

Creating Institutional Arrangements for Managing Water-Scarce River Basins: Emerging Research Results¹

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Abstract

Because of increasing water scarcity in developing countries, poor people are suffering greatly from 'water deprivation.' One approach to improving water resources management is to develop river basin management institutions. This paper contrasts government-dominated approaches to forming such institutions with attempts to create stakeholder-based institutions. Two cases of the latter, in Mexico and South Africa, are compared to extract lessons for other countries.

Introduction

The World Water Forum held in The Hague in March 2000 highlighted the growing global concern about future water supplies, and the complexity of the issues that must be faced if developing countries are going to meet future demands for water. As its contribution to the Forum, the International Water Management Institute (IWMI) developed and applied an interactive policy planning software to generate scenarios on future water supply and demand and the likely impact on food production. Some of the key findings include:

1. Nearly one-third of the population of developing countries in 2025, some 2.7 billion people, will live in regions of such severe water scarcity that they will have to reduce the amount of water used in irrigation to meet other water demands. This includes one third of the populations of India and China who will live in regions facing absolute water scarcity. Nearly every country in Sub-Saharan Africa will find the investment requirements to develop sufficient water supplies to meet their needs are far beyond their financial capacities.
2. The world's primary water supply will need to increase by 22 percent to meet the needs of all sectors in 2025. Seventeen percent more water will be needed for the world to feed itself *if* significant improvements are made in irrigation productivity – but at current levels of irrigation effectiveness, a 34% increase in water for agriculture would be required.
3. The people affected by growing water scarcity will continue to be the poor, especially the rural poor; and among poor people, women and children will suffer most from "water deprivation" (van Koppen 2000). If the world fails to invest in finding and implementing solutions, the health, livelihoods and incomes of millions of poor people will deteriorate further. If large areas of India and China were forced by water scarcity to *reduce* irrigation

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(point one, above) this would have enormous consequences for the livelihoods and food security of poor people in these regions.

IWMI's researchers believe that notwithstanding these findings, the global community can meet future food requirements, make sufficient water available for domestic and industrial uses, increase food security and rural incomes in countries where poor people depend on agriculture for their livelihoods, and achieve higher water quality and environmental objectives. But this will require substantially increased productivity of water resources, and development of new water supplies.

Two pre-requisites for achieving these objectives are: 1) substantial well-directed financial investments, and 2) radical changes in policies, institutions and management systems in the water resources and agricultural sectors (IWMI 2000; Vermillion and Merrey 1998).

During the past 25 years or so, much attention has been directed at creating or strengthening local-level water users associations in both the irrigation and domestic water sub-sectors, and transferring financial and management responsibility for water services to these associations. In the irrigation sector the record is mixed: some countries have done very well in transferring management of irrigation schemes to farmer-based organizations, while others have not. Even where "irrigation management transfer" (IMT) policies are judged as 'successful,' IWMI's work shows that it is rare to find dramatic changes in productivity (Samad and Vermillion 1999; Vermillion et al. 1999; Kloezen et al. 1997). IMT remains official policy but an unfinished business in most developing countries.

Nevertheless, with the rising awareness of the need to manage scarce water resources in an integrated manner, many countries have turned their attention to river basin management. Policy makers, researchers, and water managers now recognize that sustainable management of water resources must be done at the level of river basins. We cannot continue to work within specific sub-sectors like irrigation or domestic water supply; we must manage the allocations and interactions among these various uses. This has led many countries to embark on a new round of water reforms, focused on national level policies, and on creating new institutions for managing river basins.

Reforms at this level are even more complex and problematic than at the local level. The few successful cases to date are in rich countries with strong institutional capacities and well-educated publics. For countries where implementing even local level reforms strains the financial and implementation capacities, trying to implement river basin institutional reforms is difficult indeed. The political economy of such reforms is daunting, with strong vested interests at higher levels and weak local-level institutions affecting the capacity of the rural poor and small-scale farmers to have a voice.

IWMI has therefore initiated research on river basin management policies and institutions, along with a variety of collaborating countries and research institutions. This research is linked closely to continuing work on IMT. Research at this scale is complex and given limited resources, proceeds incrementally. Therefore, this paper reports "work in progress;" it is by no means complete and has not reached firm conclusions as yet.

