

**Participatory Training of Water Users' Associations**  
*A Tool for Irrigation Management Transfer*

A Case Study from Indonesia

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**SUMMARY**

THIS PAPER PRESENTS a case study from Indonesia on participatory training of Water Users' Associations (WUAs) developed under the On-Farm Water Management Project with FAO Technical Assistance. Based on experiences over a ten-year period from 1983 to 1994, the project developed an innovative methodology to introduce on-farm water management improvements for increased and intensified crop production and for farmers' self-reliance in the operation and maintenance of the farm irrigation system. The methodology and approach of the participatory farmer training are based on the principles of Participatory Rural Appraisal (PRA). In a range of training sessions phased over a 2 year period, farmers identify the potential for water management improvements and initiate simple and practical improvements of the farm irrigation system through the WUA. Benefits of improved water management are ensured by intensifying and diversifying agricultural production, while a sustained support over an extended period develops the necessary skills in the community to effectively assume responsibilities for operation and maintenance of the farm irrigation system. Technical staff and extension workers carry out the farmer training and provide technical advice to the farmers; special staff training programs for each staff category were developed and designed for that purpose. The training of farmers was introduced and tested in 7 provinces in Indonesia and is initiated in several regional irrigation development programs. The training curricula for both farmers and agricultural staff have been extensively tested and afterwards implemented in 7 provinces: 670 WUA's covering 40.000 ha received training. About 160,000 farmers were involved. Costs including staff training and incentives for on-farm improvements amount to US\$50 per ha, with benefits in agricultural production increase in the order of 20-30 percent.

**BACKGROUND**

The period of 1965-90 was characterized in Indonesia by a rapid development of irrigation infrastructure and the area covered with fully controlled irrigation increased from 1.8 million ha in 1965 to 4.5 million ha in 1990. Together with the irrigation system improvements, intensified agricultural practices and introduction of HYV, the country achieved self-sufficiency in rice in 1984. The expansion of the irrigated area in Indonesia has presently reached its limits, and land and water resources are becoming increasingly scarce and costly to develop. Each year, progressive urban and industrial expansions are taking substantial areas of good irrigated land out of production. This tends to be especially the case in Java which shows for the first time a yearly decrease in irrigated area now. If self-sufficiency of rice is to be maintained an additional area of 1.6 million ha need to be developed for irrigation under present levels of water use by the year 2020 (Smith 1993).

Irrigation is almost exclusively directed towards the production of wetland rice, which, particularly in the dry season, requires substantial amounts of water. Although irrigation of upland and horticultural crops provides an attractive alternative in terms of water saving, farmers are less familiar with nonrice crops under irrigation and production remains risky with low yield levels. An important part of future crop production requirements has to be covered by improving water use efficiency and productivity of existing irrigated agriculture. To achieve improved water management and increased agricultural production cooperation between the farmers is essential. The formation of Water Users' Associations (WUAs) has proved to be an effective tool to realize this cooperation among farmers. If farmers are motivated and receive the necessary support, WUAs can achieve higher water use efficiency and ensure maintenance of the irrigation system resulting in higher production levels (Smith 1993).

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The main interest in the promotion of WUAs has been the policy to transfer part of the responsibilities for operation and maintenance of the irrigation system back to the farmers in order to disengage a growing public sector from a vicious circle of rehabilitations and inadequate management of the irrigation system. Over the past decade, a range of programs has been designed with various approaches and concepts and much effort has been put in promoting the establishment of WUAs. In Indonesia, the government has promoted the establishment of WUAs by a special presidential decree in 1984, making the formation of WUAs compulsory and devolving responsibility for water management, maintenance and development of the system at tertiary level.

The establishment of WUAs proves, however, a much more difficult task than the description of successful case studies in various development reports may suggest. In many locations, WUAs have not been established yet and where established they continue to be inactive. WUAs tend to become appendages of the state or paper organizations, rather than autonomous bodies with real decision-making power (Ambler 1993). In many WUA programs carried out, the main emphasis has been on general institutional and management aspects; little attention has been paid to the technical aspects and the introduction of appropriate water management techniques as part of the effort to transfer responsibilities to the farmer-controlled irrigation system (Smith [1994]).

