WATER USERS' ASSOCIATIONS AND SUSTAINABILITY OF IRRIGATION SYSTEMS

ATEF HAMDY (*) - COSIMO LACIRIGNOLA (**)

ABSTRACT

In many countries, irrigation development policy has undergone a dramatic shift during the past five years. The emphasis on the State as the central actor in developing and managing irrigation systems is giving way to a greater role of local users' associations. Along with this shift, however, comes the need for information about how such organisations work and about the policy instruments that are most effective in helping them to improve the performance and sustainability of irrigation systems. In addition, understanding the potential strength of water users' associations (WUAs) is insufficient without the awareness of their limitations and types of outside interventions required. Those are the major issues to be addressed in this paper.

RÉSUMÉ

Ces cinq dernières années, en de nombreux pays, la politique de développement de l'irrigation a subi des changements profonds. Dans le développement et la gestion des systèmes d'irrigation, on assiste au fur et à mesure au passage du rôle de l'Etat au rôle des Associations des utilisateurs de l'eau. Ce changement, toutefois, impose des éclaircissements sur le fonctionnement des ces organisations et sur les instruments politiques les plus efficaces pour les aider à améliorer leur performance et la durabilité des systèmes d'irrigation. De plus, la compréhension de la force potentielle des associations des utilisateurs de l'eau (AUEs) ne suffit pas si elle n'est pas accompagnée d'une prise de conscience de leurs limites et des types d'interventions externes requises. Ce sont les principaux problèmes qui font l'objet de ce travail.

In many countries, irrigation development policy has undergone a dramatic shift during the past five years.

The emphasis on the State as the central actor in developing and managing irrigation systems is paving the way for a greater role of local users' organizations. The World Bank paper (1993) on water resources management policy describes this shift and the new approach in this sector which focuses on demand-led development of water services and decentralized management.

The centralized approach to water resource management has proven to be unsustainable because it has neglected incentives for users to participate in system funding and management and to provide services based on what users want and are willing to pay for. As a result, services from these expensive capital investments do not match local demand, and users view the services as neither reliable nor easily accessible. Poorly adapted services created common problems including: users' refuse to pay for the services, public agencies complain about the lack of ownership by farmers and local residents, operation and maintenance are neglected, and expensive infrastructure begins to deteriorate prematurely. Along with the pressures to decentralize and transfer the management of irrigation systems from government agencies to local organizations in many countries, it is needed to understand the factors that contribute to the success of WUAs. Equally, greater attention should be given to the tools for strengthening the organizations considering the limitations of organized user groups and the context in which outside intervention is required.

THE NEED OF WUAS IN IRRIGATION SECTOR

Earlier approaches to irrigation development tended to emphasize the technology of the systems, the market and the economic structure in which they operate, and the government agencies managing the systems. These approaches were based on the assumption that a combination of correct technology, efficient markets and capable agencies would result in the best performance.

However, the prevalence of technological, market and agency failures and the ensuing poor performance of irrigation have shown that in most cases the combination of the above-mentioned parameters has often not succeeded in providing effective irrigation services.

Countries have generally entrusted the management of their irrigation systems to government agencies, on the assumption that they will have the capacity and motivation to achieve high performance standards.

The contrary is true, as documented reports and literature cited generalized the fact that the performance deficiencies of many government-managed irrigation system has increased.

The deteriorated performance of irrigation systems under the government agencies is the resultant of the following:

* the failure to operate and maintain systems adequately;
* the financial burden of subsidizing agencies to manage the system has become more serious for many governments due to the low fee recovery rates from farmers;
* the fiscal crisis of the State is opposing major difficulties in maintaining subsidies for irrigation systems that

(*) Director of Research, Mediterranean Agronomic Institute - Bari, Italy.
(**) Director of Research, Mediterranean Agronomic Institute - Bari, Italy.

perform sub-optimally;
* difficulties in implementing water pricing and cost recovery as a traditional economic solution of "getting the prices right";
* policy-makers did not pay the necessary attention to the potential of utilizing water users group to plan and manage water infrastructure because of the twin problems of the institutional costs of implementing water distribution rules and of planning and managing water infrastructure with incomplete information;
* local information constraints and inappropriate incentives for government employees.

From the above, it emerges that there is high correlation between farmers' participation in the management of irrigation systems and their performance and sustainability. The poor performance and the ineffectiveness of many State-managed irrigation systems call for local cooperation through local users' organizations to take on a greater role in developing and managing irrigation systems.

