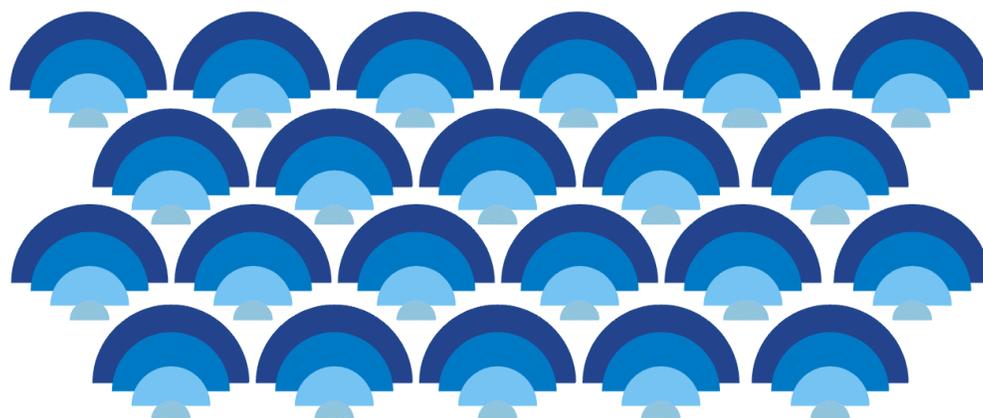




# Efficient Management of Water Resources: An Analysis of “Grey” Literature for the New Millennium

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Third World Centre for Water Management

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# Forward

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Grey literature, that is, those documents that are not published as books by commercial publishers and as papers in refereed journals, constitute a significant bulk of documentation available globally in the water area. For the most part, these documents appear to have had somewhat limited impact on water planning, management and development, irrespective of their qualities or nature of information contained therein.

The World Commission on Water decided to make a review of the available “grey” literature to see if there are some important ideas, experiences or viewpoints that are now not available in the mainstream publications of the water sector. In the entire history of the water profession, not even a single systematic attempt has ever been made to analyse such literature. It is thus the very first effort to review the type of knowledge and information available in such documents and for the current review, we also considered manuscripts of books that are not yet published to be “grey”. The Third World Centre is carrying out this review for Water Management by Nancy Contreras.

The “grey” literature, because of their very nature, are almost limitless. Furthermore, the internet has vastly enhanced its scope and reach. However, unlike books and journals, there is no single locations like the British Museum or the Library of Congress where such documents are available for ready consultation. Equally, they are spread all over the world in numerous languages. The main emphasis of the current review has been on English and Spanish languages only.

The main objective of this 4 person-months study was to carry out a very rapid review of certain selected grey literature to get some idea about the concerns raised, concepts and methodologies used and experiences outlined. Because of the paucity of time, both the Secretariat of the World Commission on Water and the Third World Centre for Water Management requested some 300 water experts from all over the world to identify major “grey” literature published since 1995 so that these could be analysed. The response to these requests, not surprisingly, was somewhat limited.

Since the Centre currently has activities in 35 major countries, it primarily used its own internal networks to identify and obtain this a significant part of the consulted literature.

All the documents analysed are classified by subject areas and geographical regions. There are also been graded of quality in a scale of 1 (useless) to 10 (excellent). Based on the analysis carried out, five major areas were identified, where the main issues and points are summarised.

The Centre is most grateful to Dr. Frank Rijsberman, Deputy Director World Water Vision Unit, without whose support and encouragement this study could not have been completed.

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# Organization and presentation of the report

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This analysis is designed to provide a selective overview of “grey” literature. Within the context of the present analysis, “grey” literature is considered documents, which have not been published, by mainstream publishers and journals. This of course opens up vast quantities of documentations, which like the universe is constantly expanding. By its very nature, “grey” literatures are often not easy to identify and obtain. A limited number of each document is published, and they are poorly distributed. Not surprisingly, because of the complexities associated with such a task, no attempt has ever been made to review them comprehensively. Thus, the current attempt is the first ever to analyse grey literature in any form in order to determine the type and quality of information contained there in.

Since it is not easy to find grey literature, both the Third World Centre for Water Management and the Secretariat of the World Commission on Water sent out hundreds of letters requesting water experts and Institutions (both national and international) from all over the world to provide important grey literature for this analysis. The present report is based on whatever documents were received because of this request and also a review of the very substantial numbers of materials that are available in the collection of the Third World Centre for Water Management. Thus, constrained by the very nature of the problem, this is an analysis of selective documents. A comprehensive analysis of grey literature is probably an impressive task, which probably is unlikely to be cost-effective.

Based on the documents analysed it was decided to organize them under eighteen topics listed in Table 6.1. These were then further analysed under five categories having the largest numbers of documents. These were international river basins, users’ participation in water management, topics of national concerns, World Water Vision for the Next Century, and privatisation.

Many of the publications were technical reports containing data from field research explaining the real and current situation in communities in which policies and programmes have been implemented.

# Acronyms

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ADB	Asian Development Bank
Af	Africa
As	Asia
Au	Australia
CG	GWP Consultative Group
CGIAR	Consultative Group on International Agricultural Research
DSI	National Irrigation Agency. Turkey
E	Europe
ERWG	European Regional Working Group
GWP	Global Water Partnership
IC	Islamic Countries
IA	Irrigation Associations. Turkey
IADB	Inter American development Bank
ICID	International Commission on Irrigation and Drainage
IDB	International Development Bank
IFPRI	Food Policy Research Institute
IMT	Irrigation Management Transfer
IWRM	Integrated Water Resource Management
LA	Latin America
M	Mediterranean
ME	Middle East.
MENA	Middle East and North Africa Regional Vision Meeting
NA	North America
O&M	Operation and Maintenance
OECD	Organization for Economic Co-operation and Development
SIWI	Stockholm International Water Institute.
UN	United Nations
UNDP	United Nations Development Program
W	More than one country
WB	World Bank
WWO	Water Users Organizations. Mexico

# Chapter I.

## Privatisation and Private Sector Involvement

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Some countries like Philippines, Indonesia, China, Mexico, Colombia, New Zealand and Turkey have made efforts towards transferring irrigation management activities from the government to private sector. Some provinces in India like Andhra Pradesh are now taking the initial steps to implement similar policies as well.

Twenty of the 300 publications analysed for the present study were related to the transfer of the control of water and irrigation systems management. The largest number of documents came from Latin America, but only one from Africa (Table 1). This is an indication of the fact that transfer of water management activities is far more advanced in Latin America compared to Africa.

**Table 1. Number of publications reviewed on policies.**

Topic	Number of publications
General reviews	2
Latin America	13
Asia	4
Africa	1
<b>Total</b>	<b>20</b>
<b>Percentage/300</b>	<b>6.0%</b>

An overall summary of the publications analysed follow next.

**General Cases.** Johnson *et al.* (1995) and Peralta & Benson (1995) argue that privatisation of water management is an expanding phenomenon, in both, developed and developing countries. Governments and external support agencies are driving the process faster because of public financial solvency and resource use efficiency. The proponents of privatisation argue that the private sector is better placed to provide finance and expertise to ensure efficient water resources use and management. They point out that the success of privatisation depends to a significant extent on the capacity and willingness of the farmers and the appropriate private sector organizations to take over and maintain irrigation and water supply and sanitation systems. Since the world is no homogeneous and the technical, social, economic, legal environmental conditions vary widely from country to country, and some times even within the same country, no single model for privatisation and transfer of irrigation districts is likely to be universally applicable. Viable management transfer of irrigation activities requires a locally distinctive configuration of institutions, technology, financing, agricultural strategy, management, and prices.

Continuing research and information exchange on transfer programmes and their impacts on life-styles of the people concerned and resource use efficiency are urgently needed. Only through objective assessment of such studies, the policy makers, planners, technical assistance agencies, researchers, irrigation managers, and farmers can learn and use the global experiences that are now available and are likely to be generated in the future. Based on information currently available, the results are still unclear. Current knowledge is very dependent on the specific situations where policies are being implemented. As programme expand, and their impact are documented, more informed policy decision can be taken.

According to the Economic Commission for Latin America and the Caribbean (ECLAC,1998) the transfer of public companies to private sector can bring substantial gains for both, users and governments where appropriate policies are properly formulated and implemented. Based on empirical research, ECLAC concluded that privatisation brings substantial welfare gains. However, the establishment of privatisation policies requires local structural adaptations such as liberalization of markets and franchising arrangements. There is no magic formula for the successful introduction of privatisation policies, since each country has its own laws, market regulations and economic structures. For privatisation policies to

succeed, changes must be predicated based on knowledge and understanding of the social and economic trends and what is necessary to support them.

Comparing the successes and the failures in promoting privatisation approaches in Mexico, Venezuela, and Chile, ECLAC (1995, 1998) concluded that the failures in Venezuela were due to a lack of knowledge of the system, which obstructed the development of proper policies. In contrast, the privatisation process was successful in Chile due to the establishment of strict standards for financial reporting, similar to those of private companies, and the establishment of rigorous independent regulatory authority. In the case of Mexico, the successes are due to the interest and involvement of private industries in improving the distribution of water, and in maintaining regular deliveries of water to their factories.

Idelochich & Ringskong (1995), Marnic (1996), Johnson (1996, 1997), Young (1997), Floris (1998), and Vermellon & Garces-Restrepo (1997) explain that Mexico has worked hard to institute a transition from centralized ownership and management of the irrigation systems to a policy of co-responsibility between the government and the irrigation water users. The new policy, to a significant extent, was the response to a major decline in financial resources available over the last several decades the cost of the water system administration, operation and maintenance, which had to be paid by the water users. The decentralisation initiative was primarily designed to reduce the burden on the central government's finances and make the public irrigation system financially self-sufficient, more operationally efficient and more responsive to the needs of the water users. It should be noted that the private administration of irrigation systems does not exclude the Government from certain obligations. For example, the government is responsible for the regulation of the privatisation process and of helping in building and maintaining the main canals.

Some countries have, in one way or another, developed legal systems to encourage turnover policies, but they have neglected to regulate environmental sustainability, assessments of the privatisation and decentralisation policies, and to encourage user participation. Based on six case studies in low-income countries, Rivera (1996) concluded that private sector participation in the water and waste management sectors is likely to result in sharply improved managerial practices and higher operating efficiencies of the systems concerned. However, it is unrealistic to expect that in the short term the private sector will be able to overcome all the inherited institutional and operational inefficiencies and compensate for the chronic under-investment by the public sector over a prolonged period. Furthermore, according to Rivera, the public sector has failed to establish clear regulatory frameworks and to implement adequate tariff regimes and subsidy mechanisms. He suggests that complementary reforms are required, especially in the areas of regulation, pricing of services, and financing. In the countries where the case studies were conducted, Rivera found that management has been strengthened, productive efficiency has improved over a short period, and commercial practices have increased revenues. In addition, water losses have diminished, and the attention to the customer has improved significantly.

Rivera believes that the consolidation of the gains and the achievement of the additional benefits would require effective institutional transformation and the strengthening of public administration. The success of the reforms would depend on sustained, strong political commitments and on the support of supplementary reforms in four basic areas: more effective regulatory regimes; formulating of realistic and efficient tariff regimes; development of innovative tailored financial strategies; and design of realistic investment programme.

Gorriz *et al.* analysed the privatisation process in Mexico that began in the 1980s, and they highlighted the experiences learned from it. They recommend that these experiences should be considered as a reference point in the privatisation that may be undertaken in the coming years in the countries with similar characteristics as those prevailing in Mexico.

Baver (1998) has analysed the neoliberal economic system in Chile after almost 20 years of implementation. According to him, market mechanisms are likely to fail when confronted with regional and inter-sectoral problems such as multiple water uses and river basin management. In cases of inter-sectoral trading, such as rural to urban water transfers, there are too many social and political implications to leave such decisions to the market mechanism alone. The proponents of the free market policies tend to oversimplify the context and conditions required for such policies to work efficiently. The proponents of

privatisation often claim or assume that markets are neutral, objective, and apolitical. On the contrary, Baver believes that the markets are complicated social institutions, not spontaneous or automatic mechanisms driven by natural forces. Markets depend not only on economic factors of supply and demand, but also on many extra economic factors and prior definitions such as political decisions, legal rules, cultural attitudes, and geographical and environmental conditions. These factors are affected by relations of social and political power and by the distribution of wealth. Baver argues that the markets can be no more neutral than their surrounding social context and the underlying institutional arrangements.

**Privatisation in Africa and Asia.** Privatisation and decentralisation policies in Africa and Asia appear to have similar results as those found for Latin America. Samad & Dingle Brewer & Raju (1996), Suendsen & Not (1996, 1997), Frederiksen & Vissea 1998) note the problems that need to be solved to ensure the success of the privatisation process include undefined water rights, insecurity of claims for irrigation water, restricted options for obtaining heavy maintenance equipment, lack of legal basis for farming federations of irrigation associations, lack of clarity on capital lost when sharing rehabilitation costs, need to increase farmers participation in Irrigation Associations, and a weak support service system for such associations.

## Summaries

- LA

R. Ahlers, E. Rymshaw, and W. Kloezen, "Policy and practice: Challenging conventional thought on water trading," International Water Management Institute, Colombo, Sri Lanka, Research Report February, 1999.

### Abstract

The authors analyse governmental policies and people's practices regarding privatisation of water management services in Mexico. Four irrigation districts in The Comarca Lagunera region were considered. There are serious discrepancies between national level policy and local implementation. Water markets are characterized by differences in prices paid, price setting, the duration and levels of sale. Differences in water availability, in terms of sources and quantities, tenure of the participants and the relative importance of irrigated agriculture in the rural context influence the type of transactions made. The neoliberal policies encouraging water markets have not yet led to the argued effect in terms of reallocation to higher value crops and more prudent water uses. Users recognize that their water rights have financial values, but they are not motivated to use the resource more efficiently. Buyers of water generally have more substantial land holdings than sellers, or cultivate crops that merit investment in water. Sellers in general do not have the capital to continue investing in agriculture under conditions of water scarcity, and thus tend to look for income sources elsewhere.

Water markets have flourished in what turns out to be a short-term reaction to the elimination of input subsidies and the restriction of credits in combination with the drought, and not as part of a longer-term strategy developed to improve the efficiencies of use of water resources. The law may have inadvertently led to the consolidation of water rights in the hands of those who can afford to invest in agriculture, and thus may contribute to increasing income disparities in the future.

Water tradings in each district suggests that market mechanisms are not essential to the establishment and functioning of water markets. Prices do not reflect scarcity in each location, the lack of well-defined water rights and of information do not hinder transactions. In Mexico, water is valued politically and socially as well as economically. Therefore, water resource planning should include social and environmental optimization.

Contributions: 8

Keywords: Comarca Lagunera, water markets, water allocation, privatisation, decentralisation.

- LA

C. J. Bauer, *Against the current: privatisation, water markets, and the state in Chile*. Berkeley, California: Kluwer Academic Publishers, 164 p.1998.

### **Abstract**

The author makes an analysis of the Chilean's neoliberal economic systems after almost twenty years of implementation. In opposition to the traditional market approach, the neoliberal model applied to the natural resources and environment relies on new and different assumptions. Bauer makes an analysis of the neoliberal policies applied to water resources, and according to him, market mechanism are likely to fail when confronted with regional and intersectoral problems, such as a multiple water uses and river basin management. Even when there are cases of inter-sectoral trading, such as rural-to-urban water transfers, there are too many social and political consequences to leave such decisions to the market alone.

Regarding the theoretical free markets approach, Baver explains that proponents of the free markets policies tend to oversimplify the context and conditions required for such policies to work well. Proponents often claim or assume that markets are neutral, objective, and apolitical. Baver argues to the contrary. Markets are complicated social institutions, not spontaneous or automatic mechanisms driven by natural forces. He states that markets exist and operate over time, and they depend not only on economic factors of supply and demand, but also on many extra-economic factors and prior definitions such as political decisions, legal rules, cultural attitudes, and geographic and environmental conditions. Baver explains that these factors and definitions are affected by relations of social and political power and by the distribution of wealth. Markets can be no more neutral than their surrounding social context and underlying institutional arrangements.

Baver remarks that the Chilean case is a good place to study about the application of neoliberal economic reforms and market ideologies that come from developed countries and are applied to Latin America. The political, social, legal structure in LA countries is not able to support models that were developed in another reality, he concludes.

Contributions: 9

Keywords: Latin America, Chile, water allocation, water markets, neoliberalism,

- As

J. D. Brewer and K. V. Raju, "Types of irrigation management transfer India," presented at 6th Annual Conference of the International Association for the Study of Common Property, Berkeley, California, 1996.

### **Abstract**

Irrigation Management Transfer (IMT) refers to the transfer of management responsibilities for an irrigation system from a government agency to user organizations, local bodies, or non-governmental organizations. IMT is currently a major concern in a number of countries. In particular, it is seen as a way to reduce pressures in thinly stretched government finances while at the same time improving the agricultural production from irrigation systems and ensuring the long-term sustainability of those irrigation systems. Several countries notably the Philippines, Indonesia, China, in Asia, Mexico and Colombia in Latin America, and others such as New Zealand and Turkey have made efforts towards irrigation management transfer. Many others including India are now following suit.

These programme differ from each other in many ways. For this reason, they feel that it would be useful to develop a typology of irrigation management transfer policies and activities. This paper discusses the issues involved in developing a typology for the variety of irrigation management policies and activities found in India. The goal is not only to develop a means of classifying IMT policies and activities that will be use to researchers, policy makers and irrigation specialists in India, but also to explore the factors that must be considered in the process of classification. This paper is a modest first attempt at a typology that may serve as a model for other attempts in other regions or on global scale. They have activities in

various types of small systems and the basis for classification derived here is relevant to all irrigation systems.

Five sections integrate the paper; the first one is formed by the introduction and general discussion of some of the key concepts. Section 2 includes an explanation of key concepts discussed. Section three describes the background and environment of IMT in India and Section four lays out the typology devised for India. Section five draws some general lessons from this attempt.

Contributions:7

Keywords: Turkey, Asia, privatisation, participation, water markets, water users associations.

- LA

Economic Commission for Latin America and the Caribbean. *Private participation in the provision of water services. Alternative means for private participation in the provision of water service*, vol. 1: Economic Commission for Latin America and the Caribbean, p.1995.

### **Abstract**

Regarding privatisation, the authors argue that the transfer of public companies to private ownership can bring substantial gains. Empirical research by the World Bank and Boston University in which twelve cases of privatisation were analysed in four middle-income and developing countries. The results indicate that privatisation did bring substantial welfare gains. In eleven of the twelve cases, the gains were both positive and large, amounting to an average 2.5 per cent permanent increase in national income. The theoretical arguments and the practical benefits of divestiture are strongest for goods and industries operating in competitive markets. In these industries, it is argued the freedom from substantial market failures, market liberalization, and the restructuring and reduction of transportation costs can be counted on to supply the beneficial pressures of competition and of contestability, which reduce the need for the more detailed and intrusive forms of regulation. Franchising arrangements provide a means of harnessing some of the information and incentive advantages of competition to industries, which do not operate in competitive markets or have substantial market failures. Franchising can also introduce the characteristics and mechanisms of free markets that are associated with efficiency even in natural monopoly situations where direct competition is not possible. Franchising provides a means in the water sector to institute regulation gradually reduces opportunities for regulatory capture and lessens the scope for political interference in the management of water sector utilities.

The authors cite the Vallejo area of Mexico City as a positive result of privatisation. There, rising water prices and potential water shortages forced a group of companies to seek an alternative to water supplied by the public utility. The companies concluded that the treatment of water flows could provide a cost-effective and reliable source of industrial water. As a result, 26 companies created a new, for-profit firm to rehabilitate an old municipal wastewater treatment plant. This project was financed by the participating industries with each shareholder contributing equity based on its water requirements, with total equity amounting to US\$ 900,000. In the case of Bolivia, it is possible to show the extent of innovation possible when companies are transferred out of the public sector. The most appropriate selection will depend entirely on circumstances, but there is considerable evidence that in the case of natural monopolies some type of franchise arrangement is easier to manage than direct divestiture. In the cases where service is deficient, which is common in LA and the Caribbean, they argue, the danger of monopolistic practices may be less costly than the existing poor levels of service. Moreover the investment needs are so large.

According to the study, most of the arrangements that can be found in the region for private participation in water-based public services are hybrid in nature. Management contracts incorporate elements of concessions that are often in part contracts or leases. In the study, there are examples of partial divestiture through the formation of joint public-private companies and there is the unique model being applied in Bolivia. The reality of public utilities in LA and the Caribbean is complex and the arrangements that are being made to improve their management reflect this complexity. There is no valid universal formula. None of the alternatives, however, eliminate the need for regulation or for on-going government responsibility. The failure of the privatisation of the water supply and sanitation in the case of Venezuela

indicates the need for serious preparatory work within the responsible public agencies. The public sector must be capable of supervising the private providers of service. Unless entry costs are low, a franchisee or contractor is always in a strong position either to amend the contract or disregard it. Close monitoring is required to ensure that private providers meet their obligations under all alternatives.

Contribution: 7

Keywords: privatisation, water management, Latin America, water services.

- LA

Economic Commission for Latin America and the Caribbean, "Participación privada en la prestación de los servicios de agua. Modalidades para la participación privada en la prestación de los servicios de agua," Comisión Económica para América Latina y el Caribe 1, May 22th , 1996..

**Abstract**

Following the privatisation policies initiated in 1970 in Latin America and the Caribbean, the document is the first one of a series related to analyzing of privatisation of water services in the area. It focuses on assessing the expected benefits brought about by the privatisation of water services, as well as analyzing the different options private corporations have in the given water service. All options available in the market are discussed and assessed.

Privatisation, the authors state, requires changes in the procedures the State has played in the management of water services. The State should abandon some activities and should take new roles in water maintenance and administration. The State's role should be centred on regulation and supervision of the services given by private companies.

Contributions: 6

Keywords: Privatisation, Latin America, water management, institutions, water allocation, participation.

- LA

Economic Commission for Latin America and the Caribbean, "Report of the second workshop on private participation in water supply and sanitation utilities in the Americas.," Economic Commission for Latin America and the Caribbean, San Jose, Costa Rica, Consultanse February 3-6. P 82 1998.

**Abstract**

The report contains an Abstract of the general debate, conclusions, and program, as well as a list of participants for a 1998 workshop organized by the American Society of Civil Engineers (ASCE) and the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), in conjunction with the Coordinating Committee for water Supply and Sewerage Institutions for Central America, Panama and the Dominican Republic (CAPRE). The discussions at the workshop focused on aspects of private sector participation in drinking water supply and sanitation services, on the experiences so far with new initiatives, and on the unique problems associated with smaller countries. Experiences presented came from representatives from Europe, India and North America, as well as from Central and South America. The main conclusions of the event were that it is urgent to state straightforward goals, priorities and strategies for water supply and sanitation to protect human health and safeguard the environment. It was also concluded that it is necessary to improve the efficiency of public sector water supplies and sanitation companies. According to the successful Chilean experience, two main elements were fundamental in getting positive results with improving public water supplies: (1) establishment of strict standards for financial reporting, similar to those of private companies, and (2) the establishment of a rigorous independent regulatory authority.

Contributions: 6

Keywords: Latin America, Caribbean, private participation, privatisation,

- LA

V.V. Floris, *Environmental evaluation of the privatisation of public services in the Latin American region*. Washington, D.C.: Inter-American development Bank. Sustainable Development Department. Environment Division, 1998.

### **Abstract**

The author explains that for years, public services in the Latin American Region have been in the hands of government-owned enterprises providing a less than acceptable service. In order to improve their efficiency, reliability and increase their coverage, the governments have been immersed in programme of state modernization in which privatisation has been one of the most widely used instruments. The traditional role of the government has been switched to a state in which its main role involves the regulation, enforcement, and promotion of private participation.

Even though the privatisation activities are carried out following many schemes and approaches, it is a fact that they all have had an impact on the social, economical, political and environmental aspects of those nations. The region has important but fragile ecosystems that have been affected by years of environmental mismanagement. According to Floris, many believe that privatisation is a "golden opportunity" to put "the house in order". The Floris' study provides an environmental evaluation of the privatisation of public services in the Region. It was comprised of field visits, interviews with practitioners, managers, consultants, multinational organizations officials and decision-makers, review of pertinent documentation, analysis of all the data collected, and discussion of environmental issues of privatisation practices in a workshop in April of 1998.

The main issues found by Floris were: (1) Environmental problems with or without the privatisation of public service. Floris recommend that it is important to differentiate environmental problems that are independent of the process and those that are strictly related to the process itself. Both require different approaches towards a solution. (2) Legislation. Massive amounts of privatisation laws have been developed in the Region. However, from all points of view, environmental norms/regulations are still below desired levels. (3) Institutional arrangements. Many institutions have been created for the transfer and regulation of the newly privatized organizations. However, few environmental organization were created or refurbished for their new role. (4) Policy and political will. Governments have been very active in creating diverse sets of privatisation frameworks but do not necessarily have the political will for fully integrating environmental protection, conservation and restoring issues. (5) Regulation. Governments in the Region have been created regulatory agencies that, in some cases, not only deal with economic allocative efficiency issues, but also award licenses and enforce environmental contractual agreements and laws. (6) Standards. Most privatisation contractual agreements refer to a determined set of environmental standards. Several countries have made considerable progress and have quite acceptable ones, others do not. (7) Monitoring, auditing and enforcement. Those approaches are the weakest link of environmental management in the Region. (8) Environmental liabilities area a burden to all stakeholders. They need to be identified and evaluated, and evaluated, and a realistic and achievable remediation program must be found and implemented. (9) Environmental impact studies. Moat public service enterprises are transferred to the private sector in precarious conditions, which makes them go through a process of restructuring, and often-significant physical/managerial changes are made. (10) Public awareness, involvement and participation. In few countries the law requires public involvement and participation in the environmental decision process for newly privatized enterprises. (11) Financing, investment and incentives for environmental enhancement. Post privatisation environmental conservation and enhancement produces known benefits but carry some costs as well and should be reflected in the public service tariffs. (11) Privatisation contracts. Privatisation contract development is a lengthy but valuable process that starts at procurement.

The author makes some recommendations for the multinational financial institutions for improving the privatisation of public services in the Region: (1) improve monitoring, auditing and enforcement mechanisms and institutions. (2) Promote technical competence and financial sustainability of regulatory agencies. (3) Increase participation of the public in matters of privatisation by means of education and environmental awareness programme. (4) Develop an environmental source-book for privatisation of

public services. (5) Create or improve environmental. (6) Support internal educational initiatives related to environmental management and the privatisation of public services.

The author concludes that it is not feasible to determine the precise effects of the process, and thus it is impossible to give a concrete answer to the question if privatisation of public services has improved the environmental quality of the Region. There are important signs that considerable progress has been made, but due the long-term maturity of privatisation engagements, conclusions would be premature.

Contributions: 9

Keywords: Privatisation, participation, water management, sustainability, institutions, Latin America.

- W

H. D. Frederiksen and R. J. Vissia, *Considerations in formulating the transference of service in the water sector*. Colombo, Sri Lanka: International Water Management Institute, 80 p.1998.

**Abstract**

Considering the programme of Water Service Entities (WSE) launched worldwide, six countries were examined – Indonesia, Sri Lanka, Turkey, USA, Mexico, and Nepal--to assess the success of the management transference, the programme implemented in each country, and the current features established by the WSE. The shared issue in all cases was irrigation distribution, though three included services to the farmers. There were differences in the transfer among several countries. In five cases, there were flaws that threatened the WSE as it now is conceived. The nature and extent of responsibilities and powers caused some flaws. Twelve factors were analysed to determine the efficiency of the WSE: Scope of the transfer, the condition of facilities, facility ownership, water rights, transport facilities, major facilities, rehabilitation of infrastructure, major facilities with capital costs, availability of finances, WSE legality, preparation for and execution of the transfer, follow-ups and support. The numbers of “adequate” ratings for each country were as follows: USA, 12; Turkey, 7; Mexico, 5; Nepal, 4; Indonesia and Sri Lanka, 0.

Contribution: 8

Keywords: Privatisation, Water Services Entities, WSE, IWMI, USA, Turkey, Mexico, Nepal, Indonesia, Sri Lanka.

- LA

C. M. Gorriz, A. Subramanian, and J. Simas, *Irrigation management transfer in Mexico*: World Bank, World Bank Technical Paper Number 292. p.118 .

**Abstract**

Gorriz *et al.* explain that the Mexican economic crisis of the 1980's stimulated a wide variety of reforms in Mexican agriculture. Among the most significant institutional reforms was the program to transfer management responsibility of irrigation operations from the public sector irrigation agency to organizations of water users at the level of the irrigation districts. As of December 31, 1994, full or partial management responsibility for 55 irrigation districts with a command area of about 2.5 millions hectares has been transferred to water users' organizations (WUO).The author outlines some essential elements of the program elaboration, including institutional, financial and policy aspects. The main idea is to fill the gap of basic documentation and information on the reform effort.

Gorriz *et al.* illustrate how the Mexican privatisation program has been implemented. It centres on developing a public-private partnership with new roles for the users and the National Water Council, the Comisión Nacional del Agua. In the past, the government built, operated and managed 3 million hectares of large surface irrigation plots organized into 80 irrigation districts. With the reform program, the management of these plots is being handed over to WUOs known as Asociaciones Civiles, which manage irrigation subsystems or modulos, with command areas from 5,000 to 20,000 hectares. These WUO are responsible for operation and maintenance of O&M functions, secondary irrigation, and drainage systems.

Elected leaders negotiate water management and rehabilitation needs with CAN's managers at the district level. Where possible, the WUO forms a user organization at the level of the irrigation district to undertake O&M activities of the main irrigation system.

A number of countrywide policy and legal changes have been put in place to support these reforms. A new National Water Law--Ley de Aguas Nacionales--has been promulgated. The CNA and the WUOs sign a concession agreement that specifies the mutual roles and responsibilities of the agency and the water users. A training and communications program facilitates the process of transfer. Internally, the WUOs have a system of charging for irrigation services and mobilizing resources for O&M. To supplement the management transfer program, the government launched an on farm development initiative to enhance farm level productivity and water conservation as well as a program to register and assign water rights to users.

The authors added that the Mexican transfer program is being assisted by international organizations, including Food and Agricultural Organization (FAO) and the Inter-American Development Bank. The World Bank is assisting management transfer and farm improvement programme through two major loans-- Irrigation and Drainage Sector Project approved in December 1991, and the On-Farm and Minor Irrigation Networks Improvement Project approved in February 1994. Farmers' contributions to O&M have dramatically changed since the transfer process has been implemented, mainly due to user management and a sense of "ownership" of the system. The authors explains that the following points as key in the success of the transfer program: strong government commitment and policy support; favorable macroeconomic conditions; establishment of strong legal and institutional frameworks; adjustments to new roles by both farmers and the government irrigation agency; substantial increase in farm contributions to O&M and on-farm capital improvements; and training and communication programme.

Contributions: 7

Keywords: Privatisation, participation, turnover, Latin America, Mexico, institutions, water policies, water management.

- LA

E. Idelovitch and K. Ringskong, *Private sector participation in water supply and sanitation in Latin America*. Washington, D.C.: The World Bank, Directions in Development. 51 p.1995.

### **Abstract**

A series of problems that are responsible for the poor performance and low productivity of most public companies have traditionally plagued the services provided by public water companies in developing countries. These problems may be classified into four categories: technical and operational; commercial and financial; human and institutional; and environmental. Because of the generally poor performance of public sector companies, many authorities have looked for alternative ways of providing water and sanitation services more efficiently. Currently, there is a growing consensus that at least some functions, and in many cases all functions, related to the management of water and sanitation services should be entrusted to the private sector.

The three primary objectives of the public sector with respect to private sector participation (PSP) are to expand the water supply and sewerage system in order to reduce water pollution and public health hazards, and to provide better quality of service. The secondary objectives are to ensure higher operating efficiency and to finance the system without public subsidies or guarantees.

Private participation in the water sector ranges from the fulfillment of limited attribution to overall responsibility. PSP has eight main options, which vary in the degree of involvement of the private sector, the risk for, the public and private sector, the private operator's autonomy and responsibility, the required capital investment, the duration of the contract, and the contractual relationship with the consumer.

Contributions: 6

Keywords: Latin America, water management, water allocation, privatisation, participation, water pricing, economics, water markets.

- W

S. H. Johnson, D. L. Vermillon, and J. A. Segardoy, *Irrigation management transfer. Selected paper from the International Conference on Irrigation Management Transfer*. Wuhan, China: International Irrigation Management Institute, FAO, Water Reports 5. 499 p.1995

**Abstract**

Based on over 100 papers presented at plenary and parallel sessions, and the spirited debate during the discussion section, this document concludes that irrigation management transfer is widespread phenomenon, both in more and less developed countries. Governments and international donors in the interest of public financial solvency and resource use efficiency often drive it. Its success depends on the capacity and willingness of farmers and private sector organizations to take over and sustain irrigation management. Therefore, it will fail unless it is clearly seen as a benefit to both governments and farming community. The state that no single model for transfer is universally applicable. Viable management transfer requires a locally distinctive configuration of institutions, technology, financing, agricultural strategy, and management practices. Continuing research and information exchange on transfer programme and their impacts are urgently needed to inform policy makers, planners, technical assistance agencies, researchers, irrigation managers and farmer leaders about the global lessons that are being learned about irrigation management transfer.

It is unclear as yet what effects management transfer is having, or could have, on the long term financial and physical sustainability of irrigation systems. Participants consistently sought assurance that local irrigation organizations will be able to mobilize adequate financial and human resources to maintain the productivity of irrigation systems in a future with increasing competition for water and with little or no government subsidy. It is also unclear what effects management transfer will have on the environment, especially on whether watersheds or irrigation systems will be better-managed and therefore minimize environmental problems such as waterlogging, soil and water salinity, erosion and siltation, and water quality. With respect to environmental concerns, the only conclusion is that more evidence is needed about the effect of transfer.

It is hypothesized that in countries where governments have had the political will to increase and maintain water fees at close to the real O&M cost, the process of irrigation management transfer has been smoother and more sustainable. Users have been encouraged to take more management responsibility in order to minimize increases in water cost, or even to reduce them if they can manage the system more efficiently. In the case of joint management, an equally important inducement for water users to accept additional management responsibility is the assurance of better, more dependable delivery service from irrigation agencies. For complete management transfer, the guarantee of secure water rights is also an important element in acceptance of the transfer process by water users.

Contribution: 9

Keywords: irrigation management transference, water management, privatisation.

- LA

S. H. Johnson, *Irrigation management transfer in Mexico: A strategy to achieve irrigation districts sustainability*. Colombo, Sri Lanka: International Irrigation Management Institute, Research Report 16. .

**Abstract**

In Mexico, the percentage of irrigation operation and maintenance costs paid by users declined from 95 percent in the early 1950s to below 20 percent in the early 1980s. As a result of the shortage of funds, the irrigation districts deferred maintenance leading to a serious reduction in output and decline in the infrastructure. To solve this problem, in 1989, the government instituted a program of transferring management from the National Water Commission (C. N. A.) to the water users. The transfer program in

Mexico took off very quickly and by the end of 1996 more than 88 percent of the 3.3 million hectares of publicly irrigated land in the country had been transferred to joint management. Water user associations have proven capable of jointly operating and maintaining irrigation districts. Water tariffs collected by the users have supported not only water user operation and maintenance (O&M) activities carried out by the water user association have stopped the deterioration in the infrastructure and hence have accomplished on one the major objectives of the transfer program. To sustain the transferred districts, the users need to establish an investment fund to cover emergencies and future development. In addition, it is necessary to clarify the water laws to protect agricultural water rights.