To improve water management at farm level and to strengthen the WUA, the FAO has provided technical assistance to the Indonesian Government for over 10 years. Working closely with the Directorate of Land Rehabilitation and Development (DLRD) of the Directorate General of Food Crops and the Agency for Agricultural Education and Training (AAET), both in the Ministry of Agriculture, the project successfully developed a methodology to improve on-farm water management through a direct support to the WUA.

Initiated in 1983, the project has in different phases and through an evolutionary process of testing various approaches and concepts, introduced a participatory training for WUAs as a key element for the development of sustainable associations. In an integrated approach, improvements of on-farm water management and strengthening of the WUAs are defined and initiated during the farmers training. In a range of training sessions with farmers, phased over [a total period of] two years, continued support is given to the WUA in which improved agricultural practices and an intensification of production are achieved. The methodology achieves the development of self-reliant and confident WUAs, which form[s] the basis for the transfer of responsibility for irrigation management to the farmers.

Implementation of the training of farmers and technical guidance and support to them are provided by extension workers, subject matter specialists and water management officers, each one with a well-defined task and role in the farmer training. To adequately prepare the staff for its new tasks, separate training programs were designed for each staff category and these programs which have proved in many ways the key to success and a condition for replicability on a national scale.

The project developed and introduced several concepts and methodologies with respect to staff training, diagnostic analysis of technical and agricultural conditions, on-farm water management improvements and crop diversification, each of them constituting important components of the project's achievements. This paper highlights the aspect of the participatory training of water users associations which formed a key element of the program.

## **METHODOLOGY AND APPROACH**

The evolutionary process in the project proved important to identify the elements of success and failures. A concept introduced already in the first phase was the diagnostic analysis of the farm irrigation system to evaluate the system in its various technical, agricultural and organizational aspects. This analysis, carried out by the water management officers, formed the basis of a technical improvement plan, implemented with farmers' assistance. Although technically very well acceptable, it does not necessarily correspond with the farmers interests and most importantly it does not raise the sense of responsibility with the farmer to undertake further initiatives. As shown in the evaluation studies carried out over the results of the first phase of the OFWM project in Indonesia, the approach did not result in viable WUAs or lasting on-farm water management improvements.

This corresponds with findings elsewhere where the conventional concept that ideas and solutions proposed by the technicians will be appreciated and properly used by the farmers, proved wrong. In the top-down transfer of technology, priorities are determined by scientists and technicians, who generate technologies to be transferred through extension services to the farmers (Chambers 1989).

In the 1980s, the concept of the farming system research (FSR) was developed. The FSR clearly pictured a resource-poor farmer in his physical, socioeconomic and political environment, facing a great deal of constraints, with small margins of profitability and high risks for crop failure and famine, considerably limiting his flexibility and willingness to adopt unknown technologies. The resulting farmer rationale is completely adapted and fits his environment (Geijer and Rodríguez 1989). Farmers have been increasingly recognized as being themselves innovators and experimenters, and they have been found rational and right in behavior which at first seemed irrational and wrong to outside professional observers (Mascarenhas 1991).

Based on the idea of the FSR movement, a lot of new farmer-first approaches have emerged, all of them being complementary to conventional research. One of them, Participatory Rural Appraisal (PRA), developed a range of techniques to involve farmers directly in the development process, making use of his considerable knowledge of his own environment and stimulating his inventiveness to find his own solutions. A large number of methods were developed most of which constitute plain common sense (Mascarenhas 1991). Outspoken exponents of the FSR school like Chambers, Conway and Scheuermeier used to refer to the farmer-first approaches as the science of common sense. Where farmers have low expectations from the government, do not identify with its interventions and have lost interest in government assistance, farmer-first strategies should be applied. The farming communities should regain self-confidence, should establish a new relationship with the government authorities based on mutual understanding and, above all, they should be regarded and treated as responsible persons qualified for taking appropriate decisions.

