



## WATER, ENVIRONMENT AND MANAGEMENT

### Intervention in farmers' irrigation systems

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#### INTRODUCTION

This paper is based on the author's experience of the upgrading of farmer-managed irrigation systems (FMIS) in mountain areas of Nepal and the Philippines. Reference is also made to other projects and research dealing with FMIS in these countries.

The procedures adopted for undertaking the improvement of FMIS on the European Community funded Central Cordillera Agricultural Programme (CECAP) in Luzon in the Philippines are described. Drawing on this experience and similar activities in Nepal, recommendations are made for principles and procedures to be adopted for the improvement and sustainability of small FMIS in mountain areas.

Two main factors appear to be the cause of the low efficiency frequently found in FMIS:

- poor organization of the farmers operating and maintaining the schemes;
- lack of financial and technical resources for carrying out essential improvements.

Where attempts have been made in the past to improve FMIS, these have frequently not produced the expected result of improved performance and higher production. Research into methods of upgrading FMIS has shown that the main cause of failure is the approach - *intervention* in FMIS by Government agencies has often alienated the farmers. The approach must be changed to one of *interaction* - outside agencies supplying the needed financial, technical and organizational resources to a FMIS, must work *with* the farmers. The farmers must retain a sense of ownership and responsibility for their system, and therefore must take part in decision making with regard to where improvements are required and what form they should take. There must also be a substantial contribution from the farmers to the cost of improvement works either in the form of labour, materials and/or cash.

#### THE CENTRAL CORDILLERA AGRICULTURAL PROGRAMME (CECAP)

CECAP has four main components; viz Agriculture, Irrigation, Roads and Community Development. The local communities are stimulated and assisted in preparing requests for assistance from the Programme (each activity being called a "micro-project"). People's participation is essential at all stages of micro-project development, including the initial identification of a problem, preparation of a request for assistance, design of the micro-project, implementation and operation and maintenance.

The most important aspect of the Programme is that requests for assistance must come from the people themselves. In order to generate realistic requests, the Programme placed a team of three to five technicians in each municipality in the CECAP area. The AT selects a base Barangay (smallest administrative unit) where it establishes itself and explains to the community what CECAP is and how it works. The AT also prepares community profiles which indicate the general socio-economic condition of the community and where the greatest need for assistance may lie, and help the AT with planning and budgeting. The AT can then assist the community in developing appropriate requests for assistance. The ATs report to the Project Management Office (PMO) through Zonal offices, each of which supervises four ATs.

#### THE CECAP IRRIGATION COMPONENT

Requests for assistance with the upgrading of existing small irrigation systems are very common and of high priority. Schemes for which help is sought are usually between 10 and 50 ha in command area with canals of 1 to 5 km in length. Existing canals are very rudimentary with no permanent structures, although dry stone walling and hollow tree trunk aqueducts occur in some schemes. Diversions from the small streams and rivers are temporary with stone and brushwood weirs commonly used.

The main items that farmers request help with include a more permanent intake and, if possible, diversion structure, cross-drainage works, slide crossings and canal lining where

seepage loss is serious. In most cases, systems are not irrigating their full potential command area, usually because of excessive water losses along the canal.

Assistance from CECAP is conditional on several key points:

1. Farmers must contribute unskilled labour and/or local materials to an estimated value of about 30% of the civil works cost.
2. Farmers must establish a water users' association to organize construction and operation and maintenance. (In many cases, some form of organization exists and CECAP then helps to strengthen this if necessary.)
3. Farmers must undertake to operate and maintain the canal themselves.

Costs are kept as low as possible, with an upper limit of about Peso 10,000/ha (US\$ 360/ha in 1991). This ensures that real problem areas are identified and work is concentrated on these. By late 1991, the Programme (started in 1989) had assisted, or was assisting, some sixty schemes covering about 1,000 ha, with many more under preparation. Costs were averaging less than US\$ 300/ha and farmer enthusiasm was very clear.

Farmers in the area generally have experience of concrete and masonry, and work in these materials was of a very high standard. Structures were of a small and simple nature and required little technical expertise to design or build.