Johnson explains that Mexico's legal system does not clearly specify what rights exist for irrigated agriculture and how those rights can be protected against demands for water from municipal as well as industrial users. The government has recognized the problem with the water law and is presently working to clarify terms of the law pertaining to water concessions to reduce future water conflicts between agricultural, municipal, and industrial users. Mexico's experiences with irrigation management transfer is breaking new ground in redefining the relationship between the irrigation users and the State.

Contributions: 7

Keywords: Irrigation management transfer, privatisation, institutions, NGO's, Mexico,

- LA

S. H. Johnson-III, "Irrigation management transfer in Mexico: Moving toward sustainability," presented at 6th Annual Conference of the International Association for the Study of Common Property., University of Berkeley, California, 1996.

### **Abstract**

Since the early 1990s government in the Latin American region decided water service should be provided by the public sector. The primary reason presented to justify intervention in the provision of water services was a belief, by both governments and international donor agencies that government intervention was required in order to ensure economic growth also led to improve economic welfare. Starting in the 1970s in some countries, and in the 1980s in Mexico, this belief was reversed with a change in ideology and a feeling that the private provision of services is the most efficient means of improving both economic efficiency and social welfare. This paper takes this argument one step further and argues that transfer of assets from the public sector to groups of users is not just a means of increasing overall production but is also a necessity in order to ensure sustainability of publicly developed irrigation infrastructure.

Mexico's willingness to join NAFTA and GATT signifies that there has been an ideological change in the country. It is now felt that the government should not be involved in agricultural production; efficiency and welfare will improve with increased private involvement. Under President Salinas de Gortari (1988-1994), Mexico instituted bold agricultural reforms, including: privatisation of most parastatals; extensive reorganization of the financial sector; elimination of credit subsidies; elimination of marketing monopolies; sharp reductions in public budgets for agricultural research and extension; and gradual transfer of the management of irrigation districts to water user's associations with the introduction of sharply increased fees for irrigation service.

In 1989 the government instituted the National Program for Decentralisation of the Irrigation Districts, or the transfer program, which established a system of co-responsibility between CNA and the water users where the 80 public irrigation systems covering 3.3 million hectares would become financially self-sufficient. The transfer program in Mexico took off even faster than planned. Consequently, by the end of 1995 more than 80% of the 3.3 million hectares of publicly irrigated land in the country had been transferred to joint management. Water user associations have proven capable of operating and maintaining the modules, even up to sizes in excess of 40,000 ha. Water fees that have increased from around \$5/ha to as much as \$40/ha have not only supported the module O&M activities both have also funded most of the activities by CNA staff at the main canal and water source levels. This is a sharp contrast to the situation that existed when the system were heavily dependent upon government subsidies and consequently was deteriorating rapidly due to lack of stable funding.

The number of CAN direct hire staff have been reduced from more than 7,700 to less than 3,000. IN most districts, the systems are being operated with less staff, although in many cases the modules have recruited staff with higher levels of training. The elimination of unionized staff has removed one of the major complains of the farmers. It has been reported that the ability to hire and fire their own staff has improved the responsiveness of the operational staff to the needs of the users. The in no discernible impact of the transfer program in terms of change in area irrigated in the transferred districts. Nor have yields in the transferred areas increased or decreased significantly as a result of the change in management.

There are additional changes the need to be made in the irrigated sector to ensure the program is sustainable over time. The system of water tariffs must be changed so that the districts develop a reserve fund. To do this, they need to shift to a system where the module collects a fixed amount to pay the costs of delivering water. The government also has to clarify the terms of the law pertaining to water concessions. With its population growth rate as well as the structural transformation from an agricultural society to an industrial nation, the competition for water is increasing. Mexico's legal system has to be modified to clearly state what water rights exist for irrigated agriculture and how those rights can be protected against demands for water from municipal as well as industrial users. Without a strong legal system that protects the rights of the modules and districts, irrigated agriculture in the country is not sustainable.

Finally, the decision by the government to remove all subsidies has turned the terms of trade against agriculture. Combined with the impacts of NAFTA, and the resulting cheap imports of grains from the US and Canada, irrigated agriculture is under tremendous economic pressure. In the next decade there will be a need for radical changes in the irrigated areas, as farmers shift to higher valued crops in order to justify the use of the expensive irrigation water and to maintain the infrastructure. These changes will require new agricultural policies, technical assistance and massive amounts of investment in agriculture at interest rates that are competitive with those available in the US, Canada and Europe. Without changes in the water law and the way WUAs change for water, as well as changes in technology and the level of investment, it is uncertain the transferred system will remain sustainable.

Contribution: 7

Keywords: Mexico, Latin America, privatisation, institutions, irrigation management, water management, water markets, NAFTA, Comision Nacional del Agua, GATT

- W

O. Perala and R. Benson, "Water transfers: Can we get there from here?," *Illahce*, vol. 11, pp. 16-18, 1995.

### **Abstract**

Society's values are reflected in how water resources are allocated and managed. It was to society's benefit and desire that decisions establishing present water policies for agriculture, municipal supply, hydroelectric power, fisheries, flood control, and recreation were made. Each generation imposes its value judgments on these policies and shapes them accordingly. With present competition for water resources, more water policy changes are imminent. A currently popular way to seek balance between in-stream and out-of-stream uses is through water transfers. In theory, water transfers allow willing sellers and buyers to market water on a temporary or permanent basis.

Water transfers are not permitted to diminish existing water rights, but they do have the benefit of keeping the priority date of the right from which they were transferred. Water marketing creates incentives for existing right holders to conserve water and creates an opportunity for society to reallocate that water, which is especially important in basins where water is over appropriated.

Contribution: 6

Keywords: Privatisation, water management, institutions, Latin America, turnover.

- W

D. Rivera, *Private sector participation in the water supply and wastewater sector: lessons from six developing countries*. Washington, D.C.: The International Bank for Reconstruction and Development, Directions in development. 83 p.1996.

**Abstract**

Rivera explains that privatisation has emerged as a promising way to improve the performance of public water utilities; expand service coverage and elevate the quality of service; increase operating efficiency; provide alternative mechanisms of financing infrastructure investment; and reduce the burden on public budget. In this publication, Rivera describes the results of six representative experiences with private sector participation in providing these services in developing countries as well as economies in transition. The cities and countries studied by Rivera --Buenos Aires, Argentina; Cancun, Mexico; Cartagena, Colombia; Gdansk, Poland; Conakry, Guinea; and Santiago, Chile - -have different social, political, economic, and institutional conditions. The cases illustrate a variety of different models of private sector participation, from service and managerial contracts to leases and concessions.

The six case suggest that private sector participation in the water and wastewater sector is likely to result in sharply improved managerial practices and higher operating efficiency. However, it is unrealistic to expect the private sector in the short term to overcome all the inherited institutional and operational inefficiencies and to compensate for chronic under-investment by the public sector. Moreover, the public sector has failed to establish clear regulatory frameworks and to implement adequate tariff regimes and subsidy mechanism. The author suggest that complementary reforms are required, specially in the areas of regulation, pricing of services, and financing. Private sector participation has led to improved service quality and expanded coverage. Management has been strengthened, productive efficiency has improved quickly, and sound commercial practices have increased revenues. In addition, water losses have diminished, and attention to customers has improved significantly.

Rivera explains that consolidation of gains and the achievement of additional benefits will require effective institutional transformation and strengthened public administration. The success of reforms will depend on sustained, strong political commitment and on the support of supplementary reforms in three basic areas: more effective regulatory regimes; realistic and efficient tariff regimes, accompanied by direct subsidy mechanism that increase the prospects for political and financial viability of tariff levels and make it possible to provide quality service to the poor; and development of innovative, tailored financial strategies and design of realistic investment programme. To consolidate reforms, efforts must be accompanied by : a sustained, favorable economic environment; legitimate regulatory decisions and effective service provision; improved design of projects and targets; and complementary structural and institutional reforms.

Contributions: 8

Keywords: Water supply, water planning, sewage disposal, privatisation, participation.

- Af

M. Samad and M. A. Dingle, "Privatisation and turnover of irrigation schemes in Sudan: The case of the white Nile pump schemes," .

**Abstract**

Sudan is one of the many countries in transition from a planned to a more market oriented economy. It is one of the few countries attempting to go through the privatisation process without pressure from external sources. Mounting economic difficulties in the country has forced the government to engage in a "load shedding" exercise. The privatisation of the agencies managing the country 's irrigation schemes was part of that endeavor. Privatisation is a complex and costly exercise. This is particularly the case with the irrigated sector of Sudan, given the capital intensity of irrigated agriculture, and the intricate socio-economic and political environment in the irrigation schemes. Moreover, a decade of rigid government control of the economy has stifled the private sector both in the agricultural and industrial sector. The

institutional framework has been structured to cater to the needs of a state dominated economy. Although government had embarked on P&T in 1991, it has concentrated its efforts exclusively on divestiture of the parastatal agencies. It had been somewhat lax about delineating the means of implementing and adopting measures, which would ensure that the new management systems functions effectively. In addition to the highly interventionist policies, the absence of a developed input and product market, high taxation levels and the presence of powerful tenant's union act as disincentives to the private sector participation. The absence of competition may led to private sector entities exercising monopolistic powers which could be detrimental to the interest of the tenants and pave the way for exploitative tendencies to emerge. This problem may aggravate in the absence of formal measures for regulatory oversight of public sector activities. Thus, while providing the right environment for private sector involvement, appropriate mechanisms to safe guard the interest of the tenants should also be in place.

Samad *et al.* mention some constraints to the privatisation process: difficult access to credit; rigid state control of irrigation schemes; a long administrative transference process from the State to private organizations. The author mentions five issues to be considered when designing a management turnover program: The need for a vision: government needs to have a clear vision about the future role of irrigated sector in the economy and a strategy to develop irrigated agriculture. Choosing complementary macro-economic and sectoral policies: the mere change in ownership or management systems will not guarantee the desired results. Institution and capacity building: Before management turnover can take place in countries that have been highly state regulated, the basic foundations for non-governmental entities to function effectively need to be constructed for oversight: The transfer of management of irrigation systems from the public sector to non-governmental entities represents a radical organizational change. This would result in the transformation in production relationship between the farmers and the management agency. The role of the State: Privatisation entails redefining the responsibilities of the state in irrigation management and also the elucidation of the role of the private sector and non-governmental bodies - both at the national level and at the state/provincial levels.

Contribution: 8

Keywords: Africa, turnover, privatisation, water management, institutions.

- As

M. Svendesen and G. Nott, "Irrigation management transfer in Turkey," presented at 6th Annual Conference of the International Association for the Study of Common Property, Berkeley, California, 1996.

### **Abstract**

Since 1954, Turkey has had a legal framework allowing the transfer of management responsibility for public-constructed irrigation schemes to local control. Such transfer proceeded at a very modest pace until 1993, when the program received new impetus and the rate of transfer accelerated sharply. The World Bank played an important catalytic role in this acceleration and since that time, the program has successfully transferred about 1 million hectares to local management. The purpose of the study on which this paper is based was to document the process of transferring management responsibility for state-run irrigation schemes from the state hydraulic agency, DSI, to local institutions, assess impacts, benefits, and costs, look ahead to potential future problems and challenges, and identify factors which have facilitated the transfer process.

The study was carried out early 1996 by a team consisting of the two authors and three staff members of the DSI Operation and Maintenance department. Prior to the field portion of the study, a list of data requirements was prepared and forwarded to DSI. Although not all of the data requested was readily available, a large share of it was provided to the team during the field portion of the study.

Following discussions and meetings in Ankara, the study team traveled to three of the four pilot transfer regions in the country visiting regional, branch, and scheme level DSI offices, 20 irrigation associations, an irrigation scheme transferred to and operated by a municipality, a groundwater irrigation scheme operated by a cooperative, and a private village irrigation scheme. The bulk of the analysis and writing of

the study report was done in Turkey and discussed extensively with DSI team members. Written comments from DSI were also incorporated into the final report.

Contributions: 7

Keywords: Turkey, water management, irrigation management, privatisation, participation, turnover, World Bank.

- As

M. Svendsen and G. Nott, "Irrigation management transfer in Turkey: Process and outcomes.," presented at International Workshop on Participation Irrigation Management: Second Generation Problems., Cali, Colombia., 1997.

### **Abstract**

Svedensen *et al.* explain that Turkey began an accelerated program of transferring management responsibilities for large irrigation systems to locally controlled organizations in 1993. Within three years, the DSI, had succeeded in transferring nearly one million hectares, or 61% of the publicly managed irrigation in the country, to local government units or to special purpose IAs created at the local level. Important motives driving this fast-paced implementation were the rapidly escalating labor cost; a hiring freeze on government agencies; and the consequent concern over the agency's ability to operate and maintain systems serving the expanding irrigated area for which it was responsible. Additionally, World Bank pressures for improved cost recovery provided added impetus for change and Bank funded study tours to Mexico and elsewhere gave DSI managers a vision of what could be accomplished through a program of management responsibility transfer to locally controlled organizations.

The authors added that the transfer program was undertaken with existing DSI staff, and was implemented in the field by regional DSI, O&M Division personnel. A defining feature of the program was the approach of initiating action through existing local government structures and leaders rather than through a campaign of grass-roots organization of farmers. In this respect differs sharply from many of the management transfer efforts, which preceded it, especially those applied in Southeast and South Asia.

The size of the units transferred averaged 6,500 hectares -much larger than the units organized to receive management responsibility in places like the Philippines, Indonesia, and Sri Lanka in the 1980. The organization structure was a unified one, not the federated type found in large indigenous systems such as those in Nepal. Organizational structures are similar, in some respects, to those districts in the United States, Canada, Germany, New Zealand, and Australia, and drainage districts in the Netherlands. There are strong similarities to modulo organizations in Mexico.

The second generation challenges for DSI include the difficulty following transfer in reducing overall staff levels in general, and O&M staff levels in particular; the absence of a charging mechanism for bulk water supply to IAs, and the consequent absence of an economic restraint or demands for water; and the indistinct vision of a new role for the agency in supporting existing irrigation the post-transfer era. New problems for IAs, according to the authors are: the undefined water rights in Turkey, and the consequent insecurity of their claim on irrigation water; restricted options for obtaining heavy maintenance equipment; the lack of a legal basis for forming federations of IAs for joint purchasing and supply "lumpy" services such as equipment maintenance; the lack of a clear de facto policy on capital cost sharing for rehabilitation; the need to increase direct farmer participation in IA governance and reduce dependence on village and municipal leaders in filling IA leadership roles; and weak support service system for IAs in some areas and regions.

Contributions: 7

Keywords: Turkey, privatisation, participation, water management, institutions.

- LA

D. L. Vermillon and C. Garces-Restrepo, *Results of management turnover in two irrigation districts in Colombia*. Colombo, Sri Lanka: International Irrigation Management Institute, Research Report 4. pp 32 .

### **Abstract**

The authors explain that most farmers see turnover as having produced a more responsive and cost-efficient management. Most, however, favor continuing a limited role for the agency, primarily in providing technical advice and in helping with resolving disputes. The majority believe that the association should own the irrigation infrastructure. However, most farmers appear satisfied with the performance of O&M. Many believe that management performance, especially cost efficiency, would have improved even more had the users been granted full control over staff and budgets after turnover. Association board members perceived that the partial turnover brought only partial benefits. Professional staff in the districts are less sanguine about the results, expressing concern that cost-cutting measures are compromising the quality of O&M. The agency was concerned about the implication of turnover on agency staff and budgets.

The authors explain as a main results: (1) Management turnover achieved the government's objective of discontinuing subsidies and making the districts financially self-reliant for O&M. (2) The districts have been only partially successful in containing costs. Staff levels have been reduced 35 percent since transfer. However, the cost of irrigation remained relatively constant for a decade after turnover. (3) Nineteen years after the transfer, only 2 percent of total canal length in Coello and 8 percent in Saldana were dysfunctional (4) Because the government retained ownership of the scheme assets, farmers insist that the government should finance future rehabilitation and modernization . Neither association is raising a capital replacement fund. (5) After turnover, farmers' associations established new crop rotation and irrigation scheduling arrangements designed to permit extension of irrigated area while decreasing the average amount of water delivered per hectare. (6) It is apparent that the transfer did not inhibit long-term expansion of the area irrigated or the ability of irrigated agriculture to sustain high levels of rice yields. (7) Increases in the gross value of output per hectare and per unit of water increased dramatically, while the cost of irrigation to farmers remained roughly the same after turnover. Irrigation constituted a relatively small and declining proportion of the total cost and value of production.

Contributions: 8

Keywords: Colombia, privatisation, participation, water management, development.

- LA

R. A. Young, "Irrigation service fees for irrigation modules in Mexico. Report of consultancy," , Colorado, USA., Consultancy January 31, 1997.

### **Abstract**

The author explains in this publication that the government of Mexico has in recent years instituted a transition from centralized ownership and management of the nation's irrigation system to a policy of transferring the management of irrigation water supply to a regime of co-responsibility between the government and water users. The new policy was a response to a major decline over the last several decades in the proportion of water system administration, operations and maintenance costs actually paid by water users. The decentralisation initiative was primarily designed to reduce the burden on the central government's limited finances and make the public irrigation system more financially self-sufficient, more operationally efficient and more responsive to water user needs.

The author conducted the consultancy during a ten working days in December 1996 and January 1997 working with IIMI staff in Mexico. He explains that the report addressed for central topics: the elements to be included in irrigation services fees; suggesting a methodology for combining these elements to determine the level of fees; identifying alternative scenarios to address various levels of cost recovery ranging from covering day to day O&M costs through covering future rehabilitation and modernizing of the infrastructure; providing suggestions for future research on the optimal level of maintenance.

Young concludes his report highlighting that little research attention has been directed to the questions of optimal expenditures on irrigation systems, and to the associated issues of cost recovery. He suggested to collect and analyse more detailed econometric data; to model studies to determine optimal replacement and improvement policies; to compare estimated fees with economic value of irrigation water.

Contributions: 7

Keywords: Economic value, Mexico, Latin America, water management, economics, irrigation, IIMI.

## Chapter II.

# Management of international river basins

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According to the information reviewed in this study, nearly 20% of the total number of publications analysed (Table 2) discusses the opportunities and constraints for sustainable use of and management of the water resources by the riparian countries using the water of the same basin. To facilitate the analysis of the information, this section is divided as follows: International, Asia, Africa, America and Europe.

**Table 2. Publications analysed on International river basins.**

<b>Geographical area</b>	<b>Number of publications</b>
General approaches	24
Asia	22
Eastern Asia	1
Middle East	10
Southern Asia	8
Southeast Asia	3
Africa	6
America	4
Europe	4
<b>Total</b>	<b>60</b>
<b>Percentage/300</b>	<b>20%</b>

**International.** Authors like Ward (1997), Johnson (1998), Foster (1998), Baechler (1999), Biswas (1999a and 1999b), Donahue and Homer-Dixon (1999), Oliveira (1999), among others, explain that it is difficult realistically and objectively to assess the need for water in a shared river basin because water problems seldom occur as a single issue. Water demands, use patterns and management practices are closely linked to many interacting social, political, economic, cultural and environmental factors. Accurate assessment of water availability (both in terms of quantity and quality) in international basins are mostly not available. Even when data are available, they are often inaccessible because of political reasons (governments can sometimes provide erroneous and/or deliberately skewed information because inter-country negotiations), institutional inertia, or even national security considerations. Reliable water use and requirement data are often unavailable, and if available, their relevance is difficult to judge because of no linkage to cost of water. It is thus difficult, if not impossible, to draw reliable conclusions on water scarcities or abundance of the basin in terms of needs.

Water issues in international basins are often struggles to get strategic control of the resources of the basins. Baechler (1999) claims that the water problems present in poor countries is a manifestation of larger issues like internal injustice and unfair distribution of wealth. Water is one of many problems which developing countries are facing; it is difficult to identify precisely which problems are due to water scarcity and which ones are due to social, economic and political inequalities. During the past two decades, water has often been claimed as a root cause of international conflicts, but the countries concerned continue to suffer from important problems like over-population, food and energy shortages, and lack of employment in this income. All these problems are complex and interrelated, and the governments have not been able to implement equitable and sustainable solutions.

Water availability is many times an issue that is directly related to power and resources distribution. Dams and irrigation systems may be present in places where people have resources to pay for them. Water scarcity may only be due to the nature of rainfall, absence of perennial rivers, increased population and climate change. Water scarcity often can be by-product of inefficient water management practices. Equally, water delivery systems may provide water for some at the cost of others. Thus, water scarcity

could be induced by inequitable social systems. Throughout history, water has often been considered to be as an important strategic resource in terms of military and economic considerations.

The national and international agencies need to be aware of the importance of having reliable data on water which should also be easily accessible to those who require them. Accuracies of existing national and international data are seriously questioned. In the absence of such data, it is not possible to know with any degree of certainty how much water is available and can be used. International and national agencies have many times given little service to developing accurate and accessible databases and establishing ways for equitable water distribution. Absence of reliable data further complicates efficient management of international river basins.

In spite of many journalistic publications which argue that future wars may be over water, it is hard to find clear historical or contemporary example of a major war that was motivated mainly by scarcity of fresh water. There is no convincing evidence that wars in the coming years between nations could be primarily over scarcity of water. Water could be tertiary cause from war; it is highly unlikely to be a primary or secondary cause.

In addition, there appears to be a lack of administrators and managers who are familiar and knowledgeable on issues that affect water resources planning management programmes in international river basins. Development of successful programmes need planners, managers and administrators who have considerable expertise and experience not only with techno-economical approaches and problems but also are familiar with social environmental, legal and political issues. Many times, good development programmes fail because the technocrats who prepared them have limited knowledge, inadequate management experience and/or poor decision-making skills. In some cases, highly trained technocrats are dependent on the decisions of administrators having no appropriate knowledge-base. Some times, the administrators are political appointees, whose main qualification is their close personal relations to political people in power, and not necessarily their capacity to perform the tasks.

Habitat (1996), Ait-Kadi (1997), Gleick (1998), among others, highlight the urgent need to develop conservation policies regarding aquatic ecosystems and the extinction of species. They state that it is mandatory to find solutions to diminish the millions of deaths from water related illnesses and to attenuate the growing risk of regional and international conflicts over scarce, shared water supplies.

Kaufman *et al.* (1997), Murakami & Musiaka (1997), ADB (1998), IADB (1998), Salman (1998), van Hofwegen (1998), the University of Kalamar (1999), point out that several strategies and models for the resolution of transboundary water conflicts decision making are now available to facilitate agreements between countries in dispute. However, most of these strategies and models are generally academic in nature; examples of their successful use under real world resolution of conflicts are really very few and far between. International agencies like IADB have conducted evaluations and assessments of water resources, infrastructure and policies in IADB countries members in Latin America and the Caribbean. The objective of these evaluations was to learn in what extent members are fulfilling the IADB goals and objectives. If the objectives have not been achieved, IADB may provide resources to ensure better results. Enhancing international cooperation and furthering the promotion of proper regulatory frameworks for international watercourses is a fundamental requirement for better water management and use.

Habitat (1998) urges consideration of the economic value of water in policies and decision-making structures, and encourages the development of initiatives, programmes to regulate, administer and conserve water. This includes issues like water pricing and conservation. The World Bank (1995) argues that many irrigation programmes have been successful and have contributed to improved food security. This may have made food more affordable for all, and most notably for the poor. The Bank has given considerable emphasis to the maintenance of irrigation systems. These are of course issues that are equally applicable to international and national river basins.

**International river basins of Africa.** Ohlsson (1995) and Habitat (1997, 1999) suggest that politicians should be aware of water conflicts in the continent, and they recommend capacity building for water management and support for water transfer policies. Even though they support privatisation, they

recognize that it could lead to political conflicts that need to be assessed before the implementation of privatisation policies. For example, it is necessary to find out how privatisation model fits in the social, economic and political environment of the African countries. It is equally necessary to determine how the overall population would be affected by the nearly-instituted privatisation policies, positively or negatively.

Most African countries, need to establish efficient mechanisms for water use and management programmes. The lack of public participation to formulate and implement water policies and projects, and the government in managing the water sector are highlighted. These publications also see water as an issue of national security. This, therefore has the potential of creating human misery. With reference to one of the largest international river basins of Africa, the Nile, Al-Atawy (1996) and Fahmy (1996), note that historically Egypt has had political control over the Nile Basin because of its economic and military power. Egypt has a treaty with Sudan to share the Nile waters, but similar treaties with other Nile Basin countries currently do not exist. While some discussions are taking place between the Nile Basin countries at present, there is no sign in the horizon that a treaty between all the Nile Basin countries would be possible in the future. On the basis of present evidence, even an agreement between the three major countries of the Lower Nile do not appear to be likely in the coming years. Economic, social and political factors would be the main issues which may hinder development of a Nile Basin treaty.

Swatul (1996) describes the close linkages between water and energy for Southern Africa. The South African government is struggling to end the inequities that have resulted from its apartheid policies of the earlier years. South Africa needs considerable water and energy, which are not available within the national borders. Considerable collaboration is now taking place between the countries of Southern Africa in terms of development of new potential sources for major hydropower.

**International conflicts within Asia.** On the basis of the current review, it appears that the most important problem in terms of management of international river basins are located in the Middle East and the international South Asian countries. In the last five years, also has been a growing concern on water resources of Southeast and East Asian countries.

Several national governments and international agencies like the Asian Development Bank, have been supporting research and awareness programmes. In addition, other organisations like the Third World Centre for Water Management and the International Water Resources Association (IWRA) have been successfully working on promoting collaboration between countries on major international river systems like the Ganges-Brahmaputra-Meghna and the Salween. In general, however, professional organisations like the Third World Centre and IWRA have made more progress in terms of getting the countries together in problematic river basins like the Ganges Basin, the Third World Centre and IWRA have made considerable progress through a Track II process, where most of the actors are from Track I. Since this model appears to have considerable potential in terms of conflict resolution on international basins, it deserves accelerated attention.

**International river basin of the Middle East.** Based on documents analysed for the Asian continent, it is clear that the international river basin of the Middle East and South Asia are receiving the maximum attention. This fact is reflected in the extensive documentation that are available for these regions. Some of the documents analysed assess the problems of the Middle East water by reviewing the past history of the area. They review the cultural, historical and religious background of the region to explain the root and basis of the current water conflict between the various countries. These authors make recommendations for the possible resolution of the conflict which are strongly linked to historical perspectives.

Al-Joyyousi and Shatanawi (1995) explain that even after 30 years, the riparian countries of the Jordan River lack of a coherent water policy to meet the demands of all competing countries and sectors. In all these years, the dominant or even the exclusive focus has been on improving physical infrastructures and increased groundwater exploitation. They argue that countries like Jordan must give priority to the efficient management of water resources at the regional level. This would include institutional restructuring, formulation and implementation of water pricing strategies, and desalination, and development of new

sources of water. Efficient water use and promotion of water conservation are also important policy instruments.

Wolf (1996) notes that considerable efforts were made during the past 40 years to keep water issues out of politics conflicts in the Middle East have been overwhelming, and it has not been possible to keep water out of politics. In fact, water has become a political issue, even though problems such as water rights and water allocation are not considered to be high priority issue, especially when compared to other contentious issues.

In contrast, Deshazo (1996) and Bilen (1997), point out that water should not be seen as a source of conflicts, rivalries or disagreements in the Middle East. Many times, water problems and issues of the area are overestimated by the political process and institutions due to many reasons. Water problems, they argue, should be considered in terms of their own requirements. Water scarcity problems should not be confused with political, economic or social conflicts which are mostly caused by many different factors, where water is not a major issue.

Several authors suggest changes should be made in terms of how water policies were developed and implemented. New approaches should focus on the use of water for each specific country, and need not consider the integrity of the Jordan Basin as a whole as the primary requirement. They argue that the international agencies could play a strategic role by encouraging agreements and programmes among riparian countries. This is because such agencies can continue to work even when the political environment in the region does not allow national governments to continue to consider water-related issues on a priority basis.

**International river basins of South Asia.** Verghese (1999) notes that in spite of the richness of the Ganga-Brahmaputra-Barak Basin, it contains the world's largest poverty and hunger belt. An equitable and beneficial utilisation of the potential resources of the region would benefit hundreds of millions of poor people. This, however, would require a major social, political and institutional transformation in each country, which though difficult, can be achieved. Water issues are only one component of the development problem that have to be solved by the five countries sharing the Basin.

Peaceful and friendly negotiations and eventual collaboration between the five countries sharing the basin are essential to identify the best solution for sustainable water development and the resulting poverty alleviation of the basin. Diplomacy and negotiations between the co-basin countries should be improved to find efficient and timely solutions. The authors highlight that water problems are submerged within political disagreements, between countries and national politics. This makes efficient management of water and related resources a very difficult task. Water problems are thus often problems are relegated to lower priority levels because of political and economic concerns.

The issue of food security is an important consideration for South Asia, and this of course has major implications in terms of water use of the region. Waterlogging and flooding in the Asian countries impact on food availability and health and economic security of the poor. Extension of irrigated agriculture adversely has also led to water contamination by agricultural chemicals. It is important to assess and include water contamination issues to make national policy decisions, and then to take appropriate measures to prevent water pollution. Proper water quality assessments are essential to establish conservation policies and measures. Decisions (both in terms of quantity and quality) makers need to consider the real magnitude of water problems and then work on finding solution. Politics without technical knowledge will not solve water problems and constraints.

While considerable literature exist on management of international rivers, management of international aquifers is a neglected issue in all parts of the world. Furthermore, struggles for water often become struggles for power in shared river basins. Water means economic development, health, sovereignty, agricultural production, electricity generation, national security, and military strategies. The country controlling water resources of an international river basin may be able to control the destiny of other nations which depend on the same resource.

**International river basins of the Americas.** Information about water policies and international conflicts in the American continents was founded regarding the struggles in the borders of Mexico and US. The border has always been a focus for economic production, increased migration, and environmental deterioration. These problems have increased significantly after the North American Free Trade Agreement (NAFTA) of 1994. The establishment of “maquiladoras” in the north states of Mexico has increased overexploitation of water and water contamination. The problems have continually worsened during the last six years. There are considerable disagreements between both Mexico and US in terms of who is responsible for pollution of the water, who is using it, and who is going to pay for cleaning and preserving it.

Considerable work has been carried out (significantly more in the United States compared to Mexico) on border waters management and conservation. Border areas of Mexico are now the most rapidly growing areas of Mexico, with concomitant increases in water requirements and water contamination. However, these issues are still not properly reflected in national policies.

**International river basins of Europe.** ECE (1996) has made a serious effort to coordinate regional approaches to protect and sustain the use of transboundary waters. ECE countries have defined national strategies for water protection. There is a consensus among the ECE countries in the application of economic principles for water management. Countries have agreed to complement pollution control measures and to work towards ecosystems restoration.

With reference to Eastern Europe, Fitzmaurice (1996) explains that water has been and will continue to be an unevenly distributed resource, which can be used to control and dominate dry regions and countries in need of this resource. He confirms that there is a close relation between power structures, social status, and water.

In Central Europe, Kobori (1998) explains that Dead, Aral, and Caspian Rivers are in a crisis, and for the next 25 years, this crisis is expected to get worse. Hamdy (1999) points out that among countries sharing the Mediterranean Basin, the concerns are more focused on economic approaches, political conflicts, and power conflicts than actual problems caused by water distribution, use and management.

## Summaries

- W

M. A. Ait-Kadi, A. Shady and A. Szollosi-Nagy. Eds. *Water, the world's common heritage*. Proceedings of the first World Water Forum, Marrakesh, Morocco. Oxford, UK. Elsevier Science. 21-22 March. 1997. p 208

### Abstract

The objective of the Forum was to raise the level of awareness of the urgent need for improved water management and policies around the world. The book provides a general discussion and viewpoints on issues like sustainability, historical background of water policies, water management, supply and sanitation, environment, privatisation and challenges for the 21<sup>st</sup> century. The papers are basically lectures given on the Marrakesh Forum, and are published virtually with no editing toward the next century.

Contributions: 6

Keywords: water management, water use, water administration, international water policies.

- Af

Al-Atawy, M. H. (1996). “Nilopolitics: a hydrological regime 1870-1990.” *Cairo Papers in Social Sciences* 19(1, Spring): 62.

## **Abstract**

The historical background of the Egyptian control over the Nile Basin is analysed. When Britain consolidated its power in Egypt, it needed to exclude other European powers from threatening the flow of the Nile water. This was one of the major reasons why Britain established an international regime on the Nile. The regime was concerned with guaranteeing the flow of water to Egypt. It did not address water usage by riparian countries. With the establishment of the British rule in the Sudan, a new regime was developed to guarantee the satisfaction of the needs of riparian countries in a peaceful manner. Within the regime developed, Britain acted as a moderator, that is, exerting pressure on all riparian parties to moderate their demands and pressuring Egypt to accept such moderated demands. In this way, Egypt upheld its right to utilize the water of the Nile and provided the verification procedures to check the water usages of other riparian states. It also effectively granted Egypt the right to veto new water projects on the Nile. Thus Egypt played an increased role in the Nile water management regime, especially by providing financial and technical resources. With time, the role played by Egypt increased after the 1952 revolution, when Egypt replaced Britain as the leader of the regime.

The author explains that Egypt's leadership depended mainly on its ability as a lower riparian state to block finances to other riparian states. Egypt also threatened to use military force when it lost its veto power over financial resources to other riparian states. Other actors in the regime complied with it because of their need for Egypt's approval for the water projects and/ or their inability to generate required financial and technical resources. Within this context, Egypt has been able to maintain its authority over the Nile river regime up until the present.

Al-Atawy explains that the Egyptian control over the Nile is changing and the current way of controlling should be modified to fulfill the needs of the increasing population. Specifically, it is likely to change the status quo, power relationships and water uses that until now have been practiced by Egyptians. To keep control over the Nile Egypt may even use force. However, the high political price that this measure implies will make force a resource to be used only for very extreme cases.

Currently, other co-basin are less willing to keep the Nile River regime as it is. An alternative regime is likely to be established in the future.

Contributions: 6

Keywords: Water and power, Egypt, Nile River, Africa, water policies, international policies.

- ME

O. R. Al-Jayyousi and M. R. Shatanawi, "An analysis of future water policies in Jordan using decision support system.," *Int. J. Water Resour. Develop*, vol. 11, pp. 315-330, 1995.

## **Abstract**

Despite looming water shortages in Jordan, the country lacks a coherent water policy and has no recognized institutional mechanism to create one. During the last 30 years, this critical problem has largely been addressed to physical infrastructure development in the public sector and groundwater exploitation in the private sector. These efforts are now not been able to meet the increasing demands of all the competing water use sectors. The possible future water policies of Jordan are analysed using decision support systems. An analytical hierarchy process is used to break policies into component parts, then synthesize and analyse them in the context of constraints and scenarios in Jordan for the year 2010. It is argued that Jordan must give priority to the efficient management of water resources at the regional level. This includes institutional restructuring, new water pricing strategies, importation of water, and desalination of sea.

Contributions: 6

Keywords: Jordan, water policy, decision-making, water shortage, water demand, water management, water-resources, water conservation.

- W

T. Allen, "Avoiding war over natural resources," in *Forum on War and Water*. Geneva, Switzerland: International Committee of the Red Cross, 1999, pp. 14-19.

### **Abstract**

It is a universally held belief that surface water that crosses boundaries is prone to dispute. In the arid Middle East and North Africa, where water symbolizes national security, the general tendency is to perceive water as a prime factor in determining the course of regional relations between the countries concerned. Since about 90% of the usable water in the region crosses one or more international borders, such an assumption is understandable. However, even though water may be important in international relations, its role in bilateral and multilateral international relations is complex and not easy to determine. This is because water issues are always linked with other factors. Water conflict is often more of a struggle to get power and to get the strategic control of the resources of the concerned basins.