Benefits of WUAs in managing irrigation systems

In recent years, many countries have embarked on programmes that tend to reduce the government role in the management of irrigation systems and to expand that of the farmers by transferring to them part or the whole responsibility for managing the physical systems. The analyses of the systems that were developed by farmers and managed by them are showing promising results and numerous successes. Examples of such systems are reported in South Korea, India, Indonesia, Italy, Mexico, Nepal, Pakistan, USA and many other countries.

Investigators have shown that WUAs have a positive impact on the performance of irrigation systems in many countries and situations. Although the effects of WUAs have not been studied consistently, nor have their effects been separated from the impact of other changes in irrigation systems, there is mounting evidence of improvements in irrigation services, agricultural productivity, system financing and environmental impacts that can be attributed to WUAs.

WUAs can contribute to better irrigation system performance because of their advantages over a public agency, on the one hand, and over uncoordinated activity by individuals, on the other. Water delivery services improve because farmers have stronger incentives to distribute the water and better information about irrigation needs. This permits more flexible allocation patterns and more careful monitoring of actual deliveries. System maintenance improves when WUAs have a greater stake in the systems. Farmer members are more likely to monitor the condition of irrigation structures and less likely to damage them if the WUAs must bear the costs of repairs. Expansion of the area irrigated is possible with improved irrigation services, water conservation, and negotiations between head and tailenders within WUAs. Increases in agricultural productivity and incomes derive not so much from the WUAs themselves (unless they also take on other functions such as marketing of inputs or outputs), but from the improvements in irrigation services and the increase in the area irrigated. Reduced negative environmental externalities similarly result from improved irrigation services under WUAs management. The costs of irrigation systems can be reduced as WUAs take over responsibilities for irrigation service provision that government agencies formerly carried out. This results from reductions in government staffing needs, cost-saving project designs, increases in fee collection, and reduced destruction of facilities. This benefit of WUAs development has received the greatest attention. However, the emphasis has been on government cost savings and increased revenues. In practice, the costs farmers bear usually increase under WUAs management, because the government removes state subsidies for agencies and users are required to bear a greater share of the responsibility for system O&M. WUAs management can achieve overall efficiency gains because of better local supervision and lower salaries and fringe benefits for irrigation personnel. However, the total monetary and transaction costs borne by farmers must be carefully assessed to determine the financial viability of WUAs. Finally, WUAs facilitate the attainment of social goals such as democratization and the empowerment of women, as they provide an organized forum for expressing users' common interests. These organizations also have the potential to increase an areàs "organizational density", which increases the likelihood that other types of voluntary local organizations will emerge. As individuals gain experience with cooperation, they build trust among themselves, which makes it easier to achieve cooperation in other spheres of activity. The effects of such social capital, while difficult to measure, are nonetheless a significant benefit.

Government strategies

For the management of irrigation systems, governments have the following three options:

1) the government officials continue to manage the systems after completion
2) to turn systems over to farmers to manage them
3) to manage the systems jointly, meaning some parts of the physical system (generally the larger canals) are managed by governmental agencies while the smaller ones are the farmers' responsibility.

Most of governments have favoured the first option, particularly in the developing countries, although this is precisely the one that is less conducive of the participa-

tion of the beneficiaires. The literature on management of irrigation systems is full of cases where the performance of such systems is poor and much below expectations due to the low level of beneficiaires' involvement. The inadequate cost recovery to meet the expenditures of the system always led to a chain of negative consequences including poor maintenance, unequal water distribution and poorly adapted services resulting in deteriorating structures and systems that have not been sustainable over time.

In the second option, governments followed two different approaches to hand over irrigation systems to farmers. Some have favoured the quick establishment of water users' associations (WUA) and a rapid transfer of responsibilities to them. The approach has been followed in some few countries, but with little success. Most countries are in favour of a phased handing over, accompanied by training programmes for the leaders of the Water Users' Organizations. The general belief is that a phased programme has better chance of success and provides more opportunities to change course, if required.

Concerning the third option of joint management, it could be indicated that empirical examples of full farmer management and full agency management are both becoming rare, whereas in between both extremes lie many forms of joint management. Options for joint management can be identified as:

— full agency control;
— agency O&M, user input;
— shared management;
— WUA ownership, agency regulation
— full WUA control.

These options are based on which entity (Agency or WUA) has responsibility for or control over regulation, ownership, operation and maintenance and user representation as illustrated in **table 1**.

