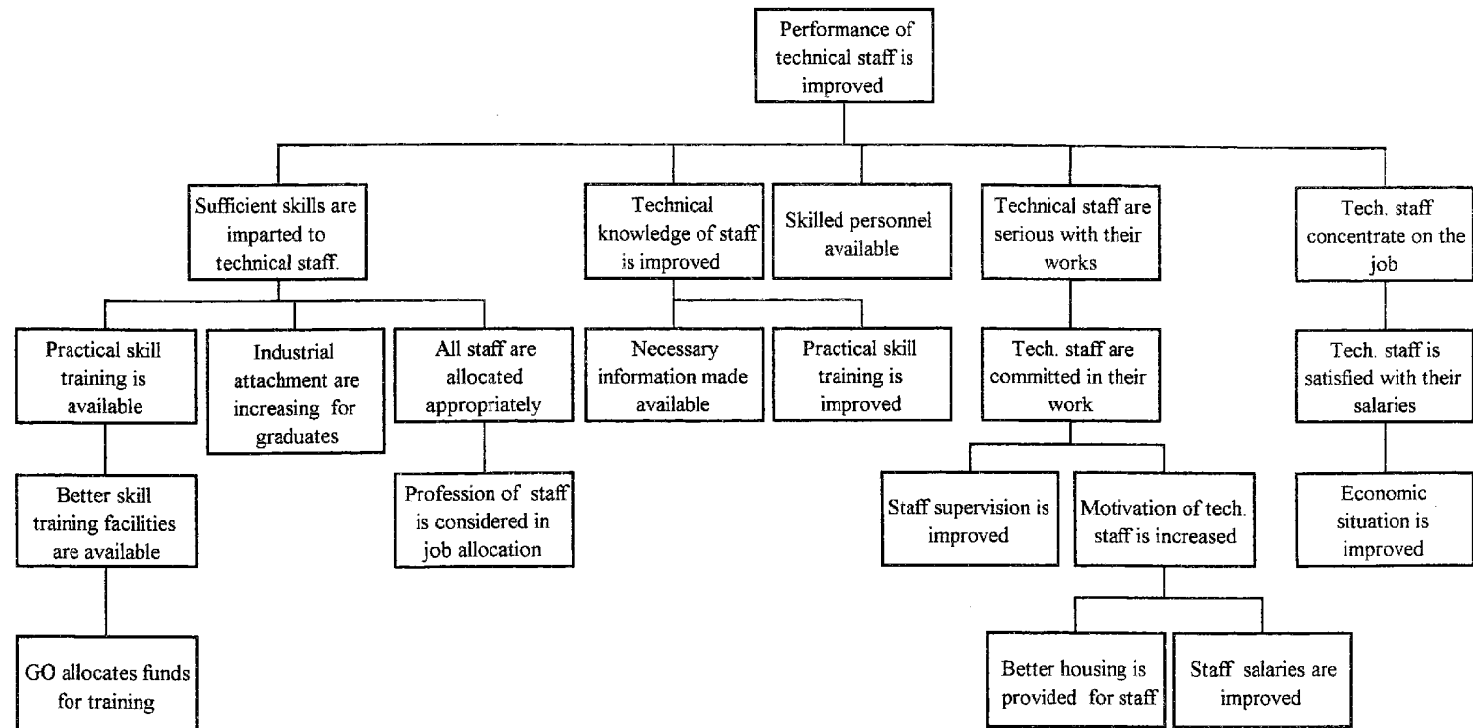
Objectives Analysis (Lower Part 3); Rice Production Techniques Improvement



