

## **CHAPTER 4**

# **PROBLEM IDENTIFICATION AND ANALYSIS**

## CHAPTER 4 : PROBLEM IDENTIFICATION AND ANALYSIS

### 4.1 Problem Identification through the Field Survey

#### 4.1.1 Field Survey in Phase I

The field survey of the Phase I was explorative in nature, focusing on 1) turnover of irrigation systems; 2) ISF, 3) WUA, 4) O/M, and 5) farming practices. It employed two approaches: 1) rapid rural appraisal or RRA and a 2) questionnaire survey. The former was intended to: a) rapidly understand social and cultural background of rural areas, b) clarify problems and constraints, c) examine WUA policies with regard to the social and cultural background of farmers and d) summarize the results with emphasis on cause-effect relationships. The latter was intended to: 1) examine current sociological conditions with regard to WUA, to underline their willingness to accept and to be involved in irrigation management to be turned-over to WUAs and to 2) clarify present conditions at farmers' level to indicate their willingness to pay for the irrigation service.

The study was conducted in five provinces: West Sumatra, West Java, DI Yogyakarta, East Java, and West Nusa Tenggara. The RRA and Questionnaire Survey areas within each province are listed below.

Province	West Sumatra	West Java	Yogyakarta	East Java	NTB	Total
<b>RRA Survey</b>						
Districts	6	6	3	6	3	24
WUA	6	6	3	6	3	24
<b>WUA Questionnaire Survey</b>						
District	7	10	4	10	4	35
WUA	56	116	20	128	24	344
Respondents	56	96	18	105	24	299
Ratio	100%	82%	90%	82%	100%	87%

The surveys were carried out during June-August 2000 (dry season period), and two survey methods were used:

- Rural sociological survey applying the Rapid Rural Appraisal (RRA) technique on a small number of selected villages representing the three WUA area categories (no WUA, one WUA and more than one WUA); the total number of RRA survey was 24, and details are explained in Sub-chapter 4.1.3
- Questionnaire survey by (a) direct interview or (b) post, directed at the leaders of a large number of selected WUAs of varying performance (including some that are doing well); details are explained in Sub-chapter 4.1.4

#### 4.1.2 Categorization of the Study Area and Selection of Survey WUA Areas

##### (1) Selection of Survey Kabupaten in the Study Province

###### 1) Necessity of provincial categorization

It was important to ensure the adequacy of surveyed locations in the five Study Provinces for field data collection and analysis, to achieve the study objectives and expected results of the Phase-I Study, in particular. Accordingly the surveyed locations of the five study Provinces needed to cover the wide range of irrigation management and WUA conditions which are found.

2) Used indicators

For categorization purposes, secondary data, available at provincial and district levels, regarding the following factors were collated and examined.

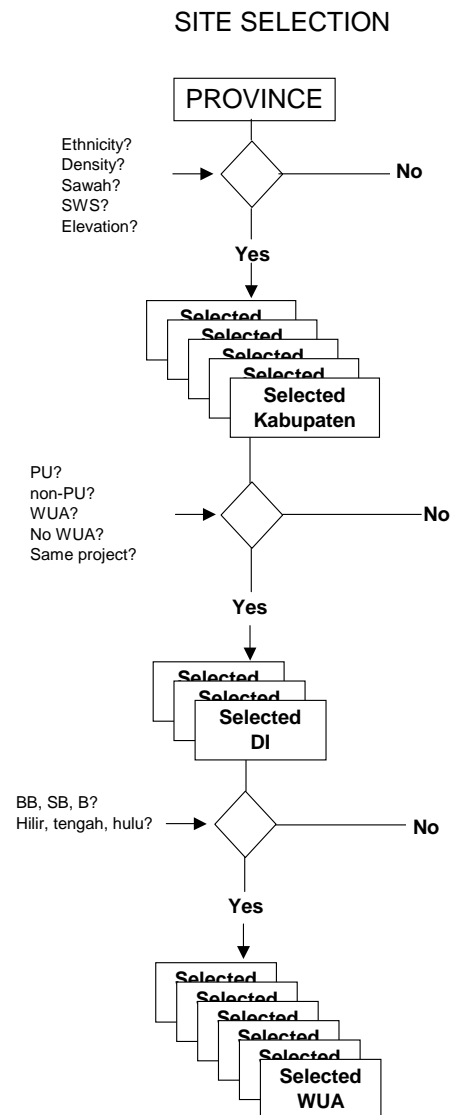
- a) Ethnic group distribution, to indicate the prevailing socio-cultural characteristics of local farmers that might affect their irrigation management and WUA practices.
- b) Rural population density (people per km<sup>2</sup>), to indicate the extent of regional development progress that may affect the local farmers' behaviour and, in turn, affect their irrigation management and WUA practices.
- c) Sawah and non-sawah landuse (ha, %), to indicate the extent to which sawah and non-sawah landuse may affect local farmers' income sources, and hence affect their irrigation management and WUA practices.
- d) SWS (river basin unit), to indicate the existing types of water resources used for the local irrigation systems that may affect the irrigation management and WUA practices.
- e) Elevation (m.a.s.l.: meter above sea level), to indicate the altitude of sawah and non-sawah landuse areas that may affect the local cultivation practice, which may in turn affect the irrigation management and WUA practices.

3) Screening parameters used

The screening parameters for the included districts of the five Study Provinces were then established, as summarized below:

Indicator	Criteria
a) Ethnic group distribution	Major ethnic group - 1 Major ethnic group - 2 Major ethnic group - 3
b) Rural population density	< 500 people/ km <sup>2</sup> 500-1000 people/km <sup>2</sup> >1000 people/ km <sup>2</sup>
c) Sawah landuse	>50% ha sawah area <50% ha sawah area
d) SWS distribution (river basin unit)	SWS – 1 SWS – 2 SWS - 3
e) Elevation classification	<100 masl >50% area 100-500 masl >50% ha area >500 masl <50% ha area

The Selected Kabupatens in each Study Provinces are shown in Table 4.1.1.



## (2) Selection of Survey WUA Area

### 1) Irrigation system categorization by District

A characterization by irrigation systems in the selected Districts was made to find out one DI (*daerah irigasi* : irrigation system) in one District respectively that altogether will represent the DI categories of the respective Province. Taking account of the available data the following set of indicators and criteria was considered:

Indicators	Parameter
a) Irrigation system by type	PU irrigation Non-PU irrigation
b) Irrigation system by size	<150 ha 150 – 500 ha >500 ha
c) Irrigation system by WUA	DI with no WUA DI with 1WUA DI with >1 WUA

### 2) Selection at DI level

Within the selected DI a categorization was then made and the survey sites were selected to represent

the local characteristics. A set of indicators and screening parameters were used to identify the required number of sites that corresponded with the characteristic requirements. The indicators and screening parameters were coded as follows:

Indicators	Parameter
a. Irrigated land area by stream categorization	Up-stream Mid-stream Low-stream
b. Irrigated land area by WUA condition	With no WUA With 1 WUA: active With 1 WUA: inactive With >1 WUA: active With >1 WUA: inactive

Sites with no WUA, with one WUA and with several WUAs were screened by taken into consideration its location within the selected Irrigation System of a selected District located in upstream, midstream, and downstream positions stream, as shown in the selection flow in the previous page.

### 3) Selection of RRA Survey Areas

Areas for RRA survey were selected based on the following criteria;

- irrigation scheme condition (good, medium and poor)
- type of irrigation scheme (technical, semi-technical or simple irrigation system)
- institution responsible for current O&M (PU or non-PU)
- scheme size (small, medium or large)
- scheme age (old or new)
- implementation of ISF program (good, average or poor)
- location (urban or rural)
- land capability

In addition to the above criteria, as described in paragraph 2), the survey areas were selected to be representative of characteristics of the selected Kabupaten. The selected RRA survey areas are shown in Table 4.1.1 and their characteristics are shown in Table 4.1.2.

### 4) Selection of WUA Questionnaire Survey Areas

Originally, it was proposed to survey four WUA areas in each of the Kabupaten within the five Study provinces. During the preparation of the questionnaire and after discussion with the field survey teams, it was decided to undertake the survey in a number of selected Kabupatens as detailed in above paragraph 2), and number of sampled WUA areas in each Kabupaten are shown in Table 4.1.1. The total number of survey areas remained the same as per the original plan.

### **4.1.3 Rural Sociological Survey (RRA Survey)**

#### **(1) Objectives and Methodology**

##### **1) Objectives**

The Rural Sociological Survey implemented in the Phase-1 Study dealt with the following objectives:

- Identification of biophysical, socio-economical and socio-cultural background of the selected sites from the viewpoint of water user farmers.
- Elaboration of constraints and problems of water user farmers' participation in irrigation management, WUA development and the turnover program.
- Elaboration of water user farmers' aspirations concerning their preferred farming, organization, and irrigation management.
- Elaboration of local potential and support required to help achieve the preferred farming, organization and irrigation management.
- Review of governmental policies, laws and regulations, programs and projects related to the practices of irrigation management, WUA development and turnover program, in the light of water user farmers' aspirations.

##### **2) Sub-Topics**

A set of hypothetical sub-topics were derived and field-tested at site level during the survey. These included:

- Bio-physical environment: location and accessibility, land size, topography, temperature range, rainfall pattern and magnitude, drought period, soil condition, landuse types and landuse changes, water availability, irrigation scheme, main production, cultivation system, cropping pattern, production means, livestock, production inputs, pest and diseases, etc.
- Socio-economic and cultural setting: historical background, demography, ethnical groups, income sources, labor force, transportation facilities, marketing, credit schemes, access to know-how and information, Government administration set-up, related Government programs and projects, traditional community institutions, farmers' organizations, water users' association, ISF collection, irrigation O&M practices, turnover procedures, government roles, belief-norms-and values, social structure, patronage, gender issues, off-farm employment, time management, land status, land tenure, land-entitlement, inheritance system, etc.

##### **3) Survey Methodology**

The RRA method (Rapid Rural Appraisal) was applied to examine the sub-topics as well as to gather, organize and analyze the required data provided by the water user communities at the selected sites. The application of the RRA varied by Province and by site but, basically, the following methodology was used:

- Sites were selected for the respective Study provinces and multidisciplinary provincial RRA teams were established. Relevant secondary data were collected in parallel with field reconnaissance. Key-informants and respondents were selected, hypothesis formulated and RRA interview checklists, guides and tool-kits were prepared.
- Primary data were provided through direct interview and through observation and by making triangulation and rough analysis. Meetings and discussions with the local water user communities were then conducted before re-formulation of the hypothesis.
- The next step was data organization (data indexing and elaboration) and analysis (historical profile analysis, spatial pattern mapping and analysis, transect making and analysis, seasonal calendar making and analysis, ranking matrix of local preferences, flowchart making for tendencies and changes analysis).
- The last step, in terms of validation of findings and reporting, was done by presenting the findings to the local water user communities, refining were necessary, report writing and presentation.

As described later the questionnaire survey was conducted in the survey area, therefore, interview for this survey will be minimized, instead the more work weight was given to opinions of farmers through group discussions.

Survey Method	Main survey items
Interview Survey	Interview to the management members of WUA on the process of the formulation, present activities, participation of members, farm management, and living conditions within the villages. The follow-up interviews were conducted with several personnel individually to confirm the discussion results shown below.
Focal Group Discussion	Focal group discussions were made with a group who had similar social characteristics. It includes the question and answer session followed by a discussion on the specific topics. Through the group discussion, several problems were addressed but it can be concentrated into a consensus of group members. Therefore this method is easy to get a conclusion evolving from particular group.

Main groups and questionnaires are considered as follows:

Groups	Questionnaires and Topics
Village leaders (Village seniors, village chief, religious leader, heads of LKMD and other villager's organizations, etc.)	- Outline of village (ethnic composition, religion, education level, livelihood, community activities, etc.) - Opinions for government supporting - Present condition of water management
Leaders of various farmers' organizations	- Selection method of organization leader - Roles of each organizations, activities, ratio of organizations, etc. - Opinions for government supporting
General farmers	- Present agriculture and problems - Opinions for government supporting
Women	- Roles of women in the families - Roles of women in their community (comparison with male) - Level of participation in water management, understandings and opinions for its problems - Opinions for government supporting
Members of WUA	- Activities and their problems of WUA - Opinions for government supporting

The survey was conducted based on the topics in the hypothesis issues on the irrigation and WUA management prepared at the initial stage of the Study as shown in Fig. 4.1.1.

## (2) Issues and Constraints Uncovered by RRA Survey

An elaboration was made following the Provincial and Central Workshop on the rural sociological findings of the five study Provinces. Because the applied RRA method is somewhat unstructured and focused in nature, the perceived problems and constraints related to irrigation management, WUA development and turnover program varied by Province as shown in Annex E and G.

The main perceived problems and constraints included the following.

### 1) Government roles, support, laws and regulations:

- The local water user communities and key-informants felt that the centralized and top-down approach of government continues as in the past. Consequently the local government policies and actions with regard to irrigation management do not match with the local need.
- The currently applied WUA success indicators do not give a true picture of WUA activity and capability.

2) Agriculture, economic, financial:

- Net cash income from farming and irrigated cultivation is low compared to off-farm income due to, amongst other factors, the small average size of holding.
- The young generation is rapidly losing interest in farming; the resulting out-migration is reducing the availability of active farm laborers. Farm labor wages are rising, and this combined with the high cost of other inputs, is making rice production unprofitable, particularly as paddy prices are so low.

3) Irrigation system, O&M, water management:

- Irrigation canals and facilities do not function well due to many reasons, causing water losses and dry season shortages and wet-season floods.
- Conflicts among water users (between mid/downstream and upstream farmers, between paddy and non-paddy farmers, and between farmers and non-farmer water users,) are frequently encountered due to lack of water supply and unfair distribution.
- Inadequate technical designs and construction are partly responsible for the rapid breakdown of PU irrigation structures and facilities. The project-oriented approach, the non-inclusion of farmers in planning and implementation, and construction work contract practices had varying unfavorable impacts on the problems of construction quality and the lack of a local sense of belonging and responsibility for water charges and O&M.

4) WUA management and institutional development:

- Too many farmers' organizations have been promoted, by various Government agencies, and exceed what are required by the farmers.
- WUAs establishment can be based on existing, traditional irrigation institutions using traditional *Ulu-ulu* or *Ili-ili*. Local water users are still committed to their *Ulu-ulu*, and the traditional practices of irrigation management including O&M remain (by using *gotong-royong* for maintenance and paying in kind to the *Ulu-ulu*, etc

The main findings of the RRA survey concerning the farmers' perspectives are summarized in Table 4.1.3. (each RRA survey site description is shown in Attachment E) The detailed RRA information is very site specific, and may not, necessarily, fully represent the situation in the surrounding region.

#### 4.1.4 WUA Questionnaire Survey

##### (1) Objectives

It is favorable to conduct the survey at areas as many as possible to size problems on irrigation/WUA management and their turnover faced by farmers. Rural Sociological Survey applying RRA method could not conduct only at the limited areas because of the financial and period of the Study. In order to fulfill the requirement, the questionnaire survey was conducted.

##### (2) Questionnaires

To collect the information on the general condition of WUAs, a questionnaire survey was conducted in the Study Area. Drawing on material from similar surveys undertaken in Indonesia, the questionnaire was drafted by the Study, covering the following aspects:

- Background to the willingness to pay, the willingness to be involved, and the willingness to accept present WUA policy,
- Conditions of facilities,
- O&M activities,
- Agronomy, farm economy and physical conditions of the cropped areas,
- Sociological and institutional aspects of WUA.

The questionnaire was divided into four main parts, as follows:

- Form RSS-SP (Rural sociological survey, partial census), and Form RSS-UT (Rural sociological survey, farm census) containing information on agronomy and general farm economy,
- Form WUA-F (First part) containing sociological and institutional aspects related to WUA
- Form WUA-F (Second part) containing conditions of facilities and O&M activities,
- Form WUA-G and Form AO containing official information regarding WUA development

The draft questionnaire was discussed with the Government counterparts and the NGO who conducted the field survey of this questionnaire survey, after minor modification the questionnaire was finalized; the major items are shown in Table 4.4.1.

### (3) Survey Methodology

It was originally planned to send the questionnaires to the survey areas, by post, requesting their completion and return. Previous experience indicated that this was unlikely to be a successful approach, particularly as the questionnaire was very long and detailed. It was decided, therefore, that a direct interview survey method would be more appropriate.

### (4) WUA Questionnaire Survey Results

The results of key questions regarding WUAs are shown in Tables 4.1.5 and 4.1.6. The findings from the questionnaire survey need to be treated with some caution since respondents tend to give a more optimistic picture than is the actual situation, but, nevertheless, the results are useful to determine the order of magnitude of problems and to highlight the differences between provinces. The findings are summarized below:

- 1) The status of most WUAs at present falls into the 'being developed' category. Most WUAs claim to have articles of association and operating guidelines (AD/ART). The majority of WUAs claim they are ready for turnover (to take on the responsibility of O&M of irrigation systems).
- 2) The majority of respondents claim they actively participate in WUA activities, and consider the service of WUAs is good (This contradicts the conclusions reached by the World Bank, ADB and others, and statements made at the workshops, that most WUAs are generally not active, and receive very little support from the farmers).
- 3) The majority of respondents consider that water is better managed under a WUA organization than under previous traditional systems. Water is distributed better in three provinces, East Java, West Java and NTB, and equitable water distribution is claimed by the majority of WUAs, and there is more order and cooperation.
- 4) The majority of respondents said that WUA officials are appointed by open elections.
- 5) Most WUAs claim to hold meetings, but communications are largely informal and records of meetings or minutes are rarely prepared. The main problems discussed are maintenance of the irrigation system, including, in many cases, secondary canals and water distribution and management. Other issues discussed were water service charges and payments and institutional and human resources matters (WUA organization and ability, personality and integrity of WUA officials, etc).
- 6) Most WUAs, which are normally based on tertiary irrigation units, claim they also maintain secondary canals. Most maintenance is done by *gotong-royong* where farmers contribute their labour.
- 7) The majority of WUAs stated that sanctions, for non-payment of water charge or violations of water use, are never applied.
- 8) In response to the question regarding what aspects need to be promoted, the main points were:



- Better trust, attention and guidance from the Government, training and extension;
- Improved water supply and distribution, and the provision of sufficient water to all farmers;
- Institutional strengthening and the improvement of human resources;
- Irrigation system repair;
- Access to capital, better management of funds, and better prices for crops.

## 4.2 Categorization of Problems

### 4.2.1 Workshops in Study Province and Central

After the field surveys had been completed, workshops were held at provincial and central government level involving government officials concerned, farmers from RRA Survey WUAs and JICA Study Team/Provincial Field Survey Team. Their results are shown in Annex G.

### 4.2.2 Problem Analysis of Provincial Survey and Workshop Results

A compilation of the main issues and findings from the field surveys (questionnaire and RRA) and workshops for each of the Study Provinces area are shown in Table 4.2.1. The main findings of the field surveys and workshops are summarized below:

- 1) There is a long tradition of managing water in the farming communities of Indonesia (particularly for wet season rice), which have developed in accordance with local conditions and customs.
- 2) It is axiomatic that the implementation of any Government project, including the WUA development program, involves a top-down approach, since the initiative and funding comes from above, and that project progress tends to be target-orientated. It is, however, considered that the implementation of the WUA program has been too bureaucratic and uniform, and has not addressed the real problems being faced by farmers and rural communities. The rigid approach of the WUA program has not allowed sufficient flexibility to take into account local variations in physical conditions and traditions. The Government's domination has been too strong.
- 3) Most WUAs exist in name only and are not active. Farmers are either not aware of WUAs or view them with apathy, and have little knowledge of the turnover program<sup>1</sup>. Support for WUAs is generally weak because the organization is formed from above without the farmers' participation.
- 4) The registration and status of a WUA on a turnover list does not indicate the effectiveness of irrigation operation and maintenance.
- 5) Most farmers consider that the bureaucratic and formal nature of WUAs, and the fact that most key posts are filled by village leaders, implies that the main purpose of the organization is to collect funds, with little benefit to the farmers themselves. AD/ART -- articles of association (AD) and operational rules (ART) -- are not clearly understood. Sanctions to deal with violations of regulations over water management are rarely enforced, because they were not formulated with the participation or agreement of the water users.
- 6) Generally farmers are confused by the addition of yet another organization at village level, and are happier with simpler institutions that are already well established in the village such as *kelompok tani* and *kooperasi*. Farmers generally prefer a simple management style. In West Sumatra many farmers questioned the relevance of formal WUAs, particularly on small upstream irrigation schemes where water was already being well managed.
- 7) Although farmers have the potential to manage the O&M of turned-over tertiary units (in some places repairs to canals and structures are carried out spontaneously by *gotong-royong*), in practice their involvement in O&M is generally low. Farmers have generally not been involved

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<sup>1</sup> Awareness is higher in East Java compared to the other Study provinces.

in the design and construction of the irrigation schemes, and many projects have not been implemented according to plan (in terms of time, cost, design and quality) -- this has led to a lack of credibility amongst the farmers.

- 8) The physical quality of many irrigation schemes is poor (for example, many diversion gates do not function) and water is lost through leakages. If irrigation facilities are in a poor state of repair, WUAs are generally not active and it is difficult to collect water service charges.
- 9) Conflicts occur where water is not allocated or distributed in a fair manner between different water users (for example, between upstream and downstream farmers, between irrigation and domestic/industrial water supply, and between rice farmers, fish farmers, duck farmers, tobacco farmers, sugarcane farmers, etc). Also, confusion can arise where technical guidelines for O&M from different Government agencies (*Dinas PU Pengairan* and *Dinas Pertanian*) are not compatible or coordinated, since this can result in changes to cropping plans and planting times leading to reduced harvests.
- 10) A major complaint of downstream farmers is that too much water is taken by upstream farmers.
- 11) There is confusion concerning the area of responsibility of WUAs. Initially WUAs were based on village administrative boundaries<sup>2</sup>. However, this was not effective in encouraging the participation of water users who tend to be spread out over wide areas (including other villages), and there is now a preference for boundaries to be based on tertiary irrigation units.
- 12) The success of a WUA depends very much on the attitude and motivation of village leaders, the strength of community participation, and the awareness of farmer members.
- 13) Technical irrigation schemes developed by the Government should be the priority of the turnover program.
- 14) There is a problem organizing the O&M of higher level facilities (primary and secondary) which still depend on Government support.

#### **4.2.3 Problem Analysis at Central Level**

In accordance with the Project Cycle Management (PCM) method, problem analysis sessions were carried out by the JICA Study Team and Government counterparts from 12 to 15 September 2000. Dealing with each of the five Study provinces in turn, problems and issues identified from the field surveys and provincial workshops were written down on slips of adhesive paper which were then affixed onto boards under the following four headings:

- Government role and support, laws and regulations;
- WUA management, institutional aspects;
- Irrigation O&M, water management;
- Agriculture, economics, and finance.

The paper slips were then positioned and categorized to determine logical relationships and flow paths between direct causes, core problems and direct effects; by this means problem trees were developed. Common themes from the problem trees of the five provinces for each of the four headings were then compiled into composite problem trees representing the 'national' situation. Fig. 4.2.1 shows all the problem trees that were prepared by the PCM sessions. The core problems that were identified are summarized as follows (also ref. Table 4.2.2).

- (1) Socialization of Government WUA policies not yet achieved.
  - WUA benefits are not understood by farmers.
  - Monitoring and evaluation is poor
  - Farmers cannot understand Government policies.

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<sup>2</sup> This is still the norm in East Java.

- No assistance to WUAs (extension/guidance)
  - Present policies cannot show good results to farmers.
- (2) WUA management is not effective (weaknesses in WUA organizational management and human resources)
- Farmers have no intention to participate in WUA activities.
  - WUA officials are not active.
  - WUA officials are irresponsible, and do not make good contacts with WUA members.
  - WUA members are not aware of their rights and obligations, including the necessity to pay for water service.
  - Benefits of WUA membership are not clear to farmers.
  - WUAs lack management skills.
  - Farmers have no sense of belonging to irrigation infrastructures.
- (3) Poor allocation and distribution of water.
- Water shortages in downstream areas.
  - Conflicts between different water users (*padi* farmers, fish farmers, etc).
  - Declining community involvement in O&M.
  - Water distribution is not efficient.
- (4) Low farming family annual income
- Small contribution of agricultural production to farmers' incomes
  - Agriculture is not always profitable.

#### **4.2.4 Farmers' Problems**

The main problem being faced by farmers is financial. The majority of farmers complain of the high costs of agricultural inputs (SAPRODI - *sarana produksi tani*) and low prices of harvested food crops in the market. Capital is scarce and most farmers cannot afford to pay for the optimal package of inputs. Access to post-harvest technology is limited, and losses during processing, handling and storage are significant. Information about market forecasts and trends is lacking.

Agriculture based fully on food crops is not very profitable, and farmers are reluctant to pay water service charges needed for O&M. Generally farmers are only willing to pay water charges in fertile areas where crop yields and returns are relatively high.

The younger generation has a low interest in farming because of the poor returns and prospects, and is more interested in the opportunities offered by employment in cities and industries. Long-term policies need to be formulated to counter this trend.

#### **4.2.5 Farmers' Wishes and Expectations to the Government**

At the Central Workshop it was made plain that farmers want to see lower prices for agricultural inputs and better prices for their produce.

The Government's role is seen as one of facilitator, taking the side of farmers to encourage the development of their self-empowerment. Farmers are ready to involve themselves in WUAs if the Government works directly with them in a democratic way as equals, and recognizes that development should take into account varying local conditions. Government and farmers need to sit down together to discuss planning and decision making. Farmers want the means to empower themselves to handle their own affairs. They do not want the Government to employ contractors to carry out work that they

can do themselves.

Farmers perceive the main benefit of WUAs to be better water allocation and distribution, and have the potential to manage the O&M of turned over irrigation schemes -- as long as the Government stands back and doesn't try to arrange everything. Farmers want to be directly involved in setting up their WUAs and choosing officials who are dedicated and honest. Farmers want WUAs which are simple, and involve traditional water managers such as the *ulu-ulu* (in Java) and *tuo banda* (in West Sumatra) whose work is seen to benefit the farmers. Farmers do not want to be involved in long bureaucratic processes.

WUAs should take into account existing institutions in the village (eg, farmer groups - *kelompok tani* - and community groups: *kelompok masyarakat*, *kelompok arisan*), and be suited to traditional systems of managing irrigation water and local environmental conditions. Many farmers said that what they would really like to see in the village an integrated 'one-stop' agricultural unit able to support all their input needs – one that deals not just with irrigation water but also encompasses the supply of seeds, fertilizers, agricultural chemicals, machinery, etc. and marketing. The *kelompok tani* is well established and active in the farming community, and is the most important existing organization with regard to O&M and should be used as a basis for developing and empowering the WUAs.

Boundaries for a WUA should be determined with the participation of the water users concerned, and based on criteria which are acceptable to all parties; a flexible approach should be used.

In a large scheme with several tertiary units, a committee or board (WUA federation) needs to be set up to coordinate the activities of the WUAs below secondary canal level. The main duties of the WUA federation are to prepare cropping plans, to allocate water fairly between upstream and downstream parts of the scheme, and to make plans for maintenance. This is in accordance with the principle of 'one irrigation system – one management' in INPRES No.3/1999.

Ways need to be found to increase the incomes of farmers/water users, both on-farm and off-farm, and payment of water service charges. There needs to be mutual agreement within farmer groups to determine which crops to cultivate. Extension work should explore the potential for crop diversification and markets for higher value crops, and agro-business ventures. Water use rights of the farmers need to be clearly defined in the turnover process.