The Programme area had been rather neglected in the past due to access difficulties and insurgency problems. What Government activities had occurred however, tended to be dole-out programmes and some dependency was developing. This caused some problems initially, but the farmers quickly learned that CECAP was serious and would not undertake a micro-project without the full participation of the beneficiaries. After two years of implementation, requests for assistance were starting to exceed the Programme's capabilities, and even planned funding for the five year programme.

#### CECAP IMPLEMENTATION PROCEDURES

The procedures adopted for the implementation of a micro-project are as follows:

1. A potential irrigation scheme requiring improvement is identified by the community and a petition submitted by the beneficiaries, with the acknowledgement or endorsement of the Barangay Council, through the CECAP Area Team to the PMO.

2. The Irrigation Component carries out a technical validation and survey. The validation team includes one of the Senior Engineers from the PMO, the Zone Engineer, an AT member and the beneficiaries.

3. The design and cost estimate is prepared by the Zone Engineer with assistance and approval from the PMO staff. At the same time, the AT helps the beneficiaries establish a water users' association (WUA) or strengthens the existing one.

4. The design and the contributions of CECAP and the WUA are discussed with the beneficiaries before the proposed micro-project is submitted to the Project Review Committee for approval. (The Review Committee consists of a small group of senior Project staff.)

5. An agreement is drawn up between the WUA and CECAP clearly stating the roles and contributions of each party to the project before construction commences.

6. A technical supervisor is appointed by CECAP to assist the beneficiaries manage the construction. He is mainly responsible for technical advice and quality control. The AT assists with materials procurement and monitors progress.

7. Operation and maintenance (O & M) is carried out by the WUA with the AT monitoring and assisting if required.

#### COMMENTS ON CECAP PROCEDURES

Although the above procedures were established early in the programme, it took some time before they were properly understood and efficiently and effectively implemented. The main points arising during implementation were:

1. Identification caused some difficulties at first. To ensure that a realistic request for help was submitted by the beneficiaries, it was important that an AT member visited a potential micro-project with the beneficiaries to help identify the micro-project and what assistance was needed.

2. Initially, the validation visit was carried out separately from the survey visit. However, it was quickly found that provided the project identification was properly done, combining the survey with the technical validation was more efficient and helped identify the scope of work. At least one of the three Senior Irrigation Engineers on the Programme took part in the validation visits. This was to ensure that an experienced engineer was available to advise the farmers and the designer as to what type of structure

would be appropriate in a particular situation.

3. All the Zone Engineers spent some time in the PMO becoming familiar with the types of structures, materials and designs that were appropriate for the improvement of the small scale farmer-managed mountain irrigation schemes that the Programme was concerned with. It was found that it took some time for engineers who were used to larger irrigation systems to *think small*, and to be able to discuss with farmers what their main problems were and to accept farmer input into the design process. The PMO irrigation staff approved all micro-project designs before they were submitted to the Project Review Committee.

4. An essential step in the process is confirming the proposed design on the ground with the beneficiaries. This ensures that the works that the farmers consider to be of high priority are included, and that the designs are appropriate to the location and are approved by the farmers. The extent of the beneficiaries' contribution is discussed and agreement reached as to how the contribution will be made - whether by voluntary labour (the normal minimum requirement), local materials or portering, or a combination of these.

5. The written agreement between the WUA and CECAP commits both parties to their contribution to the micro-project and confirms that both agree on the works to be done and approve of the project. It is important that all the members of the WUA understand and agree to the works to be done and their contribution. A full meeting of the WUA is required to ensure this.

6. The technical supervisor is usually selected from the community, or a nearby community, and may be nominated by the WUA. The supervisor is paid by CECAP however, and the appointment is the responsibility of CECAP. In nearly all cases, work has been carried out diligently and is of high standard and monitoring has not been difficult.

7. Operation and maintenance of existing systems has always been the farmers' responsibility although some schemes have had local government support, usually in the form of a supply of cement for a particular repair or construction work. Because of the simple nature of the structures, it is expected that the farmers will have no difficulty with routine O & M of the assisted micro-projects. However, at times there will be serious failures due to heavy rain and consequent floods and/or landslides. CECAP is prepared

to return in these cases to again assist the farmers with repairs. When CECAP phases out, responsibility for these small schemes will pass on to the National Irrigation Administration (NIA), although normally NIA does not undertake such small projects.