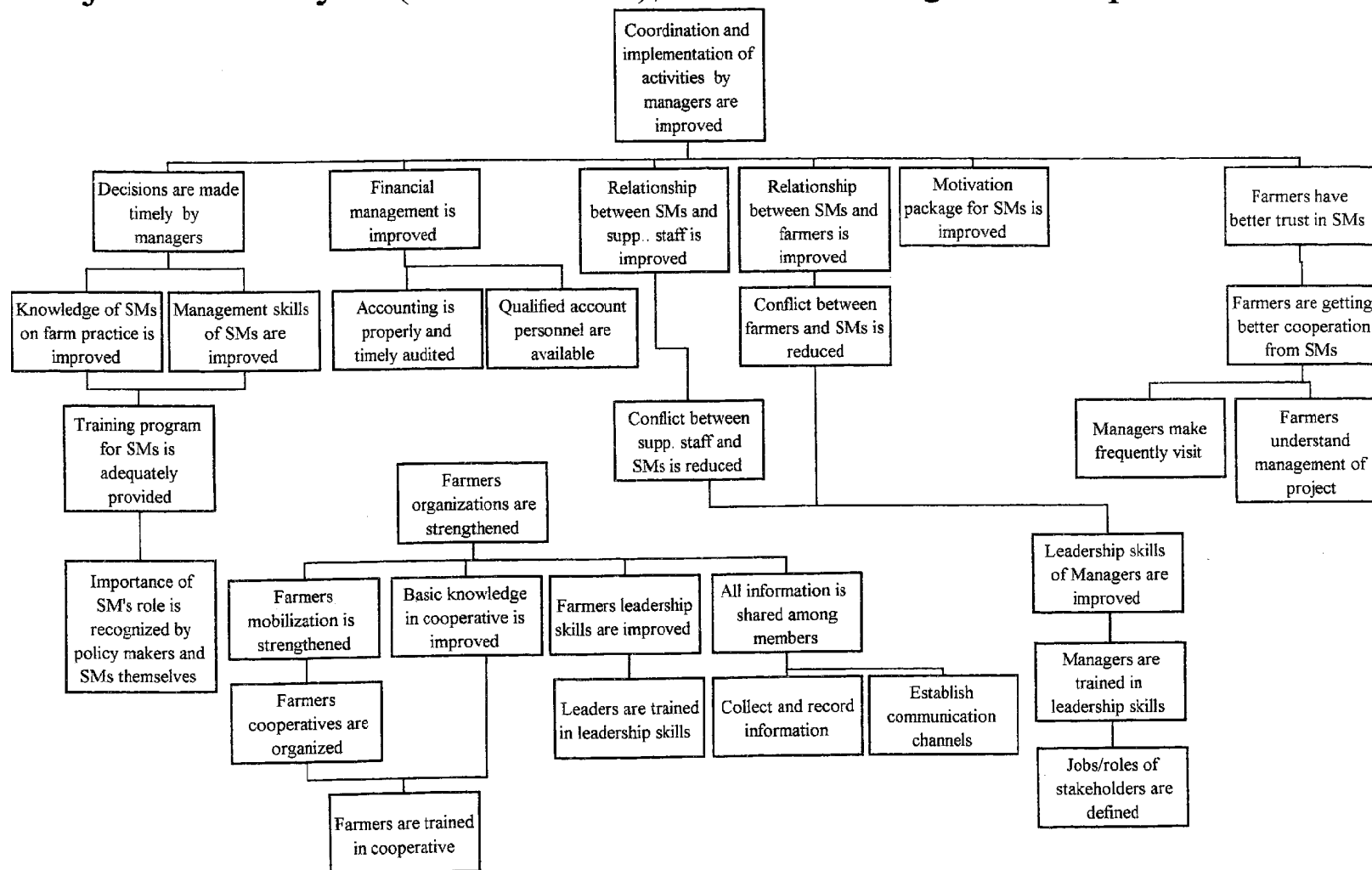
Objectives Analysis (Lower Part 4); Soil Fertility Improvement