Contributions: 8

Keywords: Water wars, water management, international relationships, water policies.

- As

Anonymous. International seminar on water resources management and development in Bangladesh with particular reference to the Ganges river. Seminar proceedings. Dhaka, Bangladesh. Ministry of Water Resources. Government of the People's Republic of Bangladesh. Government of Japan. The World Bank. Asian Development Bank. 8-10 March. 1998. P 236.

### **Abstract**

The seminar was organized to discuss the water resources management in Bangladesh with particular reference to the Ganges river to assist the Government of Bangladesh in developing appropriate approaches to meet the needs of the Ganges dependent area of Bangladesh (GDA), and to explore the possibility of basin-wide co-operation among the Ganges riparian countries in the light of the historic Ganges Water Sharing Treaty signed in December, 1996 by the Governments of Bangladesh and India. The importance of basin-wide planning as a means of achieving optimal water resources development of a hydrological unit was highlighted. However, it was also noted, that basin-wide planning especially for very large international basins takes a long time and requires the effort of all the co-basins countries. As such, it should not be a strict requirement for the solution of urgent water problems in the GDA .

The Seminar reached and initiated the following two main conclusions: take immediate advantage of the opportunities provided by the signing of the historic Ganges Water Sharing Treaty, a programme for dredging of the Gorai River should be taken up as soon as possible to provide some immediate alleviation of the environment degradation of the GDA. This should be accompanied by baseline and monitoring surveys on the effects of additional freshwater on salinity intrusion. They also agreed to establish the basis for optimal use of the Ganges waters made available under the Treaty; further studies should be undertaken as a matter of urgency. These studies should determine the water-related social and environmental needs of the GDA. These studies should determine the water-related social and environmental needs of the GDA. The studies also assess the technical and economic viability of different options, including a barrage across the Ganges, for restoring the environment and promoting social and economic development in the GDA. The National Water Management Plan will identify during the inception Phase the detailed requirements and programme for these studies and, following agreement with the Donors, will subsequently undertake them as a top-most priority. (3) There was also agreement to build on the success of the Ganges Water Sharing Treaty and the Mahakali Treaty, it is desirable to continue the process of cooperation within the region over a broad range of development issues. The Sub-regional Development Quadrangle provides a possible framework for strengthening co-operation among the participant countries.

These proposals were formally adopted in the closing session and received the endorsement of all cosponsors of the Seminar as well as representatives of both India and Nepal. Pledges of full support

were received also from representatives of the government of the Netherlands, Italy, the United Kingdom and from the Islamic Development Bank and the Kuwait Fund.

Contributions: 7

Keywords: water management, Bangladesh, Nepal, Ganges river.

- As

W. L. Arriens, J. Bird, J. Berkoff, and P. Mosley, "Towards effective water policy in the Asian and Pacific Region. Overview of issues and recommendations," vol. One. Manila, Philippines: Asian Development Bank, 1996,. 328 p.

### **Abstract**

The Asian Development Bank (ADB) is formulating a water policy to improve its support to developing member countries in the region to manage their critical water resources problems and improve their water services to meet increasing demands. Preparatory analysis among the ADB staff began in 1993, and a consultation process with the appropriate stakeholders began in 1995. The key stakeholders involved are developing member country (DMC), government agencies, private sector and non-government organizations, and regional experts; representatives from external support agencies and other member countries and the ADB staff.

The publication contains the lectures, discussions, conclusions and recommendations of the consultation process, which had its first workshop in Manila on 10-14 May. The Proceedings recommend a set of seven principles to the governments in the region, and seven general strategies for effective water sector development. These strategies and recommendations are recommended to be applied according to the specific conditions and development context of each country.

Contributions: 6

Keywords: Asia, water management, water allocation, Asian Development Bank, water conservation, water policies, water institutions.

- As

Asian Development Bank, *The Bank's policy on water*. Manila, the Philippines: Asian Development Bank, Working Papers. 15 p.1998.

### **Abstract**

The paper was developed through a process of in-house analysis and dialogue among the ADB staff in all departments and offices concerned with the topic. This was followed by extensive consultation with other policy stakeholders. The consultations included the Bank's developing member countries (DMCs), with participation from governmental, private sector, and NGOs, other external support agencies, including various United Nations agencies, Inter- American Development Bank; sector; international research institutes,; and experts from the region and beyond. The consultation process started in 1995 with the circulation of a discussion paper on issues and opportunities, and the Bank's Interdepartmental Water Policy Group has guided the process. The Bank has adopted a participatory approach in the preparation of this policy, in view of many stakeholders concerned with water policies and projects. The expectation is that the resources invested the consultative process in would help to build the commitment to implement effective water policy in its DMCs, through a process of continued consultation, partnerships, reforms, investment, and capacity building.

The document is based on an analysis of the water management policies, including promotion, implementation evaluation of the new programmes.

Contribution: 6

Keywords: Asian Development Bank, water policies, development, Philippines.

- W

G. Baechler, "Violence through environmental discrimination," in *Forum. War and water*. Geneva, Switzerland. International Committee of the Red Cross, 1999, pp. 20-23.

**Abstract**

The author explains wars over natural resources are present in already poor countries with internal injustice and unfair distribution of the country's wealth. It is difficult to determine in what extent water is the real cause of the internal conflicts and not to the social and political inequalities present in poor countries. In the recent years international conflicts have targeted water as the main cause, but another time those, conflicts have been present among poor countries with problems of overpopulation, struggling with food shortages and where government have not been able to find solutions.

Contributions: 8

Keywords: Water conflicts, international policies, water allocation, equity, water policies, water management.

- LA

C. R. Bath and A. Petit, *Who owns the water? A case study of El Paso del Norte*. Madison Wisconsin: The Land Tenure Centre, University of Wisconsin, Working Paper No. 23. 31 p.1998.

**Abstract**

El Paso del Norte was the name used by both Spanish and Mexican administrators for the region encompassing El Paso, Texas, Ciudad Juarez, Chihuahua, and Dona Ana County in New Mexico, including the city of Las Cruces. It is increasingly the name applied currently to what is well recognized as a regional economy. Most of the economy is based on trade, which has increased substantially since the signing of the North American Free Trade Agreement in (NAFTA) in 1994, Another recognised economic integrative factor is the booming maquiladora industry, which has substantially increased since NAFTA went into effect. As a result of industrialization and migration, the population of El Paso del Norte has also increased, well over 2 million people at present . With both a booming economy and increasing migration, it has become quite evident that the region shares common environmental interests, especially increased environmental deterioration, which was prominently featured through the NAFTA debate. Air and water pollution, damages to natural resources, and disposal of wastes were all hotly debated during the trade discussions. This eventually led to the signing of a side agreement to alleviate the fears of the border residents that their environment was going to deteriorate significantly due to increased trade and unmanaged urban growth.

More attention should have been paid during the NAFTA discussion to the issue of water availability to sustain high economic and problem growth. All along the border, the population growth rate has placed increasing demands on water availability. It is evident in San Diego/ Tijuana, Mexicali/Calexico, in both Nogales, and other twin cities located in the arid to semiarid regions of the border. Nowhere is the water problem more acute than in the El Paso del Norte region. If the current trend continue, the major sources of water for both El Paso and Ciudad Juarez, the Hueco Bolson, are likely to be exhausted during the early part of the 21st century.

The authors reviewed the report of the Western Water Policy Review Advisory Commission which, in diplomatic terms and without offending anyone, considers all the major issues associated with water rights and uses in the Upper Rio Grande Basin, defined as that part of the river from the San Luis Valley in Colorado to Fort Quitman, Texas. They review historical development over water use and water rights and briefly discuss the major characteristics of El Paso del Norte that have and will have impacts on water availability and use. The positions of the major stakeholders in the Basin are analysed, which particular attention to their legal indications. The possible alternative outcomes of the continuing struggle over water are described.

Contributions: 7

Keywords: Latin America, water management, water markets, water allocation, water prices, pollution, North America, WWPRAC.

- LA

F. A. Bernal, *Tenencia de la tierra y recursos hidráulicos en la región fronteriza Mexico-Estados Unidos: El Valle de Mexicali*. Madison. Wisconsin: Land Tenure Centre. University of Wisconsin, 33 p.1995.

**Abstract**

The paper provides a historical analysis of the land tenure process and its evolution in Mexico. There are linkages between the land tenure issues and irrigation management established during the past decades. Current to the changes in the land tenure policies in Mexico, irrigation projects were implemented and/or improved to support the irrigated agriculture in the northern part of the country. Land tenure and agricultural policies were changed during the administration of President Salinas, these changes had major implication on irrigation management, privatisation process and users participation.

Special attention is given to water uses in the border areas between Mexico and USA in the Valle de Mexicali. The conflicts and disagreements on who uses water, property rights and who should pay for water conservation are analysed. Privatisation policies play a critical role in irrigation management and in water pricing, allocation and conservation practices.

Contribution: 5

Keywords: Land tenure, irrigation management, property rights, water allocation, water markets, Mexico, Valle de Mexicali.

- ME

O. Bilen, *Turkey and water in the Middle East*. Ankara: Southeast Anatolia Project. regional Development Administration, 223 p.1997.

**Abstract**

The book has three parts, the first one includes topics about the historical background that shaped the Middle Eastern Map. This focus starts with World War I, since that was when the main changes in the map were instituted. The chapter explains the political conflicts that gave birth to Iraq and Syria, and the conflict with Palestine. The second chapter is focused on the hydro-political and technical assessments of the water in the area. The author makes an analysis of the Euphrates and Tigris Basin, the hydrological features of the basin, the impact of dams built in Turkey and the utilization of water by each country constituting the Middle East. Bilen analyses of water use, management, and needs as well as possible conflicts over water between Palestine, Syria, Iraq and Turkey. Demographic data such as current population and projections are included as are demands for water in the future. The roles of agriculture and desalination and their impacts on water availability are analysed. Proposals are made to solve the water conflict among countries an explanation of the origin of the political conflicts regarding water use. Global water problems due to population growth, are examined, as are their financial and issues like public participation, privatisation, water pricing, economic value of water, and efficiency and conservation issues are examined.

Discussion on water resources measurement of the Middle East, generally emphasize potential conflicts. It is a widely accepted that the region as a whole is heading towards a critical shortage of water, and it is often suggested that the use of existing water resources is by itself a reason for such potential conflicts. He argues that the alarming and pessimistic prognosis of the future of the water resources of the region should not necessarily be gloomy. The prognosis may be considered useful, as long as they serve to focus attention on the real problem, However, once this is done, one should not fall into the trap of becoming prisoners of simplistic conclusions, but should rather question their validity.

The water problem of the Middle East is generally conceptualized as an unified regional issue. However, any serious attempt to treat such a region as a unified whole and to search for solutions to the problem

may not correspond to the existing geographical, economic, social and political realities. Such an approach may render the issue too complex, for any realistic and implementable solution. Bilen explains that the uses and decisions Turkey has made concerning water of the area are based on technical facts. Turkey's technical decisions concerning water use do not, have any political or economic intention to harm other countries of the region. Turkey realises that the Tigris-Euphrates Basin needs efficient management, and they are trying to provide it. Political and economic interests attributed to Turkey cannot be supported by facts.

Contributions: 6

Keywords: Middle East, water use, water regulation, international regulations, Turkey, Palestine, Iraq, Syria.

- W

A. K. Biswas, "Water crisis: current perceptions and future realities," presented at Federation Internationale de Ingenieurs-Conseils (FIDIC), The Hague. The Netherlands, Association of Consulting Engineers of the Netherlands (ONRI). 1999.

**Abstract**

The role international organizations like the United Nations have played during the 1990s and the impact the International Conference on Water and the Environment in Dublin and the UN Conference on Environment and Development at Rio de Janeiro, both held in 1992 are analysed. The contributions of both conferences and international organizations like the United Nations have been minor to the understanding and solution of the water crisis. The Dublin conference was poorly organized and planned, and its real impacts, if any, have been marginal. During the 1990, the UN basically lost its leadership in water issues. In its place, other institutions like The Stockholm Water Symposium have taken over the leadership and have introduced water issues to the international agendas.

The current approaches to manage water problems leave much to be desired. International organizations should be more accurate in their evaluation of water availability and future uncertainties. The reliability of data from which international institutions are making projections for the future is seriously questioned. Reliable data on water, both in terms of quantity and quality, simply does not exist at present. From incomplete and unreliable data it is not possible to make any projection of the future water shortages. Economic approaches to make management have not received enough attention. Countries worldwide need to find effective ways to monitor water quality. Water reuse needs more attention.

Contributions: 9

Keywords: United Nations, International Conference on Water and the Environment, Dublin, United Nations Conference on Environment and Development, Rio de Janeiro, The Stockholm Water Symposium, World Water Council, Global Water Partnership, World Commission on Water.

- As

A. K. Biswas and T. Hashimoto, "Asian International Waters. From Ganges-Brahmaputra to Mekong," in *Water Resources Management Series: 4*, A. K. Biswas, Ed., First ed. Oxford, UK: Oxford University Press, 1996. 289 p.

**Abstract**

The document is the result of the forum of international waters in South and Southeast Asia conducted in Bangkok, Thailand, 30 January-1 February 1995. The focus of the forum was to discuss, in a open and friendly environment, the political, technical, social problems due to sharing basins of the three most important rivers in the area: Ganges-Brahmaputra, Mekong and Salween. Only 30 high levels experts were invited to the event based on their personal capacities to endure a free, frank and authoritative exchange of ideas, facts and opinions.

The document contains the analysis suggestions, and comments made for the experts regarding the difficult task to be solved by countries sharing those basins.

Contributions:8

Keywords: Thailand, international waters, Asia, Southeast Asia, Ganges-Brahmaputra, Mekong, Salween, international water policies.

- I

A. K. Biswas and D. J. Merrey, "International Journal of Water Resources Development. Special double issue: research from the International Water Management Institute (IWMI)," , vol. 15(1-2) March/Jun., 1999, . 252 p.

### **Abstract**

This double issue from the International Water Management Institute covers the main results of their first ten years' of existence. The issues discussed include: increasing water availability at the global level; the adoption of a river basin paradigm leading to new insights into opportunities for water conservation and productivity; application of new information technologies and quantitative analytical techniques; and a stronger focus on policy, institutional issues, health and environment, and social inequities in terms of access to water.

Contributions: 7

Keywords: water management, Muslims countries, OIC, water research, water and environment, irrigation, water assessment, tropical diseases, malaria, gender,

- As

S. S. Bosu, "Sharing of inter-state river water resources: Case studies of two major irrigation systems in Tamil Nadu, India.," *Water Resources Development*, vol. 11, pp. 443- 456, 1995.

### **Abstract**

Water flows according to physical laws and it does not respect the political or administrative boundaries defined by human beings. Sharing of water resources is one of the major challenges to be focused on for the survival of mankind. Most of the rivers in southern India originate from the Western Ghats, and the two rivers systems in Tamil Nadu - the Cauvery Mettur Project (CMP) and Periyar Vaigai Project (PVP)-are considered. In both systems, the catchment areas are shared with the neighboring states. Their water potential is entirely dependent on the monsoon rains, as well as good relations between the co-basin states. The Cauvery water dispute has become highly sensitive issue leading to dwindling of the rice cultivated area, migration of landless agricultural labourers, changes in cropping patterns and techniques of cultivation, drinking water problems, etc. A portion of the surplus water from the westward-flowing Periyar River in Kerala State is stored and diverted through a tunnel across the Western Ghats to benefit the drought-prone areas on the eastern side of Tamil Nadu.

Tamil Nadu has reached its limits in the utilization of the both surface and groundwater potential. The thrust now is to obtain water diversions from adjacent state surpluses. Any great benefit for Tamil Nadu can only be achieved when integrated use of available water potential in the southern region can be planned with mutual understanding and cooperation among the states. The necessity of multidisciplinary approach to the solution of shared water resources problems, which often extend far beyond the physical boundaries of the basins concerned, has to be clearly recognized, accepted and acted upon. Representatives of all the major disciplines, such as administration, economics, engineering , agriculture, environment, legal, political and social sciences, should be consulted and involved throughout the process. An authority can be formed involving and to cater for the needs of all concerned.

Contributions: 6

Keywords: India, water management, irrigation, water policies.

- M

Centre for Strategic Research, *Facts about Euphrates-Tigris Basin*. Ankara, Turkey.: Centre for Strategic Research, 24 p.1996.

**Abstract**

The conflicts over water use in the Euphrates-Tigris basin is reviewed. It highlights the water in the three countries, Turkey, Syria and Iraq, as well as water requirements of the future in the entire basin. Syria and Iraq are strongly opposed to all of Turkey's development projects on the Euphrates and the Tigris. They maintain that as the Tigris and the Euphrates are both international rivers, they should be considered as shared water resources. The essence of the Turkish approach is that each country should estimate its own water requirements objectively, and that these estimates could then be used as the basis for allocating the river flow. Specific allegations on the water issues made against Turkey by the Syrians and Iraqis include the following: Turkey failed to inform them in advance about its plans on the rivers and did not follow the customary practices of international law on international watercourses; they claim that Turkey's hydro-power projects reduce the amount of water flowing into their countries and harm agriculture and power projects in countries further downstream; they allege Turkey release polluted water across the frontier.

To these allegations the Turkish government argues that full data on its water projects has always been passed by Turkey to both Syria and Iraq at meeting of the joint technical Committee of the three countries where "exchange of information always headed the agenda; Turkish dams have made an important difference, but it is not one which works to the disadvantage of Turkey's southern neighbors. The Euphrates has been tamed and its flow regularized. Until the dams were built, there were sharp fluctuations between different seasons. In winter and spring, there used to be floods, followed in summer by drought in when the flow the rivers to Syria and Iraq would be reduced. Since completion of the Ataturk Dam, Syria and Iraq receive guaranteed stable flows of river water. Even in the driest years, the flows are assured because of the storage.

Syria and Iraq are also unhappy about two dams being built in lower Euphrates at Birecik and Karkamis. Turkey argues that these are regulatory dams. Turkey has been careful to avoid water pollution which could affect its neighbors and thus fail all existing agreements.

Contributions: 1

Keywords: Turkey, Syria, Iraq, Euphrates, Tigris, water management, international policies, Mediterranean Basin, dams.

- ME

M. A. Civic, "A new conceptual framework for Jordan River management: A proposal for a trusteeship commission". *Colorado Journal of International Law and Policy*, vol. 9, pp. 285-329, 1998.

**Abstract**

Ancient Jewish and Moslem water laws viewed water and all of its uses and its value to human beings, as a gift from God, which is to be communally shared, and not subject to ownership by any person. The Mejelle Code and, later, the Government of Israel and the region's Arab countries, transformed the concept of communal rights to water resources into state ownership, and as a result, the state, on behalf of the people, have held, managed, and administered all water resources. Civic argues that a public trusteeship of the Jordan River Basin would address the divisive, nationalistic-oriented claims to this Transboundary water source and adjust such rights into a multinational communal framework, so that the basin would be used and managed as a shared, unitary, basin-wide regional source. The toughest practical hurdle to implementing a public trust approach to transboundary water sharing in the Jordan River Basin would be overcome the potential anxieties of the states relinquishing their national sovereignties at least potentially, over this resource.

The critical difference between a public trusteeship of the Jordan River Basin and the creation of a standard river commission to manage shared water resources would be, first, conceptual and then second, practical. The conceptual distinction would be that the river basin is a single entity, in spite of the fact that it flows through several state territories. Accordingly, it must be managed as such, rather than as connected but discrete units defined and managed by geopolitical boundaries. The single entity must be recognized as a common resource for use of all the users of the river basin. The basin should be reviewed as a whole so as to optimize the use of its resource on a sustainable basis. The practical advantages could be twofold. First, a public trusteeship would expand the public and other interested parties' ability to monitor the prudent and unified management of the river basin by permitting a breach of fiduciary duty claim under traditional trust principles. Second, related to the conceptual change of unified management in the public interest, a public trusteeship would centralize and coordinate management policy, which would constitute a vast improvement over the competing unilateral development policies that have been implemented in this region for over forty years.

Unilateral developments of the Jordan River Basin since the 1950s have resulted in unsustainable development practices, inequitable use, and even military actions by basin states against each other. The Basin Trusteeship Commission could provide a good alternative for its sustainable management and prudent development.

Contributions: 6

Keywords: Jordan River, water management, international policies.

- As

R. Deshazo and J. W. Sutherlin, *Building bridges: Diplomacy and regimen formation in the Jordan River valley*. Maryland, USA: University Press of America, Inc., 175 p.1996.

**Abstract**

Looking at the conflicts the riparian countries in the Jordan basin are facing it is easy to understand the amounts of energy and time needed to find just and equitable solutions for all parties concerned. It is easy to understand the limitations of human beings to build bridges of peace to overcome these differences. In contrast to many other publications, the authors consider water not as an issue of disagreement or war, but as an element and opportunity for improving relationships between The Arab countries and between Arabs and the Israelis. Water should be considered as an element of unity and peace in the Jordan River. Water is the excuse for talking and gets together and find out the best way for improving the life conditions of Arabs and Israelites. The original idea helped to organize the Treaty between Jordan and Israel signed in the last years.

The authors open new horizons to the water distribution problem, give hope to the resolution of international conflicts develop around water.

Contribution: 7

Keywords: Asia, Israel, Arab states, water allocation, international policies, water policies.

- W

J. M. Donahue and B. R. Johnston, "Water, culture, and power: local struggles in a global context". Washington: Island Press, 1998, . 396 p.

**Abstract**

The authors make an analysis of the historical water uses and its availability all around the world. They highlight the importance water has played in the development of cultures and the close relation among cultures and water sources. A special attention is given to the fact that those cultures developed around the same basin have confronted political and power problems that will be increased in the upcoming decades. Water has had a uneven distribution and it is only possible to find water where people are richer and powerful. Marginal countries and social classes every day have fewer opportunities to have access to

drinking water. The authors explain that water scarcity is more than a matter of disturbed terrain, increased population, and climate change. Water scarcity can also be a by-product of water management projects: the building of dams, canals, and complicated delivery systems may provide water for some at the cost of others, with short-term gains that wreak long-term ecological havoc. Moreover, water scarcity can be a product of the social systems.

The artificial nature of the geopolitical borders influences water quality and water scarcity. Many of the important water basins of the world straddle political borders. Water containment and diversion schemes in one country affect supply and quality in other countries. Water allocations based on political and economic interest often exceed actual water availability, leaving downstream users with a trickle of salty, contaminated water. Water scarcity is more than a matter of decreased supply or increased demand. Water scarcity is influenced by a variety of factors, including topography, climate, economic activities, population growth, cultural beliefs, perceptions and traditions, and power relationships.

Contributions: 4

Keywords: Water resources development, water policies, institutions, international cooperation, water supply, water and politics.

- W

Economic Commission for Europe, *Protection of transboundary waters*. Geneva: United Nations., Water Series No. 3. 36 p.1996.

### **Abstract**

More than 50 percent of Europe's 31 rivers with a drainage area of over 50,000 km<sup>2</sup> have transboundary catchments. Moreover, much small and medium-sized rivers criss-cross the boundaries between two or more countries. The Finnish-Russian inventory for transboundary waters, for example, lists more than 400 transboundary catchments areas, and in the catchment areas of the rivers Rhine and Meuse, more than 130 small rivers cross the border with the Netherlands. For decades, transboundary waters in Europe have played an important economic role without particular thought being given to the notion of preventing, controlling and reducing transboundary impacts.

In recent decades, the needs and benefits of cooperation on the protection and sustainable use of transboundary rivers have received wide recognition among countries. However, cooperation concerning various rivers was based on differing underlying principles. Significant efforts have therefore been made under the auspices of the United Nations Economic Commission for Europe (ECE) to promote a coordinated regional approach. Intensive negotiations and cooperative action have produced agreements on a number of policy declarations and recommendations to governments to respond to the challenges of environmental protection and sustainable use of water resources. These soft-law instruments were at the root of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, which was adopted at Helsinki on 17 March 1992 and entered into force on October 6 1996.

A number of ECE countries have defined national strategies for the protection and use of water resources or are in the course of drawing up new strategies to respond to specific objectives of the Convention. There is agreement on the application of the precautionary principle, the polluter-pays principle, and the rules of sustainable water management as the major guiding principles for cooperation on transboundary waters. Many countries have also expressed the need to control wastewater discharges and to take other comprehensive water-quality measures. Countries need to share experiences on specific measures to reduce wastewater discharges into transboundary waters and to ensure environmental conservation, and where necessary, the restoration of ecosystems. Thus, ECE has focused its activities on such issues as the ecosystem approach to water management, prevention of water pollution from hazardous substances, water quality criteria and objectives, and the prevention and control of water pollution from agricultural chemicals.

The publication includes guidance in the issues of information for decisions-making, specific measures to protect groundwater, and licensing wastewater discharges into transboundary waters. In May 1966 the

Committee on Environmental Policies, adopted the Guidelines on water-quality monitoring and assessment of transboundary rivers.

Contributions:7

Keywords: Transboundary waters, water management, international regulation, Economic Commission for Europe.

- Af

H. Fahmy, "Comparative analysis of Egyptian water policies," *Water Int.*, vol. 21, pp. 35-45, 1996.

**Abstract**

As the beginning of the 21st century nears, the Ministry of Public Works and Water Resources of Egypt (MPWWR) is working toward developing its water strategy to satisfy pressing future requirements. Although until now MPWWR has been successful in satisfying the different economic sectors' requirements, a recent analysis indicates a very critical situation regarding the match between available water and requirements. Currently the per capita share of the Nile water is very close to the minimum threshold. With rapid population growth, it will decrease significantly in the next twenty years. Accordingly, water will be a constraint for any development, especially in the agriculture sector. Economics and sociopolitics will be the decisive factors in allocating water among the sector requirements. This article discusses and analyses previous Egyptian water policies. A comparison between past, current, and projected water policies is presented. Contradictions among some numbers, and changes in the assumptions used in these policies are pointed out. A conceptual framework that should be followed to design the water strategy for the next century is introduced as an alternative to the traditional scheme.

Contributions: 6

Keywords: Egypt, water policy, comparison studies, future planning, water allocation, water supply, water management, water resources, water demand, water.

- W

FAO, *Reforming water resources policy. A guide to methods, processes and practices*: 1995.

**Abstract**

The document highlights water's economic, political and social importance in all countries. Water management and administration requires an inevitably high government involvement in this sector. International agencies working together with local governments have stressed the importance of water for developing during the next 25 years. Governments should accept the need to review master policies, recognizing its growing scarcity value.

The purpose of the guide is to describe and to identify the issues involved in water management, setting out principles and criteria for such management, introducing some useful methods and key process, and indicating some of the results obtained in actual cases.

Contributions: 6

Keywords: Water management, water use, water policies, institutions, Dublin Conference, Rio UNCED.

- ME

E. Feitelson and M. Haddad, *Identification of joint management structures for shared aquifers: a cooperative Palestinian-Israel effort*. Washington, D.C.: The World Bank, The World Bank technical Paper No. 415. 415 p.1998.

**Abstract**

This study suggests a step by step open-ended approach for the identification and structuring of joint management systems for shared aquifers, with special reference to Israeli-Palestine case. In the first

phase of this study four directions and routes for building joint management structures were outlined. However, further scrutiny in the second phase of the study showed that there are many elements that need to be addressed to in negotiations by the two parties before such structures are likely to, be implemented. A Palestinian-Israeli team, with international funding and support, conducted this study, which has been able to continue even when the geopolitical climate became less conducive for cooperative efforts between the parties concerned. However, it is also clear that the likelihood of a joint management agreements being reached is negligible when the relations between the parties deteriorate and the confidence in the current coordination institutions erodes. It argues that international agencies can have a role in advancing new ideas such as joint management by providing the funds for independent local research, where such capacities exist. In these cases, a no-strings attached, hands-off approach, as was the case with the sponsors of this study, may prove to be the most constructive approach.

International bodies may have also an important role to play in the joint management schemes. One possibility could be the role privatisation efforts may play in reducing conflicts between the parties, by changing the rules and the interest structures of the parties. This option, however, needs more theoretical and empirical research before it can be carefully used. International bodies may also play a role in conflict resolution and management functions, though it is not clear at present whether third parties would help or hinder to reach reach accommodation but themselves. There are several real options for joint management of shared aquifers. However, much work still needs to be done before joint management can be successfully implemented.

Contribution: 6

Keywords: Palestine, Israel, International policies, water management, World Bank.

- Eu

J. Fitzmaurice., *Damming the Danube: Gabčíkovo and post communist politics in Europe*. Oxford, UK: Westview Press, 137 p.1996.

### **Abstract**

The book is about the power symbolized through a dam constructed over a Danube river; The Nagymaros-Gabčíkovo project on the Danube on the Hungarian Slovak border. The dam is a powerful and potential explosive symbol with a opposite meanings for the population. Fitzmaurice highlights that, for the former communist regimes in Czechoslovakia and Hungary, and parts of the Austrian banking and energy utility establishment, it was a symbol of progress, economic independence, control over nature, national pride and prestige. The opponents -Greens and central European dissidents-- considered the project as a symbol of everything that was wrong with the communist system in central Europe. For them the dam would violate the Danube River, destroy the environment and traditional ways of life. The opposition argue that the project no longer had an adequate economic justification. The meaning of the dam was more political than ecological, it was an example of the stubborn conservatism and stagnation of old style communist leaders and their refusal to adapt and respond to increasingly critical voices in society. The dam in an example of a paradoxical collusion of Conservative Communists and western financial interest characteristic of the 1970's and 1980's. The collusion tended to support the status quo in both sides.

The author's intention is to analyse the historical background of the dam's construction and its implications for supporters and opponents. He highlights that it is not only a dam it is a symbol of power and domination of communist countries and Central European bankers. The author analysis is focus more on the political and power meanings of the dam than its environmental implications.

Contributions: 5

Keywords: Water resources development, Danube River, Hungary, political stability, Europe, politics, Gabčíkovo, Czechoslovakia.

- W

S. Foster, A. Lawrence, and B. Morris, *Groundwater in urban development. Assessing management needs and formulating policy strategies*. Washington, D.C.: The World Bank, The World Bank Technical Paper No. 390. 55 p.1998.

### **Abstract**

The principal aims of this policy paper are to highlight key urban groundwater issues and management needs; to raise awareness and understanding of hydrogeological processes in urban areas; to provide a framework for the proper and systematic consideration of the groundwater dimension in urban areas; and to suggest options for more sustainable development and management of groundwater systems in urban areas. Chapter 1 introduces the importance and behaviour of groundwater in general terms, and the interdependence and interactions that often exist between urbanization and groundwater. Chapter 2 covers technical details to enable non-specialists to appreciate the behaviour of groundwater systems in urban areas, because those concerned with urban water supply and environmental management often have a poor understanding of groundwater. Effective, regulatory controls and economic instruments are needed within in a sound hydrological framework.

Chapter 3 presents three somewhat different perspectives on the subsurface environment of cities, focusing on water supply provision and regulation; wastewater and solid waste disposal and engineering infrastructure development and maintenance. Sustainable development and effective management of groundwater in urban areas, Simultaneously, must reconcile different interests; maintain high yields, safeguard water quality, manage solid wastes and liquid effluents effectively, and protect the engineering infrastructure. Appropriate specialists should analyse each individual case to identify priority areas for constraining groundwater abstraction and to establish priority targets for controlling the subsurface contaminant loads. Chapter 4 is dedicated to formulating policy strategies to eliminate or to mitigate these problems. It reviews the requirements in terms of an appropriate institutional framework, and recognises that the implementation of sustainable policies for allocation and protecting groundwater resources will often require building public awareness and promoting stakeholder dialogue so as to create the necessary sociopolitical consensus.

Another important aspect highlighted is the need to obtain a realistic balance and effective control of both public and private use of groundwater in urban areas, if serious negative consequences for all groundwater users are to be avoided, and if scarce, high-quality groundwater is to be conserved for potable and sensitive uses.

Contribution: 6

Keywords: groundwater, urban areas, water use.

- W

D. A. Giannias and J. N. Lekakis, "Policy analysis for an amicable, efficient and sustainable inter-country fresh water resource allocation," *Ecol. Econ.*, vol. 21, pp. 231-242, 1997.

### **Abstract**

In the area of fresh surface water resources, which are gradually becoming more scarce, sustainable utilization implies the need for policies aiming to provide adequate water supplies for everyone in both national and international contexts. Many international river basins are shared without any formal intergovernmental agreement, while bilateral agreements guaranteeing amicable cooperation amount to a handful. This paper presents a simple economic-ecological model within which it examines input-output controls, social input prices, bilateral water trade, a water market for all water users, and a fixed water allocation agreement, as possible water policies for cross border river water sharing. All of these policies can satisfy the conditions for maximum joint economic benefits, while simultaneously working towards maintaining the functional integrity of river ecosystems. In theory, therefore, these policies are of equal use. There are, however, several costs associated with policy administration, which are hidden and must

explicitly be taken into account. The analysis indicates that bilateral water trade can prove a workable, efficient and sustainable policy for cross border water sharing.

Contributions: 6

Keywords: water resources, bilateral agreements, water management, fresh water, water policy, international cooperation, water supply, water-allocation

- W

P. H. Gleick, "Water in crisis: Paths to sustainable water use," *Ecol. Appl.*, vol. 8, pp. 571-579, 1998.

**Abstract**

A wide range of ecological and human crises result from inadequate access to, and the inappropriate management of, freshwater resources. These include destruction of aquatic ecosystems and extinction of species, millions of deaths from water-related illnesses, and a growing risk of regional and international conflicts over scarce, shared water supplies. As human populations continue to grow, these problems are likely to become more frequent and serious. New approaches to long-term water planning and management that incorporate principles of sustainability and equity are required and are now being explored by national and international water experts and organizations. Seven sustainability criteria" are discussed here, as part of an effort to reshape long-term water planning and management. Among these principles are guaranteed access to a basic amount of water necessary to maintain human health and to sustain ecosystems, basic protections for the renewability of water resources, and institutional recommendations for planning, management, and conflict resolution. "Backcasting" a positive future vision of the world's water resources as a tool for developing rational policies and approaches for reducing water-related problems is also discussed in the context of the Comprehensive Freshwater Assessment prepared for the United Nations General Assembly in 1997.

Contributions: 7

Keywords: Water Use, water resources, water management, water supply, drinking water, sustainable development, planning, fresh-water.

- As

D. Gyawali, "Patna, Delhi and environmental activism: Institutional forces behind water conflict in Bihar," *Water Nepal*, vol. 6, pp. 67-115, 1998.

**Abstract**

With increased upstream withdrawal for irrigation and urban industrial uses, the dry season flow of the River Ganges declining. Bihar Government expects the centre (Delhi) to curb the increasing water needs of the upstreams states; However, Delhi's water bureaucracy, having grown within a culture of "construction" rather than "water management", is reluctant to do so. Adding to this anxiety of Patna is a new fear in the form of the 1996 Farakka Treaty. Patna feels that this international obligation will further curtail its water rights. But Delhi is able to placate Patna with promises of a Kosi High Dam in Nepal. On the other hand, activist groups in Bihar, point to the dismal consequences of past technological choices (embankments) on the land and its poor. The hierarchic discourse between Patna and Delhi, however, filters out this activist review and pursue a business-as usual programme of new constructions. Such a rigid, single-mission policy would be prone to costly surprise and impasse. In contrast a constructive engagement among differing perspectives of the state, market and civil society on Bihar's water problems may minimize this risk.

Contributions: 7

Keywords: Delhi, environment, water management, water policies, international regulations.