This paper focuses on the process of creating institutional arrangements for managing river basins where these were previously unknown or incomplete. The next section briefly discusses two basic patterns emerging from IWMI's work, while the third section analyzes the experiences of two countries trying to create river basin institutions that will be representative of all the major stakeholders.

Creating River Basin Management Institutions: Two Basic Patterns

IWMI and its partners are carrying out research on river basin institutions in the following countries: Australia, China, Indonesia, Japan, Mexico, Nepal, Pakistan, Philippines, South Africa, Sri Lanka, and Turkey. Some of these countries, like Nepal, are at an early stage of thinking about what kind of river basin institutions might be desirable. Others, like Australia, have a long period of experience in reforming and building institutions to manage water-scarce river basins. The two basic patterns that have emerged are: 1) continuation, even strengthening, of government-dominated river basin management; and 2) promotion of broad stakeholder-based management institutions.

The first pattern, government-dominated river basin management, involves either one government agency taking a dominant role in managing the water resources and major infrastructure on a river basin, or in a few cases, a council that brings together the major government institutions involved in water management but excludes non-government entities. Such a council may often be dominated by a single powerful ministry.

Examples of the pattern in which one government agency dominates are Turkey, and the Mahaweli Authority of Sri Lanka. In Turkey, the State Hydraulics Works (DSI) is the national agency in charge of major water infrastructure development and management throughout the country. While Turkey is known for its success in IMT, DSI remains the dominant agency in managing river basins in Turkey. The Mahaweli Authority of Sri Lanka was created to develop and manage major water control infrastructure for irrigation and hydro-electric purposes, and to implement ambitious irrigation-based settlement schemes. A program is currently underway to re-focus it as a river basin management agency, but forces within the Agency seek to retain most of the downstream irrigation management responsibilities as well. There is a "Water Management Panel" that includes carefully selected representatives of irrigation farmers, but its influence is not strong.

An example of government-dominated councils is found in Morocco. In this case, there is a competitive relationship between, on the one hand, the Ministry of Agriculture and its nine semi-autonomous government authorities in charge of developing and managing large-scale irrigation schemes ("ORMVAs"); and on the other, the Ministry of Public Works, which is in charge of major dams and is the lead agency for the new basin councils.

In all these countries, strong government agencies continue to dominate water management. These agencies have either performed well enough to minimize pressures for reform, or have been successful in resisting efforts to restructure them, usually because of strong political support for the *status quo*.

The second pattern, promotion of stakeholder participation in river basin management, is found to varying degrees in quite a number of countries, including Australia, France, Mexico, South Africa, Sri Lanka except for the Mahaweli, and parts of the USA². In Sri Lanka, a new water law is proposed which would facilitate a process of stakeholder mobilization for improved management of river basins. Sri Lanka seeks to avoid creating large new bureaucracies on its remaining relatively small rivers, but recognizes the need to manage each basin more effectively.

The next section of this paper examines the Mexico and South Africa cases in more detail, to extract lessons that may be of use to other countries.

Creating Stakeholder-Based River Basin Institutions: Two Cases

Mexico and South Africa are of interest for several reasons. Both river basins being studied by IWMI and our national partners are roughly similar in area (about 55,000 km²); both are increasingly stressed in terms of demand versus available supply; both are characterized by competition among domestic, industrial and agricultural uses of water; both face serious environmental issues; both cross provincial boundaries (and in the case of the Olifants in South Africa, an international boundary); both contain both poor and relatively prosperous groups of people; and both are in the early stages of interesting, serious and fundamental institutional reform at the local and river basin levels.

Mexico: Lerma-Chapala River Basin³

The Lerma-Chapala River Basin in central Mexico contains about 750,000 ha of irrigated land, using 79% of all water presently used in the basin. Irrigation is generally well-managed and productive, but achieves low overall economic returns. About 35 percent of Mexico's GNP is produced in the basin, where about 11 million people live. From a water perspective, the basin is in crisis because water demand exceeds supply in all but the wettest years. About 109% of the available water is developed and used, showing the degree of over-commitment. In the terminology used by IWMI, this basin is "closed," i.e., there are no utilizable outflows, and water depletion (use of water that makes it unavailable for further use) equals or exceeds the available supply⁴. As a consequence, the groundwater is being mined, and Lake Chapala, into which the river flows, is gradually drying up. This Lake is the largest in Mexico, giving it a high symbolic value, and it generates significant tourism revenues.