Full agency control is often the reported management form, particularly at higher levels of systems; however, such a full control is increasingly scarce in practice, because users often have some representation or input, however informal. Agency O&M responsibility and user input are the most common form of joint management.

Under shared management, WUAs represent users and have some O&M responsibilities, while agencies continue to have the bulk of O&M responsibilities. The objective of many management transfer programs is for WUAs to take over responsibility for O&M, while agencies continue to own the systems and play a regulatory role. WUAs ownership implies that WUAs are responsible for O&M and user representation, while agencies continue to have a regulatory role.

Full WUAs control, including regulation, is rarely found in practice except in more isolated regions where the States presence is less effective. The allocation of functions between agencies and WUAs varies with the system. A greater degree of agency control is generally found at higher levels of the system, with greater WUAs role at lower levels.

However, a clear definition of the responsibilities of each party anl efforts to foster a collaborative working relationship are critical for any program to strengthen overall irrigation management.

Sustainability of WUAs

The concept of *sustainability* of WUAs does not mean that the organizations are unchanging. Indeed, change is often necessary for long-term viability. Nor does the concept imply that WUAs are necessarily *self-sustaining, that is*, that they can continue to exist without external inputs. The issue is not how to get organizations to function without any external assistance, but to identify what types of interactions and assistance are required for long-term viability, and how to create a facilitating framework for sustainable WUAs. State assistance and regulation should be seen as a continuing activity, even when WUAs take on a greater role in irrigation management.

More than any other single factor, the initial success and long-run sustainability of WUAs depend on sufficient incentives for farmers to participate. The potential for increased yield through better water delivery services and better maintenance are, ultimately, the most compelling incentive for farmers to take on expanded

Table 1 ***Joint management options.***

Activity	Full agency control	Agency O&M (user input)	Shared management	WUA O&M	WUA ownership (agency regulation)	Full WUA control
Regulation	Agency	Agency	Agency	Agency	Agency	WUA
Ownership of structures, water	Agency	Agency	Agency	Agency	WUA	WUA
O&M responsibility	Agency	Agency	Both	WUA	WUA	WUA
User representation	Agency	WUA	WUA	WUA	WUA	WUA

responsibilities in system management. The value of these increases must be greater than the additional costs farmers assume by actively participating in a WUA. The financial viability of WUAs is another critical value for the sustainability of the organizations themselves and the irrigation infrastructure. The WUAs should be able to raise enough resources to cover the relatively high cost for necessary operation and maintenance. In addition to the previous factors, legislation is an essential issue of notable impact on the sustainability of WUAs.

Legislation should provide a facilitating framework not a repressive one and be oriented to balancing the requirements or responsibilities with rights.

WUAs should be adapted to local conditions, thereby, being more effective and sustainable than those that follow a single blueprint design. We cannot use a blueprint approach to develop a standard WUA for a country or a region.

The sustainable development of WUA, requires a more explicit examination of the effects of economic, social and policy environment in which WUAs operate, which affect individuals, incentives and the organizational structure. WUAs should start spontaneously among the irrigators themselves and not as an idea brought by outsiders. This will give the irrigators the "sense of ownership", that is a personal task, which is an essential promotor for WUAs sustainability.

The definitions of membership in WUAs are essential for determining who has rights and responsibilities within the group.

This will activate the individual incentives and increase and sustain cooperation mechanisms.

Groups are likely to be stronger if their membership is defined so as to maximize members' common interest. Equally, a more homogeneous background among the members helps in defining common goals for the organization, which thus becomes more efficient.

Finally, WUAs should not operate in isolation to achieve their sustainability goal. One way in which even small base units of WUAs can take a broader range of activities and take advantage of economies of scale is through federation.

This allows coordination between WUAs at each level and permits them to undertake activities at the next higher level of the system.

In addition to allowing WUAs a wider scope of activities, WUA federation facilitates two-way interaction between irrigators and irrigation agencies. Through federation it will be possible not only to develop a service orientation among agency staff, but also a collaborative attitude between agencies and WUAs. Those are primary principles for successful joint management in irrigation systems as well as management transfer programmes; both are essential components of WUAs sustainability.

TRAINING AND WUAS DEVELOPMENT

Training is an urgent need

Most programmes of management transfer responsibility from agencies to farmers encourage WUAs to take on expanded roles. The formation of federations of WUAs raises the level at which each joint management option is found.