- M

A. Hamdy and C. Lacirignola, *Mediterranean water resources: Major challenges towards the 21st century*. Bari, Italy: Centre International de Hautes Etudes Agronomiques Mediterraneennes. Mediterranean Agronomic Institute of Bari., 562 p.1999.

**Abstract.**

Hamdy and Lacirignola highlight the problematic situations, explain causes and effects, and suggest some possible solutions to the overwhelming problem of water use among the 18 countries of the Mediterranean basin. They explain that competition for limited freshwater sources is growing quickly among householders, industry and agriculture; while water is becoming scarcer due to increasing pollution and higher consumption. Preventive rather than curative policies should be developed so as to provide water to the rapidly increasing population in the area.

An overview of the water resources in the Arab countries, of the Maghreb and Mashreq regions, and in the North Mediterranean countries is provided. They also analyse the water resources management and water needs in every country integrating the area, and based on this, they examine the capacity of each country to make improvements in the water resource sector. They argue that economics is one of the most important approaches for water use and management, but it is also necessary to consider the social and political factors involved in the international negotiations among the three continents involved. As a new possibility for water management, the use of low quality water for irrigation and sewage water is proposed as an alternative.

In The Mediterranean, they argue, it is necessary to develop and adapt new technologies to better use water, and the utilization of improved irrigation technology and irrigated agriculture development and the use of Geographical Information Systems are possible options for water use and recycling. Hamdy and Lacirignola state that an important task is to find solutions for the existing problems and to prevent problems from arising. However, they note it should be realized that (1) water management is an a complex task and it is necessary to get way from the simplistic ways of addressing it; (2) polluted water can not be rehabilitated, and people will have to live with polluted aquifers; (3) there are differences between high and low latitudes in the technical assistance and that dry climate conditions are particularly vulnerable to environmental influences; (4) not only land use is water dependent, but that is also water impacting since rain falls on all outdoor activities. For this reason, they argue, an equilibrium should be found between water-dependent land use and water use in relation to impacting land use, and water use on the landscape scale

Contribution: 8

Keywords: Mediterranean, water resources, water management, water use.

- W

P. J. M. Hofwegen and F. Jaspers, *Analytical framework for integrated water resource management. Guideline for assessment of Institutional frameworks*. The Netherlands: Inter-American development Bank. Sustainable Development Department. Environmental Division. International Institute for Infrastructural, Hydraulic and Environmental Engineering., 53 p.1998.

**Abstract**

The article outlines the IWRM (say what this is, unless there will be a close reference) strategies and its two main goals of improving water management and reducing the conflicts among the different water uses and users . To achieve their goals, the IWRM proposes a platform for coordinating water use and water allocation. Coordination implies a change in water use rules, explained as a change in an organizational function that includes coordination, planning, decision-making and policing of water users in water systems. To make the organizational function possible an enabling environment has to be created. This requires water policies, institutional development policies, including human resources development , and normative and executive legislation. The latter is the constitutional function. The IWRM is a process of assignment of functions to water systems, the setting of norms, making allocation for use, enforcement

and management. It includes gathering information, analysis of physical and socioeconomic processes, weighing of interests and decision-making related to availability, development and use of water resources. The IWRM requires: (a) a platform for weighing all relevant interests and decision-making concerning use of water and water systems in the river basin. (b) This platform should represent all interests and be under governance of the government to protect the interests of society. (c) This platform should have decision, control, and sanctioning powers. A minimum set of conditions should be met to allow such IWRM platforms to operate. These conditions are related to constitutional, organizational and operational functions. For all these functions it is required that the respective authorities have the mandate and the resources – financial and human—to carry out their tasks of developing and implementing IWRM.

The basic function at the organizational level is to coordinate between the different stakeholders and to decide on the different uses of water. The effective operational functioning within an IWRM context requires a system that responds to societal needs. A proper assessment of the institutional situation requires a good understanding of the physical conditions, the important stakeholders and their relationship, the current problems and envisaged solutions.

For IWRM's goals to be reached it is needed a substantial change and the establishment of clear new regulations that support the new approach. It is not possible to achieve new results with the old administrative structures.

Contributions: 5

Keywords. Water resource management, institutions, development, structural change.

- W

T. Homer-Dixon, "The myth of global water wars," in *Forum. War and water*, vol. International Committee of the Red Cross. Geneva, Switzerland, 1999, pp. 10-13.

### **Abstract**

Despite fears that future wars may be over water, it is hard to find clear historical or contemporary examples of major wars motivated mainly by scarcity of fresh water. There is no doubt that some major wars the 20<sup>th</sup> century were motivated in part by one country's desire to seize another's non-renewable resources, but history is different for renewables resources.

The author signals that meetings like that was held in Stockholm in August 1995 are sensationalist and distract the public's attention from the real results of water scarcity. Shortages reduce food production, aggravate poverty and disease, spur large migrations and undermine a State's moral authority and capacity to govern. Over time, this stress can tear apart a poor society's social fabric, causing chronic popular unrest and violence. Institutions like the World Bank should emphasize these outcomes rather than water wars.

Contributions: 8

Keywords: Water war, The World Bank, International Committee of the Red Cross, water scarcity, international policies.

- LA-Cb

Inter American Development Bank, *Strategy for coastal and marine resources management in Latin America and the Caribbean*. Washington, D.C.: Inter American Development Bank. Sustainable Development Department. Environmental Division, IDB Strategy Paper. 38 p.1998.

### **Abstract**

The strategy for ADB's involvement in integrated water resources management in Latin America and the Caribbean is outlined. It applies to all Bank water-related projects, irrespective of whether they have a government guarantee or not. The strategy focuses on principles and on the flexible application of instruments on a case by case basis. It also envisions a succession of actions of diverse nature, which

does not start or end with this paper. This paper started with the strategy development and consultation process, whose results are outlined. An interactive implementation procedure is proposed, whose initial supporting actions are described in this document and whose results ought to be periodically evaluated in the field.

The strategy is integrated by fifteen guiding principles: These are : (1) promote comprehensive national water resources management policies and strategies; (2) focus on capacity building; (3) pay attention to long-term efforts; (3) conform to the Bank's and countries' objectives; (4) provide incentives for national involvement and Bank coordination; (5) foster cooperation and coordination between international organizations; (6) focus on institutional innovation and capacity building; (7) pay attention to both short- and long- term efforts. For every principle, the Bank offers seven levels of action: strategic instruments, levels of action for the Bank, principal actors in the decision making process, types of problems, main aspects to be assessed, IDB instruments, and supporting actions.

Contributions: 6

Keywords: water management, IDB, development, strategies for water management, Latin America.

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Islamic Development Bank. (1997). Water sector study working group report. December.

### **Abstract**

According to the Islamic Development Bank (IDB) water resources problems in the Bank's constituency are among the most urgent, complex, and intractable of any part in the world. Many members states face the problem of rapidly populations, rapid urbanization, expansion of irrigation, rising costs of providing water, and pollution of fresh water. All these problems have increased the urgency to produce effective measures to manage water as a social and economic resource with emphasis on its conservation. Though any strategy must be flexible and tailored to the requirements of individual countries, there are elements that are common to any effective process. A number of member states have demonstrated their commitment to tackling water issues in a coordinated and comprehensive manner. The Bank should attempt to add an impetus to such initiatives and preempt similar approaches in other members states. Numerous international conferences have called for medium to longer-term policy measures. These measures include: (1) the adoption of policies base on a comprehensive approach to planning and management that takes physical, economic, social and environmental factors into account; (2) increased participation by "stakeholders" in both decision making and operations; (3) decentralized responsibility for management and delivery of water; (4) protection of water quality and preservation of aquatic ecosystem.

Taking into account the policy measures articulated in UNDP global consultation on safe water and sanitation, the International Conference on Water and the Environment in Dublin, the meeting of world leaders in 1992 in Rio de Janeiro, The bank has formulated water resources management polices to enhance the application of those policies. Keeping those polices in view the IDB would recommend that a Water Sector Study be conducted by a Consultant, preferably a senior water resource economist, with the following Terms of reference: On the basis of the objectives outlined in the Bank's Strategic Agenda for the Medium-Term and taking into consideration the Procedures of the Operations Manual, as well as the recent developments in the project cycle, and bearing in mind the Bank's modes of financing, it is proposed to: (1) carry out a critical review of the Bank's financing in the water sector over the past ten years and its current funding procedures in this sector; (2) identify and assess the main current and future constrains that will face the bank's constituency in the water sector in the coming years; (3) study strategies, policies and procedures of multilateral and bilateral funding institutions and agencies providing support to the water sector to overcoming these constraints, and the new modes of financing in emerging markets; (4) propose changes to current Bank Policies and Procedures and new modes or conditions of financing, if need be.

Contributions: 5

Keywords: Islam, Islamic Development Bank, The World Bank.

- I

The International Development Research Centre, *Workshop on water resources management in the Islamic world*. Amman, Jordan: IDCR, p.1998.

**Abstract**

The main topics covered in the document are related to the Islamic principles to water management the equity of access to water, water conservation and reuse, water economic issues, and water management. Leading water experts familiar with Islamic principles of water management were assembled in Jordan by International Development research Centre and International Water Resources Association. The papers will shortly be published as a book by The United Nations University Press.

Contributions: 5

Keywords: Islam, water management, water conservation, economic value of water.

- W

W. I. Jones, *The World Bank and Irrigation. A World Bank operations evaluations study*. Washington, D.C.: The World Bank, 150 p.1995.

**Abstract**

The publication is an abstract of the Bank's goals, objectives and investment in the area of irrigation worldwide. Irrigation represents 7 per cent, or \$20 billion, of World Bank lending from 1953 to 1990. To determine the impact of this lending Operations Evaluation Development of the Bank undertook a comprehensive review of the Bank's experiences with more than 200 irrigation projects. The review examines project results, traces shifts in policies, and explores trends in lending. Also, it looks at the effects on farmers, and suggest ways to improve irrigation investment and promote sustainability. Two thirds of the Bank financed irrigation projects have had satisfactory outcomes. The projects benefited some 16 million farm families directly, and served millions more indirectly. Perhaps the greatest benefit of irrigation has been its role in enhancing food security and in making food more affordable for all, most notably the poor.

Because fewer and fewer of new sources of water are available, the emphasis of irrigation investments has shifted away from new facilities towards rehabilitating and upgrading of the existing projects. Water scarcity also calls for effective resource management and participatory institutional mechanisms. The study proposes steps for improving the Bank's processes, including methods for better supervision and evaluation of investments projects; addressing key issues in system design and sustainability. (such as water scarcity and operations and maintenance) and for dealing with major issues like drainage , resettlement, catchment degradation, and project design in the humid tropics.

Contributions: 5

Keywords: World Bank, irrigation, development.

- As

M. Jurriens, P. P. Mollinga, and P. Wester, *Scarcity by design. Protective irrigation in India and Pakistan.*: Wili, Luquid Gold. Paper 1. 41 p.1996.

**Abstract**

The objective of the document is to explain a number of essential elements of protective irrigation. Authors recommend that: (1) more systematic analysis should be done on initial design of the system in terms of design duties and intensities; (2) studies of irrigation water management are required to assess the actual performance of systems; (3) actual results should be compared with design and reasons for differences should be identified, with prior attention to possible implications of the protective nature of the system, especially concerning crop water requirements and water-yield relations. Author suggest a list of question to be answer in design and performance assessment exercise. Only after such analysis, a start

could be made to develop measures for improvement. It is then essential to take into account the conflicts between initial objectives and current farmers' objectives, which inevitably seem to lead to serious performance problems.

As a conclusion, it is evident that no clear cut solutions can be given for the problems that best protective irrigation, because they will vary depending on the specific circumstances. There are no quick-fixes for the irrigation sector of India and Pakistan and improving the performance of surface irrigation schemes will be a complex and time consuming process. It is in any case crucial first to analyse the relation between water demands and availability and to identify the implication of that in terms of scheme productivity and related scheme and national economy, farm budgets and incomes, measures to be taken for areas excluded from irrigation, and the legislative and management consequences of all this.

Contributions: 6

Keywords: India, Pakistan, international policies, water management, scarcity, irrigation.

- W

E. Kaufman, J. Oppenheimer, A. T. Wolf, and A. Dinar, "Transboundary Fresh Water Disputes and Conflict Resolution: Planning an Integrated Approach.," *Water-Int.*, vol. 22, pp. 37-48, 1997.

**Abstract**

An integrated, interdisciplinary approach to assess, model, and resolve transboundary fresh water disputes is proposed. This ongoing multiyear study combines an in-depth study of historical water disputes, processes for their resolution (or lack of them), and a computerised database of water treaties. It contains an assessment of similar transboundary environmental resource conflicts, such as oil, air resources, and fishing rights. Lessons from these surveys, and from the theoretical and practical world of alternative dispute resolution are considered for resolution of water disputes resolution. These models will be tested against a series of simulated and actual workshops focusing on key watersheds involved in ongoing disputes. The final product from the surveys, models, and workshops is expected to yield important lessons for the future resolution of transboundary fresh water disputes.

Contributions: 7

Keywords: Water resources planning, water supply, treaties, available water, watersheds, water management.

- W

I. Kobori and M. H. Glantz, "Central Eurasian water crisis. Caspian, Aral, and Dead Seas," in *Water Resources Management and Policy*. Tokyo, Japan: United Nations University Press, 1998, . 203 p.

**Abstract**

Central Eurasia water crisis is becoming evident in three of the most important seas of the region, Dead, Aral, and Caspian Seas. Water problems of these areas are being studied and analysed by several groups. The water level in the Dead Sea has been declining in recent years, and this has added to the political tensions in the region. It is through the need to resolve environmental issues related to water resources associated with the Dead Sea that a major step could be taken to peaceful cooperation between the countries concerned. The Aral Sea has been depleted because of the cotton growers in the Central Asian Republics. The level of the Caspian Sea has dropped rapidly from 1930 until late 1970, and then began to rise causing problems for the coastal states. All the three seas are now suffering from serious social, economic and environmental problems because of inappropriate policies of the past. The problem facing the three seas are complex, and it would not be easy to find implementable, cost-effective solutions in the foreseeable future.

Contributions: 6

Keywords: Dead Sea, Aral Sea, and Caspian Sea, Central Europe, Central Asia, water depletion.

- ME

Murakami, M. and K. Musiaka (1997). Eco-political decision-making and confidence-building measures in the development of international rivers. *International Journal of Waters Resource Development*. A. K. Biswas. Montreal, Canada: Vol. 13, No. 3, pp 403-414.

**Abstract**

One of the most important resources for socioeconomic development in arid and semi-arid countries is water, and its scarcity in the Middle East has been a key factor for war and peace. As water shortages occur and full utilization is reached, water policies tend to be framed more and more in zero-sum terms, increasing the probability of discords. The aim of this study is to provide some innovative technological answers to the fundamental questions of how to sustain the water supply without causing diverse effects on the ecosystem both now and for the 21st century. This paper evaluates several non-conventional approaches highlighting the economic and environmental gains of co-generation applications that would have the potential to resolve this persistent problem, and thus contribute towards peace among the water users in the Middle East. Priority of development projects including viability of (1) the strategic use of such resources as brackish water, seawater and reclaimed wastewater, and (2) the transboundary transport of water is preliminarily evaluated by taking into account the four feasibility elements 'technical', 'environment', 'economy' and 'politics'. Water conservation and management including water pricing scenarios are essential confidence-building measures to manage the water resources in the region. In this circumstance, non-conventional strategic alternatives including desalination and reuse of treated wastewater will become significantly important in water resources development to supply new additional fresh waters in the 21st century.

Contribution: 6

Keywords: Decision making, international waters, water policy, water water shortage, arid lands, water users, water resources, economic aspects, Middle-East.

- As

T. D. Nguyen, *The Mekong River and the struggle for Indochina: Water, war and peace*. Westport, CT: Praeger Publishers, 264 p.1999.

**Abstract**

The book is focus on the historical development of the power struggles for harnessing the Mekong River; since the French empire build in the Indochina Peninsula to the Vietnam war and its current consequences on the liberalized young countries. Riparian countries and foreign conquerors have strove to transform the Mekong River in a way of controlling the strategic military base that the river represents. The meaning of international power to control countries in the area and observe "the enemy" since Indochina. The study focus principally on the period of the Johnson administration and peripherally on that of the Nixon administration, during which the Mekong Project's progress was to reach a decisive pace closely linked to American intervention in Indochina. For L. B. Johnson the River offered to his administration constructive potentials reminiscent of the success of the Tennessee Valley Authority. In the Nixon's period, the project became a peripheral factor in this part of the world. The war became Vietnamized and its potential was transformed to a bargaining chip in the Paris Peace negotiations.

With the end of the second and third Indochina's war, riparian countries -Cambodia, Laos, Vietnam and Thailand - are casting a hopeful to the project, expecting much from it in an era where, experience has shown the negative environmental damage that could take place if the Mekong Project is established in the way it was first conceived.

Contributions: 5

Keywords: Indochina, Mekong River, Laos, Thailand, Vietnam, Cambodia, international policies, water resources development, water supply.

- Af

L. Ohlsson, *Water and security in southern Africa*. Sweden: Swedish International Development Cooperation Agency, Publication on Water. Department for Natural Resources and the Environment. Publication on Water No. 1. 66 p.1995.

### **Abstract**

The need for integrated, basinwide, water resources management is considered a prime security objective for the prospects of SADC regional cooperation. Any measure that will strengthen such efforts therefore ought to be reviewed for development cooperation support. In the short term, outdated or non-existent data for basic hydrological data collection are necessary for creating or updating national water master plans, as part of assessing the resources all river basin. Any programme directed at increasing awareness of water issues among decision-makers in the region deserves support. The possibility of utilizing existing expertise from South Africa for regional capacity building ought to be fully explored. Water transfer schemes to ameliorate acute water shortages for cities and water-starved regions are already at the top of the regional agenda, and will continue to be so for the medium term, necessitating regional negotiations and underlining the need for basinwide management. The most important such regional water resource management programme, the ACPLAN, has been scrutinized extensively by experts from both within the region and outside. Judging by these reviews, the principal agency handling the programme, SADC ELMA, would benefit from institutional support.

Attention to security aspects of water issues so far has been concentrated on the risk of water transfer schemes creating conflicts (political or ultimately violent ) between states of the region. The mere perception of such risks is a security threat in its own right, undermining confidence-building measures between the countries. On the merits of available evidence, however, it is argued that the regional cooperative framework seems to be strong enough to handle present aspects of this threat, specially as the officials on all levels from the South Africa seem very concerned about eliminating any ground for suspicion that the country is ambitious in terms of increasing its regional power.

Furthermore, concentrating on security in this traditional inter-state sense may obscure the potentially much larger risks long-term of environmentally induced scarcities, which could increase misery and conflicts within the countries. This could lead to consequences which are very difficult to foresee. Conflicts between states may turn out to be one of these unforeseen consequences. It is worth noting, however, that the most likely scenario for such future conflicts to arise will be through a failure to meet the internal challenges facing governments and states already today. These risks can be mitigated by cooperation, understanding, trust, identifying the expectations and concerns and by determining the potential of the resource base, so that negotiation can be based on facts.

Development cooperation efforts aimed at preparing countries in the region for a strategy of learning to live with aridity, therefore seems imperative as part of a larger strategy of preparing for the inevitable long-term and large-scale forces of social change which will be at work for the duration of the foreseeable future in the SADC countries.

Contributions: 5

Keywords: water security, Africa, Sida, South Africa, water management.

- W

E. P. Oliveira, "Oil for food": Too many expectations," in *Forum. War and water*. Geneva, Switzerland: International Committee of the Red Cross, 1999, pp. 78-79.

### **Abstract**

United Nations resolution 986 was never really supposed to be the long term solution for the needs of Iraq. Thus, the expectations ran high, and the disappointment ran deep. The author outlines the real impacts international policies could have in the countries where they are implemented. Overestimated goals, capabilities and resources have generally caused disappointments where foreign aids have being.

External financial and technical support were not planned to help local people on long-term basis. They may have caused more damages than benefits.

Contributions: 8

Keywords: Water policies, international policies, Iraq, United Nations, Memorandum of Understanding.

- LA

Organization of American States, "Status and proposed actions to continue the implementation of the initiatives on water resources and coastal areas of the plan of action for sustainable Development of the Americas.," Unit of Sustainable Development and Environment. General Secretariat of the Organization of American States., Washington, D.C., Report on the Inter-American technical Meeting on Water December 8-9. 1998.

**Abstract**

The objectives and historical background of the Inter-American Plan of Action on Water Resources Management (1992-1999) are explained. It includes the conclusions from several regional meetings held in Trinidad and Tobago, Panama City, and Gramado, Brazil, over the 1997-1998 period. It also discusses the proposed initiatives for water supply and pollution control; for the sustainable river basin development and marine and coastal water management; as well as the national water policy Initiatives and the initiative for institutional capacity and information exchange. Finally, there is a discussion of the future goals, challenges and follow-ups that should be analysed and discussed at future meetings of the group.

Contributions

Keywords: water resources, coastal areas, OEA, OAS, sustainable development, sustainability

- As

E. B. Rice, *Paddy irrigation and water management in Southeast Asia*. Washington, D.C.: The World Bank, 64 p.1997.

**Abstract**

The objective of this study is to assess the agro-economic impacts of investments in gravity-fed irrigation schemes in the paddy-lands of Southeast Asia, and to determine whether and how the quality of operation and maintenance (O&M) services influences the sustainability of those impacts. The study team selected six gravity-fed irrigation schemes with reservoirs for water storage in Thailand, Myanmar, and Vietnam. Four were large schemes - at least 40,000 hectares - and the other two were small tanks of about 1,000 hectares. The six schemes, which were widely dispersed across the region, were chosen for their variety and not their representativeness. Nevertheless, the findings were similar at all sites, which suggests that the lessons learned have wider application. The study included an audit of a flood control and drainage project at three sites in Bangladesh to identify differences in O&M organization and effectiveness between irrigation and flood control.

Fieldwork was carried out in three phases in late 1994 and early 1995. An Operations Evaluation Department (OED) impact study team comprising Bank staff and international and local consultants visited farmers and officials at the scheme sites and pertinent public irrigation authorities, The field work had a participatory orientation, as the team arranged interactive group and household interviews in all four countries. The fieldwork was also carried out rapidly: on average the team spent one-and a half weeks at each site.

Contributions: 7

Keywords: Irrigation projects, Asia, evaluation rice, irrigation, cost effectiveness, flood control, Bangladesh, privatisation, participation.

- W

S. M. A. Salman, *The legal framework for water users' association*. Washington, D. C.: The World Bank, World Bank Technical Paper No. 360. 100 p.1997.

**Abstract**

This study is a comparative study of the legal framework for water user's association (WUA) in six countries – Colombia, India, Mexico, Nepal, the Philippines and Turkey. The study postulates that, since water is becoming an increasingly scarce resource and irrigation is the single largest user of water, every effort should be made to achieve efficient use of irrigation water. The paper builds on the theory that if farmers participate through WUAs in managing and operating parts of the irrigation system, including collecting water charges, the results will be an optimum use of water. It goes on to describe the legal instruments that are necessary for the establishment of WUAs. In Chapter 1, the author deals with the enabling law – the law from which the authority to establish WUAs is derived – and describes the main issues that this law would include. Chapter 2 discusses the bylaws of the WUA and describes the main issues that the bylaw would usually address, showing in a number of areas the different approaches by different countries to the same issue. In chapter 3, the author addresses the transfer agreement, the agreement between the irrigation agency and the WUA in which the irrigation agency agrees to transfer to the WUA responsibilities for managing parts of the irrigation system, the WUA accepts such responsibilities for managing parts of the irrigation system, and the WUA accepts such responsibilities. The chapter also deals with the relationship between the irrigation agency and the WUA, and details, again in a comparative manner, the issues that the transfer agreement would usually address. In the concluding chapter, it is argued that the different approaches to the same issue by the six countries is due mainly to the different environments in which each WUA is operating, and to their experience in participatory irrigation management.

Contribution: 5

Keywords: privatisation, water management, irrigation laws, irrigation districts, irrigation management.

- As

T. Shah, "Water against poverty: Livelihood-oriented water resource management," *Water Nepal*, vol. 6, pp. 117-143, 1998.

**Abstract**

In all three of its critical functions ( consumption good, a productive resource and environment) water is linked to food supply and livelihood security of South Asia's urban and rural poor in a myriad of complex ways. The waterlogging and proneness to flooding that result from locational excess of water are as injurious to the food, health and livelihood security of the poor as are groundwater overdraft and contamination by salts, fluoride, arsenic, nitrates and other pollutants. Minimising these adverse impacts will require policies that promote the responsible use of water and the efficient, equitable and sustainable management of aquatic environments. Water resource development and allocation policies can also transform the productive impacts of irrigation instruments for improving the livelihood of small farmers. A range of issues and policies regarding the theme of water and rural poverty in South Asia are reviewed.

Contributions: 6

Keywords: Poverty, water management, water allocation, water markets, contamination, health.

- ME

O. Sheikmous, "Water disputes and ethnic conflicts in the Middle East: The case of the Kurds," in *S. M. Yurukel*, vol. 1, O. Hoiris, Ed. Oxford, UK: Aarhus University Press, 1997, pp. 562.

**Abstract**

The complex current situation in the Middle East caused by water scarcity is analysed. He explains that the whole area in the Middle East is becoming an every day worst conflictive area due to the population

growth and the diminishing of water. Water is the "white oil" or the "colorless gold" over which; countries are willing to take war. In the area, only Turkey, Lebanon, and Iran have sufficient water available and the other ME countries need to find ways to use more efficiently the resource. Three main areas in the ME and North Africa have been affected by long lasting disputes between states over sharing water: the Tigris Euphrates basin involving Turkey, Syria and Iraq; the Nile basin involving Egypt, Sudan, Ethiopia, Uganda and other East Africa States; and the Jordan basin involving Israel, Jordan, Syria and Gaza and the West Bank.

The Euphrates and the Tigris rise in the mountains of Kurdistan in southeast Turkey. They are cross-border river basins and flow through the territories of Turkey, Syria and Iraq. Turkey as the upstream state argues that it is entitled to make full use of all waters in her territory, while Syria and Iraq demand an international agreement on equitable sharing among all three states. The conflicts among Kurds become some time very sharp with the possibility of initiation a war in the ME. The historical conflicts have an indirect impact on the Kurdish ethnic conflict.

Contributions: 6

Keywords: Middle East, Turkey, Iraq, Iran, Syria, Lebanon, Egypt, water resources, water management, international policies, Gaza, Jordan, water use.

- LA-NA

Southwest Centre for Environmental research & Policy, "The US-Mexican border environment: a road map to a sustainable 2020," Institute for Regional Studies of the Californias., California, Research report Border Environment Research Report Number 5., 1999.

**Abstract**

This policy paper argues that surface and groundwater supplies are threatened along the US-Mexican border due to the dumping of raw sewage, agricultural runoff, and industrial and hazardous waste pollution. Such contamination reduces the supply available for human use and often has serious implications for human health, as well as the viability of animals, plants and ecosystems. All streams and rivers in the border region have suffered deterioration of water quality due to the lack of adequate municipal wastewater collection and treatment systems. The current infrastructure deficit is enormous, and the added demand created by growing populations will be significant. Thus, it is likely that significantly greater levels of financial resources will be required to adequately address water quality issues by 2020. Wildlife in the area as well as the flora diversity has been threatened because of the water shortages and pollution. Special efforts will be invested in protecting the ecosystem in the border area.

Contribution: 7

Keywords: USA, Mexico, NAFTA, Mexican border, environment, international regulations.

- As

M. Svedsen, "East Asia regional consultation on water for food and rural development," Kuala Lumpur, Consultation 21 May 1999.

**Abstract**

The document represent the effort of 22 representatives from East Asia nations and to develop a regional vision for water, food and rural development for the next 25 years. The region covered expanded from Myanmar to Japan and from Korea to Australia. It is concluded that "in 2025 all members of East Asia's still growing population will enjoy secure access to food, rural residents will live in vibrant communities with access to a full range of infrastructure and services, and regional water resource systems will meet competing demands in a balanced and sustainable way".

The vision portrayed in the paper is the equal development and wise use of resources where everybody has access to water and food resources The region's weaknesses and strengthens are listed in the paper. In the same token, in the document are analysed.

Contributions: 6

Keywords: Asia, development, environment, water management, irrigation

- As

A. Swain, "Reconciling disputes and treaties: Water development and management in Ganga Basin," *Water Nepal*, vol. 6, pp. 43-65, 1998.

**Abstract**

Politics dominates water and its management in the Ganga Basin, which was one of the reasons behind the 1996 agreement between India and Bangladesh on sharing Ganga water. The same was the case for the Treaty on the integrated development of the Mahakali River between India and Nepal. The response to water problems needs compatibility between politics and technology, and it should not be led by hubris of the later. Any agreement must address social and environmental factors sincerely and bring people to the centre stage. From the perspective of water management, both the response are conventional and past lessons regarding the introduction of large-scale technology were assessed nor they have been internalized.

Contributions: 7

Keywords: Water development, irrigation, water management, international policies, Ganga Basin.

- Af

L. A. Swatak, *Power and water: The coming order in Southern Africa*: Centre for Southern African Studies, 45 p.1996.

**Abstract**

Swatak explains that the dynamics in South Africa have changed dramatically in recent years. There is much continuity, for it will be many years before the negative impacts of uneven capitalist development and apartheid "destabilization" are overcome. Nevertheless there is, for the first time, recognition that problems and possibilities for the region may be approached on their own merits without first having to be filtered through Cold War and apartheid ideological lenses. As a result, the "old" regionalism is now making room for new, innovative and important conceptions of regional identity and practice in Southern Africa.

Swatak conducted an analysis of several instances of cooperation in the region with a focus on understanding approaches to resource use in energy production and water in the Zambezi River Basin. Development in these sectors over the last few years are suggestive of a new type of regionalism; one that is more open, flexible, cooperative and inclusive. However according to Swatak, there is a great deal of carry over from the past, and if the new regionalism is to contribute significantly to the establishment of peace, economic growth and ecological sustainability in Southern Africa, there are many obstacles to be overcome.

In the document Swatak makes an historical analysis of context and of the apartheid unevenness and consequences, then he highlights the economic conflicts and destabilization after apartheid policies. He looks to the various factors facilitating and pressing for a "new regionalism" the end of the Cold War and apartheid, globalization, and the growing sense of urgency among peoples in the region. Through the book the author makes clear that in South African countries there is a very close relation between power and water control. The area will need to develop a strong institutional mechanism to avoid water conflicts.

Contributions: 7

Keywords: Africa, South Africa, apartheid, water management, water wars, institutions, international policies, development, water supply.

- W

A. Umana, "The World Bank Inspection Panel. The first four years (1994-1998).," . Washington, D.C.: The World Bank. International Bank for Reconstruction and Development. International Development Association., 1998, . 327 p.

**Abstract**

The books refers to 10 cases presented to the World Bank Inspection Panel for further investigation of projects which were accused of violating environmental regulations, rights of peoples in the communities, or the economic, social, environmental interests of the people involved. Of the 10 projects, only one was suspended for negatively affecting people. For the other nine cases, some did not proceed due to lack of facts ; in other cases, the negative effects on people's rights or interest were corrected and the project were continued.

Contribution.: 6

Keywords: World Bank, Inspection Panel, environmental protection, people participation

- Af

United Nations for Human Settlement (Habitat), "Partnership in the water sector for cities in Africa.," United Nations for Human Settlement (Habitat), Cape Town, South Africa, Report of the cape Town Consultants. December 8-10. p 290. 1997.

**Abstract**

The main topic of the publication is privatisation of water management. The importance, transcendence and benefit African cities can get from the privatisation process is discussed. Throughout the book, the authors highlight the need for establishing efficient mechanisms for water use, maintenance, distribution, and administration. In the frame of privatisation movement, the authors explain that there is a lack of people's participation in governmental programme, and that there is a lack of concern and involvement in the administration of water in African countries.

The authors are very interested in establishing policies and mechanisms that fulfill The Cape Town Declaration, and they are working on finding the most efficient ways to implement the declarations. The book consists of six keynote papers, which focus on privatisation, public-private partnerships, and water sanitation. It includes 18 case studies about privatisation in Africa, sanitation, water supply issues, and infrastructure issues.

Contributions: 3

Keywords: Africa, The Cape Town Declaration, privatisation, participation, water sanitation, water supply, irrigation infrastructure.

- W

United Nations Centre for Human Settlements (Habitat). Beijing, China. 18-21 March.

The United nation Centre for Human Settlement (Habitat), "Managing water resources for large cities and towns. Report of the Habitat II International Conference," The United nation Centre for Human Settlement (Habitat), Beijing, China, Conference Report March 18-21 1996.

**Abstract**

The report contains five theme papers, and 32 case studies, with ten relating to Africa, 14 about Asia and Middle East, five concerning the Americas, and three about Europe. The topics covered in the theme papers are planning, managing, supply sanitation, and the sustainability of water. The case studies of Africa were related to providing water to urban areas, community participation, collaboration among private companies and government in the management of water, and sanitation and waste treatment. Case studies from Asia and the Middle East covered areas such as environmental problems, water supply in urban areas, sanitation, water management, and water quality and conservation. The topics focused on

the case studies of Latin America were sustainability, water management in urban areas, sanitation and privatisation. The main topics from Europe were water supply in urban areas and groundwater resources.

Contribution: 5

Keywords: water supply, water quality, water management, urban use, rural use, Latin America, Asia, Middle East, Europe, Beijing Conference, United Nations

- W

United Nation Centre for Human Settlement (Habitat), *Water demand management in developing countries cities*. Nairobi: United Nations Centre for Human Settlements., 102 p.1998.

### **Abstract**

The UN argues that the economic value of water must be recognized and addressed in all policy and sector activities in order to initiate and promote the wise and efficient use of water resources in all sub-sectors, especially in the large urban centres. Using water in an efficient manner and managing competing demands in any city, country, or region are essential steps to ensure that water is no longer undervalued and misused in the world. International efforts should be oriented to integrate a global campaign to foster water conservation and to demonstrate to all governments of developing countries that using water more efficiently will generate substantial economic, social and environmental benefits. Everybody should pursue the establishment of adequate policies, strategies and action planning for step by step program to be adapted to the conditions of each site. Appropriate technological implementation, water metering, and pricing policies are indispensable elements in this campaign, which calls for legislative, regulatory, and institutional reforms, to accommodate demand side management. Water conservation should be included in all programme and should be considered by policy makers in implementing future economic and conservation policies.

The document recommends that: (1) National and local governments should initiate creative approaches, courageous policies, regulations and their enforcement; (2) the industrial and institutional reform, in many developing countries, must include water conservation and pollution abatement components as an integrated activity; (3) the governments, the public, the multilateral and bilateral funding and donor agencies all have a role in the water conservation activity; In addition, it is noted that (4) cities in Asia that have conflicting policies and rules should look at low water prices as the culprit within this context; (5) high rates of unaccounted for water are common in the cities of produced; (6) rate structures have been changed in many utilities from regressive to progressive block rate paying more per unit for the higher water consumption; (7) contractors can be paid on the basis of the real water savings achieved.

Contributions: 7

Keywords: Water management, water policies, participation, institutions.

- Af

United Nations for Human Settlement (Habitat), *Managing water for African Cities*. Nairobi, Kenya: The United Nations Foundation for International Partnership. the United Nations for Human Settlements. The United Nations Environment Programme, 13 p.1999

### **Abstract**

Africa is experiencing the most rapid rate of urbanization in the world. The growing number of medium and large cities in the continent face a major challenge of providing their populations with adequate water supply, with large parts of the continent facing severe water stress. African cities urgently need to put in place effective water demand management strategies that could use the limited water resources efficiently without wastage, and widen the service coverage, particularly in the burgeoning urban low-income settlements. A major environmental crisis is also looming large in the continent as the African cities continue to discharge ever increasing volumes of waste into freshwater bodies, threatening water quality and aquatic ecosystems. Several African cities share one or more international river basins which present a special challenge of managing water resources in these basins so as to avoiding future conflicts. A

business as usual approach to urban water resources management threatens not only the sustainability of its cities but also its precious water resources and supporting ecosystems which are closely linked to Africa's future.