Although the methodology applied in the developed participatory farmer training in Indonesia did not emerge directly from an FSR approach, its concepts and philosophy, as applied already in the diagnostic analysis, are similar. The breakthrough came when the role of technical innovator was transferred from the technician to the farmer. In this it comes close to PRA, in the sense that farmers carry out an appraisal of their own irrigation system as part of the agricultural production system and identify their capacities to improve this with technical support from the competent technical agencies.

The concept of the participatory appraisal was first tested in a range of pilot projects where various methodologies and techniques were developed. Based on these experiences a full-scale training program was defined and initiated in 1993, including a full training program for agricultural staff in charge of the implementation of the program in 7 provinces.

The main elements of this participatory training program for WUA were :

- \* Selection of representative key farmers for participation in the training and through group activities and block tasks involvement of all farmers of the Water Users' Association.
- \* Identification of problems in water management by farmers in their own fields.
- \* Self-reliance of farmers in finding solutions and formulating their own improvement plans and a commitment to implement these plans.
- \* Competent and practical advice and sustained support from technical staff.
- \* Phased training sessions to be implemented on predetermined periods at critical farming periods and maintained over an extended duration of two years to ensure sustainability of improvements.
- \* Detailed procedures and guidelines for conducting of each farmers training session with specific themes relating to operation and maintenance of the farm-irrigation system, organization of the WUA , the cropping plan and cultural practices for irrigated crops.

To ensure better communication with the farmers over a sustained period and also to integrate water management with improved agricultural practices, the water management officer works closely together with the field extension worker and subject matter specialist of the Agricultural Extension Service each one with a specific task and role in the training. The extension official who is well familiar with the local conditions and has been trained in farmers' communication techniques, plays a key role in the training of farmers. The subject matter specialist and water management officer are assigned to provide technical advice in their specific field of technical competence. Training was essential not only to increase technical knowledge but, in particular, also to improve conventional training habits.

## **PARTICIPATORY TRAINING OF FARMERS**

### **Selection of Farmers**

The effective number to participate actively in participatory training sessions should not exceed 30. An average WUA covers approximately 40-100 ha with 200 to 300 farmers. The large number of farmers makes it impossible to effectively train each individual. For that reason, a selection of 24 key farmers was made to participate in the actual training, ensuring through the involvement of all other farmers through groups activities, block tasks and separate WUA meetings.

The selection of farmers to participate in the training is crucial as it forms the basis for the functioning of the WUA. It is done in consultation with the village authorities and the field extension worker. To ensure a representative selection of WUA members participating in the training, criteria for selection were established :

- \* Equal representation of 4-6 farmers from each block in the irrigation command area.
- \* Participation of local officials, such as former water masters.
- \* Respected and trusted farmers with a certain level of knowledge.
- \* Progressive farmers responsive to new ideas.
- \* Literacy of at least 50 percent of the farmers.
- \* Minimum of 1 woman participant per block.

In almost all the villages, these criteria were met, resulting in a group of heterogenous farmers comprising old and young people, and reflecting the social and economic contrast in the village.

### **Block Repartition**

The irrigation command area is divided into blocks of 5 to 20 ha, each one with a common water source and typical position in water distribution. The repartition of the irrigation command area proved to be an important aspect of the training of farmers. In many areas farmers were already familiar with the repartition into blocks, since the blocks are also the basic units of the Agricultural Extension Service and consist of naturally divided parts of the area. Each block has its own typical hydraulic condition and priority position in the water distribution. The blocks represent water-competing units of small groups of farmers, who know each other well and have common interests in water management and form the natural subdivision in a WUA and the basis for its organizational structure.

### **Training Methodology**

Emphasis in the training of farmers and motivation sessions is on a high degree of active participation of the farmers. Special procedures are developed to ensure full participation, based on methodologies of adult education. They include group activities and group discussions, block tasks and block presentations, field practices and field visits. In this way farmers formulate their own improvement plans ensuring their full consent and motivation for the implementation. The training consists of a series of weekly sessions with a specific aim and output. Each session is conducted on a fixed day in the week agreed with the farmers to avoid conflicts with weekly markets or other local activities and covers a morning of 5 hours concluded with a joint meal.