The empowerment of WUAs and federations will require a great deal of training of officials and farmers. There must be political will and a long-term commitment from the Government for this. Government extension staff must be dedicated and motivated, and encourage farmers to learn by doing. Key provincial agencies are *Dinas PU Pengairan* and *Dinas Pertanian*, and NGOs and private enterprise could also have important roles to play. Training is required in the following fields:

- General management and administration, accounting/book keeping, budgeting;
- Preparation of cropping plans and estimation of water requirements;
- Water management, operation and maintenance of irrigation system;
- Maintenance and repair of irrigation facilities, preparation of cost estimates, execution of works.

It is strongly recommended that officials and members from successful WUAs be used to train other WUAs needing assistance. This approach was successfully used on the Madura Groundwater Irrigation Project in East Java. The main advantage of this approach is that the training is done by

people with hands-on experience.

#### 4.2.6 Categorization of Problems

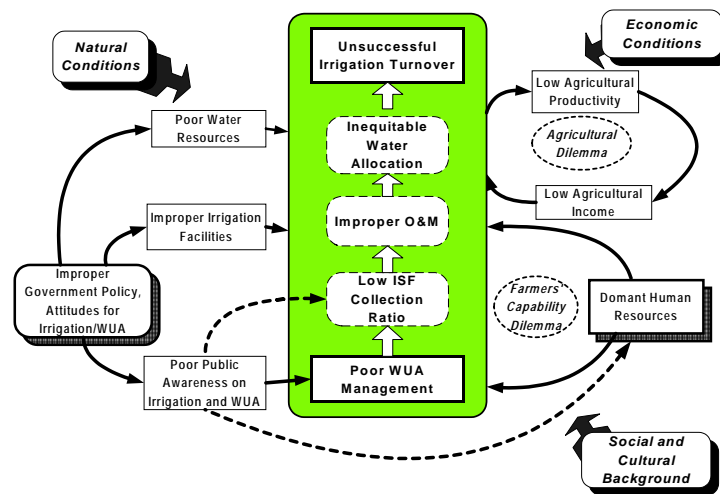
##### (1) Comprehensive Problem Analysis of the Survey Result

Issues regarding irrigation management and empowerment of WUA raised from the field works (RRA and Questionnaire survey) in the Study areas can be categorized into four major issues as follow: 1) WUA's function in O&M, 2) Adequacy of water allocation, 3) Effectiveness of social awareness, 4) Ability of WUA to accept turnover of O&M. Description of problems within each issues can be seen in Table 4.2.2 and Fig. 4.2.2.

##### (2) Categorization of Problems and Major Issues

Based on the Phase I study results of the problem analysis, the major constraints affecting WUA management is simplified as shown below. This figure explains that the most basic and important subjects for the improvement of irrigation management are:

- how to promote concepts of efficient irrigation O&M and management by WUA (Government action required);
- how to empower the farmers, as the users of irrigation systems, and government officers, as the providers of information as civil servants and facilitators of the community, to mobilize their own capacity of solving problems; and
- how to improve farming productivity, which is a direct output of irrigation O&M, and political policies and economical conditions.



Major Issues causing Irrigation and WUA Management

Based on the these analysis, the following hypotheses were derived to summarize the main problems and issues concerning irrigation management, WUA empowerment, and O&M turnover:

##### Hypothesis-1: Government's Role

In the past the Government has used a top-down approach to implement the WUA program which was structured around the village authorities, and involved little or no public awareness amongst the farmers and other water users. The program attempted to impose a uniform model or blueprint without regard to local variations in traditional practices and existing conditions. Although some WUAs took root and successfully operate, the vast majority are inactive and exist in name only. Farmers are either not aware of WUAs or view them with apathy.

In accordance with Law No.22/1999 concerning the granting of greater autonomy to local government at *kabupaten/kotamadya* level, INPRES No.3/1999 concerning Irrigation Management Policy Reform, and irrigation management policies being developed under the WATSAL, the role of government should change from being a centrally based ‘implementer/ provider’ to being a locally based facilitator/ enabler’. Although this will take time to achieve, it is the right direction in which the Government is heading.

Hypothesis-2: WUA Empowerment and Turnover of O&M Responsibilities

WUAs and WUA federations (WUAF) need to be empowered to work for the farmers’ best interests, and to be self-standing and sustainable organizations. However, WUAs will only be effective if farmers:

- are made aware from the outset of the potential benefits in terms of better irrigation water management (which should result in more dependable agricultural production);
- participate in the formulation process taking into account local norms and conditions (bottom-up approach);
- agree to the various conditions involved – particularly the responsibility for paying a water use charge (*IURAN*) to meet O&M expenses.

Hypothesis-3: Improvement of Farmers’ Income

Agriculture in Indonesia is dominated by very small farms and landholdings, especially on the densely populated island of Java where average landholdings range in size from 0.2 to 0.6 ha. Farmers’ income from the production of rice and other food crops from such small areas is very low, especially for sharecroppers (tenant farmers) where returns may not cover production costs. The direct consequences of this are that farmers are reluctant to pay for additional expenses such as water use charges (to cover irrigation O&M costs), and many young people in rural areas are not attracted to farming and prefer instead to look for jobs and opportunities in the towns and cities. If agriculture becomes increasingly the reserve of the older generation and no action is taken to improve farmers’ incomes, it is inevitable that agricultural production will decline and the security of strategically important commodities such as rice will be at risk.

**4.2.7 Variation of Problems in each Survey WUA Area**

(1) Problems Identified in Each WUA Area

In order to collect problems in WUAs under deferent socio-cultural and natural conditions, the selection of Kabupaten, irrigation scheme and WUA area for questionnaire survey and RRA survey in Phase I was conducted based on the criteria shown in the table herein.

Study Area	Selection Criteria
Kabupaten	- Socio-cultural condition (ethnic composition etc.) - Socio-economic condition (population density etc.) - Agro-ecosystem (ratio of paddy field etc.)
Irrigation Scheme	- Owner of construction and management (PU/non-PU) - Location of Scheme in the River Basin (Up-, mid-, and downstream) - Scale of Beneficiary Area
WUA	- non-WUA (Not function) - Unit WUA - Area required to formulate WUA federation

It was confirmed that the problems of farmers and local government supporting farmers were extending over the complexity and many topics, as presumed at the initial stage of investigation (Refer to Fig. 4.2.2). These problems are easily understood that they originated from the combinations of

historical, socio-cultural, economical, and the natural conditions background.

The problems of irrigation and irrigated agriculture faced by farmers are analyzed based on 1) maturity of WUA development, 2) regional conditions and 3) socio-cultural background. Based on these analyses, the direction to solve the problems for the improvement and turnover of irrigation and WUA management are studied. They are summarized as follows.

## (2) Comparative Analysis on Maturity of WUA Development

The institutional maturity at WUA level had been one of the criteria to select Study WUAs at the time of S/W. The institutional maturity is categorized 1) WUA not yet formulated or not functioning, 2) single WUA based on tertiary unit, 3) WUA required to formulate federation at the secondary canal level, and 4) success WUA. By these categorization, it was intended to understand 1) what is the main factor to formulate the WUA and federation of WUAs, 2) what is the causes formulated WUA become not functional, and 3) what is factor to activate WUAs. Some of the example of the success and unsuccessful WUAs among surveyed WUAs are as follows:

### 1) Success and inactive WUA at unit WUA level

- Sungai Janiah irrigation scheme (90 ha) in the Kabupaten Agam, West Sumatra Province constructed the irrigation system by funded and managed by farmer participation after the 56 times of discussions among farmers under traditional community leader (*Ninik mamak*). Farmers are extending their effort to improve farming conditions not only in paddy field but upland crops such as banana to increase their farm income and improve their live standards.
- At Cialang WUA area (120 ha) located in Kabupaten Purwakarto, West Java Province, the operation and management of irrigation system is conducted by farmers participation (*Gotong-royong*) using the materials offered by the volunteer farmer under the strong supports and guidance of Jatilhur Public Corporation (OPJT). Farmers are operation the system to stabilize their agriculture in their scheme.
- Many husbands of farm households are working in Jakarta and adjustment cities, and farming is operated by remained women and aged people in the Sinar Maju WUA area in Kabupaten. Lebak, West Java Province previously. Originally, the farming operated by house labour mainly husband, without husband it became difficult to maintain their farming. They have intention to maintain farming, but all of their land cannot cultivate because of labour shortage. Also these conditions affects the O&M of irrigation system which was maintained by husbands as a part of routing farming activities. When the number of such farmers increases, the activities of village community including WUA activities become inactive.

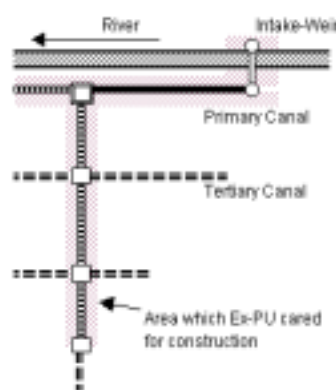
### 2) Success and inactive WUA at Federated WUA level

- In Mejing Irrigation Scheme (419 ha) in Kabupaten Bantul, DI. Yogyakarta Province, 10 WUAs formulated the Federation of WUA under the strong leadership of ex-policeman, and farmers are conducting the repair and improvement of drains channel and secondary irrigation canals actively. However, they worry how to request financial support from the outside because the amount of the repair works estimated is beyond their capacity.
- WUA federation in Bringin Sila Irrigation Scheme (2,400 ha) in Kabupaten Sumbawa of NTB is operated under the strong leader who can influence the decision of village chief in the irrigation scheme. They have the punishment articles in their regulation. They are expanding their activity to group purchase and selling agricultural inputs and outputs.
- The cultivation of the tobacco is expanding in Sumber Salak village, Kabupaten Jember, East Java Province recently. Tobacco is cultivated in the dry season irrigated by private shallow well and a small pump. And paddy cultivation is irrigated by irrigation canal in the rainy season. Rather rich farmers who can introduce the tobacco intended to concentrate tobacco production because of higher cash return. Then they do not pay so much attention to O&M of irrigation system, resulting the poor condition of irrigation system and WUA inactive.

Based on these examples, factors/conditions to improve the irrigation management and activate WUA can be summarized as follows:

Item	Condition for success	Notes
Social Awareness and government support	<ul style="list-style-type: none"> <li>- Government officials have the ability to conduct social awareness and support farmers in farmer's standpoint.</li> <li>- The budget of the supporting farmers can be secured.</li> </ul>	<ul style="list-style-type: none"> <li>- In DI.Yogyakarta where capability of government officials is rather high and having comparatively enough budget, farmers trust the government officials.</li> <li>- Moreover, the project such as IDTO on the Java island presses a qualitative improvement of the staff of the government in Java.</li> </ul>
Able leader	<ul style="list-style-type: none"> <li>- There is a leader strongly trusted by the farmer.</li> <li>- In case of WUA federation, able leader shall have wide capability to understand the necessity to cooperate with other communities outside of his community.</li> </ul>	<ul style="list-style-type: none"> <li>- Even through a leader appointed by government by top-down, if he has strong intention to activate WUA, it become possible to activate WUA and success the irrigation management.</li> </ul>
Uniformity of community	<ul style="list-style-type: none"> <li>- Most of farmers are land-own and less tenant farmers.</li> <li>- Absentee landowner is few.</li> <li>- The access to the income sources other than agriculture is difficult.</li> </ul>	<ul style="list-style-type: none"> <li>- Relatively rich farmers having own well for the irrigation water securing at the dry season, decrease the dependency to irrigation from existing irrigation system, and participation in WUA activities decreases.</li> </ul>
Dependency to irrigation	<ul style="list-style-type: none"> <li>- Water resources can be secured the 200% of crop intensity.</li> <li>- Cannot cultivate without irrigation in dry season..</li> </ul>	<ul style="list-style-type: none"> <li>- Agriculture is not attractive to young generation especially near large cities</li> <li>- WUAs are not active in the rain-richer scheme in the West Sumatra Province, on the other hand, farmer's like to construct the well and participate WUA activities in dryer region such as NTB Province.</li> </ul>

It is no fund close correlation between condition of irrigation system and maturity of WUA at the survey. Most of WUAs are not involved in the management of the primary level management, some WUA is conducting the irrigation management at the secondary level but not extended to the primary level. These facts are resulted by the responsibility demarcation at the initial stage of irrigation system



- Ex-PU owed the task to provide trunk facilities from water source to turn-outs along secondary canal while farmers owed tertiary block development including tertiary canal, according to the previous task demarcation of facility provision.
- This task demarcation has been one of backgrounds which farmers have poor sense of ownership for the trunk facilities, while they have maintained tertiary level by their own manner.
- Farmers were not involved for planning of the scheme and just had kept their own crop production as previous with rainfall mainly. Hence the scheme could not be shared with farmers actually.
- This indicates that transfer of O&M authority of whole facilities to farmers is seemed a new concept to farmers completely. Gov should consider some incentives to let them have sense of ownership.

Task Allocation between Government and Farmers on Introduction of Irrigation Scheme

construction under previous government policy. Previously government took the responsibility to construct irrigation system from water intakes up to the end of secondary system, and farmers are requested to construct the tertiary system by themselves. It is possible to say that tertiary system is constructed by farmers then it is farmers property. There was no objection of farmers to maintain their tertiary system as their own property. But farmers consider that new intakes which assures the water resource for irrigation and primary irrigation system to deliver the water to tertiary block are belonging to the Government and they are beyond the farmers concern. Farmers were not involved in the construction, O&M and management of primary system.

Also clear correlation between the institutional maturity of WUA and differences of ethnics did not



recognized, during and after establishment of WUA. If the farmers' livelihood is depending on irrigated agriculture, they understand necessity of irrigation O&M, which will no deference in ethnics. Farmers live in based on the their traditional custom and life style even now. Their traditional customs and life style varies area by area, but their diversity dose not influence the irrigation O&M.

Then it is possible to conclude that there is little meaning to consider the diversity of ethnics and traditional socio-cultural conditions for the development of WUA. It is proved that the average ratio of WUA formulation is substantially estimated at 25% in each Study Province, deferring with Government record. In order to achieve the target to formulate WUA instructed by the central government, local government reported the list of formulated WUAs with less explanation to farmers and understanding of farmers. Most of the WUA formulated and registered by Government were expected that firstly formulate the frame of WUA then farmers could fill activities/contents in the frame. Practically, in the case of traditional function of irrigation management match with Government led WUA, the traditional activities for irrigation are implemented in the WUA. If they are not matching, WUA could not get the participation of farmers. WUA will not develop from the formulation of unit WUA, up to formulation of WUA federation step by step automatically without any farmers' voluntary participation

### (3) Regional Comparison within Study Province

In addition to maturity of WUA, geographical conditions, accessibility to the market, ethnic distribution and agro-ecosystem were set as selection criteria for the questionnaire and RRA survey WUA areas. The Government promotion of new irrigation management policy give the additional stress to the farmers and traditional community activities. The main stress to be accepted by the farmers is economic stress. The selection criteria were formulated based on this hypothesis that farmers' allowance to accept economic stress would be influenced by the distance between the community and market. Based on this viewpoint, the problem identified through the survey are examined below:

- Communities in active WUAs shown the economic allowances which locate near the market. Their allowances do not come from their agricultural income, but they come from the off-agricultural income earned by diversification of income sources and income from other sector of family member in all Study Provinces.
- In the suburbs of large consuming cities where the farmers can get more incomes from other sector, the economic allowance of farmers shows the two deferent attitudes of agriculture and irrigation O&M. One is farmers' economic allowance activates their farming, the other is reducing the farmers' dependency to agriculture and abolishing the agriculture infrastructure including irrigation system. These differences occurred the availability of good leader who can lead the community.
- Walahar irrigation scheme in Kabupaten Cirebon, West Java Province, the most of husband and young generation working in factory and daily farming are maintained by women and aged family members. Originally, farmers maintain their farming by their family labour, after main labour shifted to other sector, then they can not maintain their farming as before. They have intension to continue their farming but they cannot make full operation because of shortage of labour they also looking to introduce hand tractor. Increasing like this farmers causes several problem on irrigation management and also community activities of gotong-royong.
- On the other hand, in Kabupaten Bogor and Bandung, West Java Province, the maintenance of the farmland and the activity in communities are active even though there are many chances to access non-agriculture incomes sources. The differing with Cirebon, factories/offices are located close to their houses, then husbands and children can manage farming before or after working

hour in factories/offices. But rather remote area of West Java Province, like Kabupaten Tasikmarya and Garut, after main house labour left to major cities, aged family member maintaining farming with employed farm labours temporarily. Their farming are not for income generating but for their "Place of the worth living".

- In DI. Yogyakarta Province, Kabupaten Gunung Kidul, where water resources are scarce, and other 3 kabupatens, where rivers of Progo and Opak supply more fevalable water, shows deferent development of WUAs. In the latter 3 Kabupatens (Kulong Progo, Sleman and Bantul) farming is active in suburbs agriculture targeting tourists center of Yogyakarta city. But agriculture in Kabupaten Gunung Kidul is basically rainfed farming and is difficult to cultivate paddy sufficiently. Also WUAs are inactive.
- Comparing the seriousness of WUA problems of tree Kabupaten in Yogyakarta, Kabupaten Bandung, with WUAs in NTB which farmers are tackling their problems, it is possible to say WUA development is mainly depending on the continuous Government efforts to empowering and supporting farmers. Of cause, it is not only one factor.

Through these analyses, it is possible to conclude that one of the main factors to activate the community is accessibility of market. For the improvement of irrigation management, increase the farm income is important basis and it is strongly required to support the improvement of agriculture based on the accessibility to the market.

#### (4) Importance of Understanding the diversified Socio-cultural Background and Uniformities of Irrigation Management

Based on the identified problems through the survey, analyses are conducted from the viewpoint of maturity of WUA and difference of problems within the regions in pervious paragraphs. Through the identification of present problems and condition of WUA and irrigation management, it was confirmed that farmers are maintaining the traditional culture and customs in their community but also they are formulating their own life stile to maintaining and improving their livelihood.

The farmers of irrigated agriculture are maintaining their life within diversified society and culture, also they are living in the modern technology, i.e. irrigation, which need deferent concepts to maintain. It needs the homogeneous approach anywhere and which beyond their traditional culture.

##### 1) Irrigation homogeneity among the diversified agriculture

"Unity in the Diversity" is a slogan of Indonesian independent, people in Indonesia understand the importance of diversity. Widely diversified livelihood under huge number of ethnics, regional customs, culture, religions, and natural conditions are basis of Indonesian culture. Unity of Indonesia is maintained by the respecting deferent culture by the people. Especially for the implementation of the national policy to obtain a final goal, this respect to diversity acted important factor. The diversification of agriculture and farmers' organizations in Indonesian main sector was accepted by the people.

However, the historical and cultural diversity which had been formulated based on the political, economical and natural conditions, was required to change rapidly to homogeneity after the introduction of modern and large-scale irrigation technology. Government decided to construct intakes, install irrigation canals, farm land acquired for cultivation of cash oriented crops such as sugarcane, coconuts and tobacco. Introduced irrigation systems were managed severely to maintain the productivity in plantations. Under these conditions, traditional diversified agricultural production stile was no more accepted.

After independent, one of the main policy was to achieve the food self-sufficiency. In order to achieve the target, the Government gave many efforts to return the plantation to paddy field and to improve and newly install of irrigation systems. After the achievement of rice self-sufficiency in 1984, the Government continued the efforts to improve the irrigation system for the food production to cover the increasing population and demand of food. Government constructed the primary irrigation system and gave the priority to support rice cultivation. Rice marketing system after harvesting also arranged homogeneously as purchasing the products through Government agencies.

As same as land leveling the undulated cultivation field, the traditional diversification of agricultural production pattern was changed to homogeneous pattern after introduction of irrigation. Cultural and ethnic diversification became not so important factor for maintaining the irrigation system as a base of rice production. Differences of ethnic and traditional customs of farmers' do not cause the difference of understanding of importance for irrigation management. It is possible to say that the key factor for the success management of irrigation system is whether outcome of rice and food crops production is sufficient to cover the management costs or not.

## 2) Necessity of acceptance of diversity for the sustainable irrigation O&M

Basic policy of the regional autonomy and benefit principle (the principle that beneficiaries should pay for part of project), will be widely extended to the society in Indonesia. Farmers are expected to decide by themselves whether they continue the farming, whether accept the management of irrigation system, how to strengthen the irrigated agriculture, etc. WUA is a just place to discuss and make decision of these farmers' problems. These problems are varies WUA by WUA, because of their different conditions and environment such as maturity of WUA, trust of farmers to WUA managers, dependency of agriculture, accessibility to market, agriculture labour forces, condition of irrigation facilities, dispute among WUAs (refer to Annex H for details).

Presently, Indonesian Government and people have a consensus to make social decision based on the participation with maintaining the transparency. Decision making of farmers within tertiary and quaternary block of irrigation is also applicable this consensus. It is necessary to respect the differences of farmers' socio-cultural, economical, educational backgrounds to their decision making and co-sharing responsibility through the identification of problems, formulate the countermeasures and identification resources mobilization potential. For this purpose, the necessity of understanding farmers' diversity became most important at present for the achievement of sustainable irrigation management.

## **4.3 Problem Analysis of Identified Main Issues**

### **4.3.1 Socio-cultural Background**

#### (1) Social and Cultural Background of Motivations to the WUA Policy

Accomplishments of the irrigation O&M turnover by present are said not being favorable than expectation, which was commenced in 1987 officially combining with components of WUA establishment and activation. Such conditions retarded as present has been caused from both of the **Government** side that has been socializing the policy in to the people and farmers' side that the policy aims for. There should be both direct and indirect constraints on the both sides.

This Study has been conducted to survey and to examine the constraints from viewpoint how the

present conditions can be improved. Most of the constraints are belonging to “Willingness of concerned person” like Willingness to accept the policy or Willingness to involve to the policy. Such willingness are affected deeply with not only physical and financial aspects but also with social and cultural aspects backgrounds. For enhancing their participations under other seeming constraints, recognitions and considerations of social/cultural characteristics are indispensable, which are synchronizing with both of “Motivation imprinting” and/or “Motivation enhancement” on both Government’s and farmers’ sides.

In this section social/cultural backgrounds and characteristics are to be summarized from viewpoints of both government and farmers’ sides, considering relations with the WUA policy, and intending to seize opportunities of introducing “hypothesizes” that are to be examined in the following study phase. A part of viewpoints of off-farm urban people is also to be included in the summarization, because the matter of irrigation water management is not dare limited in between the Government and farmers only, but also connecting deeply with them on issues of social assets, environment conservation assets, trade-offs on water use by a certain basin.

## (2) Social and Cultural Backgrounds of Farmers’ Motivations

### 1) Issues of Economical Profile

Generally income generated by rice production of farmer who has average rice field acreage is low constantly. ISF as planned and been guided by Government is beyond from their reference points of owing availability considering their low income. Hence Farmers’ positive willingness to owe the ISF has never been matured.

Average size of one farm household is small as being handed by previous generations. Acreage itself has never been increased and been kept as scale before the Independence. They have kept their traditional farming practice with high labor intensive so that being limited to find ways to expand their income.

Recent depreciation of market price of rice has made farmers lose motivation to keep irrigated rice production rapidly. Both of depreciation of social demand for rice and expansion of off-farm business availability have been boosting complementarily for such motivation depreciation among farmers.

State measures to agricultural sector by Government during half century after the Independence have caused situations so called “assistance addiction symptom” among farmers, while being protected and cared continuously. It is quite hard to find out farmers who are independent and running his business by himself in the field. Situation now in the field can be said that farmers have no enterprising spirits and just waiting for government’s cares.

Even though Government has pouring efforts to introduce new cash crops or changing cropping patterns from previous practices for enhancing agro-industry and agro-businesses as approaches of income stabilization and expansion, measures of establishing concrete marketing procedures, necessary facilities for adjusting exporting from villages are never matured and never progressed actually. So being aware that farmers have selecting off-farm business as their solution to increase income in rural areas, also scenes of losing dependency on irrigation facilities.

Relation between landlord and tenant farmers has been survived through ling Indonesian history and traditional customs as one of Indonesian rural society. The relation is like “master and servant” on land

ownership issue and has been accepted and acknowledged by their society, without any serious conflicts. Generally tenant farmers are paying a certain portion of their crop yield, commonly from 30 to 50% of their total production, to his landlord. Hence tenant farmers have been faced to substantial low-income situation constantly. Due to such background tenant farmers and small scale independent farmers who are sharing most of majority in a village, have been changing their business condition from full-time farming to part-time farming gradually, synchronizing with rapid industrialization and urbanization. Such movements has effected onto rural communities being hold good with traditional mutual assistances societies. Also causing declining of farming practices and water management, which are also being handled by such mutual assistances traditionally.

Most of farmers have been depending on subsistence rice production of rainfed irrigation that allowed barely to keep self-consumption, before the Government commenced development of modern irrigation schemes over the country. Even though after the completion of such development, they were left in farming conditions like small scale farm land and labor intensive production. There was no way for them to find out alternative off-farm job opportunities in their vicinities because both of the urban and other industries were never matured yet by end of '80. Hence only "Yield Expansion" was their available way of "Income Expansion", utilizing such irrigation system prepared by the Government. But after starting and rocketing hyper economic growth in '90s, situation of their income-alternatives was changed drastically, which offered possibilities to farmers to off-farm occupation and off-farm incomes. Hence such alteration of business conditions has caused decline of farming motivation among farmers, especially in Java and in areas closed to cities.

## 2) Issues of Social Profile

Rice production by irrigation system in Indonesia has been managed with labor intensive ways basing on small scale field tenure system. But there might be about 1,000 households under a small-scale irrigation scheme (about 500 ha of scheme wide). Hence it can be easily aware that unite individual intentions of each household under one irrigation scheme into one direction democratically is quite difficult. Farmers, being said "conservative" commonly, have never been getting out from traditional spell of top-down system, because never been shown and met with particular ways of decision making for such high population density society.

Hierarchy formed with landlord, independent farmer, tenant farmer and farm laborer in a rural society is natural social system without any doubts for people there. They have been born in, growing up, working in and passing away in the system. Also wealth disparity in the hierarchy has been natural, and disparity of education mainly caused from wealth disparity is also natural. Such fixed or being fated hierarchical ranking relations originated from wealth disparity has affected to decision-making procedure deeply as lower rank people are going to obey to higher rank ones in a rural society.

There is an understanding on the Government side that what farmers can keep manageability for collected water fee is farmers' most incentive. But the manageability by farmers means just normalization as their own money returned to their own pocket. Hence quite big gap is there in between Government and farmers, regarding to the merits of establishing WUA and enhancing O&M turning-over.

Recently while progressing rapid urbanization into rural areas, number of off-farm people intruding into rural community has been increased. Such phenomena cause difficulty to keep agriculture-oriented mutual-assistances in a community and being obstructing smooth

farming-practice and water management. Urbanization in rural areas is giving opportunities of off-farm job occupations, which is available for higher income relatively.

Bursting of mass-media, mainly of television broadcasting networks are offering scenes to farmers to let them compare their living conditions with urban ones, which seem so attractive relatively for them and initiate them to let their younger generations to get out from the village. For younger generation, on the other hand, mass media owes function of imprinting naturally for off-farm job occupations, which seem well facilitated with high income and also higher possibility for more wealth. Such socializations through mass media will accelerate increasing number of part-time farming, aging villages and also leaving from farming, while hastening collapse of rural communities including water management and farming practices.

Generally part-time farm household faces labor shortage for keeping proper farming practices because some members are leaving from village, mainly they are husband and sons or young generations. Hence they are going to change farming practice conditions gradually from rice production only to vegetables and tree crops which are not requiring hard works nor high water consumption than rice production. Consequently causes decline of mutual-assistances and motivation of involving to water.

Also available to notice of “Negative Cycled Condition” in fields already that maintained condition of tertiary canal and facilities are left as poor or rough conditions, it causes low capacity of water delivery and it causes shortage of available water, and then causes decline of motivation of rice production.