WUAs are expected to take on more tasks at more levels. The question of whether WUAs will have adequate capacity to perform these tasks needs to be ascertained. The immediate answer to the raised question is training to develop a qualified and motivated staff in organizations at all levels.

The skills of individuals occupying leadership positions are as important to WUA success as are the definitions of their roles. This underscores the significance of training programmes for WUA organizational leaders.

We need new skills for WUA leaders; they should have a better understanding of technical disciplines related to water users, operation and management of irrigation system and should be knowledgeable about economics, ecology, legal-social aspects and analysis. Equally, the leadership must be an influential one, with high ability to resolve the coordination problem that exists, enhance the cooperation federation links and convince the WUA members with solutions and decisions to be taken.

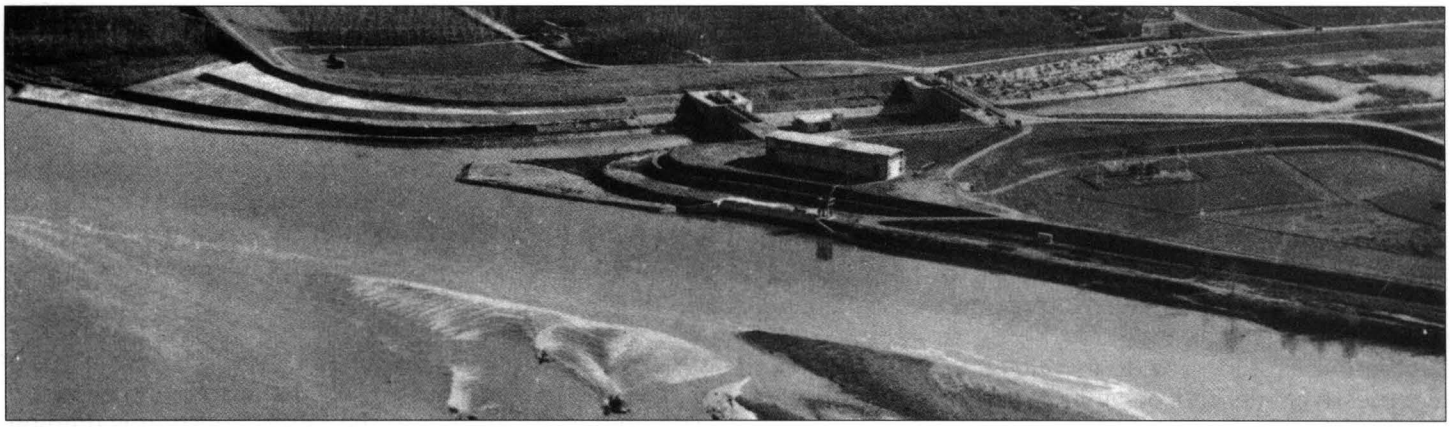
Training programmes for leaders should not be limited to basic ones such as how to run a meeting, etc., but they should be widened to cover more complex aspects of accounting collection of service fees, or of legal regulations affecting WUAs.

Training should emphasize technical aspects of irrigation, particularly those related to the operation and maintenance of irrigation and drainage systems. More specialized training ranging from water management procedures to the operation of a specific machinery including computer programmes, marketing and business affairs, is often required, particularly for the technical staff.

Too often training is directed to farmers only; to achieve maximum benefits of training for the development of WUAs, government should be included under those training programmes for a better understanding and realistic cooperation links between WUAs and governmental agencies and institutions.

Training should be also provided for general WUA membership to improve members' understanding of how the organization and the irrigation system operate. Physical construction activities provide an opportunity for training association members in management tasks.

One important principle of training is that it should be as close to the trainees' direct experiences as possible.



This requires developing training materials in the local language, as well as using more applied techniques. In this regard, videos, posters are more efficient tools than O&M written manuals.

Many face-to-face applied training techniques limit group size, but videos and the use of mass media campaigns can extend applied training to a large number of farmers. Farmer-to-farmer training including both organizing tours for members of newly organized WUAs to systems with strong local management organizations, and inviting leaders from successful systems as consultants to other WUAs are a recommended training approach because it relates most directly to peoplès experiences.