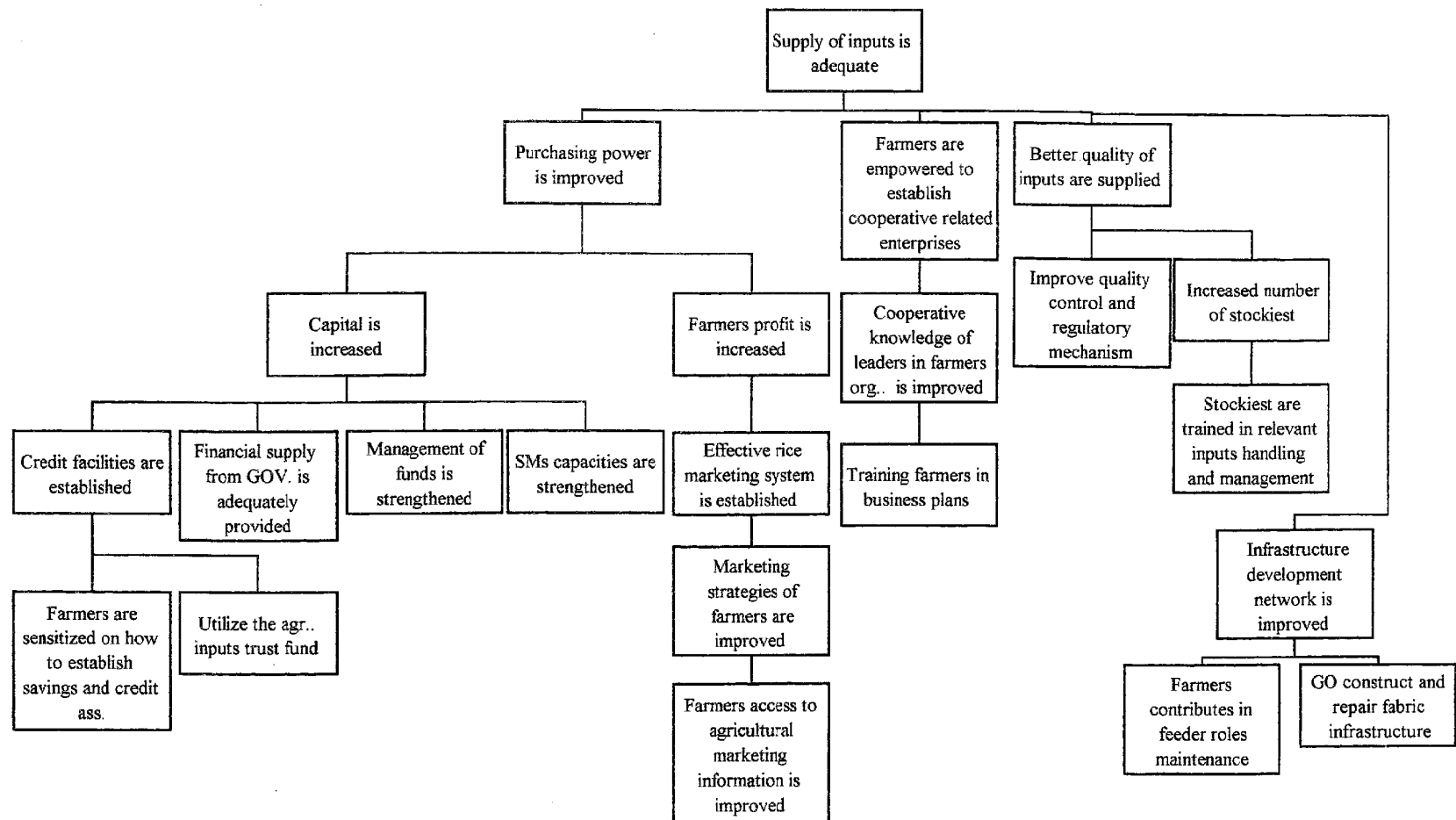
Objectives Analysis (Lower Part 5); Technical Staff Development



Objectives Analysis (Lower Part 6); Scheme Management Improvement



Objectives Analysis (Lower Part 7); Improvement of Inputs and Supply



Alternatives Analysis

1) Water Management Improvement Approach

Criteria		Water management Course for farmers	Water management Course for technicians	Irrigation SM courses for farmer's leaders and irr. SMs
Target Group		farmers	technicians	farmers leaders/ irr. SMs
Priority	Tanzania Go.	High		
	Japanese Go.	High		
Technical Aspects		High		
Cost		Depend on the selected activities		
Human Resources		Depend on the selected activities		
Social Factor		Positive impact		

2) Rice Mechanization Improvement Approach

Criteria		Tractor operator course	Rice mechanization course	Fabrication course	Utilization of animal power in transportation	Practical Training
Target Group		Tractor operator	Mechanization Staff	farmers leaders/ irr. SMs	farmers	Farmers/ VEOs
Priority	Tanzania Go.	High				
	Japanese Go.	Medium			High	
Technical Aspects		Enough			Not enough	
Cost		Depend on the selected activities				
Human Resources		Depend on the selected activities			Not enough	
Social Factor		Depend on the selected activities			Positive	

3) Rice Production Techniques Improvement Approach

Criteria		Farmers-extension-research linkages are strengthened	Use of high yielding varieties	Use of rice seeds	Training method in extensions are improved	Demonstration are organized by farmers
Target Group		farmers/ VEOs	farmers		farmers/ VEOs	farmers
Priority	Tanzania Go.	Very High				
	Japanese Go.	High				
Technical Aspects		High	Medium		High	
Cost		Depend on the selected activities		High	Depend on the selected activities	
Human Resources		Not enough				
Social Factor		Positive				

4) Technical Staff Development Approach

Criteria		Practical training is improved	skills is	Technical staff are highly motivated
Target Group		Technical staff		
Priority	Tanzania Go.	High		Low
	Japanese Go.	High		Very high
Technical Aspects		Enough		Low
Cost		Depend on the selected activities		
Human Resources		Not enough		-
Social Factor		Positive		