### 3) Issues of Cultural and Historical Profile

Even though many reforming were occurred from colonial era there was no difference for farmers fundamentally in between colonial era and the half century after the colonial era. For farmers its change was just a change of ruler from foreigner to domestic people. During those change farmers should have survive to keep their own substantial crop production to feed his family, avoiding any interruption from then rulers. Under such conditions manner of “blind following” was their most concrete way to keep themselves from any harms, keeping close eyes, close ears and keeping close mouth. State power dominated society over 400 years made people decline generous culture and their character.

Situations under state power-dominated society made people characterized like “to obtain to his hands at first without any considerations if available to do so for securing his defend “, under such uncontrollable conditions by himself. All decisions for his secure were rulers’ hands, not in farmers’ hands. On the other hand recognitions for “social responsibilities” have been grown sparsely, which usually obstructs or harms his secures. There were rare cases for them to experience such recognitions by present.

Any religions provide mental and spiritual frames of people. Major religion in Indonesia characterizes people to do decision-making through communications with peerless God. Manners obtained through such religious customs and courtesies affect people to apply in human relation also. People decision–make respecting opinions and comments of higher rank people in a society and not dare to express his own ones. as respecting manners to him.

Indonesian hospitalities provides manner of “Discussions without harming opponents” and

“Discussions not clarifying points of issue” on the other hand. That character developed characteristics in rural areas where is dominated with more conservative temperaments as follows;

- Not to express his own objections directly and bear to pass time during its discussion.
- Not to express his own objections when being decided on opposite direction and not to follow the decision later.

So that results approved through discussions are sometimes deadlocked during implementation.

Alterations of regional resources were conducted with state power during the hyper ecumenical growth in 1990s, alteration irrigated paddy fields to urban and industrial land use and agricultural successors to laborers of urban industries. Especially in Java it is said that about half million irrigated paddy fields were turned to urban area or industrial area in 1990s. Alteration of paddy fields means not only vanishing of paddy field, extinction of farming practices and crop production, but also disappearing of rural communities, which have tolerated cropping infrastructure and also introduction of possibilities of income diversification. Full-time farmers depended on their living on to agricultural income only, started joining to off-farm businesses in cities. Hence number of part-time farm households has increased rapidly in 1990's as like filling the income gaps between cities and villages. Increment of part-time farmers in villages means decrease of dependency to irrigation facilities because of low price of rice. Also it caused decrease of motivation to care facilities in the fields.

There might have been a fair society era before the colonization where people could accept wealth allocation without complains, originated from agricultural production utilized fertile resources and gentle monsoon climate. (“fair” means conditions accepted by people without any complains for social and economical situation of each individual relatively). Customs/spirit of “donation from ruler to ruled” and “Indonesian mutual-assistance spirit” have been handed over through generations by today. That mutual-assistances in a society, including the “donation from ruler to ruled” is still existing today's Indonesian societies and been a background to produce tender society. On the other side, that custom allowed people to recognize that ruled has not to owe any social responsibilities by dint of receiving donation from rulers. In fact most of projects have profiles to attract people to approve then rulers. It seems that farmers would like to use irrigation system while functioning only as donation from ruler.

#### 4) Issues of Administration and Scheme Management Profile

Most of development projects were planned and apprized by the Government through top-down system only, not included beneficiaries' participation. Hence people/farmers are recognizing that most of projects are for Government, not for people/farmers. Also irrigation water conveyed and delivered through irrigation system is understood as “one of welfare or donations given by Government” and acknowledgement as “their own project/own asset” is so sparsely.

Presently Government has been pouring efforts to switch over from the previous centralized system, which has been continued for about 400 years, to democracy-based new era. Terminology of “Decentralization” and “Democratization” are noticeable at anywhere in any societies and becoming social reference points for any decision-makings. Also “Bottom-Up organization” is said at any places as a goal of today's reformation. It is said that terminology of KKN (*Kolusi*= Collusion, *Korupsi* = Corruption, *Nepotism*= Nepotism) was an expression of people's will against pus of centralization during last 400 years symbolically. Impression of people to the Government was sublimated into that KKN. That impression might be common also among farmers.

### (3) Social and Cultural Backgrounds of Government Officers' Motivations

#### 1) Issues of Economical Profile

It seems quite hard to encourage motivations to enhance work qualities among officers due to lack of current budget, low wages and limited incentives.

Condition of low wages of officers comparing with private sectors has caused overuse of public authorities, which caused those KKN situations, which cause confusion of the public and the private, also, which caused low qualification of public services. Such condition on the government side caused distrustful of the people which seems hardly to wipe out from their minds.

Condition of shortage of proper budgeting to cover O&M works has been kept for long period because Government concentrated modernization of the country and accelerating food self-sufficiency, highlighting facility constructions. Such situation became a strong background to neglect O&M works after completion of construction and to decline officers' motivations, because of absolute lack of budgets for O&M.

Same as previous item, hastening stresses of country modernization and realizing food self-sufficiency generated ethos / manners in Government to neglect characteristics by region or by project. Most of IRR for apprising project proposal were always more than 10, costs estimated were based with unit acreage instead of adopting results of market researches. Hence quality control of a certain project has been faded away actually. Such contradictions on project management were widely known among officers even though nobody expressed.

#### 2) Issues of Social Profile

Any projects/activities not only irrigation development project and agriculture extension schemes but also other development projects of regional social infrastructures conducted by Government had been owed tasks of not only public services but also measures to attract the people to put into same direction of the then centralized state powers. Effects of such stratified activities were so successful that farmers are recognizing that Government will accept and reply for any requests from them and still expecting many government assistances like facilities, extension services, farm machineries, chemicals, fertilizer and others. Situation now can be expressed like “assistance addiction symptom”

#### 3) Issues of Cultural and Historical Profile

While being not different in between colonized era and era after independence for farmers, the Government could be a place where is available to keep social superiority which is not put spell by traditional customs. Hence officers of the new government could leave from the traditional spells and handle the public authorities even though being not satisfactions on official wages. Lack of satisfaction could be filled with benefits from the public powers. Confusion of the public and the private has obstructed to awaken to “public/social responsibilities”.

Same situation, which farmers are not going to express their own wills clearly, was rooted and existed in administrative hierarchy. Lowerers were not going to defy uppers even though finding out contradictions in policies and just kept function of conveying instructions to any other sections. “Blind following” was the most concrete way to save themselves from any harm, as keeping him behind the fronts. But put it the other way around, once being at upper position than present he was promised availability to touch with “social contradictions” and other benefits with public powers.



Hence rare cases were there to resist against any doubts in the hierarchy.

Government had adopted centralized establishment backed up with strong army and police powers to keep the state structure. Same system was applied to the administration systems as rational organization to convey down orders/instructions smoothly to bottoms. Hence recognition as “civil servant” is weak among officers.

#### 4) Issues of Administration and Scheme Management Profile

Target of WUA establishment, detailed action plans for empowering farmers and prioritization of schemes have been not clarified and never been got hold of accomplishments of activities in the field by present (at National level). Government has never shown clear figures of farmers’ benefits of forming WUA by present.

Government has never had occasions to socialize “ their public responsibilities” and the benefit principle to farmers severely and allowed to use the water by present, because any irrigation development projects were owed tasks of measure to win farmers over to Government’s side. It could be said that Government left the issue over, not touching to the core of the problems by now.

Indonesia selected the centralized establishment with strong state powers to unite the country of cultural diversity and physical expansion. The system functioned successfully to convey down any orders and instructions from the central to the bottoms. As one of effective measure to win people over to her side, Government employed many peoples into her own system as officers. It is like a measure against unemployment and resulted corpulent body.

### 4.3.2 Irrigation Operation and Maintenance and Irrigation Service Fee (ISF)

#### (1) Efficient Operation and Maintenance (EOM)

As discussed in sub-chapter 3.3, the efficient operation and maintenance (EOM), special maintenance and an ISF were introduced under the Irrigation Operation and Maintenance Policy (IOMP, 1987). WUA is the establishment of a legalized and registered body of farmers who can accept and be responsible for the management of irrigation systems under their control through the financial administration and practical application of efficient operation and maintenance (EOM). This empowerment is the mechanism of transfer of the responsibility for the sustainability of irrigated agriculture to the beneficiaries, which in turn allows the Government to decrease its yearly budget allocation to O&M.

The empowerment of an organization is dependent on the attitude and strength of its members or supporters. Hence the application of EOM is the responsibility of the WUA members through guidance by the WUA organization. The sustainability of an irrigation system is totally dependent on the success of EOM and it is therefore necessary for all concerned parties to understand the definition of EOM, i.e. efficient operation and efficient maintenance.

- **Efficient Operation:** Efficient operation of an irrigation system is the equitable distribution of irrigation water to each water user (farmer) within the boundaries of the irrigation area as is each farmer’s water right to receive both a timely and equitable allocation relative to his crop or land requirement.
- **Efficient Maintenance:** Efficient maintenance is the combination of regular, periodic and yearly maintenance works that are implemented to return the irrigation infrastructure (canals, drains and structures) to or as near to the as built condition so ensuring that the efficient

operation as detailed above can be achieved. Additionally, the application of regular and periodic maintenance is to lengthen the time span delay between construction and the need for upgrading and rehabilitation.

If the above aspects of EOM are not achieved or if, over time, the benefits of EOM are not realized due to the non-application or inefficient application of EOM, then the water users (farmers) will not support the WUA thus decreasing the benefits of WUA Empowerment. It is recognized that there are many other aspects that must be considered to achieve successful WUA Empowerment, i.e. social, cultural, traditional, religious, financial, technical and farmer attitudes and personalities. These must be addressed but if the above concepts of EOM are not realized, then the sustainability of the irrigation infrastructure is decreased, the area of irrigated land decreases, yields decrease and irrigated agricultural production is not sustained.

## (2) Operation and Maintenance Costs

### 1) Estimation of a Realistic Value for Main Irrigation System O&M

A realistic value for the O&M management of an irrigation system (excluding O&M of the tertiary unit), inclusive of administration costs and gatekeeper salaries. The cost, at 2000 exchange rates was Rp.120,000/ha/year (US\$ 15/ha/year)<sup>3</sup>. This was an average value calculated from selected project data and irrigation systems of the provinces of *Aceh* and North *Sumatra*. When compared to the requested Sub *Dinas* UP budget 1999/2000 for DI *Pekatan*, Province of NTB, of approximately Rp.210,800/ha/year (US\$ 26.35/ha/year), derived from the “walk through, needs based budget” procedure, it can be seen that there are wide disparities between areas.

### 2) Tertiary Unit and Village Irrigation System Management Costs

Not included in the above cost estimation are any associated costs of O&M of the tertiary unit or village irrigation system. The tertiary unit and village system O&M is the farmers’ responsibility, in association with the respective WUA. Delivery of the water to the farmers is the responsibility of the water foreman (or *Ulu-ulu*) and for this the farmers pay a service charge (*IURAN*) either to the water foreman or to the WUA. In some instances, farmers make a payment to the WUA committee for administration and honorarium. *IURAN* is generally paid in-kind, often in the form of paddy. Therefore in some irrigation areas, farmers make two payments, an ISF and a *IURAN*.

Maintenance of the tertiary unit irrigation infrastructure is in theory meant to be completed through a system of self-help (*gotong-royong*) whereby labour and materials for repairs are meant to be supplied by the farmers at minimal or zero cost. This concept, where applied, has been quite successful but in the main, not all farmers partake in *gotong-royong* nor do they compensate for their absence through a payment. The payment of an *IURAN* to the WUA or *Ulu-ulu* for the delivery of water can adversely affect the participation in *gotong-royong* and the responsibility for maintenance, through the argument that having already paid *IURAN* why should the farmer also contribute labour for to clean and repair canals, claiming that this is the responsibility of WUA and the *Ulu-ulu*. Farmers are required to implement *gotong-royong* programs as needed, for example just before planting for the cleaning of canals. At these times not only may the farmer numbers be insufficient but the time (number of days) required to complete the maintenance work, is insufficient. In these instances, tertiary and quaternary canals and drains can be poorly maintained thus decreasing the equity of water distribution.

The intensity of agricultural cropping and the economic reality of farming have a direct bearing on the

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<sup>3</sup> Refer to 3.3.1 (6) of Chapter 3 in the Report

application of *gotong-royong* and the efficient maintenance of tertiary unit irrigation. Farming, in general, returns minimal profits, except where farmers have the opportunity to produce high value crops such as vegetables, fruits or tobacco. In addition, many farmers use any spare time to supplement their income with other avenues of employment.

In 1997 as part of a report for an ADB Technical Assistance proposal<sup>4</sup>, consultants valued tertiary unit EOM to be approximately US\$ 8.00/ha (Rp.64,000 per ha per year at the 2000 exchange rate) where tertiary unit maintenance work was completed with contract labour. Assuming that the majority of this estimate was wages for labour contract and salaries, it is expected that this cost has remained relatively the same with minimal effect from the inflationary crisis.

### 3) Realistic Estimation of O&M Cost including Tertiary System

Hence to establish a realistic estimate for ISF, it is considered practical to include all costs within a single estimate including the administration and O&M management costs of both the main and tertiary unit irrigation systems, inclusive of WUA officials' honorarium and *Ulu-ulu* payments.

Based on the above estimations, a realistic ISF value could be around Rp.184,000/ha/year (i.e. Rp.120,000 for the main system plus Rp.64,000 for the tertiary system) plus contributions for WUA honoraria and *Ulu-ulu* payments. The two latter payments are usually paid in the form of paddy and can reach as high as 50kg per ha per season.. Under the "one irrigation area, one management" policy, it is now envisaged that there will be a number of WUA committees within the administrative and management structure. The WUAF will be responsible for the management of the secondary canal and the *Induk* WUA (IWUA) will be responsible for the management of the primary canal and in-take head-works structure. Within the boundaries of one irrigation area, there may be a maximum of three WUA Committees for which a financial payment may need to be paid for the administration and honoraria. With respect to the JICA Study, estimation of O&M costs for the irrigation management of the main irrigation system has included costs of administration and salaries for the Government irrigation department; at a later stage these should be reduced and replaced by the payments to the WUA.

Administration costs and salaries are expected to be far less for irrigation management under the IWUA, WUAF and WUA principle than for management by the Government irrigation department. Any necessary increases for honoraria and *ulu*-payments at the WUAF and IWUA levels are expected to be covered within the JICA Study estimated Rp.120,000.

Based on the above discussion, a realistic estimate for the yearly payment of ISF, would be a maximum of Rp.334,000 inclusive of a tertiary unit requirement, assuming no *gotong-royong* (culverts), and a minimum of Rp.270,000, assuming efficient *gotong-royong* for the tertiary unit O&M. The estimate is derived as follows:

Items	O&M Cost (Rp./ha)			Remarks
	Case 1	Case 2	Case 3	
O&M (main system)	120,000	120,000	120,000	Estimate of the Study Team
O&M (tertiary unit)	64,000	64,000	0	ADB Report (contract base)
WUA management	150,000	100,000	150,000	Paddy at Rp.1,000/kg, includes IWUA
Total	334,000	284,000	270,000	

Notes: Case 1: 300% of paddy cropping intensity and repair of tertiary unit by contracted labours

<sup>4</sup> ADB Technical Assistance TA No.2588-INO "North Sumatra Irrigated Agriculture Improvement Project", Volume 4, Annex 1 – 'O&M Financing & ISF', Binnie & Partners (Overseas) Ltd. plus associated consultants, March 1997

Case 2: 200% of paddy cropping intensity and repair of tertiary unit by contracted labours  
Case 2: 300% of paddy cropping intensity and repair of tertiary unit by Gotong-royong

### (3) Irrigation Service Fee (ISF or IPAIR)

#### 1) ISF System

As discussed in sub-chapter 3.1, the irrigation service fee (ISF or IPAIR) has been introduced since 1989. The ISF policy in Indonesia is very hard to achieve, although the concept is a worldwide policy with varying degrees of success, not only in developing countries but also in developed countries such as Australia and the USA, amongst others. Beneficiaries paying for the cost of irrigation scheme O&M is a necessity to accommodate decreased government O&M expenditure.

Failures of the ISF program was the result of three aspects of the method of inception gone wrong. Firstly, the collection of the ISF, its insertion into general revenue and its non-accountability in terms of fee collected per specific scheme became a woven bureaucratic nightmare of procedure. Secondly, ISF funds collected within a specific scheme did not necessarily benefit that scheme through an expenditure of funds for O&M. Thirdly, farmers did not see a return in improved O&M services inclusive of extension and technical assistance from payment and hence ISF payments ceased. This third factor did little to foster farmer confidence in the proffered incentive of “farmers having a voice in irrigation management”.

On September 14, 1998, the Director General of General Affairs and Regional Autonomy of MOHA, issued a decree whereby *Kabupaten* authorities were to:

- Inform WUA of the ISF amounts collected within their irrigated area, and
- To transfer these amounts to active WUA bank accounts for use by WUA for the O&M needs of the irrigation systems under their jurisdiction.

This decree went a long way towards restoring the credibility of the ISF principle but in general most farmers still have misgivings and misunderstandings of the purpose of ISF. Farmers need to understand that the principle of WUA responsibility for irrigation management requires self-financing by the farmers and for that reason farmers will have to adopt the ISF principle.

Under INPRES No.3/1999, ISF collection has been made is the sole responsibility of the WUA. Each WUA is obliged to collect an ISF from each and every water user beneficiary within the boundaries of the WUA irrigation area of responsibility and the funds are to be allocated for the irrigation management, inclusive of O&M, of their WUA irrigation scheme only. WUA now have the authority to raise ISF funds but each WUA and all its members, i.e. water users (farmers, domestic, industrial, fish pond) must understand the need for the ISF to be established at a realistic level to cover all the associated costs of irrigation management.

#### 2) ISF Estimation Method

In accordance with proposals under WATSAL, the estimation of Government O&M budgets will no longer be based on a per hectare command area formula. The O&M budget to be made available by a *Kabupaten* government for each irrigation scheme will be matched or linked to the total ISF payments collected by that scheme. Thus, a direct linkage will be created between *Kabupaten* irrigation agency funding (through the recommended *Kabupaten* Coordination WUA Support Forum) and the use of the Kabupaten Irrigation Improvement Fund (KIIF) and WUA/WUAF/IWUA satisfaction with irrigation

supply and support services and the farmers' willingness to pay the ISF. This linkage will foster irrigation agency accountability for services to WUA.

The application of ISF at the field level is best estimated by conducting an O&M walk-through of the irrigation infrastructure, determining operation and maintenance priorities, and calculating an annual needs based budget. From this and the number of water users (farmers, fishponds, domestic, industrial, etc.) the value of each individual's ISF payment can be established; the standard average annual per hectare cost approach is no longer valid.

As part of the JICA Study Team's determination of O&M costs, it was necessary to estimate realistic ISF levels, based on previous studies, O&M management requirements and actual Government budgets (both those requested through a "needs based" estimation and the budget delivered from Central Government). As time did not permit a complete application of "walk-through" and "needs based budget" estimations for each of the Study's irrigation area infrastructure, the JICA Study estimated realistic value of ISF is presented as a cost per hectare of command area.

### 3) ISF Collection Method

The JICA Study Team recommends that the ISF, should be a one off yearly payment covering all of the above costs. Also it is recommended to accept the payment by paddy, which is easier by farmers.

The above discussion has established a realistic value of ISF. This is a value that should be applied to each irrigation area's initial or first year farmer ISF payment for the establishment of a financial and economical cash flow base from which WUA administration and irrigation management can progress. The value may be too high or too low, but what has been established is a working base and following the implementation of a first year O&M "walk through and needs based budget" assessment, administration needs, salaries etc., the ISF value can be adjusted either up or down according to each WUA's individual irrigation area budget assessment. The process of payment is from the farmer/water user to the WUA who are then responsible for any on-payment to the WUAF who in turn are responsible for on-payment to the IWUA.

### (4) Farmers' Ability to Pay for O&M

#### 1) Farm Income and O&M Cost

In addressing the matter of whether or not farmers would be able to cover the full O&M charges which would need to be levied if irrigation systems are to operate at maximum efficiency and to be kept in full working order, it is necessary to have an estimate of the costs concerned. As stated above, at this stage, it has been assumed that approximately US\$ 25 or Rp. 120,000 would be required, in addition to the costs of O&M of the tertiary systems which are, to a greater or lesser extent, already being borne by the farmers.

Table below indicates the proportion of total net annual revenue which an O&M charge of Rp. 120,000 /ha/year represents. It can be seen in the most favorable condition this is around 1.5%, but that it increases quite rapidly in less favorable conditions, reaching almost 10% for the worst case where a positive net return is achieved. The simple conclusion is that, given the fundamental importance of water, farmers would be willing to forgo up to 10% of their net return, if the alternative was that water would not be available and irrigated cropping would no longer be possible.

Cropping pattern	Cropping intensity %	Conditions	Family labour use	Family days/yr	Tenure status	Net income Rp000/ysha	O&M charge Rp000	% of net income
Rice dominant	235%	Favourable	Partial	123	Owner	8,252	120	1.5%
Mixed	235%	Favourable	Partial	123	Owner	8,050	120	1.5%
Rice dominant	195%	Favourable	Partial	102	Owner	6,907	120	1.7%
Mixed	195%	Favourable	Partial	102	Owner	6,598	120	1.8%
Rice dominant	235%	Unfavourable	Partial	135	Owner	2,543	120	4.5%
Mixed	235%	Unfavourable	Partial	135	Owner	2,587	120	4.6%
Rice dominant	195%	Unfavourable	Partial	113	Owner	2,210	120	5.4%
Mixed	195%	Unfavourable	Partial	112	Owner	2,124	120	5.6%
Rice dominant	235%	Favourable	Partial	123	Share	1,594	120	7.5%
Mixed	235%	Favourable	Partial	123	Share	1,552	120	7.7%
Rice dominant	195%	Favourable	Partial	102	Share	1,336	120	9.0%
Mixed	195%	Favourable	Partial	102	Share	1,271	120	9.4%
Mixed	195%	Unfavourable	Partial	112	Share	-1,688	120	-7.1%
Rice dominant	195%	Unfavourable	Partial	113	Share	-1,814	120	-6.6%
Mixed	235%	Unfavourable	Partial	135	Share	-2,074	120	-5.8%
Rice dominant	235%	Unfavourable	Partial	135	Share	-2,155	120	-5.6%

The matter, however, is not such a simple one; many farmers cannot survive from the income generated by their farms and any additional outgoings, even quite small ones, create real problems. Clearly such families need to find additional income from other agricultural or non-farm enterprises. In present times, with millions of employment opportunities having been lost in the non-agricultural sectors, finding alternative income generating employment is very difficult. It should also be borne in mind that for many farmers with small plots, the family needs to retain most of the crops grown for their own consumption; crops are only sold to pay off debts incurred when obtaining crop inputs (such as fertilizers and chemicals) on credit and to purchase other essential goods and services. For sharecroppers the situation can be dire and all attempts should be made to introduce systems more favorable to the sharecropper. At least the landowner should contribute towards the O&M costs. Mention is often made of the desirability for farmers to diversify their irrigated cropping and for them to produce higher value crops. Whilst this is happening to some extent, it should be appreciated that there are only limited opportunities and for the vast majority of farmers there are few alternatives to the well-known crops of rice, soybean, groundnuts and maize.

The market for vegetables is already well supplied, and it is very easy for prices to fall and for farmers to lose money; with the high costs of establishment these losses can be very substantial. Tobacco is grown in specific areas, and where this is part of an organized program, farmers can reap substantial benefits. The ability of the relatively few farmers who produce high value crops to pay for water is in little doubt. The fact that many use privately owned pumps to provide supplementary water at costs ranging from Rp. 400,000 to Rp. 600,000 /ha/season, reinforces the argument. It would, however, be very unwise for a poor farmer to attempt growing a high-value, high-risk crop, unless the market was assured. It would be misleading to attempt to prove that most farmers can easily afford to pay full O&M charges by including high value cropping in the average farm budget. In an “improved-WUA situation”, there is little point considering the possibilities for any significant changes to existing cropping intensities and patterns and the best that can be hoped for are modest improvements in crop yields and some increases in cropping intensities on the tail-end holdings. The cropping scenarios used in this analysis assume reasonable water supply; it is unlikely that many farmers will be able to do better than the best case situation.

Although farmers complain about low crop and high input prices, in fact the current levels are reasonably in line with their border parity values. Unless Indonesia imposes import taxes on rice and soybeans or reintroduces subsidies on fertilizers, it is unlikely that there will be any significant

changes to input and output values. Rice is an expensive crop to grow, with high labour and water requirements. For HYV rice, it is only after GKG yields exceed 2.5 to 3.0 tons that farmers can expect to make a profit. Soybeans and groundnuts, whilst being much cheaper to produce, have limited yield improvement potential. The full potential for maize has yet to be exploited; some farmers in North Sumatra and East Java, for example, are obtaining high net returns from a crop which has limited water and labour requirements. Whilst substantial quantities are currently being imported, overall domestic demand is limited, and it would require only a minor shift in emphasis towards this crop to achieve national self-sufficiency.

## 2) Farmers' Ability to pay for O&M

There is little reason to believe that with the strengthening of WUAs there will be any significant increase in farmers' net returns. Any stimulus to the program is likely to come from the stark realization by the farmer that they are no longer able to rely on Government to assist them with annual O&M assistance and that the only possibility for obtaining financial assistance to rehabilitate severely damaged schemes, would be through the presentation of WUA-prepared rehab proposals, backed up by a commitment that the farmers will make significant contributions in cash and/or kind.

There is no guarantee that farmers will respond positively, and Government needs to consider the real possibility that the condition of many of the irrigation systems will deteriorate at a faster rate than has been the case in the past. The implications of this scenario are that food production will decline and the costs of irrigation system rehabilitation, when it eventually takes place, will be very high.

### 4.3.3 Irrigation Rehabilitation

#### (1) Past history of Irrigation Rehabilitation in Indonesia

Many irrigation schemes have been rehabilitated twice in 5 years or three times in 10 years<sup>5</sup>. There are many reasons for such a high level of rehabilitation work but, the main cause is the lack of Government funding and application for yearly EOM programs inclusive of both routine and periodic works. In addition, the general concentration on contracts and projects produced an ingrained practice of preferred periodic rehabilitation rather than implementing a program of yearly (routine & periodic) O&M. World Bank has stated, "a de-facto provincial government deferred maintenance culture has led to at least one third of the three million hectares of Government designed irrigation schemes being rehabilitated twice in the last 25 years".

Rehabilitation projects or programs have, in the past, been implemented without the participatory involvement of the farming community, i.e. water users, either financially or as partners in the decision making process of design, construction, maintenance and/or rehabilitation. This has, over time, encouraged the farming community to adopt a Government dependency attitude; furthermore, the non-participation of the farmers, i.e. water users, has also encouraged them to consider that the irrigation system is Government property and not their responsibilities. Farmers still maintain this attitude and for example, farmers from WUA *Pelopar, Pekatan* irrigation scheme (April 2001) stated that they were prepared to accept responsibility for the main system infrastructure but the system must first, be rehabilitated by the government irrigation department.

Rehabilitation as a result of a policy of deferred maintenance is an expensive option. The World Bank

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<sup>5</sup> Consortium for International Development report, "Assessment of Options for Sustainable Irrigation Development in Indonesia – ADB TA 2679-INO", Final Report, Volume II of III.

has estimated that “apart from production losses, deferred maintenance results in scheme rehabilitation investment that is 6 to 7 times higher in present value terms than that required if maintenance were to have been satisfactorily undertaken”.

