

## INSTITUTIONAL ASPECTS OF IRRIGATION MANAGEMENT

Three papers were presented in the session on Institutional Aspects. The lead paper by Bret Wallach was entitled, "Grabbing the Bull by the Horns." Supporting papers were by David Groenfeldt ("Farmer Organization and Irrigation Management: A Reconsideration") and Mick Moore ("Social and Institutional Aspects of Irrigation Management"). These three papers and the discussion are summarized in this section.

### GRABBING THE BULL BY THE HORNS

*Bret Wallach*

In 1900 the world had about 40 million hectares of irrigated land, an area about the size of Bangladesh. Most of the systems irrigating this land had been developed by farmers; there was little question about water rights. Social cohesion had sustained these systems generation after generation.

When colonial governments began constructing large-scale irrigation systems in the 19th century, a fundamental change took place in the nature of irrigated agriculture. Irrigation was taken out of the hands of farmers and placed under the jurisdiction of government agencies. Independence brought new governments, but the old irrigation management strategies persisted. One of the first schemes built by independent India, on the Tungabhadra River, was unable to irrigate more than two thirds the intended command area. Local officers explained that upstream farmers were taking more than their share. Farmers are generally the ones who are blamed for poorly performing irrigation systems. They steal water; they refuse to follow the recommended cropping pattern; they do not maintain their field channels.

In the Indus Basin system of Pakistan, the early British estimates had suggested that 20% of the irrigation water entering the outlets (*mogha*) was lost through seepage. This figure was lowered to 10% in some estimates made after independence. Measurements in the 1970s showed that water loss rates were 50% higher than previously realized. As part of Pakistan's current on-farm water management strategy, 5,000 water-user associations are being formed to build and maintain improved water courses. It is unclear how successful these associations will be in maintaining such channels; the provincial irrigation departments have left responsibility in the hands of the farmers and the agriculture department. Physical problems of siltation and social problems of factionalism have yet to be solved.

The Gezira scheme in Sudan, the world's largest and perhaps most autocratic irrigation system, provides a lesson in large-scale management problems. Born of a colonial vision of orderly, productive agriculture, the straight lines and 4 hectare plots took shape under a three-way partnership between government, a business syndicate, and tenants. The main canal, opened to irrigate government land in 1925, was managed by the syndicate and farmed by tenants. Enforced cropping patterns, planting dates, and cultivation practices freed farmers from any decision-making, and relegated them to the role of hired labor. Ironically, over half the tenants hire other laborers to farm their plots today. The original colonial paternalism has been retained in the form of the Gezira Board, while the infrastructure which allowed this vast system to function is steadily breaking down.

Examples of other colonial legacies reveal a similar story. The Dutch began constructing irrigation systems in Java near the end of the 19th century. Like the British, they built them to last and imposed cropping rules to limit the area of paddy, especially in the dry season. Unlike the British, they attempted to provide varying quantities of water to meet seasonal crop requirements. Irrigation districts were established on a river-basin basis controlled by the provincial administrations. They lacked a detailed knowledge of soils and water crop requirements, and the flexibility designed into the system could not be utilized to best advantage. Distribution below the government outlets was entirely in the hands of village officials.

Development funds for Java after independence focussed on irrigation, primarily in the outer islands. Projects, long ignored, required massive investments in the **1970s** for rehabilitation. Even after rehabilitation, however, operation and maintenance remained grossly inadequate. Efforts to strengthen the provincial departments finally began in **1983**, but efforts to create water-user associations have not been successful. Lines of authority are tangled. Power to allocate water is still held by village officers, while rotation rules are issued by the irrigation department.

Irrigation systems developed by French engineers in North Africa exhibit features which have been generally ignored by the English speaking world. Self-regulating **NEYRPIC** gates and proportional modules were introduced in Morocco in the 1930s and have since been adopted in many parts of the country. Morocco's major irrigation systems begin with land consolidation that wipes the existing cadastral pattern clean and replaces it with a rigid geometry of privately owned plots on which particular crops must be grown. An intricate network of semi-circular-elevated concrete flumes gives a misleading picture of successful management. **Broken** modules and unauthorized crops point to uncertain relations with the farmers. Fully volumetric sprinkler irrigation is one possible solution; a cheaper approach might be to promote active farmer organizations charged with local **level** irrigation management.