## RECOMMENDATIONS FOR IMPROVING FMIS

### Institutional Recommendations

Institutional development is the most important activity to be undertaken when improving FMIS. A strong active WUA is a prerequisite for sustained efficient operation and maintenance of an irrigation system. The establishment of a WUA is a time consuming activity which frequently requires the person concerned with helping the WUA to attend meetings at night or during normal rest days and needs dedication. In both the Philippines and Nepal it is now common practice to have a trained institutional organizer appointed to assist the farmers to establish a WUA. The organizer, or better, facilitator, lives in the community in order to understand the local social conditions and can then help develop an appropriate form of WUA. While the farmers must decide themselves what form of organization they want and its rules and regulations, it is usually necessary to introduce ideas for the type of organization that may be suitable and provide examples of typical rules and regulations. One of the best ways of doing this is to take some members of the WUA to another well run system so that they can interact with the farmers operating it and freely discuss the management arrangements.

In setting up or strengthening a WUA, efforts should be made to ensure that the following principles (adapted from Ostrom, 1992) are included in the rules and regulations; these should help ensure long-term sustainability of the WUA:

1. The land included in the command area and who have rights to water from the system must be clearly established.
2. All members of the WUA must contribute to O & M or penalties should be imposed, which could include loss of water rights.
3. The rules and regulations of the WUA must be established by the members and they must be involved in deciding on any changes in the regulations.
4. Sanctions should be included for rule violations and provisions for their implementation agreed.
5. There needs to be a simple procedure for conflict resolution.

The processes of design, construction and O & M should be considered to be highly interdependent, with the WUA, which is responsible for future O & M, having an important role in design and construction decisions. Farmer participation at all stages of project development is thus essential; identification of problems, decision on solutions, approval of designs, participation in construction and responsibility for future O & M. Farmer participation results in lower costs, mobilization of local resources, a sense of ownership and improved ability to manage the system.

### Technical Recommendations

In improving FMIS, it must be remembered that the farmers have a great deal of information both about the system itself, and the local environment. They are familiar with the problems and know the priority areas for improvement. In many cases, they will already have tried to solve the problems themselves and will be able to explain why they failed and suggest better ways to deal with the situation. In most cases, it will be a lack of resources that renders them incapable of dealing with a particular problem.

An assessment must be made of the availability and suitability of local materials for the proposed construction works and the farmers' ability to use these materials. It is preferable, wherever possible, to use local materials and familiar technology as this will usually result in better quality, lower cost and easier maintenance. Where new materials or techniques are introduced, the farmers must be trained in their use, so that both quality of construction works is high and the farmers can handle future maintenance and repairs.

In planning improvement works on a small FMIS, the aim should be to have an efficient distribution system that conveys water to all the command area equitably, and that the farmers can operate and maintain the system over the long-term with no outside involvement except in times of catastrophes. In order to improve a system effectively and still ensure the farmers' sense of ownership and responsibility, works should be of relatively low cost so that the farmers' contribution can be substantial (25-30% of the cost seems to be appropriate). To achieve this, it is usually necessary to target only real problem areas in the system that the farmers have not been able to deal with by themselves. With these problems dealt with, O & M is simpler and water supply to the full command area can be more easily ensured.

Identification and prioritization of problem areas should be the responsibility of the farmers, although the engineers should discuss and agree with the farmers what the most appropriate solution to any given problem will be. The method of water distribution and allocation is also the prime responsibility of the farmers, and the type of division and control structures will therefore usually depend on what their normal practice is. Great care must be taken if it is proposed to change traditional methods of distributing water. The sharing of water must be seen to be in the right proportions - in this connection, the use of proportional dividing weirs is often found to be the simplest method and the one most readily understood by farmers.

Although one of the main problem areas in FMIS is the acquisition of water from small rivers, it is nearly always uneconomic or impractical to construct a permanent structure in the river. A pragmatic solution is to have a temporary diversion structure, which will require frequent repairs by the farmers, combined with a carefully located permanent intake structure with orifice control on the canal intake and spill weirs to deal with sudden floods.

Use of outside contractors should be avoided wherever possible. Work should be shared equitably amongst the members of the WUA to strengthen the sense of community and of working together towards a common goal.

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