Government policy with respect to the rehabilitation of irrigation schemes, is a very important precondition for the application of the countermeasures and the implementation of an Action Plan aimed at achieving the objectives of this Study. Current Government policy regarding turnover of the responsibility for the management (O&M) of irrigation infrastructure to the beneficiaries, states as one of the criteria, that, “...., irrigation infrastructure must be in good working condition before official turnover to WUA”<sup>6</sup>.

Past turnover policy was restricted to small-scale irrigation schemes (below 500ha), tertiary unit irrigation infrastructure and village based irrigation schemes. Under the current irrigation reformation policy of “one irrigation area – one management”<sup>7</sup>, the turnover of larger irrigation schemes will be encompassed. If the pre-condition of rehabilitation before turnover is maintained, the cost to Government will be excessive and, under the current economic conditions, beyond its capability, if the program is to cover significant areas.

But, it must also be realized that the current financial returns from the general yearly three seasonal farming practice of; rice, rice or *palawija*, *palawija* or the yearly two seasonal practice of rice, rice or *palawija* are limited. For example, farmers in *Nusa Tenggara Barat* (NTB), irrigation area (DI *Pekatan*) (April 2001), have stated that they receive Rp.800/kg wet paddy (*GKP*). When compared to the economic calculations of farmer returns for rice, depending on the costs of farm inputs, this price of Rp.800/kg only returns a profit of Rp.1,917,000/ha/season under favorable cost of production conditions and a profit of Rp.804,000/ha/season under unfavorable conditions. Such economic returns from rice production do not allow a large financial input from farming communities for a program of rehabilitation of irrigation systems. But, for the implementation of participatory O&M management it should be noted, that these returns are capable of supporting realistic yearly O&M costs through a payment of realistic established irrigation management fees (inclusive of ISF, a tertiary unit O&M charge & *Iuran* to WUA/*Ulu-ulu*) of Rp.334,000/ha/year (US\$41.75/ha at exchange rates for 2000), Section 4.7.4 (4) – ISF and Government Subsidies for Irrigation O&M.

This pre-condition of turnover must be reversed, if the mindset of the farming community, in particular the water users, is to be changed. Both the ADB and World Bank recommend that the rehabilitation of irrigation schemes should occur only after the responsibility for the O&M (and rehabilitation) management of the irrigation system has been turned over to the beneficiaries, through their democratically formulated WUA, WUAF or IWUA. Such a policy change is intended to create a sense of belonging and ownership in the minds of the water users through their participation in the rehabilitation process. Through participation, water users are able to present their requirements, needs, traditions, ideas, concepts etc. for discussion and consensus.

Another concept of rehabilitation that needs be altered is the inclusion of certain irrigation maintenance works into the program of rehabilitation works, such as the minor repair of concrete and masonry lining of earth canals and the removal of sediment from canals and drains. These work items

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<sup>6</sup> INPRES No 42 PRT/1989 System of Turnover of Small Scale Irrigation Systems and Management authority to Water Users Association

<sup>7</sup> Presidential Instruction, No 3,26 April 1999, Irrigation Management Policy Reform. (Ref: “General Guidelines for Irrigation Management Delegation (PPI), 30<sup>th</sup> August 1999”. (BAPPENAS), Department of Internal Affairs (DEPAGRI), Department of Public Works (DOPW).



should be managed within a yearly, routine and periodic maintenance program.

Canal lining can be classified as preventative maintenance because it is used to prevent regular or excessive repair of broken, slumped or eroded earth canals. Minor repairs of the earth canal can be done routinely using locally available materials and the lining repair can be included in a seasonal or yearly (periodic) maintenance program. Sediment removal from canals and drains can be classified as either a routine or a periodic maintenance item depending on the severity and volume of sediment; it is not a rehabilitation item

## (2) JICA Study Findings

Phase II of the JICA Study included 25 irrigation areas (DI: *Daerah Irigasi*) for Participatory Rural Appraisal (PRA) surveys and assessment. Phase I of the study conducted Rapid Rural Appraisal surveys at 24 sites within irrigation areas. The irrigation systems were investigated via an O&M walkthrough, where in particular the condition of the irrigation system and the level of maintenance and/or rehabilitation work required were evaluated. A visual inspection and assessment of the irrigation infrastructure was made and the type and quantity of maintenance works noted. From the JICA Study Team field assessments, an estimated 90 to 95 % of the irrigation schemes inspected required either an extensive and time consuming program of maintenance works or a complete rehabilitation. to return the infrastructure to an as-built or equitable operational condition.

The field assessment included main irrigation system infrastructure and the tertiary unit infrastructure; conditions were similar in both. Under the implementation of irrigation management reformation where the management of main system irrigation is now being made the responsibility of the water users, through their respective WUA organizations, the attitude towards rehabilitation and O&M by both farmers and Government must change. Of concern is the farmers' misconception of O&M. Farmer members of WUA *Pelopar*, DI *Pekatan* (April 2001) revealed their willingness to assume responsibility for O&M of the main irrigation system. Of concern, however, is that these same farmers have been unable to efficiently maintain their current tertiary unit area of responsibility, as evidenced by the number of broken gates, structures and the level of sediment and grass in both tertiary and quaternary canals.

Based on the findings of the field inspections, the financial budget for the government turnover program can be expected to be excessive, if the pre-condition of rehabilitation before turnover is applied hence, there is reason for the Government policy of turnover to be one of rehabilitation after turnover. The implementation of the policy change must be accompanied by a participation of the water users in planning, design, construction and funding, whether in cash or in kind. A sense of belonging and a sense of ownership can be developed through participation and through this the empowerment of the WUA can be attained.

From the field surveys, farmer and WUA discussions and irrigation system inspections, the number of existing WUA, be they single (WUA), federation (WUAF - *Gabungan*) or main (IWUA - *Induk*), that are already sufficiently developed to manage an irrigation system was found to be minimal. For a WUA to be empowered to stand alone as a self-sufficient unit, external assistance is required. A partnership between Government (under autonomy – *Kabupaten* level of local government) and the WUA through the Joint Management principle of the irrigation system may well be a viable approach to WUA empowerment.

### (3) Rehabilitation after Turnover

Presidential Instruction No.3, 26<sup>th</sup> April 1999, Irrigation Management Policy Reform, states that turnover of irrigation management responsibility to the users/WUA, will be done in stages, selectively and democratically by the principle of: “one irrigation system for one management unit”. For irrigation systems not yet turned over to the WUA, their management and financing shall be conducted jointly by the Government and the WUA through joint management until the irrigation networks can be fully turned over to the WUA.

The concept of joint management mentioned under Presidential Instruction No.3/1999 refers to joint management being continued until the irrigation system is turned over to the WUA. It may be necessary for joint management to continue even after turnover, although with reduced government management input, until it is assured that the WUA is sufficiently empowered to stand-alone.

WATSAL, the Water Resources Sector Adjustment Loan, has suggested under the sector for the reformation of irrigation policy and participatory management (Draft Guideline), that a *Kabupaten* Irrigation Improvement Fund (KIIF) be instigated so that funds can be provided through the *Kabupaten* for financial assistance to water user associations. These funds would be water user participatory developed irrigation O&M and irrigation rehabilitation programs but with allocation to WUA based on reciprocal financial or in-kind inputs by the WUA. This concept allows the joint management facilitation of the financing for O&M or rehabilitation.

The KIIF is a workable concept but the application of the fund will be important, particularly in the first year of adoption. It is expected that the Irrigation Improvement Fund will be activated as WUAs commence their participatory development of budgets for either rehabilitation and/or O&M programs. From this Study’s assessments, it is not unreasonable to expect that the majority of irrigation systems, either turned over to WUA or managed under Joint Management, will be in need of rehabilitation and, if not rehabilitation, at least high cost maintenance work. If funds are not available at the *Kabupaten* to satisfy WUA requests for assistance because local governments are waiting to receive proposals in order to request and plan the fund allocation, then the receipt of funds by WUA may possibly be delayed by up to a year. In this time, further deterioration of the irrigation system will occur, and farmers will believe, whether correctly or incorrectly, that Government has not honored its Joint Management commitments. In such cases the trust and participatory involvement of farmers will be difficult to maintain.

It may well be necessary that Government, both at Central and Kabupaten will need to alter its standardized budgetary procedures to ensure funds are available to the *KIIF* at the inception phase. Any funds allocated to the Fund must be presented as a percentage of a realistic cost of O&M and rehabilitation, for example the calculated O&M costs derived during Phase I of the JICA Study, and from further ISF analyses, Section 3.4.3 – ISF and Government Subsidies for Irrigation O&M – [of this Progress Report II]. Funding in this manner will therefore present Government in an honest and transparent manner. Even though the available funds may be insufficient to satisfy WUA needs in the first years, and WUA will have to prioritize their program of works and reassess their farmers’ ability to pay and their need to add additional funds, the farmers will appreciate the honesty and openness of Government.

For WUA to formulate rehabilitation and O&M programs, they need to have available to them, the technical services of irrigation management, i.e. design, construction, contract administration, labour

administration etc. WUA can access these services either from a Government agency or a private consulting company. At present there are very few local consulting companies who offer their services in the outer regions of most provinces; furthermore, it is doubtful that many WUA would be able to afford their services. Hence, in the majority of situations, WUA will request these services from the respective *Kabupaten* agencies, through the concept of Joint Management. Of concern is the capability, in terms of funds and expertise of the *Kabupaten* local government, to provide these services to WUA, Government needs to address this issue. Firstly it needs to ensure that people, with the relevant expertise, are available at the local government level to support the WUA technically and secondly, it needs to provide adequate funding to ensure that the services provided are sustainable.

#### **4.3.4 Empowerment of WUA**

##### **(1) Water Users' Associations in Indonesia**

In 1984 through the Government rules and guidelines, WUAs were to be established at either the tertiary unit level or for those irrigation systems classified as village irrigation systems then WUA were established at village level. Irrigation schemes of < 500Ha is area were to be handed over by the Government to the registered and legalized WUA to be operated and maintained by the beneficiaries through their WUA. The purpose of developing WUA formation was to decrease the Government financial burden for O&M. This in fact did not occur.

Presidential Instruction No.3/1999 has decreed that all irrigation system, i.e. primary, secondary and tertiary infrastructure is to be handed over to the farmers through their legally constituted WUA and that each irrigation system is to be managed via “one irrigation system, one management”. This instruction has created a focus towards the use of the terminology, WUA Federation, i.e. an organization encompassing several tertiary or village WUA that is of a size to administer and financially control the EOM of the irrigation system.

This above issue has also created some “meaningless” statements in terms of how WUA empowerment is to be achieved. Such a statement is as follows: “The JICA Study should be focusing its efforts on the establishment of guidelines to empower the WUA Federation and that the smaller WUA (tertiary & village) are no longer required, they are in the past”.

Before a set of guidelines can be established, it is best that the past history of WUA development in Indonesia be presented. It is also necessary that the findings from the Questionnaire Survey, Rapid Rural Appraisal (RRA) and the JICA Study Team field survey be listed.

Firstly, from 1984 up to and including 1998 there were some 38,000 WUA (30%) established from a total expectation (goal) of 104,000. Of these 38,000, only some 7,000 plus WUA (19%) are listed as active with only some 500 (1.5%) legally registered.

Secondly, from the JICA Study Team consultant's field trips and based on the level of EOM and current condition of irrigation infrastructure seen in the field, the following is most likely. That is it could reasonably be stated that of the number of WUA visited and studied, the true number of active and effective WUA is most likely to be less than 10 %.

Thirdly, with respect to the findings of the RRA and combined with JICA Study Team field discussions with farmers and the Government officials and staff, a number of issues come to the fore

with respect to EOM and WUA development. They are:

- WUA manifestation was from the Government – top down – without farmer participation
- WUA Committees were not always from the farmers but in the majority of cases selected by the Village Heads.
- Farmers know their Water Foreman or Water Distributor but a number do not know whom their WUA committee members are and also do not see themselves as members of the WUA.
- Irrigation systems were designed and constructed without and involvement of the farmers in terms of farmer needs and requirements
- Once irrigation systems are constructed, the Government leaves the area and there is very little continued follow up or guidance.
- Agricultural Extension Officers (PPL), the main extension arm to the farmers on agricultural matters have minimal technical knowledge on O&M and on-farm water management (OFWM).
- Small farm size (area) increased costs of agricultural inputs and decreased profits from agriculture influence the funding requirements of farmers for O&M.

Based on these findings, it is imperative that any WUA Empowerment must start at the ground level, i.e. the farmers need to be empowered through their involvement – the participation of the farmers and their community.

If this is not done and WUA empowerment is directed at the WUA Federation level without a significant consideration of the smaller WUA (tertiary and/or village) and farmers, then the base will be weak and sustainable WUA will not be achieved. WUA Federations will become inactive and the possibilities of returning to the current status (year 2000) of WUA development in the future are very real.

One of the major findings of the Study, is the complete misunderstanding of the true cost of O&M for Primary and Secondary Irrigation Infrastructure. Both farmers and the Government officials and staff appear to have no realistic concept of true costs or the implementation of maintenance work plans through regular and periodic maintenance programs. These two issues, i.e. true cost and method of maintenance implementation are major concerns for EOM and hence have to be addressed both by farmers through their WUAs and the Government.

## (2) Empowerment of WUA

### 1) Guidelines for WUA Empowerment

It must be noted that any guidelines are not to be set in concrete and that the guidelines are used with respect to each individual WUA requirements and the needs of the farming community. WUA sustainability is dependent on the cooperation and power of the farming community and if established to suit their needs and requirements then sustainability can be achieved.

Based on the above brief discussion, there are four levels of WUA Empowerment;

1. Empowerment of the farmers through facilitation and farmer/community participation.
2. Empowerment of the individual WUA through the farmer participation, needs and requirements to either stand and function alone (a small irrigation area / system) or to support and strengthen the WUAF.
3. Empowerment of the WUA Federation to control, administer, assist, guide, strengthen and implement EOM for the total irrigation system either via individual WUA committees or individual tertiary block controllers.

4. Empowerment of the Government<sup>8</sup> and the respective agencies responsible for WUA development, irrigation and agriculture to assist the empowerment of WUA through, either financial assistance, technical assistance, extension, education and training or a combination of all aspects until each WUA is sufficiently empowered to remain a sustainable entity.

## 2) Empowerment of Farmers

The empowerment of the farming community towards supporting sustainable WUA requires, in the first instance, an understanding of Government's intention with respect to the turnover of irrigation system management to the farmers. Government must be transparent in its intentions regarding such aspects as authority, responsibility, the provision of continued funding, available agricultural and irrigation technical assistance. Before farmers can be empowered, Government must categorically state its policies and commitments.

If the responsibility for irrigation management is transferred, farmers need to know to what authority they have within the management role. To achieve a successful transfer of irrigation management, the transfer of authority to the farmers must accompany the transfer of responsibility. In this instance authority is the right to distribute water and to control and allocate funds while responsibility is the acceptance of the role of O&M management. This aspect has been demonstrated within the JIWMP<sup>9</sup>

The second issue is the level of Government financial assistance that may or may not be provided to assist with WUA empowerment and improved irrigation facilities; the final goal is the complete funding by the beneficiaries. Currently, Government does not have the financial capabilities for large scale assistance. It must be also be considered to what extent farmers have the capability to fund both O&M and the cost of system rehabilitation in the near future. As discussed elsewhere it can be shown that even if farmers contribute US\$ 15 per hectare per year, it is worthwhile for them to keep their systems in good working order rather than to allow them to fall into rapid disrepair.

WATSAL has recommended that funding be made available at the *Kabupaten* level to be used as an infrastructure building fund. These funds would then made available whereby each WUA would submit a project proposal for funding assistance in which they have also provided an estimate of their commitment to the project in terms of financial, labor and material contribution. Funding assistance would be allocated according to the level of farmer/WUA input. Such a system would require that Government be transparent and strict in its application of this funding mechanism.

The above concepts and other issues relative to successful empowerment must be made clear to the farming and village community.

WUA empowerment can only be achieved through the committed and strong support from the farmers. But, because of a record of poor WUA past performance, the farming community has established a number of negative conceptions of WUA; these need to be altered. It is therefore apparent that these activities can only be achieved through an awareness program directed at the village community and particularly the irrigation farmers within the community.

Awareness campaigns can be conducted in a number of ways, one of which is through the use of

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<sup>8</sup> The empowerment of the government is a strengthening of the government mechanisms responsible for the collection and allocation of revenue to ensure that sufficient funds are made available to sustain WUA empowerment for the time it takes to attain the goal of EOM and hence sustainable irrigated agriculture.

<sup>9</sup> IDTO Project, Reference: JIWMP – IDTO Progress Report, Twentieth Quarterly Period – April to June 2000

Community Organizers (COs). WATSAL and the JIWMP – IDTO project have considered a proposal for using COs. Others consider that the appropriate way is to continue the use of such staff as the *PPL* and the *Juru Pengairan*.

3) Empowerment of the individual WUA (tertiary unit and/or village)

a) Farmer participation

- The above facilitation of the farming community has either strengthened the existing WUA or established a WUA in which farmers have confidence and control.
- From this development it is then necessary to empower the individual WUA with respect to its rights for the purpose of the individual WUA supporting and strengthening the WUA Federation.
- In this instance, it becomes necessary for either the selected village community organizers or elected WUA chairman or representative to liaise with other individual WUA, upstream and downstream, within the irrigation area to achieve consensus of the formation, development and strengthening of a WUA Federation.
- Empowerment at this level is to ensure that the individual WUA rights are protected through EOM to ensure that their farmers are not disadvantaged in the delivery of water.
- Facilitation of both the farmers and the WUA Committee must continue because farmers must realize that a committee does not lessen their own individual responsibilities to both EOM and the WUA.

b) WUA Committee

- At this level there is a need for the implementation of a comprehensive extension program through the use of “on the job training techniques”.
- Farmers (from the RRA Survey and Provincial Workshops) have stated that they “learn by doing”.
- The aspects of agriculture, irrigation (EOM), law, social and WUA administration need to be addressed. But again only at the requests from the farmers and/or the WUA Committee as to what their required needs for training are. In this instance, all the training modules from the PTGA system of training WUA can be utilized – possible except from the modules applicable to the law and regulations – due to the altered concept of WUA/farmers’ responsibility.
- There is a definite need for an input from the Government to this training in the form of an active and effective extension service from both agencies responsible for agriculture & irrigation – on-farm water management (OFWM) – efficient operation and maintenance (EOM).
- Funding or revenue is required by the Government to facilitate and implement this aspect of extension and “on the job training to WUA”.

4) Empowerment of WUA Federations

- If the above empowerment of the farmers and each individual WUA has progressed, the empowerment of WUA Federations will occur naturally – Because the growth and participation has been generated from the bottom. A true sense of belonging and ownership has been introduced to the farmers and their community.
- The empowerment of WUA Federation will require continual support from the Government. Extension services are required to guide and assist WUA Federations through their developing phase until, they become self sufficient and capable of standing alone. This extension input by the Government will in the initial phase be one on programmed support and should continue until the WUA Federation starts to only avail itself of the Government extension service – upon request, i.e. the WUA determines when it needs assistance.
- The strength of the WUA Federation will be totally dependent on the strength of its farmer and community base and the strength of each individual WUA under its umbrella within the irrigation area. The ability of the farmers and WUA to commit and perform the duties and responsibilities required for EOM will determine the strength of the WUA Federation, although

if the empowerment of the farmers and individual WUA is successful – then success.

### (3) Empowerment of Government Officials

Even though the new approach is one, which emphasizes participatory approach from the farmers to WUA empowerment, there is a vital role for Government to supply guidance and assistance, as outlined in INPRES No.3/1999. Following decentralization, the logical positioning of this assistance is at the *Kabupaten* level.

Listed below are a number of areas where assistance may be necessary. Mechanisms have been recommended, through WATSAL, on how to assist financially and these have been discussed above. The guidance, supervision and application of technical assistance to farming communities where WUA are weak, or have failed or need to be formed and developed may need to be intensified. Under the farmer participatory concept of self-responsibility, such assistance should only provided upon request; it is important that Government has the capability to respond, when the assistance is requested. Some of the important issues are as follows:

- The full cost of EOM needs to be calculated. In some circumstances this may be more than farmers can afford at the present time. It will be necessary to determine at each WUA location to what extent farmers can afford to cover the full EOM cost,
- It is likely that the Government will need to assist financially over a period of time, not only with EOM costs but also with the cost of rehabilitation. It will not be possible to completely abandon schemes in the short term; Government funding may be necessary over a number of years, hopefully on a diminishing scale, until such time that the WUA can become fully responsible. It is unlikely, however, that WUAs will ever be capable of covering the full cost of major rehabilitation,
- Continued extension and guidance will be a necessary input to WUA following empowerment to ensure that the farmers and WUA are administratively and technically capable of implementing EOM. Government will need to address the funding of agricultural extension services to ensure the implementation of the extension guidance is sustainable,
- Government will also need to address their ability to supply extension guidance in the fields of OFWM and EOM on a continual basis. PPL lack the knowledge of OFWM and EOM and the field staff of the Irrigation Agencies do not have the capability or the resources to implement extension services to WUA.
- Government empowerment requires both the central and local governments to raise general revenue that can assist WUA in their development towards empowerment and sustainability. New taxes may need to be introduced or a proportion of existing tax revenues will need to be directed towards WUA empowerment and the attainment of sustainable irrigated agriculture. WATSAL has suggested the partial use of the irrigated land tax or PBB.

If the farmers and Government can be sufficiently empowered to support the formation and development of sustainable WUA, then the empowerment of the individual village or tertiary unit WUA leading through to the WUA Federations, be they *Gabungan* or *Induk*, will be successful. The base of WUA empowerment is dependent on the support and strength of the farmers (beneficiaries) and if Government can assist in a logical and planned role of guidance and supervision and in line with the needs and requirements of the beneficiaries, WUA management of irrigation will be successful.

### (4) Participatory Training

#### 1) Participatory Training

Participatory training of WUA must first commence with the public awareness campaign of the farming community. Socialization and facilitation of the farmers towards understanding and the development of a willingness amongst the farmers to participate in the identification of the irrigation

system problems and the necessary solutions, inclusive of WUA(F) problems and solutions is paramount to the empowerment of WUA. Community organizers need to be active in their public awareness campaign amongst farmer groups and individual farmers at the three distinct demarcation points of an irrigation system, i.e. upstream, mid-stream and downstream. Following this public awareness campaign or even during its application, it is necessary to first include the farmer and water user participation in the “irrigation problem and solution” activity through the Participatory Rural Appraisal (PRA) methodology. This is the first step towards farmer and WUA responsibility on irrigation system management.

From this activity, farmers/water users can then democratically decide to proceed with either their existing WUA/WUAF Committees or democratically elect/form new WUA/WUAF Committees where either none existed or there is consensus to replace. Once this has been achieved and farmers are satisfied with the structure, organization, administration procedures and the agreed AD/ART, then participatory training can proceed.

## 2) Participatory “Learning and Action”.

The method of implementing “Participatory Training of WUA” will be dependent on each individual WUA(F)’s structure and needs. WUA and farmers do not, in the initial development stage, need to be subjected to classroom training according to standard Government procedures and mechanisms. The goal of training is not the record of numbers of participants trained. It is the successful application of the training curriculum and its successful application by the WUA(F) and farmers.

Farmers indicated, during the field surveys and during the Government, Provincial and Central Workshops of Phase I, that they learn by doing and they are more receptive to training implemented through “on-the-job” methods. They also stated that training should be directed at the topics and aspects of irrigation management that they need and not what an external agency, which in the past was Government, perceives that they and WUA need.

In the context of participatory training and the implementation of “on the job” training, successful application can be achieved in many ways. Within the procedures of irrigation management are the main aspects where WUA committee members, WUA irrigation managers and WUA gate keepers (main system and tertiary gates) must become competent. They are; 1) administration and financial, 2) irrigation operation – water delivery, and 3) irrigation maintenance.

## 3) Activation of the PTGA Methodology

*INPRES* No.3/1999 details the need for Joint Management between Government and WUA during the development and empowerment process to self-supporting status. Through this Joint Management, Government should activate and use the procedures of the *PTGA – Proyek Pengembangan Tata Guna Air* (Water Use Development Program)<sup>10</sup>. The PTGA was established in 1983/84 as a project-based implementation to train both Government officials and WUA committees for the purpose of WUA sustainability. The objective of PTGA was the enhancement of irrigated agricultural production through the optimization of water use in tertiary, pumped and village irrigation systems. By 1991/92, PTGA had been implemented in 23 provinces. As with all past Government aspects and procedures of WUA development, the approach was “top down”. Government officers at central, provincial and kabupaten level received good training through the development and use of an excellent set of training

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<sup>10</sup> N. Darismanto, M. Eng, 2000



modules<sup>11</sup> covering all the relevant topics of WUA.

At the farm level (field level) where the training and guidance was most needed, the PTGA system was less successful due to a lack of funding to train sufficient numbers of WUA committee members and gatekeepers. Where training was successful, a lack of funds to implement “follow-up” training activities, such as “on-the-job” training and extension guidance from agricultural and irrigation department officers decreased the effectiveness of the training, as farmers only received “a 40-hour class room” session. The PTGA system had success but not so much where the success was needed, at the WUA/farmer level.

The successful “training of trainers (TOT)” component of the PTGA system will be beneficial to the empowerment of WUA and the enhancement of turnover. The number of Government officers in the departments of local government, agriculture and irrigation who were trained as trainers, can be reactivated, given refresher training, developed and trained in the art of management and facilitation and then used as facilitators, managers and trainers for the process of WUA empowerment. Many of the previous PTGA trainers are still located within the departments at the *Kabupaten* level. It is these officers who need to be approached and evaluated as to their ability to implement participatory training of WUA committees and gatekeepers, through the Joint Management principle of Inpres 3, 1999.

#### 4) Development of On the Job Training (OJT) Methods

These trainers need to develop methods of “on-the-job” training (OJT) either through a process of facilitation with existing WUA or via a WUA on-request basis. It is recommended that the trainers make use of the PTGA modules in conjunction with the Government irrigation department’s EOM modules<sup>12</sup>, used for training of irrigation officers and staff in the operation and maintenance of main system irrigation. Both modules provide excellent presentations on the technical aspects of irrigation O&M, on-farm water management (OFWM), crop water requirements, agriculture and WUA financial management and administration. The following aspects, as listed below, need to be covered but WUA and farmers not only need to learn the content relevant to these aspects but they need to learn and understand why and how these aspects are applied to WUA irrigation management.

- development and application of cropping plans and calendars;
- water distribution scheduling procedures based on the cropping plan and the availability of water;
- irrigation operational procedures at the tertiary, secondary and in-take (head-works) gates and structures;
- walk-through of the irrigation scheme to inspect the physical infrastructure of the scheme to determine maintenance and rehabilitation program of works;
- preparation of maintenance and rehabilitation program of works proposals for submission to the *Kabupaten* – requesting assistance via the *Kabupaten* Coordination WUA Support Group and the KIIF;
- development and preparation of a “needs based” budget plan inclusive of all cost estimates with a prioritization of works and detailing the WUA contribution (financial, labour and material);
- actual demarcation of WUA / WUAF & IWUA boundaries and areas of responsibility and area of operation for delivery of water to individual rice farms – (this aspect needs to be

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<sup>11</sup> “PTGA Training Modules – Modules A (Central & Provincial), Modules B (*Kabupaten & Kecamatan*), Modules C (Village & Farmers & WUA)”, developed by *Proyek Pengembangan Tata Guna Air* and DHV Consultants.

<sup>12</sup> “EOM – (Efficient Operation & Maintenance) Modules”, developed by the Government of Indonesia within the IOMP Reform – PU *Pengairan*, Director General of Water Resources & Sir MacDonald & Partners, Consultants.