5) Scheme Management Improvement Approach

Criteria		Knowledge of SMs on farm practice is improved	Management skills of SMs are improved	Training Program for SMs is provided	Managers are trained in leadership skills
Target Group		SMs			
Priority	Tanzania Go.	High			
	Japanese Go.	High			
Technical Aspects		Medium			
Cost		Depend on the selected activities			
Human Resources		Not enough			
Social Factor		Positive			

Criteria		Farmers are trained in cooperatives	Leaders are trained in leadership skills	All information is shared among members
Target Group		Farmers	Leaders of farmers	Farmers
Priority	Tanzania Go.	Very high	High	Very high
	Japanese Go.	Very high	High	Very high
Technical Aspects		Low		
Cost		Depend on the selected activities		
Human Resources		Not enough		
Social Factor		Very Positive		

6) Improvement of Inputs and Supply Approach

Criteria		SMs capacities are strengthened	Farmers access to agr. Marketing information	Marketing strategies of farmers improved	Training farmers in business plans
Target Group		SMs	Farmers		
Priority	Tanzania Go.	High			
	Japanese Go.	Very High			
Technical Aspects		High			
Cost		Depend on the selected activities			
Human Resources		Not enough			
Social Factor		Positive			

Criteria		Cooperative knowledge of leaders in farmers org. is improved	Stockiest are trained in relevant inputs handling and management	Farmers are sensitized on how to establish savings and credit asso.	Management of fund is strengthened
Target Group		Farmers	Stockiest	Farmers	
Priority	Tanzania Go.	High			
	Japanese Go.	Very High			
Technical Aspects		High	Low	High	
Cost		Depend on the selected activities			
Human Resources		Not enough			
Social Factor		Positive		Very positive	Positive

Draft of the Tentative Project Design Matrix (PDM): The Kilimanjaro Agriculture Training Centre Phase II Project in Tanzania

Duration : July 2001 to June 2006

Target group : Rice farmers in the irrigation schemes

Project Area : Selected irrigation schemes

Version 0 (June 24, 2000)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Super Goal Living standards on rice farmers in the selected irrigation schemes are improved			- There are no major policy changes
Overall Goal Agricultural income of rice farmers in the selected irrigation schemes is increased			- Income is used for better living standards
Project Purpose Productivity of rice in the selected irrigation schemes is improved	- The rice yield per unit area of target farmers groups increase 50% by 2006 compared to 1996-2001	- Reports from planning commission - Reports from the field (Farmers coop. Societies) - Bureau of statistics - Reports of Ministry of Agr.Coops - Reports on base line survey - Reports of VEOs - Information/interview with farmers and VEOs	- No agricultural policy changes - The price of rice is not going down seriously
Outputs 1 The needs of farmers in the selected irrigation schemes are identified 2 Technical/professional/pedagogical capabilities of KATC staff are improved 3 Rice information center at KATC is established 4 Human resources for rice production in the selected irrigation schemes are developed 5 Rice production techniques in the selected schemes are improved 6 Water management techniques for farmers, technicians and SMs in the selected irrigation schemes are improved			- The trained field staff and VEOs remain in the irrigation scheme - District levels recognize the importance of improved rice farming and implement extension activities

ANNEX VI

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p>7 Supply of inputs in the selected rice irrigation schemes is improved</p> <p>8 Rice mechanization techniques for farmers, SMs and technicians in the selected irrigation schemes are improved</p> <p>9 Gender aspects are adequately addressed in the selected rice irrigation schemes</p>			