Concluding remarks and recommendations

Evaluating the impact of management transfers from agencies to farmers is particularly difficult because many cases are too recent to have impact assessment available. Identifying and isolating the benefits achieved exclusively through participation is even more complicated, because the casual linkage between WUA activity and actual gains derived from it is not distinctly separable from other factors, such as better farm management, a sound environmental policy and more favorable market conditions. However, to the extent that WUAs contribute to improvements in management or to the sustainability of physical system improvements, a careful and systematic evaluation of the contribution of WUAs in the overall management transfer process are still needed, ideally using a combination of cross-sectional comparisons between systems with and without strong WUAs and time series of the same system before and after transfer.

Although the transfer programmes have mostly been initiated in recent years, already some lessons are being learned and some issues identified that should be carefully considered:

* a transfer programme needs strong political support at the highest political level of the country. Furthermore, changes to the water laws are often required and there should be political will for such changes.
* Farmers must understand what the transfer programme means: their roles and responsibilities, how to organize, clear rules and regulations for the operation of the system, financial implications, etc.;
* Just as technology, agencies, and markets alone generally fail to result in a high level of performance from irrigation systems, so one cannot expect WUAs to achieve acceptable and sustainable levels of system performance by themselves. Along with the institutional structure of WUAs, a combination of appropriate technology; supportive state agencies and policies; and positive economic forces, including clear property rights and profitability of irrigation enterprises, are required for sustainable water users' associations, as well as for sustainable irrigation systems.
* Although the appropriate role for the state changes as WUAs take on additional responsibilities, government support should continue, particularly in establishing and adjudicating water rights; monitoring and regulating externalities and third party effects of irrigation; maintaining a supportive legal framework for WUAs; providing technical and organizational training and support to WUAs; and occasionally providing design, construction or financial support for major rehabilitation.
* WUAs must be legalized and their rights, obligations and attributions must be clearly spelled out and integrated in the water codes or regulations of the country.
* Transfer programmes imply that one or several government institutions will see staff drastically reduced or will have to assume different responsibilities. Consultations with the concerned staff are of great importance in these situations.
* In any type of WUAs, the benefits to farmers must outweigh the costs of participation. This applies at both the farmer and the enterprise level. For the farmers, benefits of physical system improvements, improved water supply, increased farm income, empowerment, and conflict resolution obtained through WUAs should offset the substantial time, materials, cash and interper-

sonal transaction costs of being active in local irrigation organizations. This requires that irrigated agriculture be profitable enough to create a demand for water, and that WUAs have a demonstrable effect in improving farmers' control over irrigation water.

* A supportive policy and legal environment are crucial to the sustainability of WUAs. State policies of administrative and financial decentralization have provided the impetus for many management transfer programs that shrink the role of the State and expand the role of WUAs.

* Training of the farmers and the technical staff that will have responsibility for the management of the system are also an important consideration. Government must take some initiative in this matter and bear some of the costs. Without this support, farmers will experience considerable difficulty in managing the systems during the initial years. ●

CITED REFERENCES

Alison K. and Sun P. (1996) - Proceedings of the National Seminar on Participatory Irrigation Management, Cairo-Egypt. March 13-16, 1996. The Economic Development Institute of the World Bank and the Ministry of Public Works and Water Resources, Government of Egypt.

FAO (1991) - Plan Action for People Participation in Rural Development. 26th session of FAO Conference. Document No. 91/22. Rome.

Frederiksen H.D., Berkoff J. and Barber W. (1994) - Principles and Practice for Dealing with Water Resources Issues. World Bank technical paper No. 233. Asia Technical Department series.

Garrize C.M. and Groenfeldt D. (1995) - Proceedings of the Intern. Seminar on Participatory Irrigation Management, Mexico. February 8-15, 1995. The Economic Development Institute of the World Bank and the Comision Nacional del Agua de Mexico.

Groenfeldt D., Svendsen M. and Sharma A. (1996) - Proceedings of the 2nd Int.Seminar on Participatory Irrigation Management. Antalya, Turkey. April 10-17, 1996. The Economic Development Institute of the World Bank (EDI) and the General Directorate of State Hydraulic Works (DSI).

Le Moigne G., Subramanian A. Meixie, and Giltner S. (1994) - A Guide to the Formulation of Water Resources Strategy. World Bank technical paper No. 263.

Le Moigne G., Barghouti S., Feder G., Garbus, L. and Meixie (1992) - Country Experience with Water Resources Management: Economic, Institutional, Technological and Environmental Issues. World Bank technical paper No. 175.

Plusquellec H. (1994) - India, Morocco, Pakistan: Mission Report on Water Users Associations. Washington, D.C.: World Bank.

World Bank (1993) - Water Resources Management. World Bank policy paper. Washington D.C.