- accurately determined by Government irrigation officers [design & O&M] for the application of water right and equity of water distribution);
- WUA responsibilities and obligations;
- legal aspects, and development and preparation of AD/ART;
- water rights and water allocation between individual WUA and WUAF and IWUA between upstream and downstream irrigation areas and water users, internally and externally and for both wet and dry seasons;
- management, administration, accounting, book-keeping;

Initially, WUA will need guidance in administration, financial management and O&M, but if the training is done at the field or village level, then far greater interest from the farmers and WUA will eventuate. The WATSAL proposal of developing the existing Government irrigation department concept of “walk through” assessment and “needs based budget” methodologies of determining irrigation maintenance needs and designing a program of works and prioritization can only be strengthened or developed amongst WUA and farmers through a participatory approach. This is where PTGA trainers, agricultural extension officers (PPL) and irrigation department officers (*Juru Pengairan & Pengamat Pengairan*) can confidently and efficiently work with WUA as “on-the-job” trainers for “on the job” applications.

Similar “on the job” training principles can be applied to the administration and financial management procedures of WUA. The respective PTGA trainers from the department of local government (*Pemda*) can work with the WUA committee at times when the WUA is involved with book keeping and record keeping and preparing budgets etc. This training or guidance needs to be implemented at the WUA office or village, so that the training is not theoretical in nature but applicable to actual WUA administration procedures. The “on-the-job” participatory training for both technical and administration aspects of irrigation management can be implemented via an organized program of visits or via a WUA on-request basis at the time of WUA need or work program, i.e. maintenance “walk through”, budget preparation, financial recording etc.

Following the practical application of training through the “on the job” methodology, the WUA’s capability to apply the procedures associated with irrigation management can be evaluated. Based on this evaluation, the training can be refined and adjusted to suit either those areas of weakness or those areas where WUA themselves believe further training is needed. In these instances, training may be necessary through a combination of small classroom application combined with practical field application.

##### 5) Delivery of Training to WUA from Successful WUA and Farmers (FTF)

It is in these above situations, that participatory training can be implemented by the trainers selected from WUA committees, gatekeepers and farmers of irrigation areas where successful and sustainable WUA are functioning. These farmer trainers, who may have experience in particular areas of expertise in WUA management and irrigation management, can be used and the training implemented in a similar manner to that used in the Madura Groundwater Project (MGIP 1992).

In this Project, WUA and the farmer trainers planned the training schedule and the number of trainees was limited to 20 to 25, with one day being set as the maximum length of training time. These trainees were divided into 6 groups of 4 or 5 persons with each group trainer having a special topic or area of expertise for delivery to the trainees. Formal training time per group per day was one hour, followed by a scheme walk through or participation in a practical irrigation or administration management topic,

after which time was spent for question and discussion. Each group had a 10 minute session with each trainer (in Madura – topic master), after which time, the group moved to the next trainer (topic master). The advantage of this training was that it was participatory, contact time per topic was reduced to a minimum, attention spans are focused, messages (topics) are delivered by a “hands on” experienced farmer trainer, often in a local dialect and the amount of paper work is at a minimum. Training costs of such a system are minimal.

More simple but similar FTF was conducted during the O&M plan formulation trial in this Study, farmers in the non-WUA area made the study tour after they discuss their necessity of O&M for their tertiary block, they visited and discussed the success WUA. They could understand how to collaborate farmers to implement the irrigation O&M on the site directory. Even this short time visit, discussion to success WUA area gave the big impact to the farmers. Through the discussion with success WUA, they can ask how to organize and work the O&M directory. It proved the effectiveness of FTF training in this Study.

This type of participatory training can be implemented from WUA to WUA both within and outside of the irrigation area and also internally from WUA to farmers. This is particularly useful where it is decided that a delivery of the procedures of irrigation and administration management to the farmers may be an advantage in the further facilitation and socialization of the farmers towards “a sense of belonging and ownership” and eventually to self-sustainability and empowerment.

With participatory training, it is necessary that the training be facilitated and coordinated. This is why there is a need for consideration of the introduction of a coordinating group at the *Kabupaten* local government level. It is also necessary that the PTGA be reactivated not only for the purpose of delivering and coordinating training activities at the *Kabupaten* level but so that the PTGA can be used as the facilitator and coordinator of Government officers and WUA within the WUA Support Group. The reactivation of PTGA for use as a facilitator will mean placement of PTGA personnel at the *Kabupaten* level. There will also be an opportunity to use these “trainers” as the coordinators and facilitators of the socialization and community awareness program through the guidance and coordination of the village based community organizers (CO). That is, as per the Study recommendation, the *Kabupaten* Coordination WUA Support Group.

##### (5) Capacity Building

###### 1) Capacity Building

Capacity Building is the term used to describe the methodology for the improvement of the capability of a particular group or organization so that the designated duties and responsibilities are implemented effectively and efficiently. Capacity Building was previously referred to as “Institutional Strengthening” or “Organizational Development”.

The capacity building or institutional development directed towards efficient operation and maintenance (EOM) of irrigation systems and the strengthening of WUA has received, since 1987, extensive investment, both in financial and manpower terms. Capacity building has been instigated and delivered through many projects, where emphasis has been placed on training and education programs; in some cases these included the preparation and publication of training modules, such as the EOM modules and *PTGA* modules. Many Government officers have been trained, but in some instances the persons who needed to be trained, were neglected in favor of more senior officers. This aspect decreased the effectiveness of the capacity building.

With respect to WUA, the farmers who needed to be trained in aspects of O&M, OFWM and WUA administration were neglected or trained in minimal numbers. In addition, agricultural extension officers (*PPL*) and irrigation field officers (*Juru Pengairan*) received training but their ability to implement their training was curtailed by a lack of continued Government funding. A lack of continued Government funding for field activities, where farmers are able to “learn by doing”, decreased the effectiveness and sustainability of any WUA and farmer capacity building program.

For capacity building to be successful, the Government needs to appreciate that an improved and strengthened capability of the organization, department or staff can only be sustained through continued support. In the instance of Government departments and their officers, a sustained capability can only be achieved if the staffing, duties and responsibilities are adequately financed through effective and accurate budgeting.

The success of capacity building for farmers and WUA is totally dependent on the acceptance by the farmers of the need for the training and the methodology of implementation to the farmers. If the farmers do not see a need for or understand why the capacity building program is being implemented, then a sustained improvement in capability and development will not be achieved. The farming community needs to be approached with open and truthful dialogue and farmer aspirations and requirements considered and included before farmers will fully accept the need for capacity building. Farmers need to see that the topic of capacity building is their responsibility, and that without the applied capacity building, economic and social sustainability may not be achieved or sustained.

Capacity building of the farmers first entails the application of a community awareness program. Farmers and their village community need to be made aware of the needs, the costs and the responsibilities. Community awareness campaigns can be expensive and as such they are beyond the economic capability of the farming community but if successful capacity building of the farming community is to be achieved, then the awareness campaign must proceed. For funding, the logical choice is the Government, but farming communities can be of assistance via supplying community members to deliver the topic, subject matter and material of the program. These community members can be facilitated and guided through Government officers but funding is needed.

## 2) Empowerment of Farmers

The empowerment of WUA, WUA(F) or IWUA can only be achieved through the empowerment of both of the participating groups, i.e. the Government and the farmers (including all water users). To empower, in this instance the WUA, means to develop, strengthen, make capable of the individuals (farmers) to be active as a group in to work as one towards self-supporting sustainability for the efficient management of irrigation systems to enhance sustainable irrigated agriculture. To empower requires a participatory involvement from the individuals (farmers) but to obtain that participation requires the facilitation, consultation and guidance from a third party, in this instance the Government.

The need for the Government is self-explanatory. Previous irrigation management responsibility was divided by virtue of Government policy, at the tertiary unit or village irrigation system boundary. Tertiary unit WUA or village based WUA were responsible for irrigation management below these boundaries while the Government, through the irrigation department was responsible for the financial and technical management of the main irrigation system, i.e. secondary and primary canal and structures and head-works and in-take gated structures. Under the new irrigation policy reform, the

water users (farmers etc.) must now accept the responsibilities and obligations of the irrigation management of main system irrigation, thus, eventually, making them responsible for irrigation management from the quaternary unit to the head-works structure. Management will be achieved through the democratically elected water users' associations, i.e. individual WUA at the tertiary or village level, federated WUA (WUAF) at the secondary canal level and the main or primary WUA (IWUA) at the primary canal to head-works level. There is a transfer of responsibility for irrigation management from Government to the water users.

Past history, IBRD and ADB Project reports and findings from the JICA Study Team field surveys and irrigation infrastructure inspections have shown a lack of efficient irrigation management at both the tertiary level and the main system level. That, in turn, indicates the efforts, by both Government and water users (TU, Village and in some instances Federated WUA), to achieve sustainable irrigation systems as very poor. The resulting deterioration of the irrigation system (tertiary and main) has resulted from a lack of funding for main system irrigation, a lack of farmer willingness to be responsible and a farmer mentality of wanting Government handouts for tertiary unit and village irrigation system. Because the vast majority of WUA are either inactive or fundamentally incapable of efficient operation and maintenance of the basic tertiary or village unit irrigation system, there is a need for the participatory approach to WUA empowerment to be implemented. The participatory approach must be simultaneous with a corresponding efficiency of consultation, guidance, extension and financial assistance from Government. This must be inclusive of an efficient and effectively applied community awareness campaign.

Persons have suggested the use of private consultants, presumably in the fields of agriculture, irrigation, financial management and accounting (simple bookkeeping) and methodology and structure of WUA organizations and administration. Irrigation systems are spread far and wide, not all are near provincial or district capitals and it is recognized that most private consultants do not have permanent offices or staff in cities, towns or villages that are easily accessed by farmers. The before mentioned services are already supplied by Government departments, in *Kabupaten* offices, although the level of expertise and the number of available Government officers may not be of a standard for the delivery of an efficient service. The idea of farmers using private consultants is not a practical or workable consideration at this time in 2001 but, as is found more advanced countries, the way of the future is where government services are being phased out in favor of private enterprise.

There is, therefore, a need to improve both the capability of the farmers and Government officers through Capacity Building.

### 3) Capacity Building for Government officials

The capacity building of Government departments and officers, responsible for the application of efficient operation and maintenance (EOM) and for irrigated agriculture sustainability, since 1987 (EOM) and early 1970's (rice self-sufficiency *BIMAS* program) has achieved an outcome that is well below expectations.

Extensive funding has been directed towards the capacity building of both the agriculture and irrigation department to improve the capability of Government officers through increased knowledge, expertise, technology and methods of application of the various aspects of EOM and irrigated agriculture. Government officers have been trained in all of the above mentioned subjects, at Central, Provincial, *Kabupaten* and *Kecamatan* levels. The main courier of capacity building programs was the

use of projects, funded mostly from grants and loans. In general, the majority of irrigation projects throughout the late 1980's and 1990's included components of training and extension and the development of training/teaching modules on the technical aspects of O&M, OFWM and agriculture.

It can be shown that the training at project level was generally successful with many Government officers receiving the training. The cessation of project funding was not followed by a corresponding addition of Government funding, and in many instances the field application of improved capabilities ceased or never materialized. Reasons are:

- No planned budget for Government funding for application or implementation of activities associated with EOM and irrigated agriculture;
- Government no longer classified Irrigated Agriculture as a high priority;
- Government officers did not have the "willingness to apply" their new improved capability, generally through a lack of funding and a low salary for field officers.

This had a direct bearing on the attitude of farmers towards acceptance of Government officers and Government programs. Farmers continued to be left stranded by Government financial inefficiencies after being part of a successful project result.

Past capacity building for Government departments and officers was directed to the improvement of the departments and officers as proactive implementers. Under the new irrigation policy reform, Government is now the facilitator, the adviser and hence capacity building must address this directional change. Farmers are now the implementers but they need assistance and direction. That assistance and direction initially needs to come from Government which should now direct and provide a system of extension, technical support, guidance and direction in the form of a dissemination of ideas, concepts and processes as a facilitator of the farmers / water users towards an empowered WUA.

The capability of a Government department to deliver an efficient and productive service to the public is dependent on the following:

- the number of officers available to do the job;
- the level of knowledge, i.e. technical, administrative etc. of the officers;
- the level of expertise available for individual aspects and topics;
- the ability of the officers to meet, where and when and how, with the public to deliver the service; and
- the experience of the senior officers in planning activities so that the service is delivered efficiently.

Government staff, who have received the training and have worked within the environment of improved EOM, OFWM and agricultural capability have the necessary technical skills to assist the process of WUA empowerment. What is needed, is to ensure that these persons are available at the field/farm level and that they are part of the local government (*Kabupaten*) Coordinated WUA Support Group. WUA empowerment cannot be achieved from the provincial level; it can only be achieved through cooperation between farmers and Government staff working together at the farm and local government level. The application of facilitation and extension services is the area that needs to be addressed through future capacity building for Government officers.

The department of agriculture (*Pertanian*) is the only Government department with an extension capability. The irrigation department has never needed the extension arm as their responsibility finished at the tertiary gate and the training and delivery of irrigation technical skills were directed

towards staff members in house and not farmers. Now, the irrigation staff must deal with the farming community and facilitate participation from farmers towards WUA empowerment. Technical skills, administration and financial management skills must be passed to farmers and this requires an ability to employ extension methodologies. Farmers learn “by doing” and that means field application of technical engineering concepts, O&M procedures and WUA administrative procedures. The best method to achieve success from the field application is to have an extension service that provides both a coordinated and planned program of field visit to WUA and an ability to respond to a WUA need through a request for assistance. Both formats will be necessary in the early stage of WUA empowerment with the expectation that as WUAs become more confident and proficient at self support, then the application of the former will decrease and the latter “request” format will probably increase.

Government officers will need to learn how to work with farmers and WUA committees and offer advice and information. There is a fine line between offering guidance and direction and giving direction on the basis that, the direction offered must be followed. Government officers must possess “the desire and the willingness” to adopt the change and approach the farmer/water user as an equal.

#### **4.3.5 Monitoring and Evaluation**

Monitoring and Evaluation (M&E) is an activity to assist management to monitor and evaluate progress and results of any specified program. M&E is a control of management practice, i.e. M&E results can be used as an input for 1) program improvement, 2) change or improvement of program direction, 3) program acceleration, 4) a revision of policy, and 5) an indicator of program completion or success.

M&E must be accurate and deliberate in its application and it is important that the aspects being monitored and evaluated are applicable to the outcome and are only influenced or controlled by the project, organization, department, etc. being evaluated. In addition, the M&E format must not be of a size that is difficult to apply, in terms of time required for field-level data collection and analysis. For example, the M&E of EOM by a WUA should only include indicators that are relative to O&M and which are directly influenced and controlled by the WUA. That is, an indicator that can be influenced by the actions of others and is not totally controlled by the party being monitored, in this instance the WUA, should not be recorded. Such indicators can be recorded and evaluated but should not be used to evaluate WUA performance. It may, however, be relevant to register it as a problem area via a yes/no answer. It can then be corrected, redirected or programmed by field staff at a later date because they then know where the problem and solution can be targeted.

The empowerment of WUA will be a slow, continuous and lengthy process and, accordingly, M&E programs must be developed and implemented to register this slow development and to include indicators of level of empowerment at which a WUA is currently positioned.

The Government has some 19 indicators by which WUA are evaluated. Table 3.4.1 presents the 19 indicators with their division into 6 categories. It is not the intention of this report to directly discuss the selection of those indicators as evaluation criteria but to discuss the indicators with respect to their importance and their implication within the “Proposed M&E WUA Evaluation Scoring Method”, presented as Table 3.4.2. This is a revised M&E methodology and was developed by WATSAL and the

As already stated, the empowerment of WUA will in the majority of cases, be a slow and continuous process. It would be unwise to assume that a high percentage of WUA will achieve a rating/score “As a Developed WUA” directly following the turnover process. It is recommended that the M&E program be implemented by a third party and not Government or WUA but preferably a Consultant, University or NGO. It would also be advisable that a Government representative and a member of the WUA committee be included in the M&E team for the purpose of discussion and program application.

Suggestions of participatory M&E, i.e. WUA performing their own monitoring and evaluation are not realistic as incorrect data collection or analysis may result in outcomes that, in the long term, are detrimental to WUA empowerment. As Government is most likely to be part of the Joint Management of irrigation schemes, it is also not advisable to have Government as the M&E controller. If Government financial constraints are an issue for the M&E application to be implemented by a third party, then there are a number of possibilities. A possible scenario is as follows

- Government funds a third party as the supervisor, coordinator and analyzer only.
- Government staff, WUA committee members and/or village community organizers are used as the data collectors.
- Funding or partial funding by WUA is most likely not viable in the early years of WUA empowerment, hence Government must be responsible.
- Development and implementation of M&E programs must be through the *Kabupaten* coordination WUA Support Group. This body should coordinate all other activities relative to WUA empowerment, i.e. agriculture, irrigation, administration, training, etc.

WUA empowerment is dependent on a number of issues. Since M&E is targeted at post turnover, the initial step of community awareness program, facilitation of farmers and the success of community organizers will have a large bearing on the success of WUA empowerment. It may therefore be necessary to ascertain the success of a community awareness program within the farming and village community as part of a base data collection. Such aspects as the following may need to be known:

- The willingness and desire of all the farmers and community, culturally, socially and ethnically, and their political willingness to operate and maintain the irrigation system to the benefit of all beneficiaries.
- The “Political Will” of Government to offer “as requested” assistance and guidance through “on the job training” to WUA for the purpose of each WUA obtaining “Stand Alone Development”. This must come through the establishment of a permanent “*Kabupaten* – Coordination WUA Support Group” inclusive of *PU*, *Pertanian* & Local Government officials and field workers.
- The classification or type of irrigation system/infrastructure within the irrigation area of the WUA / farmers, i.e. traditional, semi-technical or technical. The more technical a system, the more time that may be required for a WUA to become a “Developed Stand Alone WUA”. In some systems this may never occur as the level of technical input – design/maintenance etc may be so far beyond farmer capabilities, that the irrigation system responsibilities of O&M may always remain a “Joint Sharing Arrangement” between Government & WUA. (Note: In all other aspects of WUA responsibilities, in O&M up to tertiary, secondary level and administration, funding, work programs etc. the WUA may be very efficient and developed. It may, however, be for the O&M of the upper parts, primary canal and structures, off-takes, weir etc., that the WUA requires a Government joint sharing of responsibilities.

The M&E, WUA Evaluation Scoring Method proposed by WATSAL and the JIWMP – IDTO project (Table 3.4.2), contains some indicators that as evaluation indicators of WUA effectiveness, are

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<sup>13</sup> Reference: “*Pedoman Umum Pemantauan dan Evaluasi (P&E) Kinerja Perkumpulan Petani Pemakai Air Secara Partisipatif*”.



indicators of activities for which the WUA is not solely responsible. That is, other influences outside the control of the WUA can affect the implementation of the indicator and its rating, The items and indicators that reflect outside influences and are not the sole responsibility of WUA are listed below:

- a) WUA can restrict lands conversion:
- b) WUA can improve prosperity of its members through increasing agricultural production:
- c) Business relationship with cooperative and other private sectors:

The revised M&E proposal presented by the JICA Study has deleted the above items and indicators from the evaluation scoring method. Also, some additional indicators have been added under respective items while some existing indicators have been altered to reflect the realism of the indicator. The alterations are presented in Table 4.3.1, and detailed discussions are presented in Annex C.4.

The success of WUA empowerment is also dependent on the relationship of the WUA with the Government supporting agencies, for example, the agriculture and irrigation departments (*Dinas Pertanian & PU Pengairan*). This relationship can affect how WUA request assistance from Government and how the Government delivers that assistance. Also of importance is the degree of expertise at the local Government level, the efficiency and the effectiveness of WUA support programs in place.

Items and indicators that are relative to the WUA and Government and other agency/organization relationships have been listed in Table 4.3.2. These items and indicators relate to areas of WUA activities where it is perceived that assistance will be required by WUA Committees and their members (not all WUAs) to ensure an ease of transition and steady continuous development. The items and indicators are seen as the important “Hurdles/Stumbling Blocks” that may impede steady progress towards sustainable, developed and autonomous WUA. The main items are:

- The establishment of yearly, seasonal cropping patterns and calendars.
- The preparation of water distribution plans for each cropping season, i.e. seasons 1 through to 3.
- The preparation of a routine, seasonal, periodic and emergency maintenance plan derived from the proposed methodology of “Irrigation System Walk Through” combined with farmer/WUA member meetings. Develop the plan according to urgent and routine needs. Allocate the requirements that can be handled by the WUA and members through “*gotong-royong*” and WUA funds – contract if need be, and then develop the proposal for assistance from Local Government (*Kabupaten*) – funding, labour, machinery etc.
- The establishment of AD/ART guidelines, rules etc and the application for legalized registration

These items have not been evaluated as “a scored rating”. They are simply listed as a YES/NO (Y/N) classification and then if the response is in the negative (N), then a series of questions to ascertain the reason for the negative response. This methodology simply shows where the weakness in development may be, and the weakness could be either WUA or Government initiated.

A scoring system has not been allotted to the M&E methodology as the score achievement is dependent on two parties, i.e. the WUA ability to activate and the Government ability to respond. The allocation of a score could negatively impact on a WUA evaluation when in fact the WUA is not the cause and effect. Also by ascertaining if a WUA is either requesting or not requesting assistance from the “proposed” – “*Kabupaten* WUA Support Group” (or in the future – private consultants), may also reveal aspects of the WUA development that may need improvement or a directional change.

#### **4.3.6 Irrigated Agriculture**

Based on field survey results and provincial seminars, problems/constraints are clarified by conducting

a PCM workshop. Concerning agriculture, “Low Farming Family Income” is identified as the core problem. The followings are major “ Direct Causes” of the core problem clarified by the PCM workshop and some considerations based on collected information during the study.

### (1) The Root Problem

It is considered that the following phenomena are the root of the all issues in Indonesian agriculture in the wider context.

- Agricultural sector has lost its competitiveness to the other sectors in the domestic economy, while this is a historical and global phenomenon from a long-term viewpoint.
- Production costs of major crops, not only of rice, have become high by global standards.

It can be concluded that Indonesia is in transition from the era of old agriculture-oriented economy to the era of new economy under rapid industrialization and economic globalization. Social structure and sense of values are also drastically changing with the transition. Indonesian agriculture must radically convert its old-fashioned structure into a new one to survive in the new era.

### (2) Food Security Policy

The Government has made every effort to increase rice production to achieve rice self-sufficiency for several decades. As rice self-sufficiency has been synonymous with food security for many years, it has undoubtedly been a policy in line with national interests. In consequence, many people including government officials still strongly support rice self-sufficiency, even though PROPENAS has adopted new vision in its food security policy.

The idea of rice self-sufficiency was basically not contradictory to the national interests as long as the domestic rice price was less than or equal to imported rice. However, under the present price gap between the Indonesian retail market price of US\$200-250/ton, and the international market price of US\$130-150/ton, FOB, the rice self-sufficiency policy must be a burden to the economy. In fact, Government has imposed a 30% of tariff on imported rice since January 2000, and there are calls for the tariff to be increased as many farmers are still complaining of low rice prices.

Food security is not a matter of pure economy, but a matter of social welfare. Rice farming in Indonesian is not only a farming system to produce food but it is also a socioeconomic system rooted in a culture the same as it is in other Asian countries. Also, it is still doubtful if a global free market system will reliably support a national food security system, especially, as the global rice market is thin as most of the production is consumed within the production area. It is, therefore, rational that Government should bear the financial burden, to some extent, for establishing a sound food security system with a rice protection policy.

Since rice is still the principal component of Indonesian food security policy, Government needs to have serious and reasonable discussions concerning the extent to which should rice be protected and what food security system should be established in line with the concept of the PROPENAS policy and from a viewpoint of the real national interests.

### (3) Rice Production Policy

The Food Production Development Plan, 2001 – 2004, issued in January 2001 by the Directorate General of Food Crops Production, MOA reveals the core causes of the problems with regard to crop production. The recognition and understanding of the problems seem to be comprehensive. However,

the plan contains few countermeasures, which are likely to have a significant impact. It is also difficult to have a clear idea what is going to be done by MOA/Government to get to the root of the problems even after explanations by MOA officials. As the problems are complicated and many of them concern issues beyond pure agriculture, the problems appear to be beyond the capacity of MOA.

In contrast, the plan shows clear target figures of rice production with information on the necessary inputs. However, it seems that the figures come from a political will without deep analysis of the present situation. Based on statistical data, it would appear that the projected production figures, above 4 million tons of increased production within 4 years, are unrealistic or impossible to achieve.

Moreover, it seems that the figures have been decided without considering market demand, even though the agriculture policy encourages farmers to have a strong mind in agri-business. If the target is achieved, Indonesia may have a certain amount of rice surplus within several years. Then, the Government would need a financial arrangement to stock the surplus since it could not be sold to the international market if the present price gap between Indonesian market and the international market is taken into consideration. It seems MOA do not fully appreciate the present rice problem, and the high cost structure of rice production must be a burden to Indonesian economy. This means that increased rice production is not always a benefit of the country, under present circumstances.

The Government should be aware that a favorable return to farmers must be the strongest incentive to increased rice production. Technology-oriented measures without a favorable return would not contribute much towards a break through of present barriers against one step higher productivity of rice, since productivity is already reasonably high. Government should make necessary policy arrangements to pave the way for generating favorable conditions for rice farmers. However, the Food Production Development Plan, 2001 – 2004 shows that MOA still could not be free from the traditional approach of concentrating its rice policy simply on increased production by means of a top-down intensification program. MOA's approach is still project-oriented rather than policy-oriented. MOA would need to adjust its policy attitude to be more flexible and aggressive to tackle the problems revealed in the plan by a policy-oriented manner instead of the conventional project-oriented manner.

#### (4) Food Diversification and Food Monitoring System

It is considered that food diversification would progress to some extent with economic development, as data on per capita food consumption shows that people have already started to diversify their food intake patterns since the last decade. Decreased per capita rice consumption, which could occur within several years, would not, however, reduce total rice consumption in the short term. This means that the percentage of per capita rice consumption decrease would not exceed the percentage of population increase in the near future for the following reasons.

- It is difficult to realize a significant reduction in carbohydrate foods consumption including rice without food diversification toward protein and fat resources, i.e. egg, meat, fish, etc. Food diversification would occur with a strong and steady economic development according to the experience in Asian countries that have already experienced decreased rice consumption. The prospects for the Indonesian economy in the near future seem to be moderate or rather gloomy.
- There are no substitute carbohydrate foods for rice since per capita consumption of traditional carbohydrate foods i.e. maize and root crops, has already reduced in Indonesia. In general, with increased incomes peoples' taste in carbohydrate foods tends to concentrate on rice and wheat. Once people consume rice or wheat, their taste never returns to the traditional carbohydrate foods. (Note: Maize demand is increasing primarily as livestock feed.)

The point for considering food security is when and how much rice consumption would decrease with the progress of food diversification. Trends of rice production and consumption change rapidly because they will strongly be influenced by the economic development trend. A system to monitor the trends could be a major concern to develop a food security policy for Government.

#### (5) Rice Price

##### 1) Rice Price Policy

It can be said that a low rice price is the core problem in Indonesian agriculture at this time. The present price discourages farmers continuing rice farming, even though the price is considerably higher than the price in international market and is supported by the tariff.

The situation is directly caused by an unprecedented low price in the international market. Thai and Vietnam who are the first and the second largest rice exporters, are selling rice at US\$130-150/ton or less for 25% broken-grade (FOB), whereas two years ago the price was around US\$250/ton (The 25% broken-grade is equivalent to Indonesian medium rice in quality). As explained before, Indonesian rice price were higher than world prices even before the crisis in 1998. Then, it was hovering at around the world price, while the world price in terms of Rupiah was continuously increasing. However, the gap between the Indonesian price and the world price has widened since the world price in terms of Rupiah has tended to decrease. It is obvious that cost structure of Indonesian rice is too high to allow it to catch up with the world price, though it is very difficult to say whether the world price represents a reasonable price.