The typical schedule of one training session consists of:

- \* Block presentation (08.00 a.m. to 09.00 a.m.). Farmers from each block present the results of the block tasks given in the previous week and report on discussions and consultation with other block farmers.
- \* Introduction of the subject by the facilitator (09.00 a.m. to 09.30 a.m.). The trainer or facilitator gives a short classroom introduction on the topic of the day and explains the field exercise to be done.
- \* Field exercise (09.30 a.m. to 10.30 a.m.). The participants perform an exercise prepared by the trainers in the field to identify specific field problems and discuss solutions of familiar conditions at the hand .
- \* Presentation of results of the exercise (10.30 a.m. to 11.00 a.m.). Presentation and discussions of results by farmers and trainers. Introduction of a new topic and information on new technologies as introduction to the subsequent group activity.
- \* Groups activity (11.00 a.m. to 12.00 noon). In order to promote formation of groups and joint activities in water management, the farmers of each block carry out a specific task related to the conditions and problems in their block.

\* Block task (12.00 a.m. to 12.30 p.m.). The facilitator explains the block tasks, which are carried out by the participants together with the other block farmers during the week, and which are presented in the following training session.

### **Trainers and Facilitators**

In the participatory training concept, the role of the trainer is restricted to that of a facilitator. The facilitators take care of the overall organization, assist farmers in the presentation, promote the activities of the groups and explain various technical concepts and solutions in short exposes. The attitude of many technicians who to provide long technical monologues, incomprehensible to the average farmer proved a bottleneck.

The implementation of the training was carried out by a team of 4 agricultural officers, consisting of the water management officer and subject matter specialist at district level, the agricultural officer at sub-district level and the field extension worker at village level. The district officers provided the technical inputs in water management and agriculture. The sub-district officer facilitated local communications and the integration in local development programs. A main task was entrusted to the village extension officer, who knows the local conditions and farmers well and is trained in communication techniques. He takes care of local arrangements and follows up in the villages. He motivates and assists the farmers in performing the tasks given to them, and provide the farmers with information on new technologies and practices. Technical guidance and supervision are provided by the two district officers.

Each member of the team of trainers has participated in separate training courses, initiated for the water management officers already in the first phase of the project. In the second phase a range of training courses was designed and implemented for each staff category. The training programs included sessions to improve the technical knowledge and sessions on the methodology and curricula of the training of participatory farmers. Field visits and practical work formed a major part of the courses.

### **Training Program**

The training program of the participatory farmers consists of a series of 12 training sessions, subdivided in 5 courses, each with a specific objective and spread over a period of two years. A continuous training is considered not suitable for most of the farmers, in view of their other activities and a more effective absorption and digestion of the subjects discussed. The five courses are held therefore on a weekly basis. During the week, the farmers have to carry out certain tasks. The courses are organized in the slack periods between the cropping seasons and are strongly linked with the cultural calendar.

### **TRAINING OF FARMERS 1 (Water Management Plan)**

A first 5-week training course is held in July/August, in the dry season. In this course, the concepts and benefits of improved water management are explained to the farmers a water management improvement plan is developed and a first WUA organization is initiated for its implementation over a 2-3 month period immediately after the training course. Improvement works include the repair and rehabilitation of the farm irrigation system including the construction of small regulating structures and canal lining, for which a nominal contribution in kind is provided by the project. All labor and part of the materials (sand, gravel) must be provided by the farmers in kind or in cash.

The 5-week course consists of the following elements :

#### **Week 1: Introduction and Mapping**

The farmers prepare detailed maps of the blocks. Fields, roads, canals, and structures are indicated. The map is completed with names, ownership, flow directions of water; sub-divisions are indicated and highlighted by coloring. The map is discussed and finalized during the consultation with the other farmers.

#### **Week 2: Problem Identification**

In the field exercise typical problems in water management are demonstrated and recognized (ballot box exercise). Farmers walk along a marked trail in one of the blocks. About 20 locations are staked-out and the farmers have to answer a multiple choice question. The questions cover a wide range of subjects related to irrigated farming. Farmers are confronted with problems of flooding, collapsing bunds, drought areas, crop diversification, agricultural practices, erosion, activities of the WUA, etc. In the classroom, the questions are discussed with trainers and the farmers. As a follow-up group activity, farmers are asked to list the most important problems of their respective blocks.