Mexico is well-known for its important water sector reforms initiated in the early 1990s. Briefly, these include the creation of a new national water agency in 1989 (the National Water Commission, CNA), the promulgation of a new water law in 1992, the transfer of government

² A special issue of the *Journal of the American Water Resources Association* (Vol. 35, No. 3, June 1999) contains interesting articles showing the diversity of stakeholder-led institutions for managing watersheds emerging in the USA.

³ This section draws on forthcoming papers produced by IWMI researchers in Mexico; see especially Wester, Melville and Ramos-Orsorio 2000. Rap et al. (1999) provide an interesting analysis of the sources of the Mexican water reforms, while Mestre-Rodríguez (1997) provides a more 'official' overview of the Mexican approach to river basin management reform with special reference to the Lerma-Chapala Basin.

⁴ See Keller, Keller and Seckler (1996) for a discussion of "open" and "closed" river basins.

irrigation districts to user organizations, and cautious introduction of water markets. The Lerma-Chapala River Basin Council is the first such council established in Mexico (1993), building on a Consultative Council initiated in 1989. More recently, separate ‘aquifer management councils’ have begun to be established (from 1998). These reforms at the basin level are a direct response to the deterioration of the basin’s water resources.

Mexico has proceeded very quickly in establishing new water management institutions at both irrigation district and river basin levels. In Asia, countries implementing IMT policies have done so gradually, with some investment in animating and training local water users’ associations. However, Mexico has followed what is sometimes called a “big bang” approach. Research carried out by IWMI (e.g., Kloezen et al. 1997) and others shows that the new irrigation associations have been effective in improving the provision of services and recovering costs from users, though the impact on agricultural performance is minimal. More recent work in one district in the Lerma-Chapala Basin raises questions about the long-term sustainability of these associations (Kloezen 1999).

The Lerma-Chapala River Basin Council was also established quickly, and began work almost immediately. The Council includes representatives of the five states in the basin, various federal and state agencies, and representatives of various water use sectors. It quickly formed a Technical Working Group to analyze water data and prepare proposals for water allocation. Wester, Melville and Ramos-Ororio (2000) argue that the Council has been successful in agreeing upon and implementing a water allocation plan involving reductions of water supply to irrigation; but the plan, while strictly enforced, has not stopped the continued reduction of the level of Lake Chapala. The Council is therefore considering new measures.

A notable failure so far is in finding ways to reduce the mining of the groundwater. But a recent innovation is the promotion of “Technical Committees for Groundwater” by the federal water agency (CNA), and “Technical Water Councils” by the state of Guanajuato’s Water Commission (see Wester, Mara  n-Pimentel and Scott 1999). The former are intended as forums in which aquifer users, government agencies and civil society will interact under CNA’s auspices, but they are not intended to have any legal status or authority. The Guanajuato Councils on the other hand are intended to be fully empowered user organizations for reaching agreement on aquifer management. It is too early to evaluate their impact, but the separation of the basin and aquifer councils seems to be a major weakness⁵.

Mestre R. (1997) emphasizes the river basin council is intended to be “an open and plural forum.” The role of ‘Society’ is seen as paramount and “comprises non-governmental organizations, private sector organisms and individuals, academic and scientific actors, as well as a myriad of other social groups who participate in a regional water scenario” (1997:142). He notes society is “commonly organized through diverse groups” This assumption that society is already organized and ready to participate in the new Councils is an important one, explaining why Mexico has not felt it necessary to invest in social mobilization for the establishment of river

⁵ In commenting on an earlier draft of this paper, P. Wester notes that the COTAS are part of the basin council, and in the future, it is foreseen that any agreements reached by COTAS will have to be approved by the river basin council. This does not come across in the literature cited.

basin councils. When the irrigation management transfer program was initiated, the government invested heavily in public relations and training to create commitment and transfer the necessary skills (P. Wester, personal communication).