Government has imposed 30% of tariff on imported rice in order to protect farmers from the influence of the low international market price. Several MOA officials suggest that MOA/Government should establish a strong rice price policy to deal effectively with the problem. They also imply the following countermeasures, which are considered now.

- To increase the present tariff
- To set quality standards for imported rice (only high quality rice can be imported)
- To reinforce the conventional rice/paddy price support system in the domestic market

It is, however, recommendable that Government should not rely too much on the countermeasures, as their contribution is expected to be limited toward reducing farmers' burden regarding the low price, without solving the following difficult problems.

#### Poor discipline

- As stated in Chapter 2, the conventional rice/paddy price support system did not function well. In that system, a floor price of white rice just played its role in confirming market price, which was strongly influenced by the world price, and a floor price of paddy mainly made a profit for traders, not for farmers.
- It is considered that the core cause of the malfunction was poor discipline amongst concerned agencies/organizations. It is regrettable that the discipline has not yet been well restored and/or reinforced.

#### Market structure (Detailed explanation is made in "2) Improvement of Rice Cost Structure".)

- There is considerable evidence that farmers do not enjoy their fair share from rice, because the market structure is not favorable to farmers. Moreover, the farmers' share has been continuously shrinking in recent years.
- It is concluded that a major portion of benefits from Government's effort to support rice price

would not reach farmers under the present market structure.

#### Border trade

- The existence of substantial border trade is noticed commonly in Indonesia. The experience of the rice crisis in 1998 revealed that the border trade would have a considerable influence on the domestic rice market, if the gap between the Indonesian price and the world price became too big to make a profit.
- The border trade would ruin Government's tariff system if the tariff exceeds a certain level, though it is difficult to predict where the break point would be.

Government's policy to keep a so-called favorable rice price would not be so effective under the present situation in Indonesia.

#### 2) Improvement of Rice Cost Structure

The rice cost structure consisting of production cost, processing cost and marketing costs must be another important issue to consider.

As has already been pointed out in the Food Production Development Plan, 2001 – 2004 of MOA, there are many causes of high rice production cost, i.e. small scale management, disorderly-segmented land, non-competitive inputs market, conventional socio-farming system (share-cropping, *bawon* harvesting, etc.). However, Government has not paid much attention to the causes of high production cost because of its production-oriented policy aiming at rice self-sufficiency.

The structure of rice processing and marketing seems to hamper the rice price from being flexible and farmers from getting their fair share. The market price of white rice has not decreased synchronously with the world price in terms of Rupiah, though the price continuously increased when the world price increased before the crisis in 1998. On the contrary, farmers are continuously losing their profit-shares from rice.

The gap between paddy price and white rice price could indicate an unfavorable rice market structure to farmers. The following table shows rice prices in Mekong Delta, Vietnam<sup>1)</sup> and in Indonesia as of early April 2001. The gap seems to be very big in Indonesia though detailed cost factors should be examined more for an accurate comparison.

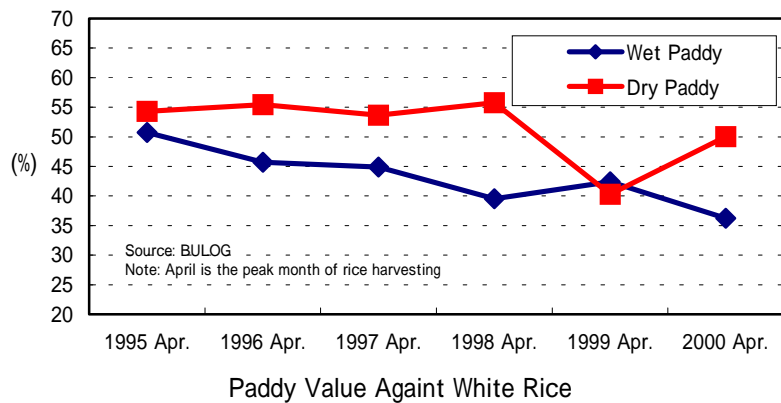
	Vietnam	Indonesia (US\$1 = Rp.10,000)
Paddy (US\$/kg)	0.08 (farm gate)	0.10 (farm gate)
White Rice (US\$/ton)	130 (FOB, 25% broken)	250 (retail, medium)
Paddy/White Rice (%)	61.5	40.0

(Source) Data collected by the study team

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<sup>1)</sup> It is considered that Vietnamese rice market is one of the most liberalized in the world.

The figure shows the gaps in Indonesia during the last five years. The value of wet paddy against white rice has been continuously decreasing in contrast to the nearly stable value of dry paddy. This means that farmers have been losing their profit-shares from rice during the last five years, as, in general, farmers sell wet paddy



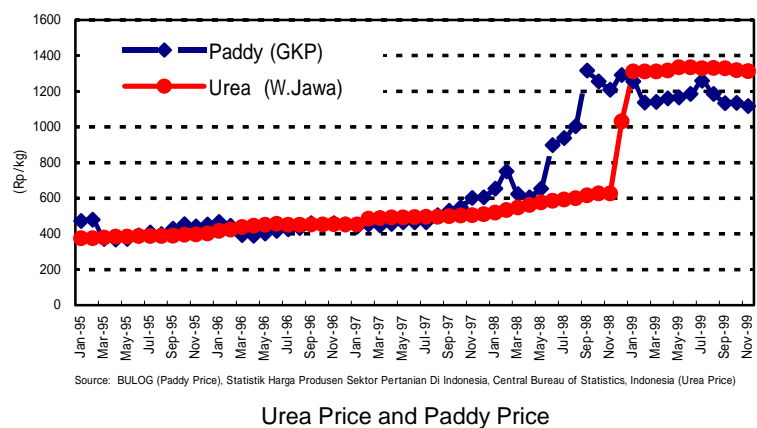
immediate after harvest and traders/middlemen dry it. This table reveals one of the major reasons for farmers' complaints about the present rice price. Moreover, the value of wet paddy did not recover even after Government imposed the tariff in January 2000. This means that almost all benefits from the tariff are going to traders instead of farmers who must have been the original targeted beneficiaries

Government needs to adjust its policy first for tackling the high production cost rather than being eager to be involved in subsidies and/or market intervention, if a sustainable development of rice farming is the main objective. It is also desirable that Government should focus its policy more on the rice market structure so that the price could be more flexible and farmers could enjoy their fair benefits.

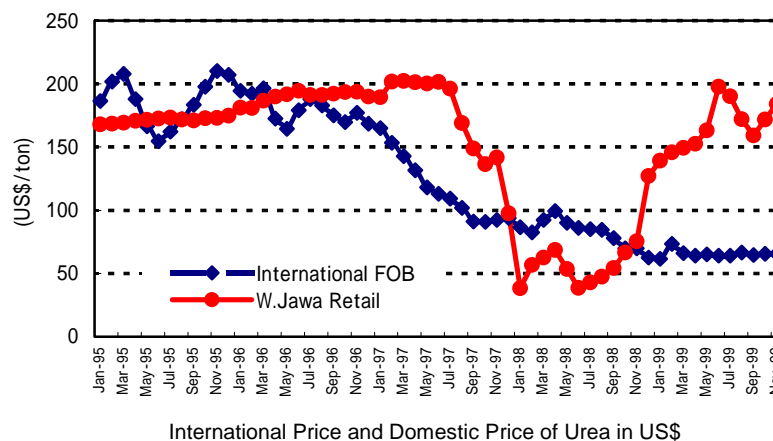
(6) Fertilizer Price

Though domestic fertilizer trade was liberalized, PT.Pusri still substantially controls fertilizer production and the natural gas price is still fixed by Government. There are 6(six) fertilizer producers in Indonesia including PT.Pusri. However, these are all state company (one is state joint venture company) under the control of one holding company. Then PT. Pusri has strong influence to the management (production, distribution, pricing, etc.) of the holding company. Such monopoly structure is one of major causes of recent high price of fertilizers.

As shown in the figure below, the clear government policy in recent years to control urea price close to the paddy price. However, the government hesitated to increase urea price in consideration of the unstable social condition, although the urea price relatively became lower in 1998 due to the sharp increase of paddy price. Then the government approved the price increase of urea and other fertilizers with the trade liberalization. In theory, the fertilizer price might have flexibility in accordance with market situation after the liberalization. However, fertilizer price shows inflexibility because of the remaining monopoly structure in production.



The urea price in Indonesia has determined without paying attention to the global market as shown in the following figures. There is a big contrast to the rice price, which is strongly influenced by the global market trend. If the government asks farmers to share the burden from the market globalization of agricultural commodities, fertilizer production monopoly structure has to be liberalized soon at least as the same level of rice marketing and trading



Source: International FOB: (European Fertilizer, FERTECON), W. Java Retail: (Statistik Harga Produsen Sektor Pertanian Di Indonesia, BPS), Exchange Rate: (BPS)

## (7) Crop Diversification

### 1) Crop Diversification and Rice Production

The Government focuses its attention on crop diversification and increases in rice production, side by side with its food security policy in the PROPENAS. Government expects agri-business development to support both objectives. The following measures should be considered to realize crop diversification and increase in rice production at the same time.

- Expansion of farmland area
- Increase in cropping intensity (by irrigation, mechanization, plant breeding, etc.)
- Improvement of productivity per unit area, especially for rice

However, it is difficult to expand farmland area in Indonesia, if the present situation in the economy, agriculture, environment, etc. is taken into consideration. Also, it is not easy to increase cropping intensity in the short term by expanding irrigated area and/or some other methods. The remaining option is to increase rice productivity per unit area. But, it is also not so easy if the present relatively high-level productivity and weak incentives for farmers are taken into consideration. Moreover, a low return from rice farming in Indonesia makes things more complicated. Some people argue that it is better for farmers to abandon rice farming and to encourage them to grow high value crops for generating income.

As a result, the both objectives, crop diversification and increase in rice production have a trade off relation in many areas in Indonesia. The food security policy may confuse farmers, as MOA/Government has not yet announced an integrated agricultural policy to harmonize crop diversification and increase in rice production. Particularly, farmers who can expect to grow two or more rice crops per year in irrigated area would be confused. It seems that the both objectives might not be compatible with each other without a strategic policy by MOA/Government.

### 2) Farmers' Attitude

According to a result of workshops, many farmers indicated that a lack of market information is the major constraint for a crop diversification. That can be translated in more easy words as follows. "We do not want to get lose. We know that a crop diversification is a risky business and needs certain

capital even there is a chance to get big profits. If we could get reliable information about a 100% promised crops, we start to grow them”.

Actually, there is no 100% promised crop in the world. Many people are making strong efforts to get such kind of information in the market globalization phenomenon. Such kind of information is not free for everyone without paying cost or making efforts to get. Farmers need to change their perception described above, if they really want to introduce new high-value crops or to get into agribusiness for more profit.

However, it takes long time to wait for a change of such farmers’ perception. Practically the followings could contribute for a crop diversification policy. The most important thing is that the government should play as a coordinator, not as a main business body, with a good will and discipline especially for protecting framers’ benefits.

- Retraining of agricultural extension workers (They usually do not have enough knowledge for vegetables and fruits)
- Reinforcement of agricultural extension system (The agricultural extension system in Indonesia is on a critical situation. Only an extension worker’s good motivation cannot change the present situation.)
- Creation of fair market system including construction of new market facilities (Information should be fairly provided to traders and producers from/through the market administrations.)
- Provision of credit system with favorable condition to ambitious farmers
- Establishment of mutual aid project to prepare for a price crisis and a natural disaster.
- Promotion of contract farming with private companies, like a supermarket chain.

#### (8) Farm Size

As mentioned in Chapter 2, average farm size is very small in Indonesia especially in Java. This is one of the major reasons of low income of farmers. With the present situation, many farmers supposed to have a side-job for their livelihood. If farmer is a sharecropper, situation is almost at a critical level. Even many farmers is leaving from farming in Java, their farmlands are not properly secured for agricultural production. Land issue could be the most difficult issue for the agricultural development in Indonesia.

#### (9) Empowerment of Farmer Organizations

Present agricultural policy intends to empower farmer organizations for improving farmer’s income and welfare. Though Government is attempting to improve the present situation of farmer organizations, the approach appears to be somewhat fragmented and temporary. More drastic reforms are required to nurture real farmers’ organizations based on due consideration of the present problems within the KUD movement.

There have been many studies and reports to investigate the reasons behind the disappointing KUD situation. Their conclusions tend to focus on two main issues, as follows:

- The KUD movement started under Government auspices, and was strongly influenced by Government’s interests, which frequently exploited KUD as a political instrument. It deterred members from having the proper motivation to manage and operate KUD by themselves.
- Government expected KUD to develop as business-oriented organizations in rural areas. However, many people in rural areas did not have the experience and capability to manage such business-oriented organizations.



Government expected the traditional mutual aid system of *Gotong Royong* to be the spirit behind KUD organization. Whilst such a spirit is very important it alone is not a sufficient basis upon which to run a KUD. *Gotong Royong* is basically a social security system capable of handling a temporary problem, when it arises. Though *Gotong Royong* helps the community to share an identity, it is not a suitable system to look after matters related to a prepared program or policy, such as KUD management philosophy, looking after people's mutual benefits by operating a business on a sustainable basis

It is suggested that the following basic points should be taken in to considerations when designing any new policy regarding the empowerment of farmers' organizations:

- Farmers' organizations should be organized and managed by members' interest.
- Government should be aware that *Gotong-royong* spirit alone can not support farmer organizations on a sustainable basis.
- Government should continuously provide training program to people, who are willing to participate in farmer organizations, to provide them with proper knowledge, skills, spirit and discipline to manage farmers' organizations by themselves.
- Government should build up transparent legal framework including penal regulations to handle injustice management and operations.
- Government should clarify the responsibilities of each concerned agency, to avoid overlapping of their activities and programs.

In addition to the above points, agricultural extension service should be kept in close linkage with the empowerment of farmer organizations. Programs concerning the both services have been carried out regretfully instead of keeping close linkage in Indonesia. A vital farmer organization cannot exist on a sustainable basis without empowerment of individual farmers. However, the agricultural extension system in Indonesia is on a critical situation in terms of financial support and system itself. Though the agricultural extension system has been transferred from the central government to *Kapupaten* government in accordance with a decentralization policy, there is an anxious sense in continuing the existing agricultural extension system, even problematic, due to insufficient revenue of *Kapupaten* government. Then the existing agricultural services are still widely implemented with outdated system based on a top-down philosophy of information and technology transfer with few flexible mechanism for managing diverse needs of farmers. It is recommendable that such an attitude of relevant government staff to the agricultural extension services should be drastically changed, and a participatory agricultural extension system based on a process of learning by doing should be newly established.

Table 4.1.1 Sampled WUA Area for Questionnaire Survey

Code no.	Kabupaten	Selected Kabupaten		Code no.	Kabupaten	Selected Kabupaten	
		Question. survey	RRA survey			Question. survey	RRA survey
no.	name	no	no	no.	name	no	no
<b>PROVINCE: WEST SUMATERA</b>				(Continued from left raw)			
01	Pesisir Selatan	✓	✓	01	Pacitan		
02	Solok	✓	✓	02	Ponorogo		
03	Swl/Sijunjung	✓	✓	03	Trenggalek	✓	
04	Tanah Datar			04	Tulungagung		
05	Pd Pariaman	✓	✓	05	Blitar		
06	Agam	✓	✓	06	Kediri	✓	
07	50 Kota	✓	✓	07	Malang	✓	
08	Pasaman	✓		08	Lumajang	✓	
09	Padang			09	Jember	✓	✓
10	Solok (Kodya)			10	Banyuwangi	✓	✓
11	Sawahlunto			11	Bondowoso		
12	Pd Panjang			12	Situbondo		
13	Bukittinggi			13	Probolinggo		
14	Payakumbuh			14	Pasuruan	✓	✓
<b>Total</b>		<b>7</b>	<b>6</b>	15	Sidoarjo		
<b>PROVINCE: WEST JAVA</b>				16	Mojokerto		
01	Pandeglang			17	Jombang	✓	✓
02	Lebak	✓	✓	18	Nganjuk		
03	Bogor	✓	✓	19	Madiun		
04	Sukabumi			20	Magetan		
05	Cianjur	✓		21	Ngawi		
06	Bandung	✓	✓	22	Bojonegoro	✓	✓
07	Garut	✓		23	Tuban		
08	Tasikmalaya	✓	✓	24	Lamongan		
09	Ciamis			25	Gresik		
10	Kuningan			26	Bangkalan		
11	Cirebon			27	Sampang		
12	Majalengka			28	Pamekasan		
13	Sumedang			29	Sumenep	✓	✓
14	Indramayu	✓	✓	30	Kediri		
15	Subang			31	Blitar		
16	Purwakarta			32	Malang		
17	Karawang	✓	✓	33	Probolinggo		
18	Bekasi			34	Pasuruan		
19	Tangerang	✓		35	Mojokerto		
20	Serang	✓		36	Madiun		
21	Bogor			37	Surabaya		
22	Sukabumi			<b>Total</b>		<b>10</b>	<b>6</b>
23	Bandung			<b>PROVINCE: WEST NUSA TENGGARA</b>			
24	Cirebon			01	Lombok Barat	✓	✓
25	Tangerang			02	Lombok Tengah		
26	Bekasi			03	Lombok Timur	✓	
27	Pwk Depok			04	Sumbawa	✓	✓
<b>Total</b>		<b>10</b>	<b>6</b>	05	Dompu	✓	✓
<b>PROVINCE: JOGYAKARTA</b>				06	Bima		
01	Kulon Progo	✓		07	Mataram		
02	Bantul	✓	✓	<b>Total</b>		<b>4</b>	<b>3</b>
03	Gn Kidul	✓	✓	<b>Grand Total</b>			
04	Sleman	✓	✓			<b>35</b>	<b>24</b>
05	Jogyakarta						
<b>Total</b>		<b>4</b>	<b>3</b>				
(To be Continued to right raw)							

Table 4.1.2 Rapid Rural Appraisal (RRA) WUA Areas

Province	Number of Survey Areas		No.	WUA Name	Desa/Kelurahan	Kecamatan	Kabupaten/Kodya	WUA Category
	Target	Actual						
Sumatera Barat	6	6	1	Tompek Harapan	Tapian Kandis	Palembayan	Agam	1 WUA
			2	Taratak	Napar	Payakumbuh Utara	Payakumbuh	1 WUA
			3	Tuah Sakato	Lohong	Sungai Limau	Padang Pariaman	WUA reverted back to traditional system
			4	Alam Lestari	Maju Singkarak Sumani	Sepuluh Koto Singkarak	Solok	More than 1 WUA (pump schemes)
			5	Karojo Samo	Bukit Sabal	Tanjung Gadang	Sawah Lunto Sijunjung	1 WUA
			6	Batu Asahan	Koto Pulai	Sebelas Koto Tarusan	Pesisir Selatan	1 WUA
Jawa Barat	6	6	1	Sinar Maju	Pasir Tangkil	Warunggunung	Lebak	Being developed, village scheme <150 ha
			2	Mekar Jaya	Situ Udik	Cibungbulang	Bogor	Being developed, technical scheme >500 ha
			3	Dewi Sri	Sukamekar	Jatisari	Karawang	Being developed, technical scheme >500 ha
			4	Kelompok Tani	Ranca Tungku	Pameungpeuk	Bandung (Kab.)	Being developed, technical scheme >500 ha
			5	Tani Mukti	Bogor	Sukra	Indramayu	Being developed, technical scheme >500 ha
			6	Mugiamulya	Sirnaputra	Cigalontang	Tasikmalaya	Not yet developed, semi-technical scheme 150-200 ha
DIY	3	3	1	Among Mitro	Umbul Martani	Ngemplak	Sleman	1 WUA (Gayam irrigation system, 38 ha)
			2	Satuhu (federation)	Sidomulyo	Bambanglipuro	Bantul	10 WUAs (DI Meijing, 396 ha)
					Mulyodadi	Pundong		
3	-	Bendung	Semin	Gunung Kidul	No WUA (Garotan Barat village irrigation, area 36 ha)			
Jawa Timur	6	6	1	Tirto Wono	Dander	Dander	Bojonegoro	More than 1 WUA
			2	Tirto Makmur	Ceweng	Diwek	Jombang	More than 1 WUA
				Tani Harapan	Diwek			
			3	Sumber Makmur	Kejayan	Kejayan	Pasuruan	1 WUA
			4	-	Sumber Salak	Ledokombo	Jember	No WUA (no longer active)
			5	Tirto Agung	Cantuk	Singojaruh	Banyuwangi	1 WUA, reactivated
6	Talang Makmur	Talang	Saronggi	Sumenep	1 WUA, formed cooperative			
NTB	3	3	1	Mekar Sari	Labulia	Jonggat	Lombok Tengah	More than WUA
			2	-	Bagik Papan	Pringgabaya	Lombok Timur	No WUA
			3	Oi Si'I	Rontu	Rasanae	Bima	1 WUA (DI Wawo, 37 ha)
<b>Total</b>	24	24						

Table 4.1.3 Perceived Problems and Constraints through RRA Surveys (1/2)

Problems and constraints		West Sumatera	West Java	DI Yogyakarta	East Java	West Nusa Tenggara
<b>a. Agriculture, economic, finance</b>	Young generation not interested in farming		V	V	V	
	Fertilizer expensive, difficult to find		V	V	V	
	Cropping plan late, not well implemented	V			V	V
	Limited number of farm laborers			V		V
	Wages of farm labor are high		V		V	
	Input prices > paddy gabah price	V	V	V	V	V
	Small holding size/family		V	V		
	Low farm income	V	V	V	V	
	Crop pest and diseases		V	V		V
	Seed not readily available		V			
	Conflicts between duck farmers and sawah farmers		V			
	Commercial crops not widely developed			V		
	Credit not readily available			V		
	Sawah contributes small % of total income	V				
<b>b. Irrigation system, O&amp;M, water management</b>	Farmers obliged to grow rice for traditional & cultural reasons	V				
	Farmers not involved in O&M decision	V				V
	Farmers feel irrigation system does not belong to them	V	V		V	
	Farmers do not want to maintain canals	V	V			
	Farmers entrenched in traditional irrigation management practice	V	V	V	V	V
	Farmers not prepared for operation charge	V	V	V	V	
	Annual flooding in rainy season		V		V	
	Canals built by PU/contractor quickly break down		V		V	
	Weir and canals (tertiary, secondary) are broken down	V	V	V	V	V
	Water loses, water shortages	V	V	V	V	V
	No rules regarding water use and water charges	V				V
	No clear responsibility for irrigation management	V		V		
	Conflicts over water allocation in dry season	V			V	V
	Insufficient water in dry season		V	V		V
	Middle and down-stream farmers receive insufficient water		V	V	V	V
	Lack of water charges for irrigation O&M	V	V	V	V	V
	No sanction for non-payment of water charges	V				V
	Water charge which are collected, not used for O&M					V
	O&M is ad hoc, not well organized	V	V			
	If water charge paid, unwilling to participate in <i>gotong-royong</i>		V		V	
	Competitive water uses by State CWS and Industries		V			V
	<i>Gotong-royong</i> is not appropriate for all maintenance activities	V				
	Farmers on larger holdings more responsive than smallholders	V				
	Deforestation in catchment area				V	
	Inadequate spring water available			V		
	No rules governing water management and allocation	V				
	Division and off-take gates are broken		V			
	Poor water allocation, some do not receive water	V				
Secondary & tertiary canals' O&M is minimal	V					
Irrigation O&M is more difficult than pumping water			V			
Poor attitude regarding responsibility to pay water charge		V				
Water demand for each block is not calculated	V					
Women are not involved in establishing water charge or O&M	V	V	V	V	V	
Water is also used for livestock and fisheries		V				
No water charge for fish ponds		V				
Share-cropper farmers do not care on maintenance				V		
Absentee landowners are undisciplined in paying water charges		V				
<i>Ulu-ulu</i> (block leader) is paid but inactive		V				

Note : V : exists

Table 4.1.3 Perceived Problems and Constraints through RRA Surveys (2/2)

Problems and constraints		West Sumatera	West Java	DI Yogyakarta	East Java	West Nusa Tenggara
<b>c. WUA management, institutional development</b>	Lack of information and awareness regarding WUA	√				√
	Members do not feel part of WUA	√	√			√
	WUA leaders inactive, low initiative	√	√			√
	Low capacity of WUA leaders to motivate members		√			√
	Low human resources, low education	√	√	√	√	√
	Lack of members' motivation	√	√		√	
	Farmers entrenched in traditional organization	√	√	√		√
	WUA not viewed as formal organization		√	√		√
	Too much bureaucracy			√	√	√
	KUD not functioning		√	√		
	Women not involved in decision making	√	√	√	√	√
	Farmers become involved in O&M if major problems arise		√			
	People feel WUA is group of gatekeeper		√			
	No coordination between WUAs within an irrigation system	√				
	No clear water demand for WUA	√				
	WUA leaders change if chief of village (KADES) changes		√			
	WUA not based on local <i>adat</i> regarding land tenure	√				
	WUA not based on hydraulic boundaries	√				
WUA boundaries not clear		√				
Farmers do not want to organize WUA				√		
<b>d. GOI roles, supports, laws &amp; regulations</b>	WUA Articles (AD/ART) have been prepared by Government				√	√
	Lack of or sporadic provision of extension and guidance	√	√		√	√
	No coordinated extension services	√			√	√
	Too many organizations, related to different Govt. agencies.	√				
	Village Government deeply involved in WUA autonomy		√			
	WUA leaders are appointed by the village Government officials				√	
	Difficult to collect farmers together to give advice		√			
	Poor institutional guidance					√
	Too many taxes charged by village government		√			
	Government budget is limited					√
	Farmers consider Government will always assist them			√		
	No formulation of water users' rights and duties		√			
	Community do not know about turnover program		√			
	Poor farmers' participation in planning and construction		√			
	Technological gap between Government and farmers			√		
	Government assistance for O&M inadequate			√		
	<i>Gotong-royong</i> shown by Government is not good example			√		
Farmers perceive Government responsible for secondary & primary canals		√				

Source: Primary Data, JICA Study Team 2000.