The project is a collaborative initiative of UNCHS and UNEP within the framework of the United Nations System-wide Special Initiative on Africa, and is a direct follow up of the Cape Town Declaration adopted by African Ministers addressing the urgent need for managing water for African's cities. The project intervention will be the first comprehensive initiative to support African countries to effectively manage the growing urban water crisis and protect the continent's threatened water resources and aquatic ecosystems from the increasing volume of land-based pollution from the cities. The project will, specifically, focus on the following points: (1) Water demand management in African cities. The project will put in place an effective water demand management (WDM) strategy in ten African cities for efficient water use by all users; the project will institutionalize WDM measures in ten selected African cities by providing technical assistance to establish dedicated WDM units within existing city levels institutions and facilitate city-wide action plans for WDM. (2) Mitigating the impact of urbanization on freshwater resources and aquatic ecosystems. The project will assist African countries to put in place in four river and lake basins early warning mechanisms for timely detection of potential 'hot spots', where sustainability is likely to be threatened; the project will also facilitate the assessment of long-term environmental impact of the growing footprints of large cities on the continent's water resources.

The project will be implemented in collaboration with the Ministry of Water Resources, Environment and Urban Development in the participating countries. Other collaborative agencies will be the South African Development Community (SADC). Lake Basin Authorities, Global Collaborative Council for Water and Sanitation and the Water Utility partnership for Capacity Building in Africa.

Contributions: 7

Keywords: Africa, water management, development, UNCHS, UNFIP, UNEP.

- W

University of Kalmar, *Project. Global International Waters Assessment*. Sweden: University of Kalmar, Project presented for funding to the United Nations Environmental Program. 115 p.1999.

### **Abstract**

Lack of an International Waters Assessment comparable with that of the IPCC, the Global Biodiversity Assessment, and the Strategic Ozone Assessment, is a unique and serious impediment to the implementation of the International Waters (IW) Component of the GEF, since there is no basis on which to identify areas of global priority for GEF intervention. There is a need for a globally coherent incremental study of Transboundary water issues, based on the many existing, but thematically narrow studies at national, regional and global levels. The GEF is in a unique position to facilitate such a study by assembling groups of specialists at a regional level, and following comparable methodologies to investigate the ecological status of international waters and the causes of degradation. From the different regional and sub-regional assessments, a global picture will emerge. The main objective is to develop a comprehensive, strategic framework for the identification of priorities for remedial and mitigatory actions in international waters, designed to achieve significant environment benefits, at national, regional and global levels.

The expected outcomes of the project is to get strategic information for GEF uses at a programmatic level through the provision of framework for the identification of regional and global priorities areas for the consideration of the GEF and its partners in the focal area of international waters, and decision making concerning appropriate management interventions, including identification of more sustainable approaches to the use of water and its associate resources. Preparation of approaches for the elucidation of incremental cost analysis, and protocols for the conduct of causal chain and transboundary diagnostic analysis in GEF-IW projects. Increase in leveraged co-financing.

Contributions: 6

Keywords. environmental assessment, water assessment, water management.

- South-As

B. G. Verghese, *Water of hope. From vision to reality in Himalayan-Ganga Development Cooperation*. New Delhi: Oxford & IBH Publishing Co. PVT. LTD, 497 p.1999.

**Abstract**

Verghese highlights the development of the vast and varied land and water resources of the Ganga-Brahmaputra-Barak basin. Despite the richness of the basin, it is the locus of the world's single largest poverty-hunger belt. The study consist of two main topics: (1) The integrated development of the manifold resources in each of the five countries in the basin--Bangladesh, Bhutan, India, Nepal, and China- to generate wealth and employment, and to reverse the environmental degradation that began even centuries ago; and (2) the need for regional cooperation in ensuring optimized solutions. Preservation of the basin will require continuous negotiations among the five countries, which will each defend their own rights to make use of the water in the way that best fits their needs.

According to Verghese, beneficial and equitable utilization of the potential benefits implies a social transformation in each country. The negotiations will raise a number of sensitive issues, which each nation has to solve through diplomacy and adjustments within each country. The main topics countries must discuss, according to Verghese, are irrigation, water and energy management, pollution control, and environmental conservation. The rapid environmental degradation suffered in the area poses a threat to national and regional well-being, and global warming also has an impact in the area. The development of dams in the basin is associated with inhabited and fertile valleys and forests behind the dams. The displacement of any population creates emotional and economic complications as well. As so often happens, tribal people are affected. Verghese makes an analysis of the poverty in the area and the consideration given to tribal people, and he gives some examples of employment and environmental regeneration. Fisheries and health problems related to water are considered in the book as well. The author outlines renewed possibilities for inland and coastal navigation and points out the importance of agrarian structures, and efficient land and water use. He also considers the seismological factor and the possibility of locating a huge deep aquifer far below the Ganga plain.

The book focuses on conceptualizing how the Himalaya-Ganga-Brahmaputra system can be harnessed for the benefit of the largest numbers in this populous region, which is among the poorest in the world. The study is supported by much experience gained in the field. The author encourages the development of efficient diplomatic mechanisms among the nations involved so as to produce agreements beneficial to all.

Contributions: 6

Keywords: Himalaya, Ganga, Brahmaputra, Bangladesh, Bhutan, India, Nepal, China, irrigation, water management, development, dams.

- W

C. Ward, *Reflected in water: a crisis of social responsibility*, First ed. London: Briddles Ltd., 147 p.1997.

**Abstract**

The author in this book makes an analysis of the uneven distribution of water worldwide. High irrigation technologies are used in high value agricultural products, but in one way or another, people not able to pay for high tech, produce subsistence crops for surviving. People have been sharing the vital element for centuries. The author supports the community control and access to water.

Contributions: 4

Keywords: Water resources development, water rights, water supply, water supply-social aspects, water supply-political aspects.

- ME

A. T. Wolf, *Middle East water conflicts and directions for conflict resolution*. Washington, D. C.: International Food Policy Research Institute, Food, Agriculture and the Environment Discussion Paper 12. 23 p.1996.

### **Abstract**

Aaron Wolf explains that given the years that the Middle East has been involved in bitter conflict, the pace of the peace process has been impressive, and no less so in the area of water resources. Past attempts at resolving water issues separately from their political framework, from the early 1950s through 1991, have all failed. It has been clear that regional water issues could not be solved in advance of high political issues. Yet the pace of the talks also argues that high and low political issues may best be dealt with simultaneously. Despite the relative success of the multilateral working group on water and its stated objective to deal with nonpolitical issues of mutual concern, one might wonder where the process goes from here. The working group on water -according to Wolf-has performed admirably in the crucial early stage of negotiations as a vehicle for venting past grievances, presenting various views of the future, and perhaps, most important, allowing for personal "de-demonization" and confidence-building on which the future peace of the region will be built. Currently, however, many of the participants in the working group are frustrated that it is not, by design, a vehicle for actually resolving conflicts. The contentious topics of water rights and allocation are relegated to the bilateral negotiations, where they take a lower priority. Likewise, the principles of integrated watershed management are difficult to encourage: water quantity, quality, and rights all fall within the purview of different negotiations frameworks.

There are limitations imposed by who does and does not take part. Syria and Lebanon have not agreed to participate in any of the multilateral working groups. The omission means that a comprehensive settlement of the conflicts related to the Jordan or Yarmuk Rivers is precluded from discussion. The focus of these talks has been the core region, including Israel and its neighbors, and has yet to include most of the Nile riparians or Iraq. The history of hydro politics along the rivers of the Middle East exemplifies both the worst and the best of relations over international water. While shared water resources have led to, and occasionally crossed, the brink of armed conflict, they have also been a catalyst to cooperation between otherwise hostile neighbors, albeit rarely and secretly.

With the flow of water ignoring political boundaries, and with appropriate measures of water equity eluding disciplinary boundaries, the history of hydro politics in the ME gives one a glimpse into a gloomy but probable future for many of the more than 200 international river basins

Contributions: 8

Keywords: Middle East, water management, water uses, policies, institutions, international law, law, equity.

# Chapter III

## Users' participation in water management

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Publications addressing water users' participation in water management and maintenance of irrigation systems have been divided into five areas: general cases, and those pertaining to Asia, Africa, Latin America, and Europe. Based on literature reviewed in this report, the Asian countries appear to have published the largest number of documents on participatory approaches in the area of water. Table 3 indicates the number of documents that were reviewed in each category. An overall analysis by each category is considered next.

**Table 3. Number of publications on user's participation.**

Topic	Number of publications
Asia	19
General cases	6
Africa	3
Latin America	2
Europe	1
<b>Total</b>	<b>31</b>
<b>Percentage/300</b>	<b>10.3%</b>

**General cases.** Turrall (1995), Bandaragoda (1997), and Subramanian et al. (1997), explain that even though water users' participation is an important requirement for improving water management, the process has not achieved its potential because of absence of monitoring and evaluations of the programme. Since the implemented projects have not been properly evaluated, there is insufficient knowledge to establish a successful strategy that would include what should be changed in the organized programmes and what should be encouraged to improve participatory projects. The absence of assessments is probably a direct consequence of inefficient management structures, which are generally not responsive in generating, implementing, and evaluating participatory projects. Unless reliable assessments are carried out, it is simply not possible to determine the effectiveness of various programmes in terms of improving the efficiencies of water management processes, and their specific strengths and limitations.

Hinchcliffe *et al.* (1995), Narayan (1995), and Gossehink & Strosser (1997?), have reviewed some successful participatory projects, including methodologies used for their assessments and follow the actions. They point out that participation of water users and government offices are essential elements for successful privatisation. Qualitative methodologies like participatory rural appraisal were found to be quite useful in assessing and implementing participatory programme. Qualitative methods, when applied correctly, often are highly reliable, and thus a valid approach to evaluate water management projects.

**Asia.** Within the Asian continent, most of the information analysing and discussing participatory approaches are on the Philippines (five publications) and South Asia (seven publications). Zaman (1996), Bandaragoda (1997), Hussain and Zahid (1998), and Pedregosa (1998) explain their experiences in participative projects from the South Asian countries. The main conclusion of these analyses is that historically people have received financial and infrastructural support from the government and thus they have become used to this process. Accordingly, users are passive and wait for the appropriate governmental institutions to plan, implement and operate the water management projects. In addition, the absence of involvement by the users, they found the governmental structures and processes highly bureaucratic and inefficient in conducting technical and administrative functions in a proper and timely manner these factors contributed to making the participatory projects somewhat inefficient.

The urgent need to change institutional structures so that these could encourage participatory approaches is highlighted. Such changes are likely to contribute to the development of more efficient system for water management, as well as water uses. If both the groups, the people and the government, work together to reach their objectives and goals, both will benefit from a better irrigation systems, more availability of water, and also ensure that the quality of water is better for domestic, industrial and agricultural uses as well as the protection of the environment.

In terms of information available for different Asian countries, Hussain and Zahid (1998) state that the Pakistan government has supported on-farm water management projects for some 20 years. The water community considers these programmes important enough to sacrifice funding for other projects for improving water management practices. In Pakistan, there have been several successful attempts to involve water users in the administration and management of irrigation systems. Zapanta *et al.* (1995) and Lauraya (1996) argue that because the participatory projects have been a successful in the past, the people and the administrators alike should regularly support such activities, since they have improved the efficiencies of water use and management processes.

Salman (1997) and Adhikari & Jha (1998) focus on the relationship between privatisation and participation in India, Nepal, Philippines and Turkey. For privatisation to be successful, they argue that institutional structures must be changed to promote its needs. Current structures and administrations in many countries do not support privatisation policies. Rao (1995), Ullah (1998) and Zwarteveen & Neupane (199?) analyse participatory policies despite different points of view. Ulla argues that the successes in participatory water management projects have a close relation with the introduction of high yielding varieties of crops (HYV). Water users interested in HYV crops are more motivated to participate in the maintenance of irrigation systems and in the construction of more canals. HYV crops increase the income of the farmers because their produce higher demand from the agroindustries. The increased income makes it possible for the farmers to afford the additional cost for extension and maintenance of the irrigation systems.

Zwarteveen & Neupane (199?) and Rao (1995) also analyse participation in terms of local knowledge and gender. They argue that water use is also a gender-related issue. In many Asian countries, women are in charge of supplying drinking water to the family, and women have done this activity for generations. For this reason, they have gathered empirical knowledge as to how water could be conserved and how it could be used to get more benefits. Women's knowledge of water use has an impact not only in terms of making such uses more efficient but also on the health and incomes of their families. Fetching water represent an income for women, this has the positive effect in improving the family's quality of life. Changes in this kind of local knowledge affect the family incomes first, and then, the social and economic conditions of the community. They recommend local knowledge to be considered for implementing privatisation policies because of the economic, political and social impact these policies could have in low-income countries.

Sinha (199?) explains why water users do not get involved in privatisation projects. He explains that the lack of participation is caused by the increases in the cost per hectare of the new irrigation development. Cost is influenced by performance of the irrigation unit as well, and this performance depends on many other causes, which often cannot be controlled by the water users. They argue that although engineers and planners may consider irrigation systems as the major component of overcoming agricultural production constraints, water use requires more than improvement and maintenance of the irrigation systems. Agricultural production is also influenced by land tenure policies, price and distribution of agricultural inputs; prices of agricultural products in the local and international markets; benefit/cost implications of their investments; and people's preferences for cash crops and local seeds.

Grekel (1995), Shanan & Berkowicz, (1995), Jamiyandorj (1998), Jayatillake (1998), Joo (1998), and Serami (1998) analyse the structure and functioning of the irrigation systems in their countries – Indonesia, Israel, Mongolia, Sri Lanka, Korea and Iran, respectively. The current situations in these six Asian countries range from changes in the whole agricultural and irrigation policies, such as in Mongolia after the breakdown of the Soviet system, to the successful establishment of irrigation in Israel.

**Africa.** Manzungu (1996) describes the efforts made by the African researches and institutions in evaluating of water management in several African countries from the end of the colonial period. Assessments were carried out to learn about involvement of users in water management, official structures to administer and maintain irrigation and water distribution, decision-making processes for water administration, and of agricultural and water resources available. Special attention has given to the relationships between environment and gender, and the future of water management.

Haagsma (1995) explains that even though water user participation has been a positive experience in Cape Verde, the government's participation is necessary to establish and enforce regulations, change dispositions, and administer the process. He points out that the government should play a facilitating role, which should enable the farmers to assume greater responsibility for water management at the local level.

In Egypt Barakat (1998) explains that the Egyptian Irrigation Improvement Project (IIP) has had an excellent impact on institutional development so far as the farmers are concerned IIP is improving water management in the country. He endorses implementing and supporting projects like IIP.

**Latin America.** With regard to Latin America, Escamilla & Kurtycz (1995) state that to get better results with participatory projects, people must be made aware of the importance of water conservation and of how this resource can be best managed. Without knowledge of the importance of water conservation, users will not be willing to take part in water management projects. According to Avila García, (1996) local people have empirical knowledge of water use, conservation and management, and this knowledge has been effective as result of the years of trial and error learning. Avila García states local knowledge should be validated and incorporated into water management strategies.

**Europe.** The number of grey literature on this subject from Europe was very limited. Dede (1998) explains that some evaluations of participatory projects were conducted in Albania. The main objective of these evaluations was to learn to what extent users participated in water management and administration. Another concern was to evaluate the irrigation systems in the country after the war. In both cases the conclusion were the awareness of researches and managers to reconstruct infrastructures and to adapt water management policies to the new Albania's reality.

## Summaries

- As

S. P. Adhikari and U. K. Jha, "Irrigation association for participatory management in Asia," presented at Irrigation Association for Participatory Management in Asia, Lahore, Pakistan, 1998.

### Abstract

Agriculture is the main economic activity in Nepal. Of the total land in production, 30% has irrigation facilities, 71 percent is under farmer-managed-irrigation systems, and the remaining 29 percent are agency-managed. In 1992, Nepal formulated an Irrigation Policy, which supported and encouraged water users participation, turnover process, and a reduction in the government responsibilities in managing irrigation. In Nepal, the integration of water Users Associations is encouraged as well as the privatisation of the irrigation system.

Contributions: 6

Keywords: Nepal, privatisation, turnover, participation, irrigation management, water management.

- LA

P. Ávila-García, *Escasez de agua en una región indígena. El caso de la Meseta Purépecha*. Morelia, Michoacán: El Colegio de Michoacán, 428 p.1996.

## Abstract

The Meseta Purepecha is a region whose geological and topographical conditions restrains the formation of springs and pump wells. The region has abundant rainfall and forest cover, which in Mexico facilitate infiltration and groundwater recharge. This region is an water producer for neighboring areas, because it is rich in springs, lakes and rivers. Majority of human settlements in the Meseta are Prehispanic in origin. The community survival is due to three main factors: development of a water scarcity culture; existence of a water control community; development of a culture of ecological water use and management based on the Purepecha conception of the world from their specific point of view.

Historically, the Purepecha community has lived under harsh conditions, which include fetching water from distant places, waiting long periods for getting water and drink water with organic material. However, the socio-cultural practices have permitted the community to survive in dry seasons. In recent years, the water situation has worsened. Currently, water scarcity not only depends on biophysical and demographic factors but also on social, political cultural technological and ecological factors. The author makes and analysis of those factors and how each one is affecting the water availability in the Purepecha region.

Contribution: 7

Keywords: Mexico, Michoacan, water management, local knowledge, indigenous knowledge.

- As

D. J. Bandaragoda, M. Hassan, Z. I. Mirza, M. A. Cheema, and W. Zaman, *Organizing water users for distributary management. Preliminary results from a pilot study in the Hakra-4-R distributary of the Eastern Sadiqia Canal System of Pakistan's Punjab Province*. Pakistan: International Irrigation Management Institute, p.1997.

## Abstract

The authors explain that even though the document is not a final output from the pilot project's social organization action research activities, some conclusion can be draw from the analysis. The information contained in this report will help the reader to understand the efforts that have been made in the given context of the project.

According to the authors, the project on water users organizations in the Hakra 4-R Distributary command area started its work in the midst of skepticism. There were doubts about its potential success in a context which wan known to be hostile to popular participation. Decentralisation experiences in Pakistan had been traditionally dominated by the ruling elites comprising feudals and bureaucrats. They had develop monopolies over these institutions made it difficult for poor and middle class people to share power with them, and this was seen as a major reason for the wastage, corruption, and poor performance in this study. The pilot project - Badaroga *et al.* explain - has taken a challenging task to confront these deep-rooted social problems. After the first two phases of its existence, the project has cleared some initial institutional hurdles, and succeeded in forming an organization to undertake decentralized management responsibilities. So far, it has proved itself socially viable.

The authors summarized the conclusions and recommendations as follow: (1) the water users do recognized the need for getting organized, but they can not do it alone; they need a catalyst that should prepare the ground work well before actual organizational activities are undertaken. (2) the farmers of the area invariably want their irrigation systems rehabilitated and improved , and will participate in any attempts towards achieving that goal. (3) If WUO do not have adequate control and authority, as well as legal, administrative and economic protection, their sustainability will be at stake, as the members will lose interest and start doubting the usefulness of the organizations for achieving the perceived benefits. (4) WUO will only be ready to undertake objectives they define and choose in their own way, and for their own economic gain. (5) for effective social organization in rural areas, extreme care has to be taken to ensure that the catalysts' interventions are not misunderstood by the community. And (6) even if the WUO are proved economically viable, the danger of WUO office bearers becoming vulnerable to the endemic disease of corruption cannot be easily discounted.

Contribution: 7

Keywords: Pakistan, water management, participation, Hakra 4-R, Punjab.

- As

D. J. Bandaragoda and Y. Memon. *Moving towards participatory irrigation management*. Lahore: Pakistan National Program. International Irrigation Management Institute, p.1997.

### **Abstract**

The authors analysed the pilot project for farmer managed irrigated agriculture in three distributaires in the Sindh Province, Pakistan. They conclude that the project has been successful in overcoming social constraints. The formation of water users organizations at the distributary level has successfully proceeded through the existing socio-cultural and political environment. Those systems are now to be tested for their economic viability. For this they need an enabling environment of institutional acceptance to start a set of economic activities associated with distributary level O&M management. Bandaragoda *et al.* explains that the major issue arising this stage of pilot effort in participatory irrigation management is that, for participatory to be meaningful, there has to be an empowerment of those who are ready to participate. For farmer-managed irrigated agriculture to advance from the watercourse level to the distributary level, the authorities having management responsibilities for the distributaries will have to transfer their power to the water users.

According to the authors, participation in this context connotes a situation in which the water users share responsibility with the government, and does not mean their total independence from the government. In the context of the prevailing social dynamics in Pakistan's rural areas, it is difficult to suggest the latter. At least during initial stages, the water users' collective actions need to be guided and monitored. In this sense, accountability becomes an important policy consideration.

For participation projects to be successful, it is needed to consider corruption as an important endemic social problem that it is necessary to solve before.

Contribution: 7

Keywords: Pakistan, Asia, participation, water management, irrigation.

- As

E. Barakat, "Irrigation association for participatory management in Arab Republic of Egypt," presented at Irrigation association for participatory management in Asia, Lahore, Pakistan, 1998.

### **Abstract**

Barakat explains that the Irrigation Improvement Project (IIP) has created an excellent impact in the farmers' institutional development. IIP's objectives are to address identified problem provided with macro improvements. IIP helps water users to integrate associations, which in turn are improving water management. Barakat describes roles, status of cost and perspectives of participatory irrigation management.

Contributions: 6

Keywords: Egypt, water management, irrigation, participation, privatisation, turnover.

- As

Y. Dede, "Irrigation association for participatory management in Albania," presented at Irrigation association for participatory management in Asia, Lahore, Pakistan., 1988.

### **Abstract**

Dede explains that before 1991, Albania followed a collective agrarian model. There were 500 agriculture cooperatives and 150 state farmers. The Land and Water Department of the Ministry of Agriculture and Food through Public Water Enterprises (WES) at the district level centrally managed the Irrigation and Drainage systems. The change of the political regime has caused damage to the irrigation systems and to the maintenance systems.

In 1993, together with the World Bank, the Albanian government launched a program to rehabilitate irrigation and drainage sectors through the creation of Water Users' Association (WUA). Dede explains that the goals are modest and only have turned over to users tertiary canals. Currently, Albania owns a legal and organizational structure for water management based on WUA in village.

Contributions: 6

Keywords: Albania, water management, irrigation, participation, privatisation, turnover.

- LA

M. Escamilla and A. Kurtycz, "Social participation in the Lerma-Santiago Basin: Water and social life project.," *Water Resources Development*, vol. 11, pp. 457- 465, 1995.

**Abstract**

The authors explain that there have always been conflicts over shared water, even wars. Tension over water rights become focused as political force, not only between different countries but also within the same country. This may be seen in the Lerma-Santiago basin in Mexico, and particularly in the city of Guadalajara where the news media and the general population blame the condition of Lake Chapala on the other states in the watershed. To stimulate user participation, the Oficina de Comunicacion del Lago has developed a methodology as part of a large "Water and Social Life". The authors recommend the inclusion of the " Social component" in the shared basin policies, and the development of new ethic come from conviction and not from outside. Besides the technical and legal solutions required to solve the conflicts that arise among the watershed communities, these communities must be moved to self-analysis to create change from within. The social fields can provide this additional dimension in the solution of watersheds-related problem. To optimize the self-analysis mechanism and the tools used, the work must advance systematically with evaluation of that advance to provide feedback on the methods and the tools.

To support the new water ethic in the medium and long term, the proposed method should be strengthening with education at all levels. The combination will produce future water users who can live in harmony with the resource. The future water users will understand the concepts of watershed, participation and organization as applied to water, a community property, and its use and enjoyment, and the shared responsibility for its conservation.

Contribution: 8

Keywords: Mexico, Latin America, participation, institutions, Guadalajara, Chapala, watershed, policies.

- W

P. Gosselink and P. Strosser, *Participatory rural appraisal for irrigation management research*. Colombo, Sri Lanka: International Irrigation Management Institute, Working Paper No. 38. .

**Abstract**

The increasing international awareness about the strengths of participatory approaches and methods for research and development has led international development banks, NGOs, donors and research and training institutes to adopt Participatory Rural Appraisal (PRA) and other participatory approaches to implement new projects and programme. At the International Irrigation Management Institute (IIMI), PRA approaches and methods have also been incorporated in a number of research activities. The present Working Paper explores the opportunities of PRA in irrigation management research through an analysis of selected case studies in Nepal, Sri Lanka, Pakistan and Kenya, in which IIMI attempted to practice the PRA approach. Recent experiences have shed light on the potential and downsides of the approach, and

in what ways it could be applied for an irrigation management research strategy which strengthens water users' input into irrigation management research.

The paper starts with the presentation of a simplified framework for irrigation management research based on the identification of actors, functions and processes required for irrigation management, along with their links with the enabling environment and their impact on agricultural production and rural development. The paper shows that water users have become very important to research as a unit of analysis to measure the impact of irrigation management and as increasingly important partners in the management of irrigation systems. Despite their recognized importance, the water users' role has remained as a passive one in irrigation management research.

The following section describes PRA as one of the most important participatory research and development approaches to increase farmers' input into the research processes. PRA enables local people to participate in joint-analysis leading to action plans. PRA has been used in different types of processes and sectors and shows a broad repertoire of methods for groups and team dynamics, sampling methods, interview and dialog, and visualization and diagram methods. Literature on the constraints to the use of PRA in practical, cultural, institutional and conceptual terminology is relatively scarce, but critiques of PRA question the cultural appropriateness of the methodology and the creation of expectations (typically aid). In research terms, the level of rigor has received criticism that may be related to the absence of proper evaluation of the methodology itself.

A literature review of the use of participatory methodologies in irrigation does not reveal many examples with clearly documented PRA experiences. PRA has been used in participatory appraisal of irrigation systems, participatory implementation of watersheds management programmes, participatory implementation of the design of irrigation systems, and in participatory monitoring and evaluation programmes. The four case studies mentioned above, show the conditions required for a proper PRA are not always met, the team composition is an important variable for the outcome of the participatory research, that biases and rigidities still persist, and that facilitators play a leading role in some of the activities. An important approach at the outset of research does not necessarily lead to interactive participation.

The authors conclude that at IIMI, PRA can play an important role in adaptive (context-specific) research, but it could also contribute to the identification of new research issues based on interactions with water users for strategic research. It is emphasized that water users should come in at an early stage of the research cycle, in which they could take on some of the research functions and responsibilities, and have a voice in the definition of IIMI's research agenda. Potential changes required to institutionalize the involvement of water users in the research process - such as modification in the process of research design, new definition of clients, new professional attitudes and values, and increased accountability to the end users of irrigation systems - are recommended.

Contributions: 8

Keywords: Participation, Africa, Asia, IIMI, Sri Lanka, Kenya, Nepal, Pakistan, irrigation management.

- As

K. Grekel, *Implementation of community-managed water supply and sanitation programme for low-income communities: A case study in Indonesia*. Toronto, Canada: University Consortium on the environment, Student Paper No. 29. 124 p. 1995.

### **Abstract**

In recent years, a great deal of effort has been expended to develop alternative approaches in the planning and implementation of water supply and sanitation projects in developing countries. The community has proposed community management as one possible alternative strategy in view of the increasing evidence that systems are more sustainable when designed, built, operated and maintained. The greatest potential for success appears to be when all users, including men, women and children, are involved from the beginning and are aware of the value and need of the new facilities. Success is also

dependent upon governments establishing the necessary institutional framework and support mechanism, as well as an environment conducive to full community participation.

The main questions addressed in the paper are; what are the key elements of a successful community water and sanitation project? How do Community Water and Sanitation Project (CWSP) measure up in terms of those elements? To what extent was the project implemented as intended, and which factors affected project implementation? The author concludes that the CWSP is not only important for the water and sanitation sector in Indonesia, but should be shared with other developing nations attempting to solve the problem of water and sanitation service provision for low income communities.

Contributions: 7

Keywords: Indonesia, water use, water management, participation, institutions, Asia.

- Af

B. Haagsma, "Traditional water management and state intervention: The case of Santo Antao, Cape Verde," *Mountain Research and Development*, vol. 15, pp. 39-56, 1995.

### **Abstract**

Local farmers on Santo Antao, one of the Cape Verde islands, have developed a traditional irrigation system that is well-adapted to the extremely difficult physical conditions of steep slopes and limited water flow. Local water management considers the interrelations between irrigation systems within the same river basin, whereas conventional irrigation technicians focus on individual systems performance. Especially since independence, the Republic of Cape Verde has attempted to upgrade the performance of irrigation systems by introducing large-scale employment schemes. The impact of this intervention on water management and farmer participation is critically reserved.

A short field study in one valley, together with an analysis of available documentation on irrigation, has given a better insight into the characteristics of local water management. This led to recommendations for a revised policy towards irrigation development. Major elements of this new policy are the use of the river basin as the appropriate planning and intervention unit, increased farmer participation, and less direct, low-profile approach by the government towards irrigation development. The state should play a facilitating role, enabling farmers to re-assume greater responsibility for local water management.

Contributions: 8

Keywords: Cape Verde, Santo Antao, Africa, privatisation, participation, local knowledge, water policies, institutions, water management, irrigation performance.

- W

F. Hinchcliffe, I. Guijt, J. N. Pretty, and P. Shah, *New horizons: The economic, social and environmental impacts of participatory watershed development*. Washington, D.C.: International Institute for Environment and Development, Gatekeeper Series No. 50. 22 p.1995.

### **Abstract**

For close to a century, rural development policies and practices have taken the view that farmers mismanage soil and water. Farmers have been advised, lectured at, paid and forced to adopt new soil and water conservation measures and practices. Many have done so, and some environments and economies seem to have benefited for a time. But critical internal contradictions have often undermined these efforts. Financial and legal incentives bring only short-lived conservation, and farmers soon revert to their own practices. Many efforts have thus been remarkably unsuccessful, frequently resulting in more erosion.

For soil and water conservation to be successful and sustained, these contradictions must be avoided. Projects must see farmers as the solution rather than the problem, and so put local knowledge and skills at the core of programmes. They must reinforce local organizations through participatory planning, an interactive and empowering approach to participation. Recent evidence is indicating that these new encounters between professional and farmers are producing considerable productive and sustainable

benefits. A collaborative study coordinated by the Sustainable Agriculture Programme of IIED and partner institutions in Asia, Africa, Latin America and Australia from 1992 to 1994 provide detailed case studies of the process and impacts of 22 participatory watershed development projects.

This document summarizes the findings of New Horizons: The economic, social and environmental impacts of participatory watershed development, and discuss implications for the future of watershed development and policy.

Contributions: 8

Keywords: Participation, decentralisation, privatisation, water policies, water management, irrigation, watersheds development.

- As

R. M. Hussain and A. S. Zahid, "Irrigation Association for participation in Pakistan," presented at Irrigation association for participation management in Asia, Lahore, Pakistan, 1998.

### **Abstract**

According to the article, Pakistan owns the largest and most integrated irrigation system in the world. In 1976, the government launched the On-Farm Water Management Project formalizing the irrigation system associations. Pakistan is the only government in the world with 20 years of experience working formally or informally with water user organizations. Based on this experience, it has been introduced a multi-disciplinary project of participation approaches beginning 1990's. From those projects, the most important are: irrigation associations at distributary/minor canal level; irrigation associations for groundwater management; farmer-managed small dams; and irrigation associations for new irrigation schemes.

New organizations like Provincial Irrigation Development (PIDA) and Area Water Boards (AWB) have been formed since 1990's. Beginning 1993, there has been a movement to turnover the operation and maintenance to farmers' organizations. Efforts are focus on adopting more participatory approach to the development of farmers' organizations to take over the management of distributaires and minors. It is explained in the article that all the government's effort to encourage participation and turnover obey to the lack of resources, to reduce expenditures, and balance its books. It was discovered during the negotiation for the national drainage program, that donors consider the introduction of PIDA as sufficiently important to Pakistan's economy that they were willing to cancel finance for projects in other sectors if the government did not confirm its commitment to the process.

Contributions: 8

Keywords: Pakistan, water irrigation, water management, privatisation, turnover, participation.

- As

P. Jamiyandorj, "Irrigation association for participation management in Mongolia," presented at Irrigation association for participation management in Asia, Lahore, Pakistan., 1988.

### **Abstract**

The country was regulated since 1930s for the Communist regime and the collectivized economic model was followed in the agricultural production. Before the communist regime the religious aristocracy controlled most of the use of the land, and the later shift the control to the collectives, Now the control is been transfer to people. Changes in the Land Use and Land legislation were introduced in 1995; those changes included new titling systems and laws. The new legislation is transforming the land from common property to private ownership and all the governmental support is given to help the process go efficiently. As of 1990, there were about 40 irrigation systems, and the irrigation systems are available for 40,000 hectares.

Contribution: 6

Keywords: Mongolia, Asia, water management, water use, privatisation, irrigation transfer management, institutions.

- As

H. M. Jayatillake, "Irrigation association for participatory management in Sri Lanka," presented at Irrigation association for participatory management in Asia, Lahore, Pakistan, 1988.

### **Abstract**

The article explains the historical background of the Farmers Organizations (FO) and their involvement in administration and maintenance of irrigation systems. The implementation of Integrated Management of Major Schemes (INMAS) implemented in 1984, promotes participatory programme to enhance productivity of irrigation systems, the program formalized the participatory management in Sri Lanka. The participatory organizations in the field area canal groups (FCG), distributary canal organizations (DCO), and the scheme level (SLFO). The participation organizations count with clear rules for their integration and function.

Contributions: 7

Keywords: Sri Lanka, water management, irrigation, participation, privatisation, turnover.

- As

Joo, S. H. (1998). Irrigation association for participation management in the Republic of Korea. Irrigation association for participation management in Asia, Lahore, Pakistan, Asian productivity Organization.

### **Abstract**

Approximately 75.2 percent of agricultural land in Korea has been improved with the introduction of irrigation systems. Since 1990 Farmland Improvement Associations (FIA) were founded as the water management organizations of farmers and they have been carrying out successfully role in water management. Water organization management has been supported and encouraged by local governments and at the end of 1995 there were 14,226 water users associations, having 482,674 members farmers in an area of 184,992 hectares. There are 106 FIAs having 925,955 member farmers with an area of 609,966 hectares of all.

Contributions: 6

Keywords: Korea, Asia, water management, irrigation, participation.

- As

F. M. Lauraya, *Research intervention to strengthen irrigator's associations*. The Philippines: International Irrigation Management Institute, IIMI Country Paper, The Philippines No. 7. 156 p.1996.

### **Abstract**

From 1989 to 1994, a four-phase pilot intervention project was implemented that aimed at strengthening the farmers' requirements or Irrigators' Associations (IA) in the Philippines. Initial activities concentrated on benchmark studies to establish entry points in the institution-building task. Results underscore the need to restructure the farmer's organization into smaller groups below the turnout service area level based on water and work distribution. A self-assessment of techniques was also initially introduced among farm leaders as a countercheck on the evaluation measures done by the project team. Drawing from the lessons learned from the preparatory stages of the project, the last two years were devoted to the development and institutionalization of a systematic process of performance assessment and monitoring of IA activities. Referred to as "self assessment performance" among farmer leaders, this 2-year project aimed at institutionalizing the self-assessment process, further developing it into a management information system for the IAs as a whole. In jointly managed systems such as the national systems where the NIA shares management responsibilities with the IA, the need to corroborate plans reflecting both the farmer's and government's management needs becomes imperative. As conceived, therefore.