Irrigation development in Thailand's central plain was oriented to averting crop failures until **1957** when the barrage at Chai Nat was built across the Chao Phraya. In **1964**, upstream storage was added to permit double cropping in much of the command area. Another project, the Mae **Klong**, is still under construction on the western edge of the plain. The carefully constructed, highly regulated network of lined canals fitted with **Rominj** weirs belies the uncertain future of a project that may never be completed. New construction by the Royal Irrigation Department is in jeopardy because Thailand cannot find markets for the rice which the project produces. Diversified cropping has met with limited enthusiasm from both farmers and irrigation staff. Meanwhile the country's older systems **are** deteriorating.

The situation is far worse in Malaysia where, by some estimates, nearly half the peninsula's **300,000** hectares of irrigated paddy land are now abandoned. In Negeri Sembilan, near Kuala **Lumpur**, the irrigation department spent **M\$120** million on project rehabilitation only to see cropping intensity fall from **75% to 25%**. In **1932**, when the irrigation department **was** created, the country had **less** than **40,000** hectares of irrigated land. **Many** settlement schemes and much investment later, the country's agricultural sector must be heavily subsidized to keep it afloat. In the Muda scheme, lined tertiary channels have been constructed at government expense to avoid field to field irrigation. **At** the same time, group farming is encouraged and farmer cooperatives have been formed to handle subsidized agricultural inputs. in spite of these efforts, farmers continue to leave agriculture, and the government's target of **80%** self-sufficiency in rice remains a dream.

Irrigation departments rarely admit that farmers should do anything except **follow** orders; the Philippines, however, may provide an exception. Between **1966** and **1980**, massive investment pushed the area under government irrigation projects **from** **60,000** to more than **one** million hectares. **The** lack of maintenance responsibility, coupled with willful destruction of control structures, prompted the government to experiment with alternative management approaches that directly involved farmers.

Beginning with small communal systems which had received government assistance, community organizers assisted farmers in managing their expanded irrigation infrastructure through community participation. In large-scale **systems**, farmers were encouraged to take over management responsibility for part of the system (e.g., a **lateral**). **So** far over **92,000** hectares of small and **34,000** hectares of large national projects are involved in this program. The results seem impressive. Farmers are irrigating more land with the same amount of water, while the National Irrigation Administration (**NIA**) is recovering a higher proportion of its investment on some schemes. The question remains whether these organizations can endure after the novelty and the outside support are gone.

Farmer participation experiments **also** occur in Sri Lanka. where experience with modern irrigation systems are less glorious than the ancient irrigation traditions would suggest. Water was first issued to what was then the country's largest irrigation and settlement project, Gal Oya, in 1951; by 1978, it required massive rehabilitation. A USAID-financed scheme sought farmer involvement in constructing, operating, and maintaining the rehabilitated system. Since then, participation **has** become a major goal for the government. The potential for improvement is great as was evidenced by the Minipe scheme. In 1978, a combined effort of a Buddhist society, a few dynamic government officials, and farmers resulted in a dramatic increase of water to the tail end. Still, the question remains: will farmers generally be so cooperative?

The privatization of government-built deep tubewells in Bangladesh may add a note of caution to the panacea of farmer participation. CARE helped organize farmer cooperatives to rebuild the distribution system on 63 deep tubewells; the irrigated area was doubled as a result. Similar results were obtained from other projects where farmers were assisted from outside. But can farmers **cope with management** responsibilities when left to themselves?

The expansion of irrigation has been spectacular, but we have still not learned how to build systems that work the way we say they will. The problem is often planners and administrators **who see** farmers not as customers but as mules. Engineers complain that farmers are eager "to throw dust into the eyes of authority." Irrigation professionals refuse to admit that, with all their specialized knowledge, they need the active cooperation of the farmers who will use the system. All around us we see what happens when we rely on technology or impotent laws to impose **our** wishes on farmers,

Capitulation? Giving farmers whatever they want? Nonsense. So government policy limits the amount of water that a farmer is to get? Fine; the engineer can live with that. He tells the farmers that **he** can do nothing for them unless they can work out a way of enforcing the agreed-upon policy. **if** a solution can be **reached** or an institution created, fine: work goes ahead. If no settlement can be reached, too bad; either the policy should be changed **or** the project should not be attempted. Pretending that the problem does not exist and going ahead with construction only results in wasted **money**.