Note : √: exists

Table 4.1.4 WUA Questionnaire Items (1/2)

Major Items	Remarks
<b>Part-1 : Rural Sociological Survey Partial Census</b>	
I. Household Identification	
Reg Respondent	
Name, Age, Education, Type of work, Income source, household member, Household	
II Land Occupancy	
Land ownership and area by type	
III Source of Income	
IV Off-Farm Activities	Income generation, Work Type, Location, Time
V Production Constraints and Priority of Improvement	
<b>Part-2 : Rural Sociological Survey - Farming Analysis</b>	
I. Food Crops Agriculture in Paddy Field	
A. Growing Season (First, Second & Third) 1999/2000	
1. Technical Aspects	
1-1 Planting	a. Area, b. Variety, c. Planting distance, d. Seed distance, e. Land preparation
1-2 Fertilization	Fertilization rate (kg/ha), time of fertilization (days after planting, HST), and method of application 2)
1-3 Pest & Disease	a. Disease type, b. Intensity, c. Time, d. Protection method, e. Pesticide type, f. Pesticide dosage, g. Management frequency, h. Management time
1-4 Harvest & Post-Harvest Methods	a. Harvesting b. Threshing, c. Transportation, d. Drying, e. Storage
2. Cost Production, Production, and Income	
2-1 Production Cost	a. Seed, b. Fertilization, c. Pesticide, d. Labor, e. Nursery & planting, f. Pest/disease protect, g. Harvest & Post-H, h. Others
2-2 Production & Gross Production	
2-3 Income	
II Food Crops Agricultural Activities ( By sites )	
1. General	1Area (ha), 2. Distance from house (km), 3. Method of Land Clearing, 4. Cropping Pattern, 5. Crop cultivation duration(year), 6. Fallow duration, 7. Perennial crop, 8. Grass strip
2. Technical Aspects ( First, Second & Third Seasons )	( Same as I-1 )
3. Cost Production, Production, and Income	( Same as I-2 )
III Farming Activities for Perennial Crops ( Fruit Trees )	
A. Number of tree or area planted ( existing condition )	
By Variety, Plots ( Home yard, Orchard, Other )	a. Harvest time, b. Yielding / ha
B. Cost Production, Production, and Income	
By Variety, Plots ( Home yard, Orchard, Other )	( Same as I-2 )
IV Cattle Breeding	
1. Number of cattle by species	
2. Labor spent in managing the animals (total) :	a. Cleaning out, b. Bath'g, c. Grass'g, d. Grass cut'g, e. Feeding, f. Others
3. Kind and source of grass/ food (By Wet & Dry Season)	
4. Type and total cost (Purchased) on domestic animal activities :	
5. Type and total value (sold) on domestic activities (during the last year) :	
6. Estimate of manure production (ton/year)	
V. Water Management & Conservation	
1. Application of water management techniques	a. Water gate operation, b. Canal maintenance, c. Division & distribution, d. Terracing, e. stripping
VI Institutional Aspects & Farmers' Participation	
1. Farmer involvement as member of social institution	
2. Source of information about the latest agricultural - water management	
3. Farmers opinions	a.WUA, b. Extension works, c. Farmers' group, d. KUD, e. Village staff, f. LKMD, g. Kecamatan staff, h. Kab-staff, I, h. Province staff, j. Researcher, k. NGO, l. Others
VII Off-Farm Income	
1. Household income from off-farm activities (during the last year)	
2. Amount of money sent by other family members	

Table 4.1.4 WUA Questionnaire Items (2/2)

Major Items	Remarks
<b>Part-3 : Farm Level Information</b>	
<b>I. Irrigation Management</b>	
1. General	
Establish Year, Classification, Member No, Block No., No. WUA in Desa, No.Desain WUA	
2. WUA History	
Traditional association, Identify water management person, Opinions on W-management	
3. Reg Existing W-Management	
4. WUA Organization	
5. Membership of WUA	( By locations ; Upstream, Middlestream & Downstream )
<b>II Irrigation System</b>	
1. Physical Conditions	
2. Irrigation system	
3. Irrigation system sketch	
4. History of Irrigation system development	Construction, Rehab., Water distribution, Expansion Capacity
5. Spot check of water distribution	
<b>Part-4 : WUA - Official Information</b>	
<b>I. Water Users' Association</b>	
WUA Organizing Accomplishment, Performance, Establishment target	
<b>II. Manage &amp; Guide to Empower WUA</b>	
Record of Training of Trainer & Farmers, M&E WUA performance	
<b>III Irrigation Service Fee Collection</b>	
Condition of ISF collection activities, Record of ISF collection, Record of IPAIR disbursement	
<b>IV Fund Allocation of WUA Improvement</b>	Allocated fund, Expected Fund
<b>V Coordination of WUA Empowerment</b>	
<b>Part-5 : Village Information</b>	
<b>I. General Character of the Region</b>	
1. No. of Household & Sub-districts	
2. Land Utilization, Acreage (Ha)	b. Irrigated Field/Tidal Land/Rainfed, c. Dryland (Ladang / Tegalan / Tadah hujan), d. Plantation, e. Public Facilities
3. Village Position	A Distance to Sub-district Capital Distance (km), B Time spent to Sub-district Capital (hour)
<b>II. Demography (People/Household)</b>	
No. of people, No. of Households, Origin, Age & sex, Education level, Work condition, Landholding, Welfare	
<b>III Public / Private Facilities in the Village</b>	
1. Transportation (unit), 2. Health, 3. Information, 4. Water Supply, 5. Environmental health	
6. Public Facilities	a. Kios, b. BPR/BMT, c. Bank, d. Active KUD , etc.
7. Electricity	
8. Social Organization	a. KUD, b. Kelompok Tani, c. P3A
9. Existence of intersectoral field staff	a. Agri-exten worker, b. Village cooperative worker, etc.
<b>IV Agriculture &amp; Cattle Breeding</b>	
1. Land Utilization	a. Food Crop, b. Plantation, c. Fish pond, d. Others
2. Land utilization based on water management	a. Techn'l, b. Semi-Tech, c Village-irri., d. Rainfed, e. Dry
3. Number of Domestic Animal	Reg. Species & Number
<b>V Small Industry</b>	
	a. Tohu, b. Tempe, c. Basket, d. Carpets, e. Others
<b>VI Others</b>	
1. Total days in one year for gotong royong activities	
2. Average household expenses for tax, fees, and other charity (per year)	a. Land and Building Taxes, b. Fee, c. Charity, d. Others
3. Map of Village	
4. Special Note	

Table 4.1.5 Summary of Results of Key Questions regarding WUA (1/3)

No.	Item	Questionnaire Form/Table	West Sumatera	West Java	Yogyakarta	East Java	NTB
1	Level of participation of respondents in WUA activities (majority answer)  Number of respondents	RSS – UT Table 17/V1.1	Active (42% of respondents)  105	Active (41% of respondents)  192	Active (60% of respondents)  40	Active (72% of respondents)  159	Active (56% of respondents)  35
2	View of majority of respondents concerning WUA service  Number of respondents	RSS – UT Table 18/V1.3	Good (51% of respondents)  111	Average (46% of respondents)  192	Good (20 respondents – 61%)  33	Good (59% of respondents)  171	Good (49% of respondents)  37
3	Main WUA category  Number of respondents (WUA)	WUA – F Table A.1.1	Being developed (21 WUA – 38%)  56	Being developed (29 WUA – 30%)  96	Being developed (6 WUA – 30%)  20	Being developed (31 WUA – 51%)  61	Being developed (15 WUA – 63%)  24
4	Main water management system before WUA  Number of respondents (WUA)	WUA – F Table A.1.2	Traditional (40 respondents – 71%)  56	Traditional (54 respondents – 56%)  96	Farmer water user organization (40%)  20	Traditional (97 respondents - 91%)  107	Traditional ( <i>pekasih</i> ) (17 respondents – 71%)  24
5	Which management system is the best? (majority answer)  Number of respondents (WUA)	WUA – F Table A.1.2	WUA (49 respondents – 89%)  55	WUA (80 respondents – 83%)  96	WUA (95% of respondents)  20	WUA (97% of respondents)  91	WUA (21 respondents – 91%)  23
6	Reasons why this management system is the best (majority answer)  Number of respondents (WUA)	WUA – F Table A.1.2	Better water management/ distribution/ coordination (55% WUA; better organization/order/ participation/self-standing (38% WUA)  47	Better communications/ organization/order/ participation/ cordination/ problem solving (52% WUA); better irrigation management/ maintenance (39% WUA)  47	Better water distribution (20%)  20	Better water distribution (44 respondents); more order, better people management (38 respondents)  98	More order, better water management (12 respondents)  22



Table 4.1.5 Summary of Results of Key Questions regarding WUA (2/3)

No.	Item	Questionnaire Form/Table	West Sumatera	West Java	Yogyakarta	East Java	NTB
7	Function of WUA (majority answer)  Number of respondents (WUA)	WUA – F Table A.1.2	Organize/manage/ guide members, <i>gotong royong</i> (52% WUA); water management/ distribution, solve conflicts (35% WUA) 48	Water distribution/ irrigation system management (57% respondents)  96	O&M (10 respondents - 50%)  20	Water management/distribution (54 respondents); management/problem solving/control/ coordination (31 respondents)  95	Water management (15 respondents – 71%)  21
8	Communication method (majority answer)  Number of respondents (WUA)	WUA – F Table A.2	Informal (49 WUA – 91%) 54	Informal (69 WUA – 72%) 96	Formal (65% of WUA) 20	Informal (53 WUA – 53%) 100	Informal (22 WUA – 96%) 23
9	Open elections of WUA officials? (majority answer)  Number of respondents (WUA)	WUA – F Table A.2	Yes (51 WUA – 93%) 55	Yes (75 WUA – 78%) 96	Yes (80% of WUA) 20	Yes (94 WUA – 91%) 103	Yes (18 WUA – 82%) 22
10	Main problems discussed (majority answers)  Number of respondents (WUA)	WUA – F Table A.2	Water management (10 WUA – 26%)  39	Maintenance, leakages, broken structures/canals (23 WUA – 32%)  72	Water use charge, repair of structures (44% of WUA)  18	Institutional/human resources, organization, ability (22 WUA – 36%); water distribution (17 WUA – 28%)  61	Personality/integri ty of WUA officials (10 WUA – 59%)  17
11	Registered with AD/ART? (majority answer)  Number of respondents (WUA)	WUA – F Table A.3	Yes (39 WUA – 70%) 56	Yes (71 WUA – 74%) 96	Yes (80% of WUA) 20	Yes (82 WUA – 90%) 91	Yes (21 WUA – 91%) 23
12	No. WUA where at least 50% of members pay water use charge  Number of respondents (WUA)	WUA – F Table A.3.2	13 WUA (37%)  35	44 WUA (46%)  96	12 WUA (75%)  16	39 WUA (72%)  54	10 WUA (67%)  15
13a	Availability/allocation of water during dry season (majority answer)  Number of respondents (WUA)			Problem (69 WUA – 72%) 96			
13b	Distribution of water in dry season (majority answer)  Number of respondents (WUA)	WUA – F Table A.3.3	Problem (32 WUA – 58%)  55	Equitable distribution (52 WUA – 54%)  20	Problem (55% of WUA)  94	Equitable distribution (51 WUA – 54%)  23	Equitable distribution (17 WUA – 74%)  23
14	Does WUA maintain secondary canal? (majority answer)  Number of respondents (WUA)	WUA – F Table A.3.4	No (27 WUA – 52%)  52	Yes (56 WUA – 62%)  91	Yes (14 WUA - 70%)  20	Yes (55 WUA – 60%)  91	Yes (17 WUA – 74%)  23

Table 4.1.5 Summary of Results of Key Questions regarding WUA (3/3)

No.	Item	Questionnaire Form/Table	West Sumatera	West Java	Yogyakarta	East Java	NTB
15	Main method of maintenance of irrigation system  Number of respondents	WUA – F Table A.3.4	<i>Gotong royong</i> (54 WUA – 98%)  55 (WUA)	<i>Gotong royong</i> (labour) (268 respondents – 93%)  287 (persons)	<i>Gotong royong</i> (100% of WUA)  20 (WUA)	<i>Gotong royong</i> (97% of WUA)  92 (WUA)	<i>Gotong royong</i> (100% of WUA)  23 (WUA)
16	Does WUA have discussion meetings? (majority answer) Number of respondents (WUA)	WUA – F Table A.3.5	Yes (47 WUA – 85%) 55	Yes (68 WUA – 71%) 96	Yes (17 WUA – 89%) 19	Yes (92 WUA – 98%) 94	Yes (21 WUA – 88%) 24
17	What are the main problems discussed?  Number of respondents (WUA)	WUA – F Table A.3.5	Maintenance of tertiary system (28 WUA – 53%)  53	Water distribution/division, maintenance of tertiary system  96	Maintenance of tertiary system, water distribution  20	Water distribution/division, maintenance of tertiary system  96	Water distribution/division, maintenance of tertiary and secondary canals  24
18	Giving of sanctions (majority answer) Number of respondents (WUA)	WUA – F Table A.3.6	Never (34 WUA – 69%) 49	Never (87 WUA – 91%) 96	Never  20	Never (59 WUA – 63%) 93	Yes (20 WUA – 83%) 24
19	Is WUA ready for turnover? (majority answer) Number of respondents (WUA)	WUA – F Table A.5.2	Yes ( 47 WUA – 85%) 55	Yes (68 WUA – 71%) 96	Yes (80% of WUA) 20	Yes (84 WUA – 90%) 93	No (16 WUA – 67%) 24
20	What needs to be pushed/promoted? – majority answers  Number of respondents (WUA)	WUA – F Table A.5.4		Provision of sufficient water for all farmers (56 WUA); trust/attention/guidance from Government (20 WUA)  96	Repair of irrigation network (3 WUA); nothing (3 WUA)  17	Guidance/trust from Government (25 WUA); institutional strengthening (17 WUA); water supply/distribution (11 WUA); capital, prices (10 WUA)  73	Training/extension; improvement of human resources; capital/management of funds  13

Table 4.1.6 Summary of Results of Key Questions regarding Agriculture

Indicator	West Sumatera	West Java	Yogyakarta	East Java	NTB
1. Farm income (average)	NA	Rp.2,063,948/season	NA	1st season: Rp.1,274,141 2nd season: Rp.1,653,149 3rd season: Rp.967,952	1st season: Rp.1,505,267 2nd season: Rp.2,241,622 3rd season: Rp.774,697
2. Off-farm income (average)	NA	NA	NA	NA	Rp. 222,854/year
3. Ownership of rice field	Average 0.41 ha/family	Average 1.1 ha/family (Max.17.0ha - Min. 0.0ha)	Dominant seize is 0.1 - 0.5ha /family (dry land incl.)	Dominant size is less than 0.5 ha/family (dry land incl.)	Dominant seize is 0.25 - 1.0 ha/family (dry land incl.)
4. Major cropping patterns in Irrigated land	Rice - Rice (more than 90%)	Rice - Rice	Rice - Rice - Palawija Rice - Palawija - Palawija	Rice - Rice - Palawija Rice - Rice - Rice Rice Palawija - Palawija	Rice - Rice - Palawija Rice - Palawija
5. Respondents mainly live on farming	91.7%	91.0%	60.0%	83.6%	91.5%
6. Contribution of rice to respondents' income	56.0%	NA	25.0%	NA	NA
7. Problem on farming (% of respondents)	1.Pest & disease (55.5%) 2.Water shortage (25.1%) 3.Low soil fertility (12.3%)	1.Pest & disease (66.7%) 2.Water shortage (28.1%) 3.No problem (2.1%)	1.Pest & disease (48.8%) 2.Water shortage (23.8%) 3.Low soil fertility (13.1%)	1.Pest & disease (53.6%) 2.Less technology (22.7%) 3.Water shortage (19.0%)	1.Pest & disease (43.1%) 2.Water shortage (37.5%) 3.Low soil fertility (7.0%)
8. Problem on farm input (% of respondents)	1.Fertilizers (41.6%) 2.Capital (29.9%) 3.Agro-chemicals (14.2%)	1.Fertilizers (31.9%) 2.Agro-chemicals (27.1%) 3.Capital (25.7%)	1.Capital (26.3%) 2.Labor (22.4%) 3.Fertilizers (21.1%) 3.Agro-chemicals (21.1%)	1.Capital (33.4%) 2.Agro-chemicals (20.4%) 3.Fertilizers (15.9%)	1.Capital (50.0%) 2.Fertilizers (37.5%) 3.Agro-chemicals (16.7%)
9. Problem on marketing(% of respondents)	1.Low price (44.4%) 2.No coops. (18.3%) 3.High cost (11.8%)	1.Low price (81.3%) 2.No problem (13.2%) 3.Limit transport (2.4%)	1.Low price (46.4%) 1.No market (46.4%) 2.No coops. (4.8%)	1.Low price (68.1%) 2.Limit transport (10.5%) 3.No market (7.7%)	1.Low price (69.3%) 2.No coops. (8.4%) 3.Limit transport (4.2%)

Source: JICA Study questionnaire survey

Table 4.2.1 Issue Domain Analyses of Indicatives Problems on Irrigation Management and Empowerment of WUA (1/2)

I t e m	Source			Province				
	Sec.	Q-s	RRA	W.S	W.J	DIY	E.J.	NTB
<b>A. INEFFECTIVE SOCIALIZATION</b>								
A.1. Top down approach (centralized)	V		V	H	H	M	M	M
A.2. Local government not given full autonomy	V		V	H	M	M	M	H
A.3. Local government dependent for full decision and funding from central government	V		V	H	H	M	H	H
A.4. Local government policy and action in irrigation management did not match with local need	V		V	H	H	M	M	H
A.5. WUA's success indicators did not indicate WUA's real performance			V	H	M	M	M	H
<b>B. LOW FUNCTION OF WUA</b>								
B.1. WUA's poorly managed by WUA official			V	H	H	L	M	H
1.1. Meetings not conducted regularly (%)		V	V	76	89	15	58	73
1.2. Meetings not properly recorded (%)		V	V	54	82	15	47	65
1.3. Meetings not conducted more than once per season (%)		V	V	68	59	35	51	71
1.4. ISF collection not transparently managed (%)		V	V	73	90	30	53	70
B.2. Majority of WUA members paying ISF (%)		V	V	78	68	29	59	70
2.1. Majority of WUA members never seen cash book (%)		V	V	76	88	30	61	70
2.2. Collected ISF not reported (%)		V	V	68	83	20	60	69
2.3. Majority of WUA members unsure what collected ISF is used for (%)		V	V	58	75	10	57	88
2.4. Member of WUAs were not able to pay cash (%)		V	V	54	93	5	31	46
B.3. Rehabilitation were eventually conducted through <i>gotong-royong</i> (%)		V	V	94	76	100	84	97
3.1. <i>Musyawarah</i> is used to legalize top-down instruction			V	H	H	H	H	H
B.4. WUA members did not trust official			V	M	M	L	M	M
B.5. WUA members did not appreciate official			V	M	M	L	M	M
5.1. WUA members did not recognize sanction (%)		V	V	61	88	60	54	82
5.2. Deviating members were not punished		V	V	77	76	67	42	62
B.6. WUA officials were assigned by the government (%)		V	V	56	69	67	72	82
B.7. Low participation of WUA members at tertiary level (%)		V	V	13	7	15	9	41
<b>C. Water Distribution</b>								
WATER WAS NOT EVENLY DISTRIBUTED (%)		V	V	68	85	65	44	82
C.1. Low water availability for paddy field		V	V	100	72	69	82	86
1.1. Inter-sectorial water competition			V	M	H	H	H	M
1.1.1. Crop vs. non crops competition was increasing			V	L	H	H	M	L
1.2. Inter-crop water competition			V	L	H	H	H	M
1.2.1. Food crops cropping pattern was inappropriate (%)			V			-	-	73
1.3. Water resource degradation		V	V	38	40	48	33	45
C.2. Facilities not functioning well		V	V	28	61	30	10	64
2.1. Turnout facilities inadequate				H	H	L	M	M
2.1.1. Irrigation system construction inadequate (%)			V	49	75	30	13	47
(1) Inadequate irrigation planning and designing			V	H	H	M	M	H
1) Top-down target-oriented irrigation planning			V	H	M	M	H	H
2) Spatial and sectorial program and project not integrated			V	M	M	M	M	H
3) Program / project at local level affected by political interest (%)		V	V	22	32	25	15	23
2.1.2. O&M functioning poorly		V	V	22	53	33	26	90
C.3. Rehabilitation by WUA was poor		V	V	H	H	H	H	H
C.4. O & M budget was inadequate		V	V	69	64	36	42	71
4.1. ISF collection was low		V	V	78	68	29	59	70
4.2. Inadequate government budget			V	H	H	H	H	H
4.2.1. Inappropriate laws and regulations			V	H	H	H	H	H
C.5. Urgent need for additional water resources		V	V	100	72	69	82	86
C.6. Spatial conflict among members of up-middle-down streams			V	M	M	L	M	M

Note: Sec. = secondary data; Q-s = questionnaire survey; RRA = rapid rural appraisal

H= high; M = medium; L = low

W.S.= West Sumatera; W.J.= West Java; DIY = Daerah Istimewa Yogyakarta; E.J. = East Java

NTB = Nusa Tenggara Barat (West Nusa Tenggara)

Table 4.2.1 Issue Domain Analyses of Indicatives Problems on Irrigation Management and Empowerment of WUA (2/2)

I t e m	Source			Province				
	Sec.	Q-s	RRA	W.S	W.J	DIY	E.J	NTB
<b>D. LOW TURN OVER</b>								
D.1 Water was misallocated			V	M	M	M	M	M
1.1 Low farm income (Rp. Million/ha/year)		V	V	2.70	3.76	2.44	3.71	4.22
1.2 Farming subsistence level oriented (ha)		V	V	0.79	1.1	0.30	0.78	0.59
D.2 High incidence of tenant farmers (%)		V	V	10	43	36	6	34
2.1 Absentee landowner exist (%)		V	V	3	29	26	14	23
D.3 Outflow of farm labour (%)		V	V	44	13	52	15	14
3.1 Average cultivated land area was low or limited (ha)		V	V	0.85	0.77	0.35	0.80	0.59
D.4 Not yet ready to accept turnover by WUA members (%)		V	V	14	74	20	17	67
4.1 Attitude to/education of WUA members still low (%)		V	V	85	88	75	81	76
4.1.1 Historical aspects			V	H	H	M	H	H
4.1.2 No interest to be involved in WUA activity (%)		V	V	9	13	3	17	55
D.5 Low yields (ton/ha)		V	V	3.2	4.4	4.2	2.5	3.6
5.1 Pests and diseases were still high (%)		V	V	55	21	68	25	43
<b>E. Cultural aspect were internalized in local living arrangement, e.g.:</b> <b>- pattern of landownership - gender role - local traditions</b>								
E.1. Women's low involvement in WUA decision making (%)		V	V	18	9	8	<1	5
E.2. Local leadership more effective			V	M	H	L	H	H
E.3. Local water management institutions strongly trusted			V	M	H	L	H	H

Note: Sec. = secondary data; Q-s = questionnaire survey; RRA = rapid rural appraisal

H= high; M = medium; L = low

W.S.= West Sumatera; W.J.= West Java; DIY = Daerah Istimewa Yogyakarta; E.J. = East Java

NTB = Nusa Tenggara Barat (West Nusa Tenggara)

Table 4.2.2 PCM Problem Analysis Workshops – Summary of Core Problems

Area	Government Role and Support, Laws and Regulations	WUA Management, Institutional Aspects	Irrigation O&M, Water Management	Agriculture, Economics, Finance
Sumatera Barat	<ul style="list-style-type: none"> <li>WUA benefits are not understood by farmers.</li> </ul>	<ul style="list-style-type: none"> <li>Farmers have no intention to participate in WUA activities.</li> <li>WUA officials are not active.</li> </ul>	<ul style="list-style-type: none"> <li>Water shortages in downstream areas.</li> <li>Conflicts between different water users (<i>padi</i> farmers, fish farmers, etc).</li> </ul>	<ul style="list-style-type: none"> <li>Small contribution of <i>padi</i> production to farmers' incomes</li> </ul>
Jawa Barat	<ul style="list-style-type: none"> <li>Monitoring and evaluation is poor</li> </ul>	<ul style="list-style-type: none"> <li>WUA officials are inactive and irresponsible, and do not make good contacts with WUA members.</li> <li>WUA members are not aware of their rights and obligations, including the necessity to pay for water service.</li> </ul>	<ul style="list-style-type: none"> <li>Water shortages in downstream areas.</li> </ul>	<ul style="list-style-type: none"> <li>Agriculture is not always profitable.</li> </ul>
Daerah Istimewa Yogyakarta (DIY)	<ul style="list-style-type: none"> <li>Farmers cannot understand Government policies.</li> </ul>	<ul style="list-style-type: none"> <li>Benefits of WUA membership are not clear to farmers.</li> <li><i>Kooperasi Unit Desa (KUD)</i> is not trusted.</li> </ul>	<ul style="list-style-type: none"> <li>Declining community involvement in O&amp;M.</li> <li>Water distribution is not well organized.</li> </ul>	<ul style="list-style-type: none"> <li>Low profits.</li> </ul>
Jawa Timur	<ul style="list-style-type: none"> <li>No assistance to WUAs (extension/guidance)</li> </ul>	<ul style="list-style-type: none"> <li>WUAs lack management skills.</li> <li>Farmers have no sense of belonging to irrigation infrastructures.</li> </ul>	<ul style="list-style-type: none"> <li>Water shortages in downstream areas.</li> </ul>	<ul style="list-style-type: none"> <li>Income from agriculture is less than that from other sectors.</li> </ul>
Nusa Tenggara Barat (NTB)	<ul style="list-style-type: none"> <li>Present policies cannot show good results to farmers.</li> </ul>	<ul style="list-style-type: none"> <li>WUA leaders are inactive.</li> </ul>	<ul style="list-style-type: none"> <li>Irrigation water use is not efficient.</li> </ul>	<ul style="list-style-type: none"> <li>Low income.</li> </ul>
Central	<ul style="list-style-type: none"> <li><b>Socialization of Government WUA policies not yet achieved.</b></li> </ul>	<ul style="list-style-type: none"> <li><b>WUA management is not effective.</b></li> <li><b>Weaknesses in WUA organizational management and human resources.</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Poor allocation and distribution of water.</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Low farming family annual income.</b></li> </ul>

Source: JICA WUA study team

Table 4.3.1 M&E WUA Evaluation Scoring Method –Post Turnover  
Adapted from IDTO – M&E Adoption

Aspect	Item	Indicator	Scoring			
			Score	Max. weight	Total weight	
Aspect of authority in taking decision	WUA can decide profitable crops	Cropping pattern and cropping calendar are agreed by members	5	5	15	
		Cropping pattern and cropping calendar have not been agreed by members	2			
		Cropping pattern and cropping calendar are not planned	0			
	WUA can prepare a plan of water distribution	Agreement amongst members of water distribution plan for the first cropping season	1	5		
		Agreement amongst members of water distribution plan for the second cropping season	2			
		Agreement amongst members of water distribution plan for the third cropping season	2			
	WUA can decide policy of water management to sustain irrigation system	Guideline of water management (including sanctions) exist and implemented	5	5		
		Guideline of water management (including sanctions) exist but not implemented	2			
		Guideline of water management (including sanctions) does not exist	0			
Aspect of capability to manage irrigation system	WUA can activate members in the organization	Official meeting every cropping season	2	5	30	
		Planetary meeting annually	3			
		No meeting	0			
	WUA can improve its performance of irrigation management	Equality of distribution and allocation of water	3	5		
		Uniformity of cropping calendar	2			
		No equality of water allocation and no uniformity of cropping calendar	0			
	WUA can activate members in stages of maintenance works and development of irrigation system	Meeting amongst members for planning and evaluation	4	15		
		Actual implementation of work program of maintenance and development using 'gotong royong' system	3			
		Actual implementation of work program of maintenance and development using 'fee collection' system	3			
		Time allocated to 'gotong royong' is equivalent to the true & real time (man-days) to complete the maintenance work plan, i.e. sediment removal, grass cutting, canal repair, painting etc.	5			
	WUA can encourage members to be responsible for sustainability of irrigation system	Members are willing to follow the rule of utilization of irrigation water	5	5		
		Members break the rule and sanctions applied	3			
		Members break the rule but sanctions are not applied	0			
	Aspect of satisfactory And prosperity of members	WUA can provide guarantee of water right for members	Guarantee correct equity of water allocation, i.e. time, area, quantity and equality for each member	5	5	5
			Less guarantee of water allocation for each members	2		
No guarantee of water allocation for each member			0			
Aspect of autonomous and self help	WUA can develop organisation with regard to laws and regulations	Set up AD/ART, with respect to village regulation, traditional concepts and member requirements	5	5	25	
		As above - setting up to be completed	2			
		As above - setting up not yet commenced	1			
		WUA has made application for legal registration of WUA Committee & Accepted form of AD / ART	5			
		Not yet applied for legal registration	2			
	WUA can activate members to be financially self help	Collected fee > 60% NBB	10	10		
		Collected fee = 30% - 59% NBB	4			
		Collected fee < 30% NBB	0			
	WUA can minimize dependency from other parties in irrigation management	Actual subsidy < 30% NBB	5	5		
Actual subsidy = 30% - 49% NBB		2				
Actual subsidy > 50% NBB		0				
Aspect of equality with other institutions	Representation of WUA in Irrigation Committee	Representative of WUA is at the level of Irrigation Committee	5	5	5	