### Week 3: Solution Finding

This exercise is again a staked-out tour in one of the blocks. At the indicated locations, farmers are shown a problem and a solution is found, groups-wise. Back in the classroom, results are discussed and farmers will start finding solutions to the problems in their respective blocks. After consultation with the other farmers, the farmer representatives make detailed action plans for infrastructural improvements, agricultural production and the WUA.

### Week 4: Water Management Action (WMA) Plan

In the WMA plan, farmers work out details of how identified solutions can be realized, estimating type and amounts of the various materials needed and the labor required. A budget is prepared and an assessment made of funds required, own contributions of labor and/or materials. A list of priorities is made and approved. A decision on how to use the grant provided by the project is made.

### Week 5: Water Users' Association (WUA) Plan.

The need for a WUA to implement the WMA plan is discussed. Organizational requirements for the implementation of the works is discussed, including the collection of contributions. Functions are determined and volunteers elected. A work plan and general rules and regulations are formulated and accepted. With the adoption of the WMA and WUA action plans in the presence of village officials, the first training course is concluded.

## **TRAINING OF FARMERS 2 (Agricultural Development Plan)**

A second training course is held in October. In this three weeks' course the impact of the first training and the improvements carried out are evaluated and an assessment made of the functioning of the WUA. The main objective of this course is to improve agricultural production through the realized improved water management system. Emphasis is on the formulation of an improved cropping plan and agreement on water distribution for the critical land preparation period in the first rice-planting season, coinciding with the start of the rainy season.

### Week 1: Evaluation of WMA and WUA Plans

Farmers evaluate the implementation of the action plans. A field exercise is made where the completed works are reviewed and evaluated, and the remaining problems and solutions identified. Experiences with the functioning of the WUA are evaluated and the cooperation of other farmers in the WUA are assessed. In group activities and block tasks, modifications and adjustments are proposed to the WMA and WUA plans.

### Week 2: Cropping Pattern

In a field exercise, the dates of planting and harvesting of the various crops are determined and are set out in a cropping calendar, followed by a discussion in the classroom concerning the cropping pattern in the various seasons and the start of nursery and land preparations for the coming wet season. The water allocation to the respective blocks will be of primary importance and priorities are listed and the farmers decide which blocks gets water first. A tentative cropping pattern and an agricultural production plan are made for each block.

### Week 3: Agricultural Development Plan

Constraints in agricultural production are discussed in the field, using the 'ballot box' exercise. [ Listing and prioritization of the main agricultural constraints.] Solutions and improved agricultural practices are discussed in the classroom, including the requirements of various inputs (seeds, fertilizers). In the block tasks, each group proposes an Agricultural Development Plan (ADP) and determines cooperation in the provision of inputs.

## **TRAINING OF FARMERS 3, 4 and 5 (Evaluation and Adjustment)**

After the conclusion of each growing season, in February (Training of Farmers 3) at the conclusion of the rainy season, in June (Training of Farmers 4) at the conclusion of the first dry season and in September (Training of Farmers 5) at the conclusion of the second dry season, actions taken so far are recalled and new actions formulated. Results of the Agricultural Development Plans are evaluated, as well as the results of agreed water distribution and planting times.

Functioning of the WUA is assessed and further adjustments are made. The WMA plan is evaluated and, if necessary, further improvements are implemented. Cropping pattern and cultural plan for the new season are determined. For the dry season, special sessions are included for the irrigation of upland crops.

## **RESULTS**

After the completion of the pilot projects for farmer training in April 1993, the actual training started in June/July in 7 provinces at a total of 130 locations.

### **Attendance**

Usually, 20-24 farmers attended the meeting of which 4-6 are women. For the opening and closing ceremonies, the village head and a high ranked provincial government officer were present. Close supervision and monitoring were given by the project staff in each province to evaluate in the field the results and to make further adjustments in the program and materials. Farmers showed considerable interest and showed increasing enthusiasm and dedication in the fulfillment of the tasks. The attendance of government officials demonstrated the support and interest given in the course and was much appreciated by the farmers.

