# Importance of Farmer Irrigation Association Participation in the Development of Small Irrigation Schemes: An Engineer's Opinion

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## THE SIWARAGAN COMMUNAL IRRIGATION PROJECT

THE SIWARAGAN COMMUNAL Irrigation Project is situated approximately 56 kilometers northwest of Iloilo City in the Philippines. Its water source is the Siwaragan River. The total irrigable area is 300 hectares (ha) comprised of 7 sectors, 1 on the right bank of the Siwaragan River and the other 6 sectors on the left bank. The irrigation project benefits 309 farmers and water rights are registered with the Natural Water Resource Council.

### Development of the Project

During the initial stages of the project decisions were made based on inadequate data collected by an engineering staff with insufficient training in the participatory approach. This led to the introduction of certain biases which later resulted in problems and increased costs during the construction phase.

*Feasibility stage.* A site-selection survey was conducted in 1980 to identify candidate areas for irrigation development under the pilot project of the Participatory-Approach Program. As a result of this survey Siwaragan was selected for a feasibility study. However, before all the data

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§ This paper presents the opinion of the author, as a result of his experience as a former Provincial Engineer who worked with the farmer irrigators' association as partners in the construction of the Siwaragan Communal Irrigation Project. The author is presently Division Manager B of the Engineering Division, National Irrigation Administration, Region VI, Iloilo City, the Philippines.

for the feasibility study were completed the scheme was selected to be the first participatory-pilot project. In addition, the feasibility study did not collect sufficient socio-technical data and used some incomplete baseline data from a preliminary study made in 1977.

It is this engineer's opinion that the site should not have been selected until the feasibility study had been completed and sufficient and accurate data had indicated that construction of the scheme was viable. Furthermore, the engineering staff should have been better-prepared in the farmer-participatory approach. If the staff had consulted extensively with the farmers the incorrect data could have been corrected by the latter. Despite being a farmer-participatory project, at the feasibility study stage insufficient farmer input was sought.

*Detailed engineering stage.* During the detailed engineering stage, the Siwaragan irrigators' association was promoted among the beneficiaries.

The detailed engineering process began in May 1980 with a differential-leveling survey. Farmers participated in the technical activities. Staff-gauge readings at the dam site were begun. Rice-field mapping results revealed that the discharge at the river would irrigate approximately 330 ha.

During these months, the design preparation was simultaneously undertaken at the regional irrigation office. The slope-area method was used for the design of the diversion dam and Manning's formula for open channels was used to design the channels. In March 1981, the final design and project cost estimate of US$100,000 were discussed by the engineers and the irrigators' association.

Once again, insufficient data were obtained at the detailed engineering stage so that certain factors were not considered early enough to prevent the need to make changes during the construction stage which resulted in increasing the cost of the project. For example, the staff-gauge readings at the dam site were recorded for only eight months. Readings collected over the course of an entire year would have given a better indication of the seasonal fluctuations of the discharge. Also, no formal and extensive soil analysis of the land along the main canal was conducted, nor was a cross-section survey 20 meters to the left and right of the proposed canal lines done. Boring of test pits would have informed engineers whether the soil was suitable for the construction of open canals and alerted them to seepage problems. Cross-section surveys would have allowed the engineers to compare the volume of work that would need to be done among alternative canal alignments.

Despite neglecting the collection of this engineering data, if the farmers had been more thoroughly consulted and educated during the design process their knowledge of the soils and topography would have allowed for some corrections to be made while the infrastructure was still being designed.

Although the irrigators' association's members were involved in the survey activities, particularly in the determination of canal alignment the technical staff failed to explain to the farmers the various alternatives that could have been considered. Technical staff also failed to explain to the farmers the implications and costs of the choices that the farmers had made. Had these explanations been made it might have been possible to prevent the necessity for making alterations to the designed structures and alignments during the construction stage.

*Construction stage.* Construction of the scheme began in April 1981. As the construction progressed new technical problems were discovered which made it necessary to revise, adapt, or add structures to the design of the scheme. Bench flumes had to be constructed for portions with

loose soil; covered bench flumes, reinforced concrete pipes, or barrel-type structures needed to be installed at deep-cut sections in lieu of the berm-type open channel that had been originally designed. Reinforced concrete pipes or perforated vinyl pipes were needed for drainage inlets or drainage-crossing structures along small water passes. And plain boulder or grouted riprap was added to canal portions with a tendency for scouring. Other stretches of the canal were relocated which necessitated the deletion or addition of certain canal structures. Additional problems resulted because of the increased work required of the manpower and machinery, all of which increased the cost of the project.

During this process both the irrigators and the engineers learned to work together and make better use of the knowledge and skills of each other so that they were able to formulate a contingency plan. They realized that there was no turning back despite the additional costs involved and by this time, the irrigators' association felt confident that the project was technically feasible. Because of limitations of manpower, construction equipment, and funds, the irrigators' association opted to implement the project in phases. Phase I was completed in late 1983 with a service area of 37 ha and was turned over to the farmers for operation and maintenance. Phase II was completed in February 1986. By then the total service area comprised 146 ha. Funding for Phases I and II came from the regular government budget at an actual cost of approximately US$217,650.

As the irrigators' association gained experience operating and maintaining the sectors developed under Phases I and II it consulted with the technical staff and requested modifications for improving the area already being operated. It also contributed recommendations for the improvement of the design of the Phase III area (154 ha) then under construction. Some of the significant changes were the increase of the dam-crest height by 30 centimeters, improvement of the sluice gate, and widening of portions of the main canal to reduce regular manual-desiltation activities.

The actual cost of Phase III, funded under the Communal-Irrigation Project loan from the World Bank came to about US$77,275. In February 1989, the whole irrigation scheme was finally turned over and accepted by the Siwaragan Irrigators' Association. The total cost of the project was approximately US$245,500. After deducting the equity generated by the farmers the development cost of the scheme came to US$895 per ha.

For the entire scheme, approximately 43 canal structures were built along the main canal. Ten structures were installed at lateral A, and five along lateral B. Discharge at the main channel starts at 0.54 cubic meters per second ($m^3/s$), distributing 0.06 $m^3/s$ to lateral A and 0.14 $m^3/s$ to lateral B. Areas irrigated by the main canal receive 0.3 $m^3/s$ per second.

## CONCLUSIONS

The lessons learned in the design process of the development of this pilot scheme are now being applied by the National Irrigation Administration in the design and implementation of new projects as well as in the rehabilitation of existing schemes.

These lessons can be summarized as follows:

1. The participation of the Irrigators' Association is essential from the project identification stage through operation and maintenance of the scheme.
2. Extensive hydrological, topographical, socioeconomic, agronomic, and institutional information must be gathered in collaboration with the farmers at the feasibility and detailed engineering stages so that the best development plan with accurate costing can be framed.
3. Project scheduling must accommodate the limited resources of both the implementing agency and the farmers so that the capacity and timing of activities can be kept within affordable limits.
4. The training of individual farmers in water-control procedures and the use of the irrigation facilities should begin prior to the detailed survey stage so that they have the knowledge to make the best choices and can provide accurate and pertinent input during the survey and engineering phases.
5. An irrigators' association can provide the necessary liaison between the individual farmer and the agency. The farmers and the irrigation agency have different objectives for water control and irrigation benefits. Engineers are interested in ensuring timely delivery of water to the entire scheme but the individual farmer is primarily concerned with obtaining water at the right time and in the quantity he needs. An irrigators' association can provide the link between the different objectives of the two groups to achieve a workable irrigation system acceptable to both.