While this rapid approach has the advantage that the Lerma-Chapala Council has been able to get down to business quickly, two of the weaknesses identified by Kloezen (1999) as threatening the existence of irrigation associations may apply to the Council as well:

1. Accountability mechanisms to users, and information flows between users and their representatives are likely to be weak; and
2. Dependence on the same leaders over time invites the possibility of rent-seeking, favoritism, and nepotism.

An additional potential weakness is the assumption that all important interests are organized and able to articulate their views effectively. There is no attempt to consider whether, for example, there are significant numbers of rural poor who are voiceless, and facing “water deprivation” either in terms of basic human needs, or in terms of access to water for productive uses. IWMI has been examining the extent and importance of less formalized ‘farmer-managed’ irrigation in the basin but the results are not yet available. It is quite possible that this small-scale sector is far more important than officially recognized, and is not adequately represented.

The Mexico case can be seen as being characterized by a combination of continued government dominance and attempts to include and empower already-organized stakeholders in the river basin decision-making process. South Africa is placing greater emphasis on the social mobilization stage, leading to a slower implementation process.

South Africa: Olifants River Basin⁶

South Africa is the only Sub-Saharan country that is projected in IWMI’s scenarios to face “absolute water scarcity” by the year 2000; countries so characterized will be forced to make difficult water re-allocation decisions in the near future (IWMI 2000). It is also important to note that about 60% of the country’s water resources are shared with its neighbors.

The Olifants River Basin is the same size in area as the Lerma-Chapala, but its mean annual runoff at about two million cubic meters per year is a fraction of the 9.7 million cubic meters in the Lerma-Chapala. The river traverses two provinces and a major national park before crossing the border into Mozambique. The basin contains about 3.4 million people, and commercial and small-scale irrigation is about 100,000 ha. Irrigation is the largest single user of water (48%). In the upper reaches thermal power plants generate almost 55% of the country’s power, using coal from over 50 mines. Some water is imported into the basin to satisfy the power plants’ requirement but this is not a significant percentage of the total available water; very small amounts are also exported from the basin for cities. Pollution, largely from the mines, is a

⁶ This section is based on research that is currently underway and not yet systematically reported, or reported in forthcoming papers (Stimie, Thompson and Perret 2000a, 2000b). Figures are drawn from a section of the draft proposal currently under preparation for forming a river basin management agency (BKS 2000). See also Blank, de Lange, and Stimie (1999).

serious problem. In all there are over 200 active mines in the basin for gold, platinum, tin, etc.; these are expected to expand significantly over the next decade.

Over half of the Olifants flow enters the river below its mid-section, making the middle area, where much of the irrigation is located, particularly water-short. About 65% of the total available water in the basin is already used, and much of the remaining water is in the lower tributaries and is difficult to develop for use in South Africa, though this may be seen as an opportunity for Mozambique in future. In some years there is no flow at all into the national park; and continued development of the upper catchment is likely to prolong these low- or no-flow periods in future. Although the basin is not as stressed as is the Lerma-Chapala, it is also a 'closing' water-scarce basin under increasing pressure.

An important feature of this river basin is that large areas, particularly in the middle portion, pass through former "homelands" set up under the previous regime. These areas probably account for more than half of the population, which is desperately poor, having been forced into marginal areas, and provided with few basic services and little infrastructure. Since 1994 the new democratic government has devoted enormous effort to re-structuring the constitution, legal system, policies and institutions to overcome the legacy of the apartheid system. Its reforms in the water sector must be seen in this context.

The new water management policies were developed through a long detailed process of public consultation and commissioned studies, and culminated in the National Water Act (No. 36 of 1998) and its companion Water Services Act (No. 108 of 1997). The new policy adopts integrated water resources management at the 'catchment,' i.e., river basin in South Africa usage, level. Local water services are to be provided through "water users associations," while river basin management will be through "Catchment Management Agencies" (CMAs).

The policy embodies the following principles: equity in access to water resources, benefits and services; sustainability; optimal beneficial use; redress of past racial and gender discrimination; participation by stakeholders in decision-making about water resources; 'representivity' to ensure consideration of all stakeholder needs, interests and values; subsidiarity, i.e., devolution of responsibility to the lowest appropriate level; integration of water resources management functions; alignment of water resources management with other related departments' functions, and transparency to foster cooperation and encourage stakeholder support for decisions (DWAF n.d.).