### **Selection of Participants**

In general, in the selection of farmers, criteria provided were followed and in particular the block repartition was well followed. The selection of farmers reflected, often, the social and political conditions in the village. The selection of women participants was not always taken seriously, but if included they contributed importantly to the success of the course and their participation was very much appreciated as their responsibilities for the family and the household finances proved very useful for the WUA. [The illiteracy among the farmers was approximately 50 percent, coinciding with the command of the national language.] Use of the local language facilitated largely the sessions.

### **Performance Trainers**

The performance of the trainers was generally satisfactory although a number of improvements are needed. All trainers were prepared for their tasks at special seminars and workshops. However, not every technician proved a good trainer. As mentioned, the concept of facilitator is not often understood and technicians tend to give technical lectures.

### **Water Management Improvements**

The direct training results were many. In most locations, detailed and clear block maps were established in a communal group effort. Usually, farmers are not familiar with map reading at all, no maps are available. The maps were used throughout the course and proved to be very important.

The problem-solving cycle approach resulted in a priority listing of problems and proposed solutions. A budget was prepared, indicating to what extent the farmers will contribute and where the construction grant would be allocated. During the course, farmers started to implement the water management action plan by starting communal canal maintenance. Concerning the organization of the WUA, farmers formulated rules and regulations, appointed the board [and decided on the first meeting to come.]

In the second series of training sessions, farmers did prepare an agricultural development plan for the coming seasons: they decided on a cropping pattern, a water distribution plan, and on the purchase of agricultural inputs.

### **Water Users' Associations**

The time was insufficient to give a definite answer on the question to what extent the WUA proved sustainable. It is clear that several factors including local leadership and support from the local administration play a role.

It was encouraging that the farmers were enthusiastic and really enjoyed the training. They clearly showed they grasped the idea of the training. They mastered the skills and attributes needed for the management of their own blocks. They showed by their contributions in kind that they were serious about the training. The continued high turnout of training attendance and motivated input during the sessions after the initial 5-week training proved their continued interest. The fact that the construction grant for infrastructural improvements was made part of the training, gave the farmers already certain responsibilities. The training apparently addressed the needs of the farmers and their organizations. In some locations a spin-off of WUA activities occurred. In central Java, a number of WUAs organized

visits to other project areas for exchange of experience (Porton 1994). Above all, the most encouraging result of all is that the Government of Indonesia has decided to continue the nation-wide training programs at its own expense after March 1993.

### **Concluding Remarks**

Most of the registered WUAs are inactive and do not exercise any real responsibilities for operation or maintenance. In the participatory training course, the existing knowledge of farmers is used to show them the potential of on-farm water management improvements and the benefits of cooperation within a well-functioning WUA. The training is carried out in their own command area where farmers deal with and recognize their own problems.

The participatory approach followed resulted in an enthusiastic and motivated participation of the farmers. Farmers appeared to be very well able to acquire all the skills and knowledge necessary to take over the management of their schemes. They produced detailed maps, budgets for operation and maintenance, understood very well the concepts of water management and produced diagrams with the planned cropping pattern. Due to the participatory approach, farmers were willing to cooperate and felt they were approached in a respectful way.

Although the results have not been conclusive, in particular in respect of the sustainability of the WUA, the preliminary results of the training have been promising and encouraging. The methodology and approach proved to be appropriate for the situation encountered in most of the WUAs. The training schedule enabled the farmers enough time to feed back the experiences of the training to the other farmers, allowing adjustment of the results of the group activities in the training sessions. The training subjects answered to the needs of the farmers.

Training of WUAs is only useful if farmers are offered the perspective of a sustained participation in irrigation management. The developed participatory farmer training proved to be able to overcome the fatalistic attitude of many farmers who lost a certain hope for substantial improvement of their situation. In the case of transfer of irrigation management a participatory approach is an essential tool to enable the WUAs to take up their share of the responsibility.

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