The data generated by the IA will eventually be linked to the NIA's information needs. This would reduce the agency's work in collecting data at the grassroots level because farmers are now being trained to have the capacity to gather and consequently analyse irrigation data. Most importantly, the farmer's perceived inadequacies, particularly in repairs and maintenance, could be regularly integrated into the agency's plans. It is expected that once this Management Information System is institutionalized, it would: (1) improve interaction among members, between members and leaders and among leaders themselves; (2) help resolve conflicts; (3) increase awareness of O&M problems among IA and TSA leaders; (4) provide a basis for the IA's feedbacking to NIA on the O&M requirements of the part of the systems. Hence, the self-assessment process could lead to enhancement of system performance and eventually spin off improvement in agricultural productivity.

The document is formed by nine chapters, chapters 2, 3 and 4 refers to the project description and its methodological background, chapter 5 contains and institutional frame and a descriptive explanation of the self-assessment project, chapter 6 highlights performance indicators, validity and reliability of the assessment project. Chapters 7 and 8 refer to TSAL and turnover process, and the last one explains goals and challenges.

Contributions: 8

Keywords: irrigator's associations, participation, irrigation management, water distribution, financing, data collection, operation, maintenance, performances indexes, privatisation, institution building, training, leadership, Philippines.

- Af

E. Manzungu and P. v. d. Zaag, "The practice of smallholder irrigation. Case studies from Zimbabwe," . Harare, Zimbabwe: University of Zimbabwe Publications, 1996,. 235p

### **Abstract**

It is explained that the book is a results of research conducted under the auspices of the Zimbabwe Programme on Women's Studies, Extension, Sociology and Irrigation (ZIMWESI). The program is an inter-university exchange between University of Zimbabwe and Wageningen Agricultural University, got away in 1993. One of the objectives of the projects was critical understanding of intervention issues and practices in the rural areas by focusing on the actors. Such actors include farmers, laborers and the state with its various apparatus and officials. The research is multidisciplinary and for this, researches in technical and sociological areas are working in team. The main goal is to integrate the technical and social aspects and assess water issues since both viewpoints.

In the book, the agricultural and water resources are analysed, as well as the administrative official structures, decision-making process, and people's participation in water management. Special attention is given to the relationship between environment and gender and the future of water management.

Contributions: 7

Keywords: Zimbabwe, sustainability, gender, water management, smallholder irrigation, Africa, institutions.

- W

D. Narayan, *The contribution of people's participation. Evidence from 121 rural water supply projects.* Washington, D.C.: The World Bank, Environmentally Sustainable Development Occasional Paper series No. 1. 108 p.1995.

### **Abstract**

Field observations have led many people to believe that beneficiary participation in decision-making can contribute greatly to the success of development projects. When people influence or control the decisions that affect them, they have a greater stake in the outcome and will work harder to ensure success. However, the evidence supporting this reasoning is qualitative -some would say anecdotal-so that many

practitioners remain skeptical. Even when they accept that participation is important, the qualitative approach does not offer much guidance on how to promote participation in large-scale programme. Therefore, three questions need to be addressed systematically: To what degree does participation contribute to project effectiveness? Which beneficiary and agency characteristics foster the process? And, if participation does benefit project outcomes, how can it be encouraged through policy and project design?

To answer these questions, researchers studied evaluations of 121 completed rural water supply projects in forty-nine developing countries around the world. Eighteen different agencies supported the projects, which employed a variety of technical approaches. The results are clear: beneficiary participation contributed significantly controlling for the effects of seventeen other factors. The results are based on quantitative and systematic qualitative analysis of data across projects and within the lifetime of individual projects, sometimes over a decade or more. The quantitative data came from content analyses done by two independent coders for each report, covering 149 variables. Intercoder reliability was high on key variables, and testing for so-called halo effect produced no significant change in the results. Preliminary correlation analysis and factor analysis to reduce the number of variable led to a model that applied the framework of collective action to management of rural water as a common property resource. To move beyond correlation among indicators toward casualty, multivariate regression analysis was used to test the collective action frameworks. Additionally, the twenty projects that were scored as most effective were analysed to determine their key design features.

Contributions: 8

Keywords: Qualitative research, methodology, participation, privatisation, turnover

- As

B. C. Pedregosa, "Irrigation association for participatory management in Philippines," presented at Irrigation association for participatory management in Asia, Lahore, Pakistan, 1988.

### **Abstract**

It is explained in the article that in 1963 was created in Philippines the National Irrigation Administration, and in 1980 was introduced the Participatory Approach Program (PAP) in the irrigation management schemes. PAP encourage people participation in designing and implementing projects, because founders believe participation will improve the results obtained, will train technicians and will help them to be in touch with users and know their needs. According to them, participation builds cooperation and cooperative spirit in the community.

The success of participatory management in irrigation will depend on the cooperation among technicians, users, and administrative officials. The maintenance of strong irrigation associations will have direct influence in the continuity and efficiency in the privatisation of irrigation service.

Contributions: 7

Keywords: Philippines, water management, irrigation management, privatisation, turnover, participation.

- AS

N. Rao, "Girijan cooperative corporation's experiences in the field of water and health care using traditional knowledge," presented at Indigenous women's knowledge in health care and water management, Asian Institute of Technology, Bangkok, International Development Research Centre, Canada. 1995.

### **Abstract**

Use of herbal medicine by the indigenous people for treatment of various ailments is an old and time-tested practice in India. There are forest areas in India rich in herbal resources long time utilized with health care purposes. In this areas inhabited 33 sub-tribes constituting a population of about 4 million spread over and area of 3 0000 sq. km in the State of Andhra Pradesh.

The Girijan Cooperative Corporation (GCC) was established in 1956 with an objective, among other things, to purchase various non-timber forest products numbering about 40 items, collected by the scheduled tribe population living in forest areas and market them to the best advantage of the tribal and pay them a fair and reasonable price. Cleaningnuts (*Strychnos potatorum*) is one of the NTFP items of the GCC. Researches have shown that cleaningnuts have been used for women from time immemorial for cleaning water. The extract of cleaningnuts has coagulating properties and as it aids in clarification of natural turbid water. Local women have used the nut for water cleaning and clarification of natural turbid water.

Local knowledge like in this case, can be used to the conservation of water in areas where it is difficult and expensive to introduce different kinds of technologies, or where it is more effective and efficient to adopt local techniques for improving water use and management.

Contributions: 6

Keywords: Indigenous knowledge, Indian, water use, water conservation, participation, Andhra Pradesh.

- W

S. M. A. Salman, *The legal framework for water user's associations. A comparative study*. Washington, D.C.: The World Bank, World Bank Technical Paper No. 360. 99 p.1997

### **Abstract**

This paper is a comparative study of the legal framework for water users' association (WUA) in six countries, namely, Colombia, India, Mexico, Nepal, the Philippines and Turkey. The study postulates that, since water is becoming an increasingly scarce resource and irrigation is the single largest user of water, every effort should be made to achieve efficient use of irrigation water. The paper builds on the theory that if farmers participate through WAUs in managing and operating parts of the irrigation system, including collecting water charges, the result will be an optimum use of water. It goes on to describe the legal instruments that are necessary for establishment of WUAs. Chapter 1 deals with the enabling law - the law from which the authority to establish WUAs is derived and describes the main issues that this law would include. Chapter 2 discusses the bylaws of the WUA and describes the main issues that the bylaws would usually address, showing in a number of areas the different approaches by different countries - or states-to the same issue. Chapter 3 addresses the transfer agreement, the agreement between the irrigation agency and the WUA in which the irrigation agency agrees to transfer to the WUA responsibilities for managing parts of the irrigation system, and the WUA accepts such responsibilities. As such, the chapter also deals with the relationship between the irrigation agency and the WUA, and details, again in a comparative manner, the issues that the transfer agreement would usually address. The concluding chapter argues that the different approaches to the same issue by the six countries is due mainly to the different environment in which each WUA is operating, and to their experience in participatory irrigation management.

Contributions: 5

Keywords: Privatisation, participation, irrigation management, water users associations, Colombia, India, Mexico, Nepal, the Philippines, Turkey.

- As

M. H. Saremi, presented at Irrigation association for participatory management in Asia, Lahore, Pakistan, 1998.

### **Abstract**

It is explained that out of 51 hectares of cultivated land in the country, only 5.1 million hectares are irrigated. It is difficult to provide water for agriculture without investing in water supply, control structures and distribution systems. Iran owns and historical knowledge and experience in water management and in the construction of ditches, dams, as well as in the efficient management of water. The Iranian government

includes in its structure specialized agencies for water management such as Ministry of Power, Ministry of Agriculture and Ministry of Joha. Participatory polices and programmes have not been implemented yet.

Contributions: 5

Keywords: Iran, participation, water management, water use, institutions.

- As

L. Shanan and S. Berkowicz, *The context of locally managed irrigation in Israel: Policies, planning and performance*. Colombo, Sri Lanka: International Irrigation Management Institute, Short Report series on Locally Managed Irrigation. Report No. 10. 21 p.1995

### **Abstract**

The policies, water laws and planning criteria for water resources and irrigation development in Israel are reviewed in this report. The operation of the main water supply systems and the farm-level delivery networks are assessed. The national water system is operated by a government-sponsored public company while municipal and village system are managed through locally elected councils accountable to the public. Private and national water supplies are regulated by government allocations and pricing policies. In the irrigation sector, performance has been high. Water distribution has been assured and equitable, deliveries are timely and irrigation networks generally operate efficiently. System reliability has been one of the main factors enabling the government to adopt policies, which moved irrigated agriculture from a labor-intensive, low-investment sector to a commercialized, export-oriented one. Drip and sprinkler systems have replaced surface irrigation methods and high production has been achieved with advanced agricultural practices and skillful farm management.

Contributions: 7

Keywords: Israel, privatisation, water management, irrigation, water markets, water use.

- As

S. Sinha, *The conditions for collective action: Land Tenure and farmers' groups in the Rajasthan Canal Project.*: International Institute for Environment and Development. Sustainable Agriculture Programme, Gatekeeper Series No. 57. 19 .

### **Abstract**

According to the author, rising cost per hectare of new irrigation development have been a major factor in the recent worldwide decline in the rate of irrigation investment. This has been matched by increasing concern, among both governments and multilateral donor agencies, about the poor performance of existing irrigation schemes. One common perception, explain Sinha, of the cause of this problem is that farmers are not sufficiently involved in the design and management of these programmes. Consequently, there has been an upsurge of enthusiasm to water users has come to be regarded as a panacea by irrigation engineers and planners. However, farmers or water users are often seen as an undifferentiated category. The author describes in this paper how such a perception ignores tenure-based differences among farmers. These differences influence strongly the prospects of the formation and success of farmers' organisations and ultimately of irrigation management transfer. The poor integration of irrigation and conventional agricultural development inhibits a complete understanding of these issues.

Sinha analyses two case studies from two contrasting areas in the Rajasthan Canal Project. He examines five key irrigation tasks to show how farmers cultivating land under short-term shared and fixed-rent tenancies experiences serious limitations in evolving organisations for increasing their control over local irrigation management. The process of formation of users groups could be enhanced by: relaxing restrictions on tenancy contracts; emphasizing the training of stakeholders for institution building; establish tradable water rights, and making membership of water users' associations open to cultivators with water rights and not conditional on land ownership; and state-initiated creation of an enabling environment for the devolution of powers within the irrigation bureaucracy.

Contribution: 7

Keywords: Participation, Rajasthan, Asia, water management, land tenure.

- W

A. Subramanian, N. V. Jagannathan, and R. Meinzen-Dick, "User organizations for sustainable water services.," in *World Bank Technical Paper No. 354*: Washington, D.C., 1997, . 162 p.

**Abstract**

This paper addresses the basic question: under what conditions are user organizations most effective in managing water systems? The first part examines the conditions under which sustainable water user associations (WUA) can be fostered in the irrigation sector. The second part deals with water and sanitation users' associations (WASAs) in the domestic water supply and sanitation sector. Key external factors and internal structure for sustainable users association, as well as conditions for partnership between the government agency and user association are identified. Sustainable associations in irrigation require a supportive policy and legal environment, and strong incentives for farmers, with particular attention to financial viability. Well-defined roles, rights and responsibilities of the government and associations in water and system management and incentives for agency staff are also crucial for the success of WUAs. In the water supply and sanitation sector, the need for agency reorientation to deal with user interest is emphasized. Benefit from participation and specific roles of WASAs must be identified in the policy and institutional context of a country. Such roles could vary from pressure groups to means of improving the accountability of the public agency or even full control over system design and construction, and later management of services. Ultimately, the appropriate institutional arrangement between the government agency, the users, and their associations needs to be developed to meet the objective of improved and cost effective water services.

Contributions: 7

Keywords: WUA, participation, institutions, irrigation management, turnover.

- W

H. Turrall, *Devolution of management in public irrigation systems: Cost shedding, empowerment and performance. A review*: Overseas Development Institute, Working Paper 80. 96 p.1995.

**Abstract**

Many practitioners and researchers in irrigation management are uneasy with the idea of producing lists of recommendations that can, unthinkingly or unwittingly, become blueprints. There is no real substitute for a methodical, wide-ranging and inquisitive assessment of the prevailing situation in public, private and community life before specification, development and implementation of social engineering experiments such as IMT. Although experience with various forms of management transfer goes back more than twenty years, the process is still regarded as a young science: the dominant reason for this apparent contradiction is that there has been insufficient monitoring and evaluation of performance at appropriate scales.

The author explains the main reason for the lack of monitoring of the IMT programme and give recommendations of how to improve the transfer, irrigation management and administration. IMT is a continuous process that should be assess before implementation and through its implementation. The author explains that it is necessary to consider factors such as water rights and ownership; research on viable joint management methods and institutions for large complex surface scheme; and markets for produce, and term of agricultural trade.

Contribution: 8

Keywords: Irrigation Management Transference, water management, irrigation management, privatisation, turnover, equity, institutions, irrigation systems, Water Users Associations.

- As

M. Ullah, "Irrigation association for participatory management in Bangladesh," presented at Irrigation association for participatory management in Asia, Lahore, Pakistan, Asian Productivity Organization. 1998.

### **Abstract**

The arable and irrigated land in Bangladesh has been estimated to be about 9.0 million the former and 7.2 million the latter. The irrigated area is approximately 3.1 million hectares. The country has the potential to increase the agricultural production if adequate technology transfer programme are implemented. Irrigation is one of the most important to increase production. Since 1960's with the introduction of High Yield Varieties (HYV) it was necessary to improve and to introduce irrigation system to fulfill the requirements needed for HYV production.

The development of irrigation association began together with the introduction of irrigation systems in the 1960's. The Ganges Kobadak project was the first project working with participatory goals. Subsequently, other organization have been organized and developed such as the farmers' co-operative societies (KSS) and the tertiary water users associations (TWA). At the same time of the development of water users associations, credits institutions were binding to the projects, providing user with funding to afford pumps and credits. In 1994, Ministry of Water resources issued Guidelines for People's Participation (GPP) in water sector projects, which is being adopted and implemented by Bangladesh Water Development Board.

The existing National Irrigation Management Coordination Committee in the Ministry of Agriculture is encouraging participatory programme and it could transform itself in a autonomous organization of participatory irrigation association.

Contributions: 6

Keywords: Bangladesh, Irrigation, participation, water management, institutions, water associations.

- As

C. M. Wijayaratra and M. D. M. Valdez, *Participatory action research. Strengthen farmer organization and agency farmer relations*. Colombo, Sri Lanka: International Irrigation Management Institute, IIMI Country Paper, The Philippines No. 6. 153 p.1996.

### **Abstract**

The publication summarizes the experiences in participation obtained by the Irrigators Associations in the Philippines. Private participation has enhanced the administrative efficiency and equitable distribution of water in the areas where the project was implemented. The research methodologies tested --process documentation research, validation workshop and validation questionnaire surveys -- were found to be complementary and a useful assessing participative approaches.

Contributions: 8

Keywords: irrigation management, irrigation systems, agricultural development, farmer interactions, maintenance, performance evaluation, institution building, farmers' associations, research methods, Philippines.

- As

W. Zaman and D. J. Bandaragoda, *Government interventions in social organizations for water resource management: Experience of a command water management project in the Punjab, Pakistan*. Lahore, Pakistan: International Irrigation Management Institute, Pakistan National Program. p.1996.

### **Abstract**

The author analysed governmental intervention and locals participation in the implementation and conduction of water management projects in the Punjab, Pakistan. They explain that The Hakra-6

experience in CWMP interventions was limited to a narrow objective of social organization. The WUAs were seen as vehicles for easy mobilization and short-term dispute resolution, both serving the implementation of a civil works program. The ways in which programme and policies have been implemented in the water management units have made water users become over-dependent on government sponsorship. A growing attitude towards demanding material incentives and subsidies from the government has infused a concept in the water users' mind that WUAs cannot be created without material incentives. Future attempts at broad-based social organization for irrigated agriculture are likely to be hampered by this deeply ingrained belief among the water users.

A recommendation given by the authors is that to be effective and sustainable, the WUAs should have a set of continuing functions, which demand organized conduct by the majority of their members. One important finding of the study is that a significant section of the water users operate lands in two or more watercourses. In addition, the boundaries of villages are not congruent with those of watercourses. A watercourse-based association, therefore, becomes socially less viable. The study highlights the need for some new thinking regarding the process of social organization in this context. The existence of different kinship groups among the water users calls for wider opportunities for participation in the organizational decision-making. Mechanisms are necessary to provide an adequate legal framework for the WUAs to be effective in implementing its collective decisions, and for an appropriate state agency to monitor the functioning of WUAs are highlighted as the main cause of failure in participative water management programme.

Contributions: 8

Keywords: Pakistan, Asia, participation, water management, irrigation, the Punjab.

- As

L. S. Zapanta, A. P. Magos, M. J. Padilla, D. Tanoy, and A. A. Torres, *Services of provincial irrigation offices to communal irrigation systems in western Visayas in the Philippines*. Colombo, Sri Lanka: International Irrigation Management Institute, IIMI Country Paper, The Philippines No. 3. 115 p.1995.

### **Abstract**

The study is primarily concerned with the services of the Iloilo Provincial Irrigation Office (PIO) to the Communal Irrigation Systems (CIS), and with the nature and extent of involvement of the concomitant farmers' Irrigators' Associations (IAs) both in Western Visayas, The Philippines. The study is based on extensive review of the effects of the structures and process of some management variable on the performance of the IAs, specifically in water distribution management and amortization repayments. Study findings support the fact that decentralisation measures undertaken by NIA have positively affected financial management and training of personnel and clientele. However, the NIA Central Office has continued to undertake coordination, monitoring and supervision activities instead of being much more supportive of field activities.

The IAs rate of amortization repayments has been crucial to the viability of their CIS. Also, the leadership and communication variables have played pivotal roles in IAs which have operational CIS. Despite several changes NIAs present organizational structures and centralized authority relations may not act speedily and adequately enough to facilitate participatory philosophy for new and existing communal projects. Recommendations are offered on the improvement on PIO structures and procedures, which may affect further decentralisation at the provincial levels. Recommendations are also offered which may make IAs more financially viable and strength the skills and knowledge of IA members in systems operations and maintenance.

The study hazards the idea that NIA might be preempting the farmers and their associations of their native genius and talents for water generation and distribution. This simply means that the clientele determines the extent of its own participation in the organization and management of its CIS. The government should impose not that this, but that the government should manage the program by substantively readying the clientele for its responsibility.

The study concludes with the reiteration of the need for organizational structures and process that will enhance the participative aspects of irrigation service delivery. It is recommended that highly capable provincial managers must be selected and be given more powers and responsibilities to direct, coordinate and harness manpower and other resources of the agency as well as those of the local irrigation area to operate in a more decentralized framework.

Contributions: 8

Keywords: Irrigation, participation, development, Philippines, Asia, Visayas.

- Af

M. Zwarteven and N. Neupane, *Free riders or victims. Nonparticipation in irrigation management in Nepal's Chhattis Mauja irrigation scheme*. Colombo, Sri Lanka: International Irrigation Management Institute, Research Report 7. .

### **Abstract**

Although irrigated farming at the head end of the Chhattis Mauja irrigation scheme in Nepal is increasingly done by women, female farmers do not formally participated in the scheme's organization. However, women's noninvolvement as formal members in meetings and the lack of female representation in the organization do not seem to negatively affect their access to irrigation services. On the contrary, women succeed extremely well in getting their irrigation needs accommodated, in part because they are not formally participating in the scheme's management. This allows them to take more water than they are entitled to, as well as to contribute less labor to maintenance than they should without being punished. Because women are not recognized as members, the organization has difficulty enforcing its rules on women. At the same time, female farmers cunningly make use of the prevailing ideology, which pictures them as weak and in need of protection. Although this ideology does not reflect realities as perceived by women themselves, it strengthens them in their negotiations for more water and in their attempts to minimize their contributions to the scheme's maintenance.

Previous studies attribute the successful performance of the Chhattis Mauja irrigation scheme to the fact that all users are involved in its management, This study shows that in the head end of the system, the group of users is not identical to the group of managers: women are the main users, but only men participate in the Chhattis Mauja organization. Although overall scheme management performance does not unduly suffer from the lack of user's participation, the problems of free-riding and labor mobilization of agriculture continues to grow, these problems will become more widespread and threaten the sustainability of the whole irrigation scheme.

Contributions: 6

Keywords: Gender, water management, Nepal, development, women.

## Chapter IV.

# National water issues

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Table 4 provides a breakdown of literature reviewed by continents in a descending order.

**Table 4. Number of publications on water management within countries.**

Area	Number of publications
General cases	2
Australia	3
Africa. Saudi Arabia	1
Europe	
Sweden	1
The Netherlands	1
America	
US	4
Mexico	2
Argentina	1
Peru	1
Asia	
India	5
Bangladesh	4
Pakistan	1
Nepal	1
Sri Lanka	1
Japan	1
Thailand	1
<b>Total</b>	<b>30</b>
<b>Percentage/300</b>	<b>10%</b>

**General Cases.** From studies conducted in The Netherlands on the relationship between policy-making and policy-analysis by Wisserhof (1995), it appears that water-related research is often performed at significantly lower levels of integration than policy making for integrated water management. This limits its possible use in policy making. Nevertheless, an analysis of strategic policy making for water management in the Netherlands show that policy research often has considerable impact on policy. This is largely due to the integrative intermediary role of the policy analysis. However, policy analysis for water management is often restricted to the natural sciences and engineering. Additional input of administrative sciences may contribute to resolve the current problems in implementation and coordination of integrated water policies.

Solanes (1999) analysed the history of the privatisation from development of ideas to implementation of policies and evaluations in the Latin American countries. He notes that during the process of development of ideas on privatisation, a series of problems surfaced, among which, regulatory frameworks were often determined by the sectors having vested disappointments with the users' protection mechanisms, limitations in the theoretical economic approaches and, monopolistic and technical failures in certain sectors. The lessons learn require new adjustments and corrections. Globalisation of service benefits from the diffusion and universalization of the legal principles that are applicable to these systems. The main objective is to balance and protect simultaneously the interest of the private investors and consumers. He concludes that for privatisation to be successful it is necessary to make necessary legal, political and economic changes to support its development.

## Asia

With respect to the total number of publications analysed from Asia (14), eleven were on South Asian countries and three on East Asia. The main concerns would be briefly summarised for the countries concerned next.

**India.** Chidananda, *et al.* (1996) explain the efforts undertaken in India to extend its irrigation system and canals. They note throughout history rulers that kings and local leaders have evinced keen interest in constructing irrigation structures. According to available statistics, the overall irrigated area in the world rose from an estimated 8 million hectares in the year 1800 to 2600 million hectares by 1994. India and China have contributed to as much as 40 percent of this increase. Even though in the Indian irrigation system has expanded significantly, the productivity per unit of water has continued to be very low. The main cause for the low production is due to inefficient administration and operation systems. Most of the deterioration in canals is due to lack of timely maintenance. The inefficiencies of these systems are encouraging people to reconsider the traditional ways to transport water and maintain canals.

The Sardar Sarovar Narmada Nigam (1997) describe and review the Sardar Sarovar Dam project built. The Dam is in the state of Gujarat in Western India, but benefits are expected to accrue three states: Gujarat, Madhya, Pradesh and Maharastras. It is the largest development project in India and possibly in the world. The project was envisaged in 1946, but was finally approved for construction in 1987. The benefits the dam will bring to the semi-arid state of Gujarat if highlighted.

Metha (1997) disagrees with the Saradar Sarovar administration, and contends that the dam is unlikely to be of major benefit to the district of Kutch where it is located. The idea that there is no other alternative but to build a dam is a view “manufactured” by the government officials. The consequence of this “manufacturing” is that the local impacts have not been adequately analysed and the social implications of the project are not known. The author argues that the social, caste and power dynamics of the villages are driving away the control of water, thus, the unequal access to water is likely to be increased. Macro and micro level water interventions do not consider social differences. Accordingly, such schemes are to further reinforce the already wide gap between the various social classes and power.

Baker (1996) analyses the interactions between institutional changes within the Kangra Valley flow systems and the contextual consequences of these changes in the area. Institutional changes have impact on the areas where they occur. Negative repercussions in the current social, religious, and political trends are noted.

**Bangladesh.** Huggart (1994), Sadeque (1996), and the Ministry of Water Resources (1995, 1998) review the strategies and the framework used for the development and implementation of a national water management plan. It is a part of the Flood Action Plan prepared from 1990 and 1994, and the earlier National Water Plan. In establishing of water management policies, the Bangladesh Government considers three major options: minimum interventions strengthening the capacity for flood forecasting and disaster prevention and management, and improving the operation and maintenance of existing projects. Selective intervention, in addition to the first option, protect water supply and provide flood proofing for vulnerable rural communities, possibly with the construction of water and flood management projects to enhance agriculture and fisheries. Third major intervention, in addition to the two earlier issues, is the implementation of large-scale measures such as embankments and river engineering works to prevent flooding and erosion by the major rivers, and multipurpose barrages on the main rivers.

Haggart (1994) and Sadeque (1996) note that in Bangladesh, not only in the Flood Action Plan launched by 15 donor countries and agencies in 1987-1988 but also in the National Water Management Plan an important element that has been missing is the views of the farmers, fishermen, women and landless poor who have good first hand knowledge of floods and their impact on their lives. Even though the country is criss-crossed by more 200 rivers, there is a pronounced dry season when groundwater table declines. This, in turn, has serious implications on the use of hand-pumps and thus the availability of water. Sadeque further explains that there is an increasing conflict between individual people and communities

as a whole to develop local controls and self-management of the resource. In Bangladesh, the cultural and religious background has been that water cannot be denied to any human being, but this has begun to change due to increasing emphasis on irrigation during the last decade. Because of this changing context, new set of questions now arise on issues like common property and equity because now rich landowners either own or control irrigation water. Existing power relationships between the various segments of the society affect the emerging informal rules over the use and control of the common resource like water. However, it still remains to be analysed to what extent such conflicts may arise due to the use of and access to a common property, resource may contribute to the evolution of informal rules, and also how that agreed consensus may prove to be equitable and sustainable as an alternative to technocratic administrative controls.

**Nepal.** Lam points out that the current trends of the irrigation systems in Nepal indicates the governmental commitment to invest in dams and associated hydraulic infrastructures do not appear to be much to expand the irrigation systems. However, does not appear to be much interest in strengthening people's institutions to maintain and administer the irrigation systems. Nor is there much interest to train people to make better use of water and manage the irrigation systems more efficiently.

**Pakistan.** Strosser (1997) has analysed water markets and water prices in Pakistan. He notes that the introduction of water markets and pricing systems needs to overcome certain constraints like the need to analyse, compare and combine various types of interventions. He stresses the relevance and importance of integrating various disciplinary approaches providing better linkages between bio-physical processes and investigating the heterogeneity of these process within the irrigation systems.

**Sri Lanka.** Baaker (199?) refers to issues that have not been considered in the documents mentioned earlier in the section. He explains that even though some water users may not be important economically because of the small quantities of water used, the low levels of contaminants present in the water may affect them. There is a public health dimension to the problem that has not been generally considered. Low levels of contaminants may affect wildlife and fish over a longer term. In addition, contaminants are likely to accumulate in the soil. He recommends that those who may be "not economically important" users of water should be involved in the formulation and implementation of water management policies.

**Japan.** Takahasi (199?) describes the historical background and development of the irrigation systems in Japan from a hydrological viewpoint. He notes that decisions made by institutions and people regarding water use and its management are affecting and will continue to affect, the hydrological cycle. He argues that the framework has to be expanded to one oriented towards overall development, conservation and management of national land and water resources from a standpoint that considers all aspects and the continuity of the cycle.

**Thailand.** Kumar & Young illustrate how the social accounting matrix of Thailand may be extended to incorporate water resources. The framework proposed is based upon an integrated approach to demand and supply management of water resource and its implication for water pricing policies. The discussion focuses on the modifications and extensions of the social accounting matrix and on demand-supply equations for water that reflect the true scarcity value of water for different uses and from different sources. The introduction of the concept of user costs of water in the matrix is encouraged.

**Saudi Arabia.** Mohorjy & Grigg (1995) provide a comparison between the Kingdom's water management tasks with state government programme in the United States, including water law, planning, management, and coordination processes; organizational structures; infrastructure development; water quality management; conservation programme now; regulation, standards, and enforcement; and support functions. The authors make clear that water laws and regulations are needed in Saudi Arabia, and that water management considerations should receive high priority during policy making processes.

## **Americas**

**Argentina and Peru.** Durand & Medina (1995) and Cirelli & Fernandez (1998). Review the experiences in Argentina and Peru, to increase the awareness of the need to improve water use and management

practices. They note that projects have been implemented to ensure better linkages between institution-people-environment.

**Mexico.** The Comision Nacional del Agua (1996) describes its programme to improve water management through better institutions and through the inclusion of new policies like privatisation and sustainability. Maranon (1999) questions the role of "COTAS" in Guanajuato related to water management, and makes clear that inefficiency is the main cause of failures of past water sector policies

**United States of America.** Miller & Reidinger (1998) present an overview of the history, institutions and operational programme of the Tennessee Valley Authority (TVA). They present the TVA as one of the world's first and most comprehensive river basin development initiatives. The authors claim that beginning in 1933, the TVA fostered the social and economic development of the Tennessee River Valley through the integration of a major infrastructure, a healthy natural resource base, control of the floodwaters, and the generation of power, thus providing cheap electricity throughout the region. Engineers, administrators and politicians worked together to make the project possible. The success of the TVA is explained in a historical context, The challenges the TVA is facing at present are outline in terms of improving its overall efficiency in supporting the seven states in the basin area and preserving the environment.

Oilinger (1997) analysed the Indian water situation in the US as a part of the initiative to evaluate water resources and concerns by the Western Water Policy Advisory Commission. This report summarises the meetings on the "Indian Water 1997" and analyses directions in the Federal water policy implications and opportunities of the Tribal Action Forum. McCool (1995) and Espeland (1998) highlight a different viewpoint of water development initiatives in the United States. McCool analyses the Central Utah Project, and Espeland the Central Arizona Project. Both authors explain the need to consider local interest and viewpoints, and the economic effect water development have over the local population, and the environment. The authors raise the question of equity regarding water distribution in Utah and Arizona.

## **Australia**

The Australian Academy of Technological Sciences and Engineering (1999) describes the current situation and trends in development of water resources in Australia. It explains that the traditional approach in regarding water as a driver of social and economic development has not been followed. Instead, it considers the likely future demands for water as an input into an expanding economy driven primarily by the various market forces. The authors claims that water is not a limiting factor for economic growth. It should be reallocated in some cases, depending on the environmental requirements and in other cases to reflect properly the policies being pursued.

The Land and Water Resource Research and Development Corporation (1997, 1998) describes the projects that have been carried out in Australia and the challenges water management fares to make water use increasingly more efficient and to lessen the overall impacts on the environment.

## **Europe**

**Sweden.** Graham (1995) explains that the approximately 700-hydropower dams currently exist in Sweden, of which 143 are classified as high dams. This dam population is now aging, placing more emphasis on the need to maintain proper safety at all of these installations. Although dam failures are infrequent, the consequences of a single failure can be severe and should be avoided. It is imperative that the risk placed on society by these structures be systematically evaluated and assessed in terms of improving overall safety and minimising the impacts of possible failures. Risk analysis approach is recommended as a way to assess and manage the safety in Sweden.

**The Netherlands.** The Netherlands Hydrological Society (1998) provides an historical description of the development of water management, irrigation systems and dams building in the Netherlands. The Society explains that the current irrigation system is a net result of continuous efforts and struggles to manage water over a period of several decades.

## Summaries

- As

Anonymous, *Bangladesh water and flood management strategy*. Dhaka: Government of the People's Republic of Bangladesh. Ministry of Water Resources, 22 p.1995.

### Abstract

It represents a framework for the development and implementation of a strategic national water management plan for Bangladesh. It builds on the extensive programme of work undertaken under the Flood Action Plan (1990-1994) and the earlier National Water Plan, Phase I and II. It recommends a five-year programme involving (a) preparation of a national water management plan, (b) strengthening of water sector organization responsible for planning, construction, operation and maintenance, and (c) implementing of a compact portfolio of high priority projects.

The document is divided into four chapters. Chapter 1 presents an overview of water resource planning in Bangladesh, summarises the work undertaken under the two phases of the National Water Plan (NWP) and details the evolution of the Flood Action Plan (FAP) and the accomplishment of its 26 planning and support studies. Chapter 2 discusses the key issues and options for development and management of water resources in Bangladesh and focuses on key issues and options that need to be taken into account in water sector planning. Chapter 3 presents short- and long-term strategies for water resource and flood management and Chapter 4 presents a development programme for the next five years (1995-2000) within the context of likely long-term activities in the sector.

The Bangladesh Government emphasises its effort in three aspects: minimum intervention (the effort central point is strengthening the capacity for flood forecasting and disaster management, and improving the operation and maintenance of existing projects, but leaving water sector to the private sector) selective intervention (in addition to the first one, protecting densely populated urban areas and key infrastructure from floods and erosion, ensuring water supply and providing flood proofing for vulnerable rural communities, possibly with development of water and flood management projects to enhance agriculture and fisheries); and major intervention (in addition to the two previous points, implementing large scale measures such as embankments and river engineering works to prevent flooding and erosion by major rivers, and multi-purpose barrages on the main rivers)

The first two options are both feasible and probably affordable in the short to medium terms. Their successful implementation would require substantial institutional reform of appropriate planning and implementing agencies. The last option is a long-term possibility, if the macroeconomic, environmental and other issues could be properly addressed.

Contribution: 8

Keywords: Bangladesh, floods, water management, Asia, participation, privatisation, institutions, policies.

- Au

Australian Academy of Technological Sciences and Engineering, *Water and the Australian Economy*. Victoria, Australia: Australian Academy of Technological Sciences and Engineering, Institution of Engineers, 127 p.1999.

### Abstract

This report describes the role of water as an input to the Australian economy, and options for its potential future roles. The traditional approach in regarding water as a driver of social and economic development has not been followed. Instead, it considers the likely future demands for water as an input into an expanding economy driven by market forces, and what kind of economy Australia should develop, given its situation and resource endowment. Demands for water are examined using a detailed, regionalised model of the Australian economy. Models were developed for water demand related to production in 55 industry groups across 18 regions, for the years 1995 to 1996 and for 2020 to 2021. The report is based

on water quantity. Having analysed pollution damages and abatement costs, it conclude that water quality is unlikely to seriously affect economic activities within the time horizon of the study.