**Ranking formula a total score of a turned over irrigation will represent it's progress**

Total score (N) max. 80	Turned over irrigation progress rank
55>N< 80	Developed and becoming Self Sustaining
30>N< 54	In the process of becoming Developed
N< 29	Not Developed – Requires continued & intensive guidance

Table 4.3.2 Evaluation of the WUA Request for Technical/Administrative Guidance, and Evaluation of the Response from Government/ Kabupaten WUA Support Group

Item	Indicator	Response
Cropping Pattern and Cropping Calendar	WUA requested assistance and guidance from Government / Kabupaten WUA Support Group (PPL & Juru Pengairan) to plan the cropping pattern and calendar	Yes / No
	IF THE RESPONSE IS NO, THEN WHY NOT? A: WUA did not require assistance as the data on crops & water availability for the seasons is a known factor. B: PPL & Juru Pengairan had already advised on such items as crops and expected water availability. C: WUA did not know who or how to request assistance	A / B / C
	Government / Kabupaten WUA Support Group assisted with the planning and guided the WUA members in agreeing to the cropping pattern and calendar	Yes / No
	IF THE RESPONSE IS NO, THEN WHY NOT? A: There are insufficient staff to assist WUA B: There is insufficient funding for field activities C: There is no willingness from Government to assist WUA	A / B / C
Water Distribution Plan for three cropping seasons	WUA requested assistance and guidance from Government / Kabupaten WUA Support Group (PPL & Juru Pengairan) to plan the seasonal distribution of water throughout the irrigation system and WUA area	Yes / No
	IF THE RESPONSE IS NO, THEN WHY NOT? A: WUA did not require assistance as the data on water availability for the seasons is a known factor. B: PPL & Juru Pengairan had already advised on such items as crops and expected water availability. C: WUA did not know who or how to request assistance	A / B / C
	Government / Kabupaten WUA Support Group assisted with the planning and guided the WUA members in establishing the water distribution plan	Yes / No
	IF THE RESPONSE IS NO, THEN WHY NOT? A: There are insufficient staff to assist WUA B: There is insufficient funding for field activities C: There is no willingness from Government to assist WUA	A / B / C
Maintenance Works &/or Rehabilitation Work Plan – WUA inputs (monetary &/or land) plus Government assistance request	WUA requested assistance and guidance from Government / Kabupaten WUA Support Group (PPL & Juru Pengairan) to partake in the proposed seasonal “WALK THROUGH” of the irrigation system and designate and plan areas in need of maintenance or rehabilitation	Yes / No
	IF THE RESPONSE IS NO, THEN WHY NOT? A: WUA did not require assistance as they have the capability to conduct the “WALK THROUGH”. B: The Juru Pengairan had already conducted a walk through and advised the WUA accordingly and this was additional to the WUA “WALK THROUGH”. C: WUA did not know who or how to request assistance	A / B / C
	Government / Kabupaten WUA Support Group conducted the “WALK THROUGH” jointly with the WUA	Yes / No
	IF THE RESPONSE IS NO, THEN WHY NOT? A: There are insufficient staff to assist WUA B: There is insufficient funding for field activities C: There is no willingness from Government to assist WUA	A / B / C
Establishment of AD/ART guidelines, inputs etc. Application for registration as a legal entity – legalized WUA	WUA requested assistance and guidance from Government / Kabupaten WUA Support Group (Pemda / WUA Administration Specialist) to assist and guide the WUA & members in the preparation and details of the AD / ART guidelines that are agreed by the members and take into consideration traditional, cultural, social & ethnic factors.	Yes / No
	WUA requested assistance from Government / Kabupaten WUA Support Group (Pemda / WUA Administration Specialist) to assist and guide the WUA in the matter of application for recognition as a legal entity (legalized WUA)	Yes / No
	IF THE RESPONSE IS NO, THEN WHY NOT? A: WUA did not require assistance as they have the capability and understanding to draft suitable AD / ART B: The methodology of AD / ART and application of legal status had already been explained during the formation of the WUA and subsequent follow-up C: WUA do not require an AD / ART or do not want to become a legal entity / company D: WUA did not know who or how to request assistance	A / B C / D
	Government / Kabupaten WUA Support Group responded to the WUA request and assisted through the Pemda / WUA Administration Specialist	Yes / No
	IF THE RESPONSE IS NO, THEN WHY NOT? A: There are insufficient staff or no qualified staff to assist WUA on this matter B: There is insufficient funding for field activities C: There is no willingness from Government to assist WUA	A / B / C



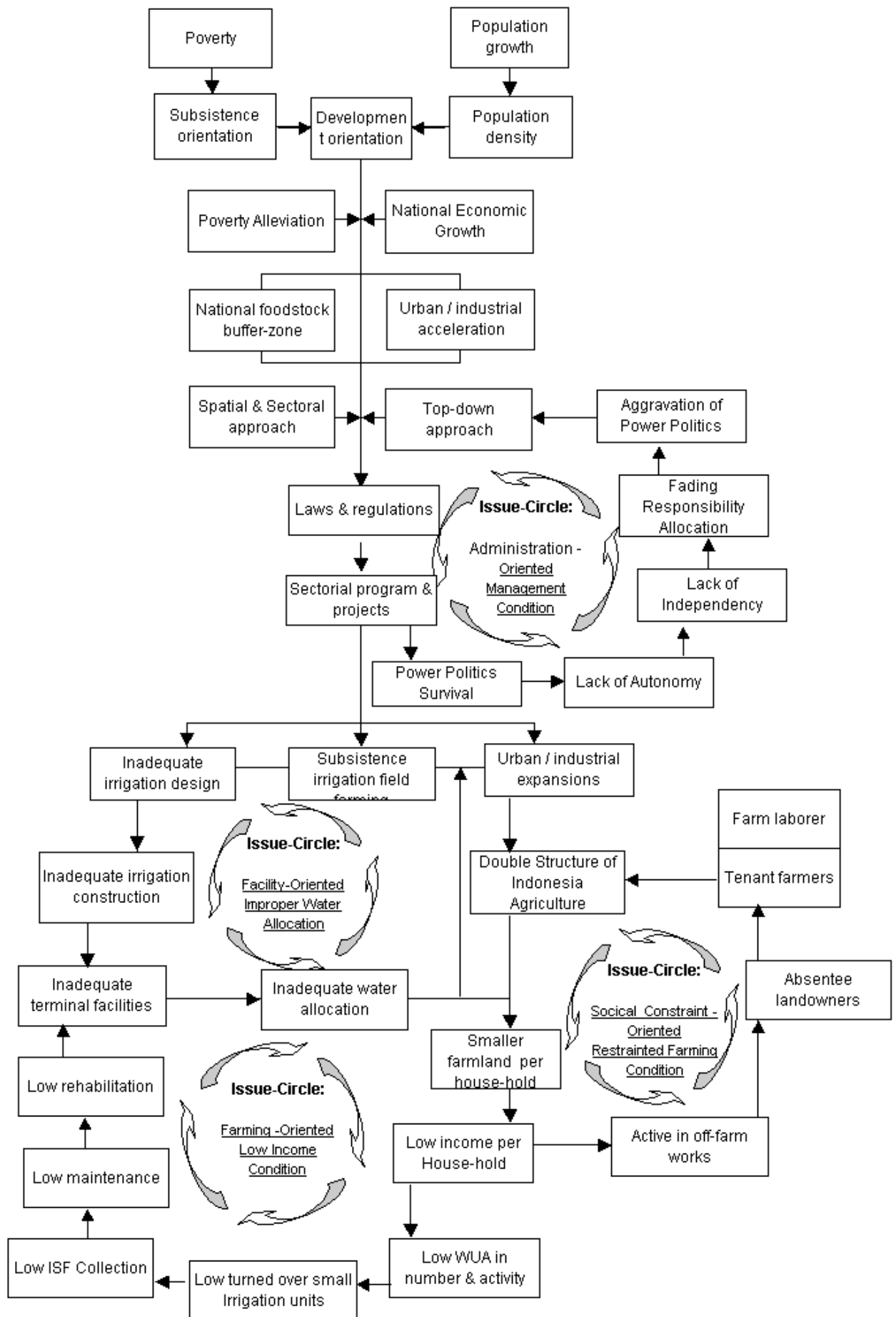


Fig.4.1.1 Hypothetical Issue Domain Analysis of Intricate Problems of Irrigated Agriculture

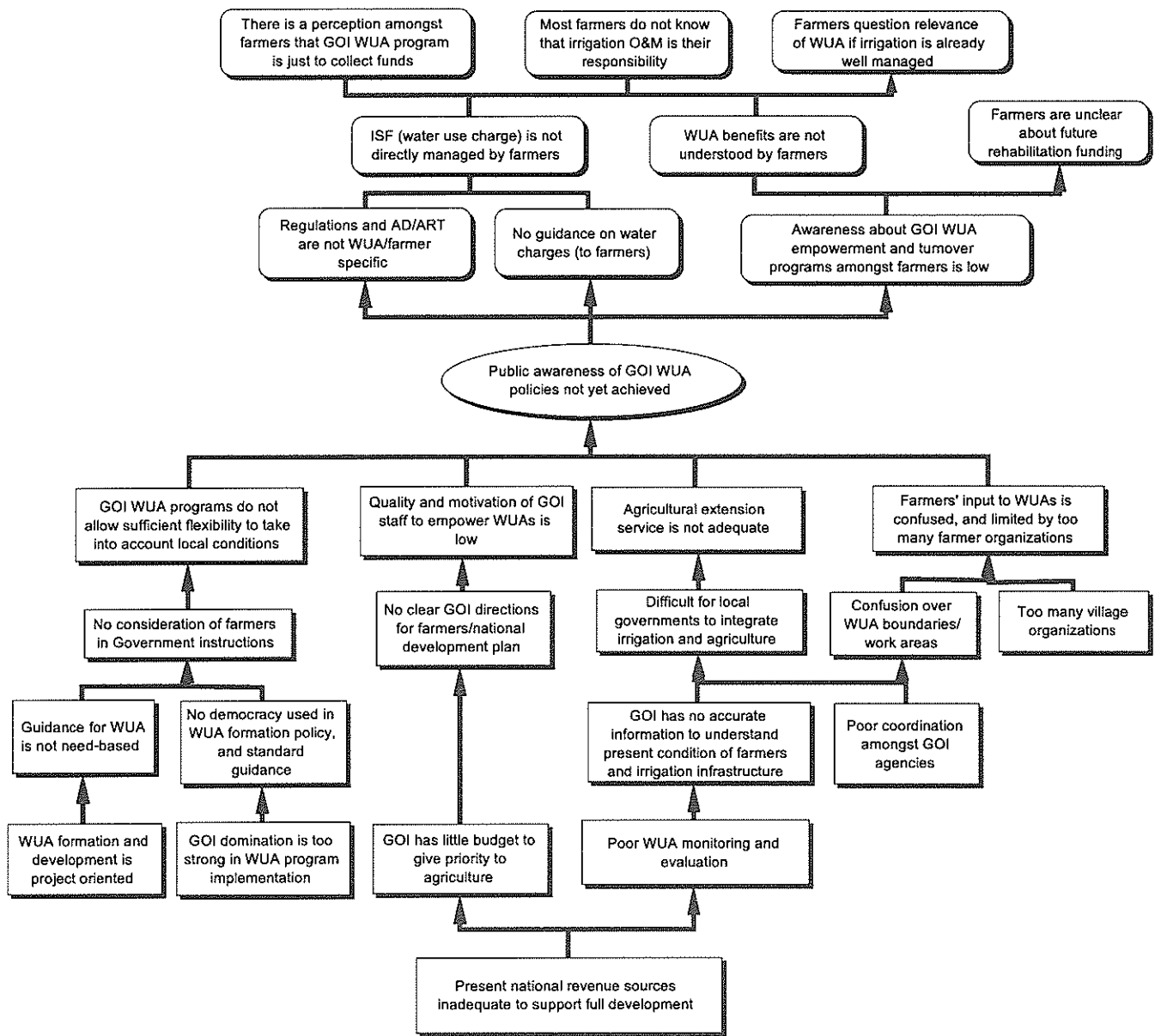


Fig. 4.2.1 Problem Tree (1/4: Government Role, Laws and Regulations)

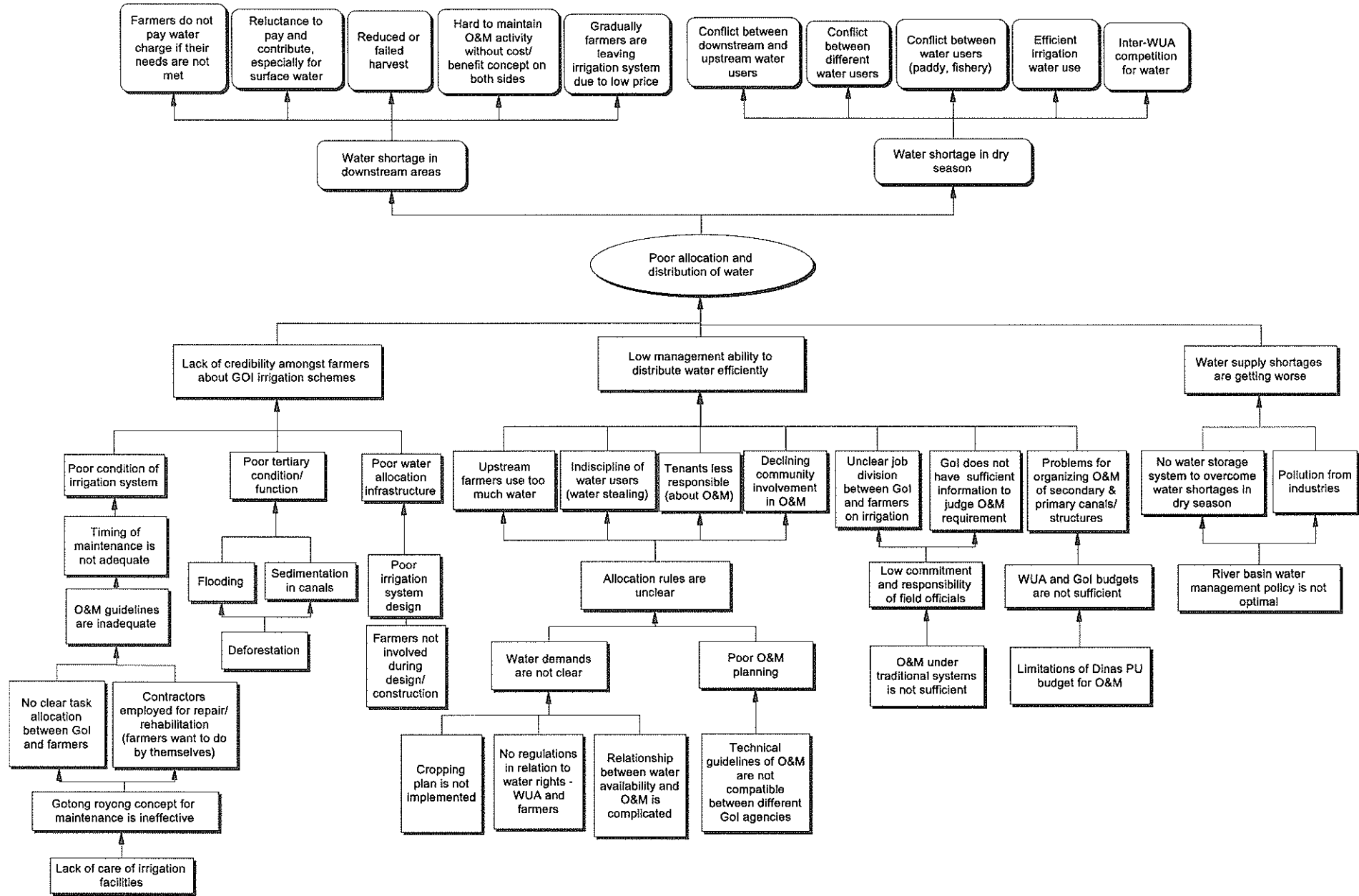


Fig. 4.2.1 Problem Tree (2/4: WUA Management and Institutional Aspect)

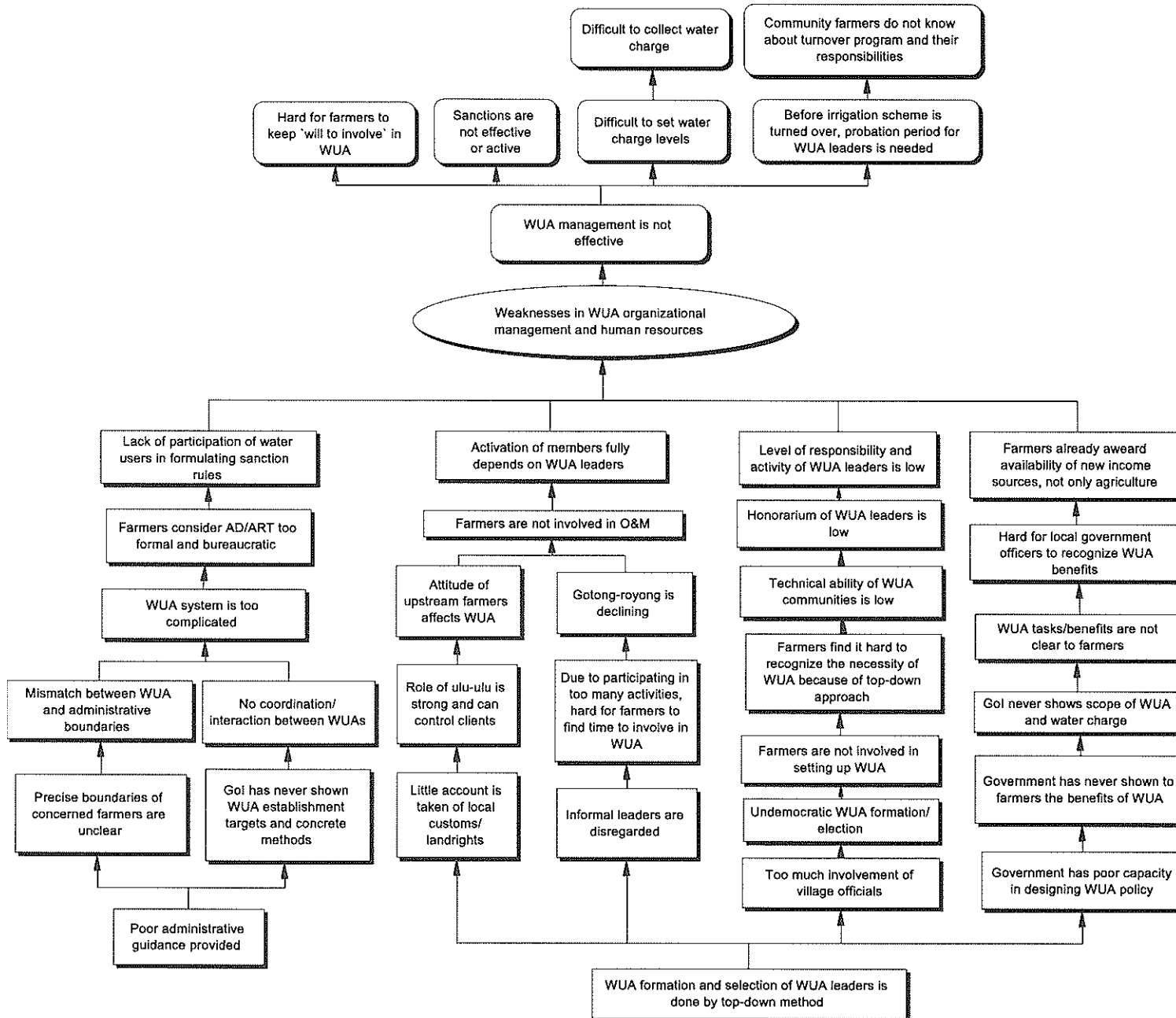


Fig.4.2.1 Problem Tree (3/4: Irrigation O&M and Water Management)

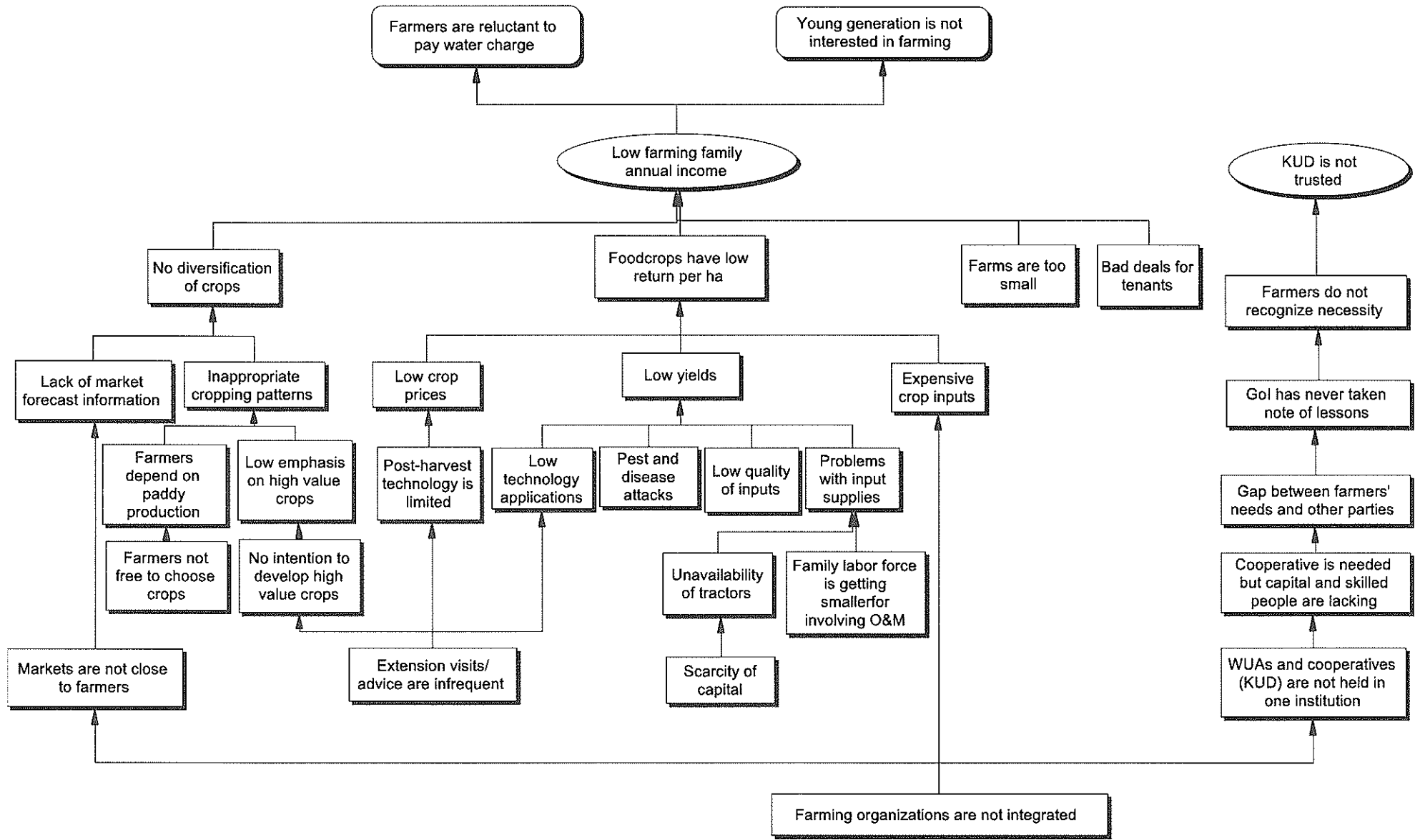


Fig. 4.2.1 Problem Tree (4/4: Agriculture, Economic and Finance)

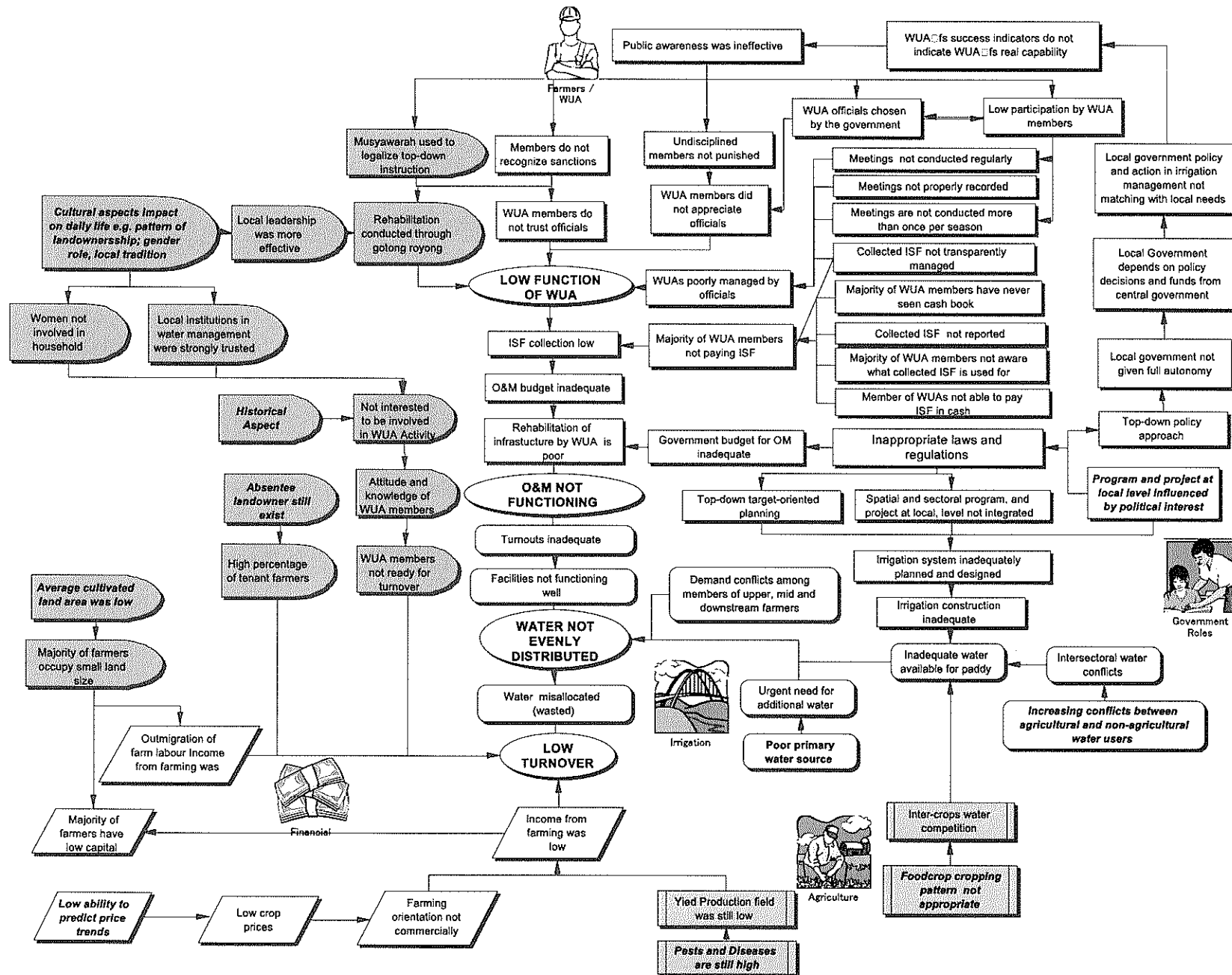


Fig. 4.2.2 Comprehensive Problem Tree Analysis