Narrative Summary	Inputs		Important Assumptions
<p>Activities</p> <p>(Output 1: Identification of the needs of farmers)</p> <p>1-1 Conduct survey on farmer's organizations and farmers.</p> <p>1-2 Conduct survey on farming system</p> <p>(Output 2: Improvement of technical capabilities of KATC)</p> <p>2-1 Ensure technology transfer to counterparts through on-the-job training</p> <p>2-2 Conduct seminars and workshops on teaching methodology curriculum development and teaching materials development for KATC staff</p> <p>2-3 Conduct further studies in degree courses for some staff</p> <p>2-4 Conduct various short courses in and outside the country for KATC staff</p> <p>2-5 Participate in technical exchange programmes with other relevant organizations within and outside Tanzania</p> <p>2-6 Disseminate the results obtained from Phase I to other training institute,</p> <p>2-7 Train KATC staff on gender issues</p> <p>(Output 3: Establishment of rice information center at KATC)</p> <p>3-1 Prepare a database plan</p> <p>3-2 Collect data and information</p> <p>3-3 Analyze and process data</p> <p>3-4 Disseminate information to farmers, VEOs, policy makers and other stakeholders</p> <p>(Output 4: Development of human resources)</p> <p>4-1 Exchange staff between KATC and other irrigation schemes</p> <p>4-2 Conduct scheme management courses for scheme managers of the selected irrigation schemes</p> <p>4-3 Conduct training courses for co-op law for farmer's leaders</p> <p>4-4 Conduct accounting courses for leaders in the selected irrigation schemes</p> <p>4-5 Conduct farmers mobilization courses for VEOs, farmers and farmers leaders</p> <p>4-6 Conduct leadership skills training courses for farmer's leaders in the selected irr. schemes</p> <p>4-7 Develop the simple accounting system for farmer's co-op in the selected irr. schemes</p>	<p>Japanese side</p> <p>1 Dispatch of experts (Long term and/or short term)</p> <p>-Chief Advisor</p> <p>-Coordinator</p> <p>-Experts related fields mutually agreed upon as necessary</p> <p>2 Training of a certain number of Tanzanian counterpart personnel in Japan</p> <p>3 Provision of machinery and equipment</p> <p>4 Local cost sharing</p>	<p>Tanzanian side</p> <p>1 Assignment of counterpart personnel and administrative personnel</p> <p>2 Arrangement of land, buildings and facilities</p> <p>3 Sharing of expenses for project implementation</p>	<p>- No policy changes on irrigation schemes</p> <p>- High inflation do not occur</p> <p>- Trained technical staff are not transferred from the selected irrigation schemes</p> <p>- Security of property is assured</p> <p>- Continued flow of fund</p> <p>- Farmers in the selected rice irrigation schemes continue to grow rice</p> <p>- Custom regulations ensured</p> <p>- No natural disasters</p> <p>- No destruction of transportation(*)</p> <p>Pre-conditions</p> <p>- Rice farmers in the selected irrigation schemes agree with the objectives of the project</p> <p>- Security situation of the country does not become worse</p>

Narrative Summary			
Activities			
(Output 5: Improvement of rice production techniques)			
5-1	Conduct rice cultivation courses for key farmers in the selected irrigation schemes		
5-2	Conduct rice cultivation courses for technical staff in the selected irrigation schemes		
5-3	Conduct rice seed production courses for key farmers in the selected irrigation schemes		
5-4	Conduct rice seed production courses for technical staff in the selected irrigation schemes		
5-5	Conduct seminars and workshops for rice researchers and technical personnel		
5-6	Conduct studies on specific problems identified in rice production		
5-7	Conduct outreach and follow-up guidance for farmers and technical staff		
5-8	Conduct technical exchange programmes for farmers and technical staff in the irrigation schemes		
(Output 6: Improvement of water management)			
6-1	Conduct water management courses for irrigation technicians and farmers in the selected irrigation schemes		
6-2	Conduct scheme management courses for irrigation scheme leaders and managers in the selected irrigation schemes		
6-3	Conduct seminars and workshops on the formation and strengthening farmer's organizations in the selected irrigation schemes		
6-4	Conduct outreach and follow up guidance to ex-participants in the selected irrigation schemes		
6-5	Conduct studies on water management aspects in the selected irrigation schemes		
(Output 7: Improvement of inputs and supply)			
7-1	Conduct courses for farmer's leaders on cooperative knowledge		
7-2	Conduct training to stockiest in relevance inputs handling and management		
7-3	Conduct marketing courses to scheme managers, farmers and farmer's organizations leaders		
7-4	Conduct seminars to farmers on saving credit modalities/approaches		
7-5	Conduct training to farmers on business plan		

Narrative Summary			
<p>Activities</p> <p>(Output 8: Improvement of rice mechanization)</p> <p>8-1 Carry out survey on rice mechanization situation in the selected irrigation schemes</p> <p>8-2 Prepare for training curriculum programmes and materials</p> <p>8-3 Conduct rice mechanization courses for mechanization staff in the selected rice irrigation schemes</p> <p>8-4 Conduct tractor operators courses for tractor operators in the selected rice irrigation schemes</p> <p>8-5 Conduct farming tools fabrication courses for mechanization staff and farmers</p> <p>8-6 Conduct outreach training Programme to tractor operators and mechanization staff in the selected irrigation schemes</p> <p>8-7 Carry out follow-up to ex-participants of tractor operators and rice mechanization of farming tools fabrication courses</p> <p>(Output 9: Gender sensitization)</p> <p>9-1 Conduct studies on gender aspects in rice irrigation schemes</p> <p>9-2 Train farmers and farmer's leaders on gender roles</p> <p>9-3 Train women farmers on alter mechanization techniques</p>			