Water is not a limiting factor for economic growth. It is sometimes suggested that water is the prime constraint to Australia's' economic growth and population. Some water can be re-allocated to the environment without great economic cost, particularly if the re-allocated water comes from efficiency gains and reductions in low value added water uses. Whether water development should proceed, in particular cases will depend on the analysis scrutiny of the engineering, social, economic and environmental aspects of proposed water development projects. A nationally agreed assessment process for major new water resources development proposals is needed. Increased environmental flow can be achieved through improved distribution system efficiency; new infrastructure-investment; improved farm efficiency; and the implementation of full cost recovery. Policies are needed to ensure the resource is managed in its totality, and this should include monitoring groundwater, unregulated rivers, and water quality. Water markets must be regulated to ensure individual trade does not impose external effects on third parties. Current regulatory systems do not offer sufficient protection to third party interest or the proper regulation of whole water system.

Unless there is a mechanism for farmers to be compensated for transferring water for environmental uses, savings in water use from improved efficiency will tend to be distributed to other farmers. Accordingly, environmental custodians should be encouraged to participate in water markets. Besides, irrigation infrastructure needs to be upgraded.

Regarding water quality, the quality of water supplies for economic uses is likely to remain adequate- to good. Salinity, nutrients and pesticides contamination are the main causes for concern in protecting the surface water resource. As a society, Australia needs to decide whether to allow the development of industries that cannot afford to pay the cost of their externalities. Protection of groundwater from overuse is a priority, particularly in the Great Artesian Basin and the coastal areas of Queensland.

With respect to water and economy, it is concluded that irrigation can generate wealth for Australia. Irrigation should be treated in the same ways as any other investment and should not be subsidized by the governments. Regions where irrigated agriculture is concentrated tend to have less diverse economic structures, which makes them vulnerable to policies adverse to the irrigation sector. Mining and energy industries are of crucial importance to Australia's economic future. Community demands for improved environmental performance in terms of wastewater discharges and water quality will exert new cost pressures on urban water utilities and storms contribute significantly to water pollution problems around the capital cities.

Related to future needs, Australia needs: policies, which ensure that water is used efficiently for purposes that will maximize its value to the economy. The COAG water Reform Agenda is complete and must be continued; As privatisation follows, the regulatory function must not be allowed to deteriorate. The price of water should fluctuate according to supply and demand conditions, just like any other commodity. Trading exposes the opportunity cost of water, which is its value in alternative uses. Trading should be between all sectors of the economy; interstate trading will become increasingly important in the future. Some regions may require institutional mechanism and infrastructure that allow water to be freely transferred; information between productive economic activity and water use needs to be improved. More research emphasis is needed on the application of techniques for improving water use efficiency, irrigation benchmarking, and distribution system design and quality control. Data systems for integrated economic, environmental, and social analysis of water development and management issues are still deficient. More input that is intellectual is required on the practicalities of trading systems. Additional research is needed to address options for the way urban systems can be gradually and cost-effectively modified for more efficient water use and reduced environmental impacts. Studies on water pollution are essential.

Contributions: 8

Keywords: Australia, water uses, institutions, water economic price, development, economics.

- As

M. Baker, "Changing contexts, steady flows: Explaining patterns of institutional change within the gravity flow systems (Kuhls) of Kangra Valley, Himachal Pradesh, India." presented at 6th Annual Conference of the International Association for the Study of Common Property, University of Berkeley, California, 1996.

### **Abstract**

Despite the unprecedented expansion of non-farm employment and the resulting stress on kuhl regimes, kuhls continue to transport and deliver irrigation water as they have done for the last several hundred years. However, this constancy of flow has been achieved only through dramatic transformation in the organizational structure of kuhl regimes, and in the mix of local/state authority for kuhl management. Part of this transformation included the collapse of nine previously farmer-managed kuhls and their subsequent takeover by the Himachal Pradesh IPH Department. From one perspective, the collapse of these kuhls constitutes a collective action "failure" because irrigators availed themselves of other economic activities, which brought them greater return.

At the basin level increasing non-farm employment opportunities initiated a sequence of responses that produced new patterns of authority and organization for water management. These differential patterns of change within individual kuhls create a web of multi-jurisdictional, interconnected kuhl networks that would appear highly resilient at the basin level because each kuhl regime is able to find its own equilibrium point of state/local authority and management structure given a particular type and rate of contextual change, and its own configuration of social and ecological characteristics. The existing basin level pattern of authority and organization for water management did not persist in the sense of remaining unchanged, the overall pattern of kuhl networks within the basin transformed in order to endure.

The analysis conducted in the study, demonstrates the importance of diachronic analysis of local resource management institutions. Formalization and organizational "robustness" when viewed from a static perspective may be related to the amount of resources that must be mobilized. Barker explains that, when viewed diachronically the process of regime formalization signals increasing internal regime stress and conflict and/or increasing interaction with external state authorities. Synchronic analyses of dynamic process successfully demonstrate relationships between physical attributes of the CPR system, the social characteristics of the resource user group and the structure of the collective action situation. However, they fail to explain why specific institutional arrangement for achieving collective action emerge, and why when and how they will persist, transform or collapse. Diachronic analysis of CPR regimes provide one way of identifying the regime characteristics which shape the effects of and responses to contextual changes. Baker concludes that while the specific indicators of "reliance" and differentiation will vary from place to place, as Abstract variables they provide one means of assessing how external change will likely affect a CPR regimen.

Contributions: 7

Keywords: Institutional change, irrigation systems, Kangra Valley, Himachal Pradesh, India.

- As

M. Baker, R. Barker, R. Meinzen-Dick, and F. Konradsen, " Multiple uses of water irrigated areas: A case study from Sri Lanka," in *SWIM Paper 8*: IFPRI/ International Water Management Institute.

### **Abstract**

The editors explain that, disciplinary and sub-sectoral emphases have too long focused the attention of researchers, policy makers, and agency staff involved with water resources only one of the following water uses - irrigation, domestic use, fishing, or livestock - when in fact, people have been using water in irrigation systems for many purposes. Going beyond the disciplinary and sectoral blinders changes our picture of irrigation systems and allows us to see the full spectrum of water uses. It also expands the view of water users beyond those (primarily male) farmers in the fields or those (primarily female and children) drawing water at the standpipe. In this study, we have seen how fishermen, livestock herders, and curd pot makers, and even the birds and animals are water users who depend on the irrigation system for their livelihood.

Recognizing the full spectrum of uses is far more than an academic exercise. It has important implications for the management of water within the irrigation system, and for a broader water resource policy. The editors explain that this study has been only a pilot activity, and could not explore and quantify all the water uses and their values. Nevertheless, it points to critical issues to be addressed. Proposed are suggested to review policies such as intersectoral allocation and infrastructural development.

Contributions: 7

Keywords: Asia, Sri Lanka, water use, irrigation, water management.

- As

B. L. Chidananda, C. P. Gracy, and S. Suryaprakash, "Role of community in irrigation management: Sustainability of traditional water harvesting practices in South India," presented at 6 th Annual Conference of the International Association for the Study of Common Property, Berkeley, California, 1996.

### **Abstract**

Many of the developing countries including India are endowed with a variety of natural resources, which have helped in crop diversity and growth. In India a substantial share of budgetary resources apart from private investments have been made on irrigation development each year. Historically also many of the rulers, kings and local leaders have evinced keen interest in developing irrigation structures. Statistics show that the overall irrigated area in the world rose from an estimated 8 million hectares in the year 1800 to 2600 million hectares in 1994. India and China have contributed to as much as 40 percent of the increase from developing countries. Nevertheless, the productivity per unit of water is very low in India due to various management factors.

Since there is a natural limit on the water availability for irrigation, due to decrease in the annual rainfall and other factors, efforts must be made towards conserving water. In most of the areas the problem with minor irrigation is that of the receding water table. Of late, the policy makers have realized the need for reviving traditional irrigation structures. In the recent past, many tanks have become defunct and those, which are functional, have reduced capacity to irrigate owing to the bad management practices. In scanty rainfall areas the water from seasonal streams are harvested by constructing pickups at suitable locations and it is very popular in coconut belts of Karnataka.

This study examines the institutional factors responsible for the deterioration of tank irrigation, the community management practices for tanks and pickups and an assessment of the sustainability of the management practices towards rehabilitating the tanks for irrigation.

Contribution: 7

Keywords: India, water management, irrigation management, privatisation, local knowledge, turnover, equity, institutions, irrigation systems.

- LA

A. F. Cirelli, "Agua "Problemática Regional". Enfoques y perspectivas en el aprovechamiento de recursos hídricos". Buenos Aires, Argentina: Editorial Universitaria de Buenos Aires, 1998. 256 p.

### **Abstract**

Water is becoming and important issue in Argentina and it is getting more attention from researchers and the government. Both are looking for better ways to make use of water and to improve the administrative system to keep water clean and available for everybody. Looking for those goals, The "Asociacion de Universidades Grupo Montevideo" (AUGM) to which the "Universidad de Buenos Aires" belongs, organized and event August 4-8th , to closed the activities the "Secretaria de Ciencia y Tecnica" of UBA was conducted in previous years. This event consisted of conferences, lectures and workshops where researchers and policy makers analysed the current water situation in Argentina and in the Mercosur countries. To the event assisted 80 experts from the Universities members of AUGM, 500 students,

technicians and public interested in the water topics. Eight countries from LA and Europe were represented, and 180 studies were published in the Conference Proceedings.

The main topics that keep assistance's attention were related to water contamination and pollution, health, water availability in rural and urban areas, standards for water control, sea and continental reservoirs, and the lack of professional trained in water management. The organizers conclude that the results of the conference were positive and established strong principles to develop further investigation and analysis.

Contributions: 6

Keywords: Argentina, Latin America, water pollution, water contamination, institutions, Mercosur, water management.

- LA

Comisión Nacional del Agua, *Promma. Programa de modernización del manejo del agua 1996-2001. México. Plan de Implementación del Programa. Reglamento Operativo del Programa*. México, D. F. México.: Comisión Nacional del Agua, 23 p.1996.

**Abstract**

The program is explained in by six chapters in which the Comision Nacional del Agua of Mexico explains the old and the new approaches to be considered in the program for water management in the next five years. In the first chapter, CNA explains the historical background of the legal institutional and technical frameworks and the need to change the old regimes to new ones more focus on sustainability. The second chapter is integrated exclusively for polices and strategies of water management in Mexico. The third chapter includes the conceptualisation, description, costs, benefits and justifications of the new approach. The fourth chapter highlights the administrative organization for the successful implementation of the program. In the fifth chapter CAN explains programme and schedules, and in the sixth the monitoring, follow- up and evaluation of goals and methods are described.

Contribution: 6

Keywords: water management, Mexico, Comision Nacional del Agua, PIP, PROMMA.

- LA

F. G. M. Durand, *Impacto social de proyectos de riego en economías campesinas*. Cusco: Centro de Estudios Regionales Andinos, Trabajos del Colegio Andino 19. 191 p.1995.

**Abstract**

Medina Durand explains in his book the importance of water for the everyday life in Peru and the close relationship between agricultural production and irrigation. Changes in the irrigation system and management will affect agricultural production and vice versa. Both changes affect the national economy and the economic activities in the country. He explains that water distribution is efficient and the recent assessment of conduction systems helped to correct the problems found in its distribution. A successful innovative project was established in Peru in the recent years. Its positive influence was extended to improve agricultural production, the participatory level in the community, education, incomes and quality of life.

Contributions: 6

Keywords: Peru, Latin America, irrigation management, water management, institutions

- NA

W. N. Espeland, *The struggle for water . Politics, rationality and identity in the American Southwest*. Chicago: The University of Chicago Press, 281 p.1998.

**Abstract**

The book is about the controversial construction of the Orme Dam, at the confluence of two rivers bordering the Fort McDowell Indian Reservation. The Dam was part of the Central Arizona Project (CAP), a plan for bringing Colorado River water to the deserts of central Arizona. CAP was the biggest, most expensive, most controversial water project ever undertaken by the Bureau of Reclamation. Orme Dam was needed because bureaucrats believed it would regulate and store water, generate hydropower, and protect Phoenix from floods. The Yavapai Indians saw things differently. Their point of view was that they should not bear the cost of others' mistakes: "of building houses in the floodplain, of growing thirsty cotton in the desert, of stopping rivers so that Phoenix could continue its unplanned, ugly sprawl and residents could keep watering into oblivion the desert that first drew them there".

The Dam would also destroy a wildlife habitat, flood archaeological sites, and force the Yavapai Indians off their ancestral home. In the struggle there were three groups involved, the Bureaucrats committed to a "rational choice" decision-making. Older Bureau engineers committed to the Dam, and the Yavapai community, all found themselves and their values transformed by the situation. The author bares the relations between interest and identities that emerged during the conflict, creating a contemporary tale of power and colonization, bureaucracies and democratic practices. Through the history, a question of "what it means to be rational" is raised.

Contribution: 8

Keywords: water supply, Government policies, Southwestern states, water rights, dams, institutions, peoples' participation.

- E

L. P. Graham, "Safety analysis of Swedish dams: Risk analysis for the assessment and management of dam safety.," in *Department of Civil and Environmental Engineering*. Sweden: Royal Institute of Technology, 1995. 95 p.

**Abstract.**

According to Graham of the approximately 700-hydropower dams currently existing in Sweden, 143 are classified as high dams. This dam population is aging, placing more emphasis on the need for maintaining proper safety at these installations. Although dam failures are infrequent, the consequences of a single failure can be severe and should be avoided. It is imperative that the risks placed on society by these structures be systematically evaluated and assessed in terms of improving overall safety and minimising the impacts of possible failure. The main objective of the thesis is to formulate and demonstrate by example how risk analysis can be applied to the assessment and management of dam safety in Sweden. The paper is divided in two parts.

Part I: in this section the author explains that the use of risk analysis is well-established in performing safety assessment analysis of many different technical systems, but it has not been previously used for the assessment of dam safety in Sweden. A methodology of probabilistic risk assessment for evaluating the risk of dam failure was formulated based on a critical review of worldwide practice in the field. The primary goal was development of a systematic method of analysing remedial measures to rectify weak components at a given dam installation. The scope was comprehensive, spanning the many sub-systems that are integrated into a dam system. Specific concerns that affect dam safety in Sweden were identified. The focus of the work was on assessment of existing embankment dams. Discussion of failure modes, data collection and remedial measures are included. Brief example applications from the literature are presented.

In part II, an illustrative case study of a probabilistic safety assessment for an existing dam demonstrates how the methodology can be formulated for use in identifying and prioritising measures for improved safety performance. Using hypothetical data, the case study incorporates the use of both event tree and fault tree analysis to evaluate the probability of hydrologic failure by dam breach for the study dam. An important outcome is a set of recommendation for further research and development to enhance the utility of the approach.

Contributions: 4

Keywords: Safety analysis, Sweden, risk analysis, dam safety.

- As

K. Haggart, "Rivers of life. Bangladesh journalist take a critical look at the Flood action Plan.," . Bangladesh: Bangladesh Centre for Advanced Studies. Panos, 1994, . 244 p.

### **Abstract**

Bangladesh is criss-crossed by more than 200 rivers, which are the lifeblood of its fertile delta and culture. Monsoon-season floods normally cover a third of the country in water, supporting agriculture, fishing and navigation. The world Bank-coordinated, 15 donor countries and agencies launched Flood Action Plan after unusually severe floods in 1987 and 1988. Supporters insisted the scheme would tame the country's volatile rivers, saving lives and boosting food production. Critics warned that the proposed river embankments and other engineering works could cause irreparable damage to the environment, displace millions of the country's poorest people, and actually increase the danger of catastrophic flooding. From the debate, the views of the farmers, fishermen, women, and landless poor who have the best first hand knowledge of floods was missing. In order to get peoples' point of views, the Bangladesh Centre for Advanced Studies and Panos asked a group of Bangladeshi journalists to take an independent look at existing flood-control projects and the potential impact of new ones. The book organizes accounts of the resilience and resourcefulness people who have endured the most of past mistakes, but whose voices are rarely heard.

Contributions: 8

Keywords: Bangladesh, water use, international policies, participation, World Bank, Asian Development Bank.

- As

R. Kumar and C. Young, *Economic policies for sustainable water use in Thailand*. Amsterdam: IIED, CREED Working Paper Series No. 4. 34 p.1996.

### **Abstract**

This paper has been prepared as part of the ongoing CREED project, Macro Economic Policies and the Environment in Thailand. The objective of the paper is to illustrate how the Social Accounting Matrix of Thailand may be extended to incorporated water resources and give examples of what the supply and demand functions for water would look like. The framework is based upon an integrated approach to demand and supply management of water resources and its implication for water pricing policies. The discussion concentrates on modifications and extensions of the social accounting matrix and on demand and supply equations for water that reflect the true scarcity of water for different uses and from different sources. There is an attempt, at the conceptual level, to introduce the user cost of water in the accounting matrix, thereby enabling a link between Computable General Equilibrium (CGE) models and user cost. Incorporation of the modified social accounting matrix and demand and supply equations for different water resources into the general equilibrium model would be a follow up of this exercise, to be undertaken at a large stage.

Contributions: 6

Keywords: Thailand, water use, water allocation, water prices, sustainability, Asia.

- As

W. F. Lam, *Governing irrigation systems in Nepal. Institutions, infrastructure, and collective action*. California: Institute for Contemporary Studies Press, 275 .

### **Abstract**

Lam explains that his study sought to answer the question of how institutional arrangements affect the performance of irrigation systems in Nepal. The study was focused in two issues. First how different kinds of governance structure (agency-managed versus farmer-managed) affect individuals' incentives and capabilities to cope with collective-action problems involved in system operation and maintenance (O&M). Second, how diverse combinations of institutions and engineering infrastructures affect irrigation governance, management, and performance. The author laid out conditions under which individuals are likely to contribute their efforts to collective action, and the relationship of institutions to these conditions. The author examined the incentive structures faced by irrigation officials as well as by farmers in irrigation systems in Nepal. He studied evidence from 150 irrigation system through statistical and qualitative analysis to substantiate some of the arguments develop in the study and to clarify theoretical understanding of relevant empirical phenomena.

The author highlights the importance to work on collaborative efforts between farmers and officials, both are crucial parts is the success of the water management programme. According to the author, many officials are trained to ignore the interest of farmers, and so farmers frequently do not trust them. All of the crucial links involved in more organization that is effective are shattered by the efforts to invest in infrastructures but not in people and their institutions.

Contributions: 8

Keywords: Institutions, development, privatisation, participation, water management, irrigation.

- Au

Land and Water Resources research and Development Corporation, "Research results and progress reports.," in *National Program for Irrigation Research and Development*, 1997, . 21 p.

#### **Abstract**

This supplement contains information about both completed and new projects, which have been commissioned by the National Program for Irrigation Research Development (NPIRD). The editors explain that the issues is focused in two areas: the first is the potential use of wetlands in treating irrigation drainage water, and the second is the progress of four participatory research projects designed to shed light on ways of improving the adoption of new technology. The focus of NPIRD projects is concerned with the sustainability of the irrigation industry through improving water-use efficiency.

This magazine is a diffusion media for the public, where editors describe NPIRD goals, challenges and objectives.

Contribution: 5

Keywords: Australia, NPIRD, wetlands, irrigation, drainage, participation, sustainability.

- LA

B. Maranon, "La gestión de aguas subterráneas en Guanajuato. La experiencia de las cotas.," , Irapuato, México, 1999.

#### **Abstract**

The author makes an analysis of the "Consejos Tecnicos de Aguas Subterraneas" (COTAS), water users organizations in charge of the administration of the underground water in Mexico. The organizations were born in the context of the transference of water management policies implemented in the country in the 1990s. The main objective of the author is to highlight that the COTAS are far from make any positive contribution to an alternative administration of the water management. The author explains that the function of COTAS is focus on advising rather than decision-making and for this, their role is relegated to a social participation without any authority to make decisions. There is a lack of clarity of the COTAS's attributes, organizations and functions. COTAS exist but nobody knows exactly what they are.

The author explains that an institutional arrangement is crucial to be able to solve the current hydrological unbalance the Guanajuato state is facing. Maranon proposes a deep analysis of the country's water

policies to find out efficient ways to manage water, to correct deficiencies and to build an efficient water management system through which to stop corruption and bureaucracies.

Contributions: 4

Keywords: COTAS, Guanajuato, Mexico, Latin America, IIMI, water management, irrigation.

- NA

D. McCool, "Water of Zion. The politics of water in Utah". Utah: University of Utah Press, 1995. 202 p.

**Abstract**

The author discusses the water policies and their impact in the State of Utah. McCool analyses the historical perspective of water management and focus on the Central Utah Project (CUP). CUP has been the main legislative plan for economic growth and water management in the state. The author's central points are economics, environmental impact, social and cultural impact, and equity. In the book are discussed water priorities and uses practiced in the region, agriculture, tourism, and urban development are weighted and compared.

The state law is assessing in the general legal water system in all the country, the author makes suggestions and highlights points to be improved.

Contributions: 8

Keywords: USA, water management, water laws, water uses, water regulations.

- As

L. Metha, *Water, difference and power: Kutch and the Sardar Sarovar*. Institute of development Studies, Working Paper 54. 31 p.1997.

**Abstract**

Kutch, a semi arid district in the state of Gujarat in western India, is known for its water scarcity. This report examines the relationship between the Sardar Sarovar Project, a controversial dam under construction in western India, and Kutch, which is supposed to benefit from the dam. It highlights that contrary to decades of promise, Kutch does not stand to benefit significantly from the project and shows how the state has "manufactured" the dominant view that there is no alternative to this project for Kutch. This has two consequences: one, locally appropriate alternatives are not adequately explored; two, crucial aspects concerning social differences are obscured.

The case study gives a picture of the social, caste and power dynamics in a village supposed to benefit from the project and shows how these are intrinsically tied to the water question. The analysis of the arrangements governing land and water use indicates that access to and control over water resources was always differentiated and this differentiation is likely to increase with the advent of canal irrigation. Hence, notions of the "user" and "community" need to be de-homogenized to accommodate variations arising due to historical legacies, class, caste, gender and occupation.

The study argues that both macro and micro level water intervention are blind to questions concerning social differences. In doing so water schemes build on or reinforce already skewed social and power relations. It contends that unless social differences are taken seriously, even ecologically sustainable options such as watersheds development may end up being "old wine in new bottles". In order for issues such as equity and social justice to be addressed in water interventions, the study argues for the need on the part of implementing agencies to be aggressively partisan in targeting the marginalized and social excluded groups.

Contributions: 7

Keywords: Power, social class, equity, gender, irrigation management.

- As

Ministry of Water Resources. *National water management plan. Draft inception report*. Bangladesh. Government of the People's Republic of Bangladesh. Ministry of Water Resources. Water resources Planning Organisation. Vol. 1. Main Report. June.1998. P 62.

### **Abstract**

This report presents the findings and conclusions at the mid-point of the first of the three-phase, three year, national Water Management Plan (NWMP), which was started on 15th March 1998. The report sets out the approach, which will be adopted to the preparation of the plan, reviews the data and analytical tools available, and outlines the future work programme. The program is relatively detailed for the next phase, water management issues and options, but less so for the third and final plan formulation phase. The report covers staffing and logistics, and concludes by highlighting key issues and assumptions. The NWMP will draw together the results of earlier studies and plans, following principles set out in the draft National Water Policy. These principles give priority to a holistic approach to water management: the involvement of people from all strata of society in a consultative process designed to seek consensus on the future development of Bangladesh's water resources. A critical assumption for the success of NWMP is that both the policy and the mandate should have finalized by October 1998.

In defining the approach, this report clarifies how the principles will be applied. The needs of the agricultural sector and the objectives of rice self-sufficiency will be the starting point for planning, but the effect of relaxing this objective on other sectors, particularly fisheries, navigation and the environment, will be fully assessed. To assist in evaluating the relative priority accorded by the people of Bangladesh to each sector, a process of consultation based on the one adopted for the National Environmental Management Action Plan will be adopted. This will indicate if policy goals may need to be adjusted to place less stress on self-sufficiency and more on achieving broader cross-sector objectives. The NWMP will depart from a business as usual approach and accept only those projects, which accord with strict economic, social, and environmental criteria. The NWMP will investigate the potential for more effective measures, including non-structural options to encourage the private sector and promote local self-help initiatives. On the technical side, issues highlighted are the uncertainty concerning future transboundary flows, continued expansion of groundwater irrigation, effects of global warming, and the extent of arsenic contamination. The plan will review the likely extent of Government involvement in the water sector considering financial resources available, both in absolute terms and in relation to competition from other sectors and administrative capacity. Cost recovery issues are reviewed from a pragmatic standpoint, with emphasis on the need for systems to be cost effective. The report outlines the steps to be adopted in the planning process.

The basis of planning is discussed, and it is proposed to retain the five hydrological regions of the Flood Action Plan, with a sixth region for Chittagong and the Chittagong Hill Tracts. Within these regions, plans will be presented by administrative area to facilitate cross-sector co-operation, information dissemination, and public participation and consultation. A two critical issues in the project are that the participation of EGIS in the process will need to be clearly defined and that it is needed timely and adequate arrangements for these studies. The report makes recommendations concerning three critical issues: (1) a task force of WARPO, WoWR and NWMP consultants convenes to plan an appropriate working environment for the integrated NWMP/WARPO team. (2) WARPO convenes a tripartite WARPO, EGIS-II and EGIS-II funding agency meeting to clarify the scope and timing of outputs to be provided by EGIS-II and; (3) MoWR takes the necessary action to obtain prompt endorsement of the GDA Scope of Service and to ensure their completion by 2000.

Contributions: 6

Keywords: WARPO, Bangladesh, water management, water administration.

- Af

A. M. Mohorjy and N. S. Grigg, "Water-resource management system for Saudi Arabia," *J. Water Resour. Plann. Manage.*, vol. 121, pp. 205-215, 1995.

## Abstract

Saudi Arabia faces severe water problems and needs new water policies to achieve sustainable development in its harsh environment. Problems include balancing supply and demand while facing aridity and water scarcity, non-renewable supplies, poor quality of ground water, wrong distribution of supplies, salt water intrusion, and over drafting and contamination of aquifers. Although a great deal is known about its water resources and problems, developing effective planning and regulatory systems and other institutions is Saudi Arabia's principal water policy challenge. Building on previous reports on water issues, this paper compares the kingdom's water-management tasks with stage government programme in the United States, including water law: planning, management, and coordination processes; organizational structure; infrastructure development; water-quality management; conservation programme; regulation, standards, and enforcement; and support functions. Water law and regulations are needed in Saudi Arabia, especially for conservation, ground-water management, and water-quality management. Defining roles and responsibilities is a challenge in both the United States and Saudi Arabia, but in Saudi Arabia intergovernmental issues are less daunting than in the United States. However, water security is a bigger challenge in Saudi Arabia.

As the kingdom moves into the next decade, a water-management system should clearly be highly priority during policy making.

Contributions: 6

Keywords: Saudi Arabia, water policy, water supply, water demand, water scarcity, arid lands, institutions, water management, water quality, policy making.

- NA

B. A. Muller and R. B. Reidinger, "Comprehensive river basin development. The Tennessee Valley Authority," in *World bank Technical paper No. 416*. Washington, D.C.: The World Bank, 1998, . 86 p.

## Abstract

The Tennessee Valley Authority(TVA), one of the world's first and most comprehensive river basin development initiatives, presents an overview of their history, institutions, and operational programme of the Tennessee Valley Authority (TVA). According to the authors, beginning in 1933, the TVA fostered the social and economic development of the Tennessee River Valley --a seven state area in the south-eastern United States— through the integration of a strong infrastructure, a healthy natural resource base, the control flood waters, and the production of power, which provided an extensive transmission system to provide cheap electricity throughout the region. Intense efforts to improve agriculture, land use, and forestry practices helped to restore and maintain a healthy environmental base, while technical assistance and small-scale credit programme provided people with the tools to improve their own lives. The document examines the circumstances that led to the creation of the agency, discusses current issues and challenges, and offers general lessons for comprehensive basin management based on the TVA experience.

The authors highlight several important features about the TVA experience: (1) The TVA emerged from a unique set of historical, political, and geographical circumstances. There was a match between the local and the presidential interest for overcoming poverty in the area. In other countries where there are strong local governments and existing national institutions, the implementation of a strong regional authority might not be appropriate or even possible. (2) The early success of the TVA depended on the strength of its champions, the vision of its first leaders, and its ability to show tangible results within a few years. (3) The TVA's greatest legacy has been the integration of a healthy natural resource base, a strong infrastructure, and the human capacity to foster the social and economic development of a region. (4) TVA's institutional structure served the Authority well during its early years but has provided the seeds for its greatest challenges as the Authority has matured. (5) The TVA's greatest tension has been between its mission as a resource development agency and as a power company.

TVA's current issues and challenges are centred on two central issues: (a) the fate of TVA's natural resources and economic development plan, and (b) the future of TVA's power program in the face of deregulation and renewed discussion about privatisation.

Contribution: 7

Keywords: Tennessee Valley, river basin development, USA,

- As

National Water Development Agency. *Seventh National Water Convention*. New Delhi, India. Ministry of Water Resources, Government of India. Government of Uttar Pradesh. 7-9 January. 1988. P.423.

**Abstract**

The National Water Development Agency organized the National Water Convention to provide a national forum to deliberate, discuss and exchange views on various aspects of water resources development use. The themes for the convention were divided in two main topics: (1) interbasin transfer of water for National development -problems and prospects, and (2) river basin management- issues and options. For further discussion, the main topics were divided into five sub-themes: (1) Integrated water resources development in a natural hydrological unit. (2) Conservation and quality aspects of water resources development issues in the water resources development within a basin or a sub-basin. (3) Integration of socio-economic, legal, demographic and environmental issues relating to water resources development within a basin or a sub-basin. (4) National and international experiences on various aspects of water use through interbasin transfer of water. And (5) Public awareness, legal and environmental issues involved in interbasin water transfer.

Contribution: 6

Keywords: India, water conservation, water management, river basin management, water quality.

- E

Netherlands Hydrological Society. *Water in the Netherlands*. Delft, The Netherlands. Netherlands Hydrological Society. Netherlands National Committee of the International Association of Hydrological Society. 1998. p. 186.

**Abstract**

The document describes the history and struggles that the Dutch have had over many centuries to conquer water. There are 13 chapters, with the first 6 describing the geography, climate and hydrology of the country. There is also an historical overview of the artificial water environment built by man. In the last decade, special attention has been given to the quality of water systems. There is a concern regarding the diminishing of water quality systems in the country. Current Dutch efforts are focused on pollution control and on the diplomatic struggles to regulate water pollution in northeast Europe. Integrated water management is considered one of the main points in the Dutch agenda. The publication describes in detail the efforts and facts currently employed to establish sustainable measures regarding flood protection, water management and planning.

Pollution control is getting more attention and Dutch government is investing in efforts to reinforce the water administration system, the institutional structure and water legislation. The educational structure involves universities and research centres, and efforts are being made to ensure that both work together to find solutions to the current challenges faced by the country. Current research efforts concentrated to solve problems associated with pollution, water management in urban areas, preservation of sea ecosystems, information systems, and modelling.

Contributions: 6

Keywords: Netherlands, Holland, Netherlands Hydrological Society, northeast Europe, water management.

- NA

O. Olinger, *Indian Water-1997, Trends and directions in Federal Water Policy*. Trends and Direction in Federal Water Policies, Boulder, Colorado, Western Water Policy Review Advisory Commission. 1997

### **Abstract**

Olinger explains that under the Western Water Policy Review Act of 1992, Congress directed the President to undertake a comprehensive review of federal activities in the nineteen western states which directly or indirectly affect the allocation and use of water resources and to submit a report of findings and recommendations to the congressional committees having jurisdiction over federal water programme. The Western Water Policy Review Advisory Commission was formed. The purpose of the Commission, Olinger explains, was to perform a two-year comprehensive review of federal activities in the nineteen western states regarding the coordination of federal and local water policy objectives.

This report summarizes the proceedings of the Commission's meeting in Arizona on March 17-18, 1997, of meeting titled "Indian Water 1997, Trends and Directions in Federal Water Policy: Implication and Opportunities for Tribal Action Forum.

Contributions: 7

Keywords: Indian rights, North America, Western Water Policy Review Advisory Commission, water rights.

- As

S. Z. Sadeque, "Nature's bounty or scarce commodity -- Competition and consensus over ground water use in Rural Bangladesh," presented at 6th Annual Conference of the International Association for the Study of Common Property., Berkeley, California, 1996.

### **Abstract**

Bangladesh is a country synonymous with abundant water and floods. However, there is a distinct dry season, when temperatures are high, precipitation is very low, demand for irrigation water is high and surface water flow reduces considerably. The resultant impact lowers the ground water table and a seasonal crisis affects millions of people upon hand pumps for drinking water.

The crisis has exacerbated in recent years as irrigation coverage has increased dramatically further lowering the ground water level. As water has always been found in abundance, rules/norms for using this common resource has never been codified and people are confused confronting the emerging reality. The competition over the finite ground water resources between mechanically powered Deep Tube wells (DTW) and manual hand-pumps for drinking water supply are forcing communities and authorities to think about instituting regulations over the use of groundwater. Technocratic and regulatory approach favours a zoning and regulatory control perspective. However, as conflicts are increasing, people and communities are beginning to develop local controls and self-management of this critical common resource.

This paper explores the context of this emerging situation. Evidence is there that due to cultural and religious sanctions, water is not denied to any one but exchanges do occur between parties. Often recipients of drinking water have to provide equal amount of surface water to the irrigation channel in order to receive DTW water. As more and more hand-pumps become inoperable due to the irrigation-triggered drawdown, people are questioning the relentless use of the common property for the benefit of modern irrigated agriculture. The equity implications complicate the conflict further as rich landowners either own/control irrigation. Therefore, existent power relations in the society affect the emerging informal rules over the harvest of the common resource. What remains to be analysed is to what extent are the conflict arising out of common property harvesting supporting the development of informal rules and how that agreed consensus is equitable and sustainable as an option compared to technocratic administrative controls.

Contributions: 8

Keywords: Bangladesh, irrigation management, water uses, property rights, equity, institutions, privatisation, participation, water policies.

- As

Sardar Sarovar Narmada Nigam, *Facts. Sardar Sarovar project. Gujarat, India*. Gujarat, India: Sardar Sarovar Narmada Nigam, Ltd., 79 p.1997.

### **Abstract**

The Sadar Sarovar project is the largest water resource development project in India and possibly in the world. Although this project was originally envisaged in 1946, a decision by Narmada Water Disputes Tribunal came in 1979, and the project saw the light of the day in 1987 when it finally got clearance from environmental and forestry factions of the Government of India.

The paper describes the different components of the project together with their status of construction up to March 1997. It also describes in detail the approach and proposal of rehabilitation and resettlement of the project affected persons together with their implementation. Similarly, it also deals with the approach and status of environmental protective measures to be carried out "Pari Passu" with the engineering works. Former comprising of compensatory reforestation, treatment to catchment area, flora and fauna, wild life, fish culture, command area development, drainage and conjunctive use, are also discussed.

Some environmentalist and agitators are protesting against the construction of Sardar Sarovar project. In order to apprise the public at large about issues under debate, actual factual position is indicated in this paper as the best response. It is hoped that this would allay all the apprehension about the project. As about 75% of the command in Gujarat and entire command of 75000 ha(?) in Rajasthan is drought prone. In addition, since it provides the domestic water-supply for the entire Saurashtra and Kachchh regions and all villages affected by salinity and fluoride in North Gujarat, this is a real drought-proofing project and hence the life line of Gujarat.

Contributions: 4

Keywords: Environment, Gujarat, India, dams, water management, irrigation.