The Department of Water Affairs and Forestry (DWAF) is the lead agency in implementing the new policy. The National Water Act makes the Government responsible for overall water resources management as public trustee, and provides for licensing of water uses. But it also provides for reservation of minimum flows for environmental purposes and basic human needs, and allows any person to use water for 'reasonable' domestic use, gardening, stock watering and recreation. The Act also includes a specific "good neighbor" provision applicable to its internationally shared rivers.

Currently, DWAF is developing "Catchment Management Proposals" on three of the 19 designated "water management areas" (defined as a large river basin, or several adjacent smaller

basins), including the Olifants River. IWMI and its local partners are carrying out research in this basin on two related topics: small-scale irrigation among poor rural people, mostly in the former homelands, and basin-level hydrology and institutional reform. There are a large number of small-scale irrigation schemes in the basin, many of which were originally built and managed by the previous government, and most of which are not performing well. The government has adopted a policy of transferring ownership and management of these schemes to the users, as part of a broader rural and agricultural development policy.

DWAF uses consulting firms to lead the process of developing a ‘catchment management proposal.’ The proposal is intended to be developed through consultation with stakeholders, and in its final form should lay out the broad scope and shape of the proposed “catchment management agency” (CMA). After a period of public comment on the draft proposal, the final version goes to the Minister for approval. To date, there are no approved CMA proposals as the process has only recently begun. The Olifants proposal is to be sent to the Minister before the end of 2000. Proposals are to be accompanied by an independent review of the process of developing the proposal and its provisions, assessing whether it meets the requirements of the policy and Act. IWMI has accepted the responsibility of playing this role for the Olifants proposal.

An enormous effort is being devoted to developing the CMA proposal. It will include the proposed name and defined water management area of the CMA, a description of the existing water resources and their management (drawing on existing, but somewhat out-of-date and incomplete previous studies and an on-going separate study on the environmental reserve), proposed functions and institutional structure of the CMA, the feasibility of the CMA in terms of technical, financial and administrative matters, and a description of the consultation process followed.

So far, IWMI and its research partners have focused on the last issue, the consultation process⁷. The mining and industrial sectors, the suppliers of water to larger towns, and, most important, the commercial farmers are well-organized to represent and articulate their interests. The commercial farms are large modern farms, using the latest irrigation technologies, and producing citrus and other high-value products for export. The government is seeking to balance the need for commercial farmers to have a reasonable and secure water supply, with its policy to redress previous inequities. All of these interests are not only well organized but speak the language of, and come from the same culture, of the consultants and DWAF officials.

On the other hand, the millions of rural poor in the former homelands are not well organized to participate effectively in a consultation process on water. Currently, one finds both “traditional” tribal chiefs, many of whom emerged in the apartheid era as a means of social control, and elected local councils which have little financial or managerial capacity. Neither of these entities are effective representatives of local communities. The government has a major investment program to supply domestic water to these areas, but its approach has emphasized rapid construction of infrastructure to make up a huge backlog of some 12 million people with no access to safe drinking water. Therefore, there has as yet been insufficient attention paid to strengthening local domestic water entities. Similarly, the small-scale irrigation sector is still

⁷ An important partner in this endeavor is the South African office of IUCN. I am grateful to Saliem Fakir, IUCN Country Programme Coordinator, on whose reports to IWMI I have drawn here.

unorganized, and in most cases not profitable; government is still pilot testing approaches to assisting this sector. In fact, DWAF has not yet approved even one water users association under the new legislation.

A study carried out by IWMI's partners in a major tributary basin to the Olifants found that rural communities are unaware of the provisions of the new water law and of the CMA process, despite efforts to inform people and offer them opportunities for expressing their views. Small-scale farmers had not heard about the CMA, and municipalities and mining companies were mixed –some knew, some did not. The Irrigation Boards providing water to large commercial farmers were however participating actively in the process (Stimie et al. 2000a).

IWMI's initial observations of the public consultation process have surfaced many important issues. In short, the effectiveness of the process in the poor rural areas is doubtful. Two reasons for this seem most important. First, the consultants do not speak the local languages, and indeed do not understand the local cultures of the rural poor. They have sought to overcome this by using facilitators who speak the local languages, with only partial success. The minutes of the meetings demonstrate that local people raise issues of immediate concern to them such as the lack of drinking water, while the consultants are focused on higher level issues, with no attempt to relate the solutions to local problems to this higher level process. This is an issue of cross-cultural communication, or lack thereof, and can be addressed as such. One fear is that the well-organized sectors may yet monopolize access to most of the water, depriving the poor rural communities, in spite of the strong political commitment to redress these inequities.

Second, the consultants and some DWAF officials clearly see developing the CMA as a largely technical process, and do not recognize that in reality it is a quintessentially political process. Water is a political issue, especially when it is a scarce and valuable good, and when access is so skewed. There are many conflicting views – and real conflicts – among stakeholders over water issues. Yet, these are not so far being addressed or even articulated by the consultants. Experience from developing the first CMA proposal on the Inkomati Basin, where disagreements of some stakeholders with the proposal have delayed finalization of the proposal, suggests that not addressing or at least identifying these conflicts may yet lead to similar problems in the Olifants. Again, the political power of well-organized sectors, as well as, possibly, of local non-representative entities in the former homeland areas, may lead to continuing inequity in access to water.

Finally, it is important to note that IWMI and others have provided feedback to DWAF officials and to the consultants themselves, on these concerns⁸. This is leading to re-thinking of the process, and consideration of ways to enhance the effectiveness of social mobilization efforts at the grassroots level.

Conclusion

In this short paper it is not possible to provide a complete analysis of the complex issues that arise when countries seek to implement new policies and create new institutional arrangements

⁸ IWMI's researchers have had similar close working relationships with the Lerma-Chapala Basin Council.

for river basin management. Indeed the processes are on-going, as is IWMI's research. But several general observations emerge from this overview.

First, there are important contrasts among developing countries in how they go about developing new policies and implementation arrangements. On one extreme, one finds a top-down almost entirely bureaucratic approach, driven by government agencies as the major stakeholders. In these cases, the process is essentially driven by a combination of technical concerns and inter-agency politics. It is important to acknowledge that some of these cases, such as in Turkey and Morocco, are characterized by relatively high performance in terms of productivity of agriculture for example. Nevertheless, there is no room in such approaches for less well organized, "informal" interests, especially poor people, to participate and gain access to water. In countries characterized by large groups of voiceless poor people, such an approach is unlikely to lead to overcoming water deprivation as a central element of poverty.

Second, the Mexico case exhibits a combination of a top-down largely government agency-driven process with inclusion of representatives of the organized users. An important result in Mexico is that the Council has been able to begin addressing the serious water issues quickly; and including representatives of organized users lends the Council legitimacy. This approach is entirely appropriate in conditions where the major stakeholders are organized, as the Mexicans assume to be the case, or where rapid economic growth is providing opportunities for poor people to improve their lives through other means. However, it is questionable whether many developing countries are characterized by these conditions. Therefore, following such an approach, while ensuring key organized sectors are represented, and enabling rapid attention to problem-solving, also presents the danger of excluding large numbers of poor water users. As water becomes more scarce, this will amplify the degree of water deprivation among poor people.

The South African approach should therefore be of special interest to developing countries considering how to design new policies and institutional arrangements for river basin management. A clear disadvantage is the time it takes before the basin institution is able to address water resources management problems. In South Africa, there are independent processes underway to respond to demands for water from new mines, for example, and decisions will either be postponed at potentially considerable cost in terms of economic development and job creation, or will be made by DWAF, with little involvement of stakeholders. On the other hand, successful empowerment of poor rural stakeholders could enable them to gain access to significant water rights, which are likely to be valuable assets. The water can be used directly for productive uses, as well as for bargaining with mines and other commercial users needing additional water.

Carrying out public consultations in a manner that empowers local communities is extremely difficult when the population is not well-educated, not well-connected to urban centers and to mass media, and not well-organized around water. The time and effort required should not be underestimated. Nevertheless, if done well, there will be a greater likelihood that water deprivation problems characterizing poor communities will be addressed effectively and equitably.

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