- LA

M. Solanes, *Servicios públicos y regulación: Naciones Unidas. Comisión Económica para América Latina y el Caribe- CEPAL*, 76 p.1999.

### **Abstract**

Solanes explains that massive public services are structural characteristics of modern societies, whose control and management have passed for both process, private control and decentralisation and, public and centralized. The centralization and state control obey to investment needs, the possibility of implementing scale economies and the perception that regulatory entities' earnings obstructed the state's control. In this process one country that support private public services in USA. The country has developed regulatory norms that includes concession's property rights, the principle of rational earnings, regulation by law not by contract, the possibility of ex post regulation, holdings' control and follow ups, the monopolistic practices, the trustiness and security or services, open access to basic installations, rights to have conditioned access to natural resources. The idea is to have a system that ensures an adequate service, sustainable and the consumers' protection.

During the 1970s began the technical possibilities, political philosophies, disenchantment and the public sector's financial crisis, and the increases of the foreign debt. During the same decade took place a big scale privatisation process that was especially important in Latin America. During the development of the economic process, was born a curiosity of topics like regulatory frames determined by sector of predominant interest, disappointment with the users' protection mechanisms, limitations to the theoretical economists approaches, holdings' control, monopolies and technical failures in some sectors. All these drive the situation to make new adjustments and corrections.

The Solanes work consists of making an analysis of the regulatory principles applied on public services traditionally given by the private sector. Solanes explain that globalisation of services economy is benefited by the diffusion and globalisation of legal principles applied for these systems. The main objective is to promote equilibrium to protect private investments and consumers.

Contributions: 7

Keywords: Economics, water allocation, water markets, water prices, privatisation, institutions, globalisation.

- As

P. Strosser, "Analysing alternative policy instruments for the irrigation sector. An assessment of the potential for water development in the Chishtian Su-division, Pakistan.," in *Agriculture*. The Netherlands: Wageningen Agricultural University, 1997, . 243 p.

### **Abstract**

The increasing scarcity of water and financial resources has made the economic dimension of water an important element of irrigation sectors policies. Water pricing is the means traditionally used to incorporate economic issues into irrigation sector policies. More recently, water market has been proposed as an alternative to water pricing. From a theoretical point of view, water markets are expected to lead to an efficient allocation of water among water users, as well as to improve water use economic efficiency. However, the discrepancy between theoretical requirements and the existing characteristics of the irrigation sector is significant. Therefore, the potential for water markets in managing water resources is questioned.

In Pakistan, consideration has recently been given to water markets as a means to improve the performance of irrigated agriculture. The present study investigates issues to water markets in Pakistan using the example of the Chishtian Sub-division, an irrigation system located in the South-Punjab. Within the framework of an integrated approach that combines hydraulic, soil and economic issues, the study analyses the functioning and impact of existing surface and groundwater markets that have developed spontaneously within the tertiary units of the irrigation system. Although constraints remain on the functioning of these markets, water transactions significantly improve the flexibility in managing water resources without threatening significantly the sustainability of irrigated agriculture.

This study also discusses elements related to the technical feasibility of water markets at higher spatial scales in the irrigation system, and their potential impact on agricultural production and the physical environment. The potential for reallocation of surface water in terms of increased farm gross income is the highest within and between tertiary units. In addition, the impact of reallocation on farm gross income is higher when volumes of surface water are transacted independently of the time of the year, as opposed to yearly reallocations that would affect proportionally the supply of canal water received each month. Constraints related to the existing conveyance infrastructure are not seen as a major obstacle to water transaction. Changes in the operational rules required to develop water markets at higher spatial scales, however, may represent an important constraint to water market development. In addition, the absence of storage facility limits the potential for temporal reallocation of surface water, thus the overall impact of potential water markets.

The thesis concludes by emphasizing the importance of a combination of interventions to manage the irrigation sector, as well as to improve its performance in terms of agricultural production and sustainability. The need to analyse, compare and combine interventions, further stress the relevance of an integrated approach that integrates disciplines, links decisional and bio-physical process, and investigates the heterogeneity of these process within the irrigation system.

Contribution: 7

Keywords: Water markets, irrigation management, integrated approach, economic modelling, Pakistan.

- As

Y. Takahasi, "New concept in water management in Japan. Toward a sound hydrological cycle within catchment areas," .

### **Abstract**

Takahasi explains in his lecture that the extraordinary experience during 100 years of modernization and high economical growth period after the Second World War in Japan instructed the Japanese population important and delicate relation between development and hydrological cycle. The Hydrological Cycle Sub-committee, River Council, Ministry of Construction, proposed a report to the Minister of Construction in July 1998, titled "What the hydrological cycle should be within catchment areas". The background and the main topics of the report are introduced in this Takahasi talk. The author explains that hydrological cycle is fundamental part of the rhythm in nature. In order to coexist with nature, it is necessary to respect the rhythm including natural hydrological cycle. The cycle also plays a vital role as a migration route of various substances.

A lack of cooperation -Takahasi explains - between administrators of rivers, lakes and marshes, agricultural waterways, sewerage systems, municipal water supplies, etc., led to an inability to take comprehensive and systematic measures. This resulted in various side effects on the hydrological cycle. Furthermore, in the use of national land also, observing problems from an overall viewpoint considering the continuity of the hydrological system in the administration of cities, forest and rural communities was insufficient. Inhabitants and project undertakers on their part pursued comfortable life, convenience and economic aspects one-sidedly and neglected to give thought to the continuity of the hydrological cycle. In consequence, the hitherto social system excessively burdened the hydrological cycle, and site effects such as urban desertification, water environmental problems, have arisen anew.

The author concludes that the framework has to be converted to one oriented towards overall development, conservation and management of national land from a standpoint which takes up all aspects of the continuity of the hydrological cycle.

Contributions: 4

Keywords: Japan, Asia, water catchment, water management, hydrological cycles, water policies.

- W

J. Wisserhof, "Enhancing research utilization for integrated water management," presented at International Conference on Integrated Water Resource Management, Amsterdam, Netherlands, 1995.

### **Abstract**

Water-related research is often performed at significantly lower levels of integration than policy making for integrated water management. This may limit its utilization in policy making. Nevertheless, an analysis of strategic policy making for water management in The Netherlands shows that policy research still has a considerable impact on policy. This is largely due to the integrative intermediary role of policy analysis. (Policy research is the acquisition of knowledge concerning a policy problem. Policy analysis is the appraisal of alternative policies.) However, policy analysis for water management is often restricted to the natural sciences and engineering. An additional input of administrative science may contribute to resolve the current problems in implementation of integrated water policies. Factors of concern in this respect are elaborated.

Contributions: 6

Keywords: Netherlands, water management, water policy, government policy, water conservation, government policies.

# Chapter V.

## World Water Vision for the Next Century

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**Table 5. Number of publications on world water vision for the next century.**

Topic	Number of Publications
General Policies	8
Management and sustainability	6
Food and agriculture	5
Countries	3
<b>Total</b>	<b>22</b>
<b>Percentage/300</b>	<b>7.3%</b>

**General Policies.** The World Water Council (1998), Serageldin (1998), and international institutions such as the International Water Resources Association, Global Water Partnership, and Stockholm the International Water Institute are concerned that if the current trends continue, not enough water of appropriate quality and quantity may be available in the future for sustainable human development and preservation of ecosystems. Concerned with the possibility of water security, and its impacts on human and ecosystems, the World Water Council established the World Commission on Water. The Commission initiated a global consultation process on water which involved literally thousands of people and hundreds of organisations in the preparation of thematic, sectoral, national and regional perspectives on the long-term issues of water. Many documents were produced during this process to develop a long-term vision for water.

While during this review process numerous documents were produced, only those that were available during this analysis of grey literature were reviewed. Rosegrant (1997), Monod (1999) and Global Water Partnership (1999) have contributed to the building of a framework for effective action, which could contribute to rational water resources management. They point out the importance of greater participation by water users, women, non-governmental organisations, and governments, either by themselves and/or in various forms of partnership. Several international Institutions that deal with water have proposed some frameworks for improved water management. In addition to the participation of the various stakeholders in the water resources planning, management and development processes, social, economic, environmental and equity implications of water management must also be considered.

Governments at various levels are generally responsible for planning, administering and managing water uses within the countries concerned. Addressing the challenges of water scarcity so that each human being has adequate quantity and quality of water will require from the local governments an intensive effort to improve water quantity and quality management, and also financial and technical support from the central governments and international organisations. Water demand management would require increasing attention in the coming years, and institutional arrangements should be adapted to the needs and situations of the specific locations. All water development projects should consider the costs and benefits not only in economic terms but also in terms of public health, environmental and social impact, and improvements of catchment areas. Intangible cost and identification of the nature of the beneficiaries are important considerations for water management.

Significant reforms in the institutional and legal structures are necessary to turn water management over to the users. At least initially, the users' organisations will require significant support so that they can manage these systems properly and sustainably. Economic factors and policies such as property rights, decentralisation, privatisation, pricing reforms including reduction in subsidies, and levying of pollution charges should be steadily introduced in all aspects of water management.

Water resources experts, various levels of governments and international institutions have tried to find organizational and planning methods to include reliable water assessments (quantity and quality) and,

based on those, come up with recommendations for water uses and planning in the next century. Biswas (1997) and SIWI (1997) have suggested that more attention be given to some topics which have not been properly considered in previous plans and programmes such as South-South transference of experiences and technology; the role of water in energy production and use, the availability of reliable national and global data on water; and the importance of relationship between water availability and national and regional security. The issue of water as factor for national peace and security in the 21<sup>st</sup> century has been basically ignored by the water profession.

**Management and Sustainability.** The OECD (1998), Scudder (1999), Vision 21 (1999), World Water Vision (1999), have conducted workshops and assessments to find out the current condition of the water resources in certain parts of the world and, based on the findings, they are interested in developing guidance for environmental management and water conservation.

World Water Vision workshops conducted worldwide by the various water organizations, highlight the need for accelerated attention to the water sector in the coming decades. There has been considerable concern globally on the lack of access to clean water and sanitation in developing countries. This concern goes back to the United Nations conference on Human Settlements, which was held in Vancouver in 1976, if not earlier. According to the workshop conclusions, access to water should be considered to be a fundamental human right. Proposals put forward include establishing more equitable policies for water use and conservation, in which everyone will participate in the benefits and obligations associated with using water. They highlight that water conservation is an obligation to all: individuals, societies and governments.

It is argued simultaneously that water is not only just a basic human need, but is also an essential requirement for the management, restoration and preservation of ecosystems. Especially important consideration is the integration between land use and water use planning and policies.

Solution to the future water problems requires that, there must be a major shift in the way people and policy-makers have conceptualised water in the past. Economic, social and political concerns must be added to in the traditional ways to manage and use water. Technical considerations are important, but these are not enough by themselves. Besides these considerations, ensuring equitable water distribution in many countries will also require consideration of traditional factors such as the strong ties that link water-religion-culture-society. Within the international water community, there is at present a consensus on the need to develop policies for water conservation and to encourage integrated water resource management. All sectors of the society must be encouraged to participate in the development of such policies.

Vermillon & Merrey (1998) recommend that the type of institutions responsible for water management should be changed in most countries so as to overcome the current problems and be prepared to face planning challenges of the 21<sup>st</sup> century, which are likely to become increasingly more complex. New governmental institutions need to be less bureaucratic and hierarchical, but more responsive to the public needs. They must be significantly more efficient to manage water resources compared to their existing counterparts, and must be more aware of their social and environmental responsibilities. Politicians and policy-makers need to be aware of the fact that natural resources like water are degradable and that economics is not the only criterion for institutional organization and administration. New institutions must be able to reach a balance among equity, economics, environment and water resources.

**Food and agriculture.** Many countries have made successful efforts to develop and implement efficient policies for water management but clearly much more need to be done if water crisis of the coming decade is to be avoided in most countries. Much of These efforts have been focused on in developing legal, economic and social measures to regulate water use and to establish a more equitable water distribution. Food and agriculture production is the most major user of water on a global basis, and hence the interrelationships between water and food production deserves a special attention. Since global population growth will continue well into the next century, it will be necessary to provide food to more and more people in the coming years, and for this reason, stress over water will increase as well, both in terms of quantity and quality, as well as due to social and environmental impacts. Water use in the next century

will demand a more efficient planning to increase food production with limited increases in water availability.

## Summaries

- W

Anonymous, *Vision 21: A shared vision for water supply, sanitation and hygiene and a framework for future action*. Stockholm: The Water Supply and Sanitation Collaborative Council, 27 p.1999.

### Abstract

The author explain that Vision 21 is the result of the water and sanitation sector over many years particularly during the International Drinking Water and Sanitation Decade (1981-1990), and the consensus reached over these years. Community groups and individual women and men around the world have provided contributions. In the words of the authors, " Vision 21 is not a document designed to sit on peoples' bookshelves. It is a start of a movement, designed to be used by activists who can apply its strategies to suit specific needs and priorities".

According to the authors, Vision 21 is an initiative to put an end to a global crisis. Despite enormous achievements over the past two decades, one billion of the earth's citizens still lack safe drinking water while almost three billion have no adequate sanitation. Three million children die each year from water-related diseases. These factors compound the suffering of more than a quarter of the developing world's people who are denied a healthy environment for living. The effort demands collective action by empowered and capacitated people in households, communities and authorities. It offers the promise of a world by 2025 in which each person knows the importance of hygiene and enjoys safe and adequate water sanitation. The futuristic scenario describing a better world also explains how it was achieved. The essence of Vision 21 - the authors explain-is to put people's initiative and capacity for self-reliance at the centre of planning and action. The foundation is recognition of water and sanitation as basic human rights, and of hygiene as a prerequisite.

The document recalls that "Governments do not solve problems, people do" and supports a people-centred development task, where the household is the prime catalyst for change, the first circle in planning and management of environmental services. Leadership, institutional reform, gender equality, and population growth are issues analysed and weighted in their influence over water management and availability. The document concludes with a description of the next steps that are intended at country, regional and global levels. The authors explain that the Collaborative Council will prepare an international advocacy plan for action through its members in more than 140 countries and will help to generate the necessary human, technological and financial resources and appeal to the inescapable international responsibility and to solidarity among all people.

Contributions: 9

Keywords: Water management, participation, environmental conservation, institutions, water policies, XXI century.

- NA

D. C. Bell, "Water in the west today. A States' Perspective," Western Water Policy Review Advisory Commission, Report to the Advisory Commission July, 1997.

### Abstract

The document integrates the basic points drawn from the Water in the West report. It contains information of the answers to five questions done to the States regarding water problems, water supply, water treatment, participation of local people, water law and management, and observation of the way the relation between Federal -State is develop.

Contributions: 7

Keywords: Water in the West Report, USA, water management, water use, participation, water and law, water regulations, institutions.

- W

W. J. Cosgrove and F. R. Rijsberman, "Creating a vision for water, life and the environment," *Water Policy*, vol. 1, pp. 115-122, 1998.

**Abstract**

The authors explain in their article the new challenges regardless water conservation and management. They highlight the need of change the "business as usual" approach and to find viable solution applicable in different social, economic and environmental strata present in the planet. They explain the vision objectives of the WWC, and how WWC is preparing strategies to solve the water shortage problems. They divide the WWC in eight main tactics to be implemented and recommended in the future WWC's conferences.

Contributions: 4

Keywords: Participation, WWC, CME, water management, water policies, institutions.

- E

"European vision on water for food and rural development. Workshop of the National Committees of CID," European Regional Working Group of ICID, Vrakunska, Bratislava, Consultance in water vision 10-11 May, 1999.

**Abstract**

The document contains the conclusions of the National Committees on water for food and rural development. Vision paper of Czech Republic, Federal Republic of Germany, Hungary, Lithuania, The Netherlands, Poland, Slovenia, Ukraine are included. The entire European countries participants in the event have established legal and economic mechanism to regulate water use and conservation. The main principles driving the European water conservation policies are: priority of prevention, cooperation of all concerned parties, polluter pays principle and full cost recovery, and subsidiary and decentralized execution of tasks. The challenges detected for the participant are focused in six main issues: climatic changes, rise of the sea level, aggravation of flood events, subsidence of land, higher requirements for safety, water quality and environment, and development of food production under market conditions.

Contributions: 7

Keywords: Europe, Czech Republic, Federal Republic of Germany, Hungary, Lithuania, The Netherlands, Poland, Slovenia, Ukraine, environment, water vision, water management, economics.

- As

M. A. Gheleta, "Sustaining the giant dragon: Rational use and protection of China's water resources in the twenty-first century," *Colorado Journal of International Law and Policy*, vol. 9, pp. 221-283, 1998.

**Abstract**

According to Gheleta, China should invest in measures that improve the efficiency of water utilization and promote the rational use of its water resources. China's current financial state and its limited investment capacity make it improbable that the country's water supply will expand substantially through construction of expensive new projects. Thus, reforms in existing operations, management, and policies that focus upon increasing efficiency are a more realistic solution to China's problems. An important step that China could take to move toward sustainable development and rational use of water is to enhance public awareness of water quality issues. China's seniors leaders may have finally begun to realize China's dependence on limited natural resources and the wisdom of conserving and managing the resource in a

responsible and sustainable manner. It is a much larger task, however, to get the public to understand the reasons that they should change their inefficient and wasteful habits. The government, Ghelete argues, could further public education on water issues by initiating a campaign that encourages ordinary people to make efficient use of water.

A crucial part of a sustainable development strategy for China must be greater emphasis on consistent enforcement of environmental laws. The laws that China currently has in place governing the use and allocation of its water resources, the prevention and control of water pollution, and the environmental impact of water resources development appear to be adequate, at least on paper. Now the challenge is to enforce those laws.

Contribution: 4

Keywords: China, water resources, sustainability, water management.

- W

Global Water Partnership, "Framework for action: Achieving the vision," Global Water Partnership, United Kingdom 1999.

**Abstract**

The Framework for Action Unit in this document gives guidance to groups working on water vision policies on how to organized and present plans for the next meeting to be held in The Hedge in March 2000. The Unit is focusing its efforts in be clear about actions to be taken in the future policies. The Unit stresses its interest in been clear, as objective and direct as possible, and state action, who and how is going to perform it. The scheme proposed is asking to add the specific follow ups to keep track of the advancements of each action in time and place.

FAU is asking for feedback from the work teams working on the vision units worldwide, to be sure, all perspectives and strategies are included. Getting feedback all new ideas will be included in the final document to be presented in the Netherlands in March 2000. The program will be cover water management policies for the next 25 years.

Contributions: 6

Keywords: Water vision, water management, water policies, international policies, water conservation.

- W

J. Monod, "World Water Commission. Principles for action," , Stockholm, 1999.

**Abstract**

The author contributes to the framework for effective action in favour of water resources management and the availability of these resources to people, farming communities and industry throughout the world. In this framework, the author encourages greater participation of users, women and government in all forms of partnership, which allow these forces for progress to converge in the interest of the fair and efficient management of water throughout the world.

The author makes contributions and analysis to water management and policies in the fields of development, water uses, urban water sewerage utilities, agriculture, industry, technology, economics, and society. He stresses that water belongs to all and to none. And it is the role of the government to plan how it is to be use and shared out.

Contributions: 8

Keywords: Water uses, water management, economics, water policies, institutions, participation, privatisation, decentralisation.

- W

Organization for Economic Cooperation and Development, *Water consumption and sustainable water resources management*. France: Organization for Economic Cooperation and Development, OECD Proceedings. 64 p.1998.

### **Abstract**

The OECD programme on Sustainable Consumption and Production, in collaboration with Environmental Australia, organized a workshop on Sustainable Water Consumption to focus on approaches, which will lead to more sustainable use of water. The main conclusions emerging from this workshop are: (1) Countries are increasingly recognizing, and acting on, the need for an integrated water resources management approach. Integrated water resources management considers both production and demand side pressures, and has the multiple objectives of: minimising water waste; maximizing the efficiency of water use; maximizing water availability by limiting degradation of water supplies, and through reuse; optimising water allocation to competing use; and limiting withdrawals to sustainable levels. (2) The optimal allocation of water resources requires full recognition of the environment as a water user, and the ability to identify the minimum water requirements to support aquatic eco-systems. (3) A number of steps are needed to implement integrated water resources management, including: developing more appropriate institutional structures, functions and responsibilities; and strengthening the information base on available water resources, environmental pressures, and present and future demand. (4) Greater involvement of water users, including private sector firms and communities, is a critical element of successful strategies for sustainable management of water resources. (5) Governments have the responsibility of setting the framework for sustainable water resources management. It will vary from country to country depending on social, economic and environmental considerations, technological possibilities, and the specific end-use patterns in question. Common priorities are: establishing appropriate water pricing regimes; strengthen social instruments designed to modify user behaviour; employing mechanisms to promote a faster and wider diffusion of available water efficient technologies.

The report describes a range of policy considerations for total water resources management. In the first section, there is an explanation of the two policy arenas, sustainable consumption production on the one hand, and water resources management on the other. The second section reviews trends in water consumption in both OECD countries and more globally, explores the notion of sustainable water consumption. The third section summarizes workshop discussion on Integrated Water Resources Management. Section four highlights conclusion from each of the four Working Groups convened to examine policies to promote sustainable water consumption in the industry, agriculture and commercial/residential sectors, as well as integrated demand management. The section includes the conclusions of OECD and considers areas where Member countries might place their focus in the future.

Contributions: 8

Keywords: Water consumption, water management, OECD, sustainability, water use.

- W

M. W. Rosegrant, *Water resources in the twenty first century: Challenges and implications or action*. Washington, D. C: International Food Policy Research Institute, Food, Agriculture and the Environment. Discussion Paper 20. 23 p.1997.

### **Abstract**

According to the author, addressing the challenges of water scarcity will require both selective development and exploitation of new water supplies and comprehensive policy reform that encourages efficient use of existing water supplies. The most appropriate mix of supply augmentation and demand management, and the most feasible institutional arrangements and policy instruments, will vary depending on a region's level of development, agro-climatic zone, relative water scarcity, level of agricultural intensification, and degree of competition for water. Highly selective, economically efficient development of new water can involve impoundment of surface water and sustainable exploitation of groundwater resources, as well as expanded development of non-traditional sources of water. To get past the proposal stage, future large and small irrigation and water supply projects will need to be acceptable to diverse

constituencies. The full social, economic, and environmental cost of development must be considered, but so must the cost of failure to develop new water sources. Project design must ensure comprehensive accounting of cost and full benefits, including irrigation benefit, but health, household water use, and catchment improvement benefits. Of utmost importance, compensation programme for those who are displaced or negatively affected projects must be bettered designed and implemented.

Comprehensive reform of water demand management will be even more important in meeting new water demand by saving water and soils. The most significant reforms will involve changing the institutional and legal environment in which water is supplied and use to one that empowers water users to make their own decisions regarding use of the resource, while at the same time providing a structure that reveals the real scarcity value of water, including environmental externalities. Key elements of these reforms include establishment of secure water rights of users; decentralisation and privatisation of water management functions; and the use of incentives including markets in tradable property rights, pricing reform and reduction in subsidies, and effluent or pollution charges. Non-market instruments such as licensing and regulation, and direct interventions such as conservation programme can also play an important role.

Cooperation between countries sharing the same water basin will become increasingly important as water becomes scarcer. Domestic and international water policies are closely intertwined. One key to defusing potential international conflicts over water is national water policy reform to ensure the most efficient use of available water supplies.

Contribution: 8

Keywords: water resources, water management, water policies, development, institutions.

- W

T. Scudder, "Relating water resource development to both people and habitat," , 1999

**Abstract**

Scudder explains that in discussing the water crisis, increasingly experts are emphasizing how water has become, or will become within the next two generations, the scarcest and most critical natural resource. Water is not just a basic human need, it is also a basic need for the management, restoration and enhancement of ecosystems of which people and their cultures, though ecologically dominant, are just one component. Especially important is integrated land and water use planning and the management and restoration of wetlands which are at risk throughout the world.

The author explains that water is a finite resource unevenly distributed in the globe. To be able to solve the future water problems in all countries it is needed a shift in the way people and policy makers have conceptualised water. It is needed to include economic, social and political concerns in the traditional way to defined and use water. Besides to those considerations, in some countries there is a strong tie among water-religion-society that should be considered to have a equitable water distribution.

Scudder supports the idea of developing a "Blue Revolution" to complement agriculture's "Green Revolution" and make population aware of the importance water represents for the current and next generations.

Contributions: 4

Keywords: water use, economics, institutions, water management, water policies.

- W

D. Seckler, "Water for food in 2025: A brief review of major issues," 1999.

**Abstract**

Seckler explains that according to the International Water Management Institute (IWMI) projections for 2025, around one third of the population of developing countries will be suffering severe water scarcity.

Agriculture is by far the greatest user of world's developed water supplies. It accounts for about 70% of the total withdrawals, and over 80% of the consumptive use of water. Then, in most countries the problem of water scarcity is mainly an agricultural problem.

As a means of helping policy makers and water managers, the author illustrate that IWMI has develop the PODIUM model. The model has the potential for helping policy makers, technician and researchers, in modelling different water scenarios. Seckler, show the major issues determining water for food situation in 2025. It is intended that the examples given by the author would be use as a background guide to PODIUM users.

Contributions: 6

Keywords: Water use, modelling, water management, institutions,

- W

I. Serageldin, "Discussion Paper. Water in the 21st century: Some issues," *Water Policy*, vol. 1, pp. 123-127, 1998.

**Abstract**

The WWC was preparing the Vision document to be presented in the World Water Day, 22 March 2000. The present article discuss some issues to be considered in the conference to be hold in The Hedge, Netherlands. Serageldin explains that the scope of the effort required that to address the challenges might well have to go beyond the application of current conventional thinking. It is needed to think of long-term strategies in addition to the application of the best current practices today. Seragelding invites to "dream" and think of the future.

Contributions: 7

Keywords: WWC, CME, water management, water policies, institutions, participation.

- W

I. Serageldin, "Water in the 21 st century: A dialog," *Water Policy*, vol. 1, pp. 129-137, 1998.

**Abstract**

The author explains that on 14 July 1998, a number of distinguished scientist, economist and other experts met to share their ideas on the challenges of sustainable water resources management in the 21 st century. The purpose of the meeting was to tap the thinking of individuals who are world-renowned, not only in water but also in areas like agriculture, population, and climate which are inextricably linked to water. The participants were chosen for their ability to identify the influence of other sectors on water, hypothesize about potential transformational forces, and recognize the multiplicity of constraints and opportunities that affect the ability to address the challenges ahead.

The discussion -explains Serageldin - focused on existing deficits and human suffering in current water management, and on a number of rapid and fundamental changes taking place outside the water sector that may affect future demand and supply. The article represent a compilation of the main topic covered in the discussion.

Contribution: 7

Keywords: WWC, CME, water vision, water management, participation, water policies, institutions.

- W

A. M. Shady, "Water, food and agriculture, challenges and issues for the 21 st century.," International Commission on Irrigation and Drainage 1999.

**Abstract**

Mr. Shady explains that in 1998, the only issue that the UN General Assembly was able to agree on at its Special five years after Rio Earth Summit of 1992 was "the looming water crisis". Closely linked to this crisis is the deepening concern over the "global food supply". However, none of the food projections by the Food and Agriculture Organization (FAO), the World Bank, or the International Food Policy Research Institute (IFPRI) currently take into account water as a potential constraint.

Shady highlights that population is currently suffering from land and water shortages that will be aggravated in the forthcoming years. The main problems to be addresses for national and international agencies meetings are land and water insufficiency, water-logging and soil salinity, climatic change, access to clean water, pollution, financial allocations, water management and equity, intersectoral competition in water management and lack of awareness by the public and many decision makers on many of these issues and problems.

The author emphasizes as well, the problems in agricultural production that should be confronted now to avoid worst problems in the future. Shady makes emphasis in the need of been aware of the water problems and find the most viable solution for them. It is needed to avoid bureaucracies, inefficient office and really focus on finding solution useful for everybody.

Contributions: 9

Keywords: Water management, privatisation, international organizations, ICID.

- W

Stockholm International Water Institute, *Proceedings. Mar del Plata 20 year anniversary seminar. Water for the next 30 years. Averting the looming water crisis.* Stockholm: Stockholm International Water Institute, Stockholm Environment Institute, 131 p.1997.

### **Abstract**

The proceedings consist of nine lectures, focused on the analysis of water stress, capacity, capability, and water and food security. Examples from Canada, Spain, Brazil and Morocco were included. The Seminar was organized to commemorate the 20th anniversary of the United Nations Water Conference at Mar del Plata. The seminar was to build a bridge between on the one hand successes and failures of past decades, and on the other the conceptual development, efforts and strategies needed for the next thirty years. Future policy options available to avert the looming water crisis were, therefore, presented. In the conclusion, Asit Biswas stressed that although the Mar del Plata Action Plan provided an excellent road map, it has not so far been successful. Very few people have realized the importance of the unconventional security threats from factors such as population growth, and the associated impacts such as depletion and degradation of natural resources, especially water. These new and emerging factors are a serious threat to future national regional and global peace. Even fewer have a clear understanding of where, how and when such threats could affect peace and security issues. Consequently, in many areas, he argues, we are now worse off than 1977.

Biswas highlights the importance of some topics that have been marginalized in most countries: the south-south experiences of technology transfer, the role of water in energy production, the availability of global data, and the importance of the relationship between access to water and peace. Biswas calls for urgent, worldwide attention to those issues.

Contributions. 7

Keywords: Mar del Plata, water management, water use, planning. Institutions,

- W

D. J. Vermillon and D. J. Merrey, "What the 21 st century will demand of water management institutions," *Journal of Applied Irrigation Science*, vol. 33, pp. 165-187, 1998.

### **Abstract**

The article is on institutions and their roles in water supply and management as the twenty-first century approaches. Institutions will face serious challenges regarding supply, equity, efficiency in water distribution because of the ever increasing population. The institutions need radical reform if they are to meet the future challenges. The challenges are stated in terms of three main goals: (1) increasing food production from irrigated agriculture to meet growing demands, (2) coping with escalating water demands in areas other than agriculture and sustaining the quality of soils and water, and (3) improving the equity of water distribution. These three goals are interrelated, and thus should be addressed simultaneously.

The institutional changes needed can be met by four ways: (1) replacement of existing institutions with service delivery organizations; (2) conversion of irrigation systems into multi-use water service systems, (3) transcendence of the infrastructure dependency-deterioration trap, and (4) implementation of integrated water basin management. The central challenge posed by each of these proposed changes will be to design institutions which will ensure the accountability of water service providers to policy-makers and users. Effective, sustainable and integrated water resources management in the future requires that the new institutions should be put in place as soon as possible since they may provide the only hope to ensure that the world can meet the twin imperatives of increasing water availability and diminishing water pollution.

Contribution: 8

Keywords: water management, sustainability, equity, institutions, planning, water use.

- LA

“Water in the production of food and in the rural development of Mexico. A long term vision,”

#### **Abstract**

In the first pages, the document shows an analysis of the current distributions of water agricultural land, and population in the country. The main topic through the analysis and explanations is to show the governmental programme like Agricultural Alliance Program, implemented to improve the extreme poverty conditions 8.8% of Mexican population is living in. In the document, it is highlighted the government effort to help agricultural and livestock producers facing production problems. An analysis and projections of agricultural and livestock production is presented as well as the initiatives Federal government is applying to solve those problems.

In the document it is explained that the most developed irrigation infrastructure is localized in the North part of the country, technological backwardness is localized in the central and south parts. It is explained that the best tools to oppose food and water deficiencies in the next decades is through general agricultural technification and increasing the extension of irrigated land.

The document ends with an analysis of the roles the institutions regulating the agricultural production will play in the 21st century.

Contributions: 6

Keywords: Mexico, Latin America, water management, agricultural production, institutions.

- ME, Af

“Water vision for food rural development. Outputs from Middle East and North Africa Regional vision meeting.,” Mediterranean Agronomic Institute, Bari, Italy, Vision report 27-29 May, 1999.

#### **Abstract**

The Middle East and North Africa Regional Vision Meeting (MENA) vision paper, contains and analysis of water situation MENA countries have and will face in the next decades. In the document, it is explained that the region confronts serious water shortages problems due to the arid and semiarid environment where countries are localized. Water availability problem is different depending on the country's geographical localization. Each country will need specific measures to make an efficient use of water.

In the document, it is made a projection of population growth and food and water availability in the forthcoming 25 years. The conclusion is that it will be needed an increasing awareness of efficient water use, better policies and management to provide water to all growing population in MENA.

Contributions: 4

Keywords: Middle East, Africa, water policies, water management

- NA

Western Water Policy Review Advisory Commission, "Water in the West: The challenge for the next century," Western Water Policy Review, Policy Review June, 1998.

**Abstract**

The Western Water Policy Review Advisory Commission made recommendations about the proper role of the federal government in western management for the next 20 years. The Commission explains that water in the west present chronic problems aggravated for the population growth. Reports show unhealthy treatments to the aquatic ecosystem and water quality, pressing water supply problems, unfilled American Indians water claims, an agricultural economy suffering the stress of transition, rapid conversion of open space to urban development, and rising drought and flood damage exacerbated by the potential for global warming.

In the document it is explained that the impetus for the Commission's formation was the Congress's finding that current federal water policy suffers from unclear and conflicting goals implemented by a maze of agencies and programme. Lack of policy clarity and coordination resulting in gridlock was a consistent theme of public testimony and scholarly research. The Commission concluded that these problems cannot be resolved piecemeal but, rather must be addressed by fundamental changes in institutional structure and government process. The geographic, hydrologic, ecological, social and economic diversity of the West will require regionally and locally tailored solutions to effectively meet the challenges of the 21st century of water management.

In the report, the Commission offers suggestions for addressing water problems in a proactive manner. The document contains the recommendations given by the Commission focus on two main areas: principles of water management for the 21st century and New Governance of Watersheds and River Basins.

Contributions: 8

Keywords: Western Water Policy Review, USA, North America, water management, watersheds, water use, water policies.

- W

*World Water Council, World Water Council. International Water Policy think tank: WWC/ CME, 10 .*

**Abstract**

The publication is an introduction to the World Water Council historical background and activities. It contains information about the motives conducting the creation of the Council, the members of the Boards of Governors, memberships and goals. The documents shows the challenges WWC for the XXI century and a general action plan to find solution to those challenges.

Contributions: 4

Keywords: WWC, CME, water vision, institutions, policies.

- W

*World Water Council, Water in the 21st century. Paris: World Water Council/ Conseil Mondial de l'Eau, 59*

p.1998.

**Abstract**

Considering the unavoidable problem population growth represents for all around the planet, international institutions are concerned to the need of analysing present water availability and examine the options for the next decades. Organizations haven been studying possibilities for future water availability focusing their interest on geographical water balances, environmental preservation, pollution control and the socio-economic consequences of building infrastructures to supply water to the increasing demands.

The French government organized an International Conference on "Water and Sustainable Development" hold in Paris from 19 to 21 March 1998. The present publication represented a preparation for the topics discussed in the French conference two years ago. The World Water Council proposed four main topics to be discussed in the conference: the present status of water development for all uses in the world; the tools that might be used to assist improved use of existing services and expansion into new services; the probable future situation, with viable planning targets, over a period of conceptual 25 years - including consideration of the policies and strategies that would need to be put into place; and policy implications. The document was centre on the topics the institution considered in jeopardy and needed immediate attention.

Contributions: 6

Keywords: WWC, CME, water management, Paris, participation, institutions, water policies, sustainability.

- W

World Water Vision, "Water in rivers" , 1999.

**Abstract**

It is explained in the document that as a part of the work to develop a world water vision, three sector consultation, "Water for People", "Water for Food", and "Water for Nature", have been set up for discussion on challenges, trends and desirable directions. These consultations on water-related issues focus on people, food and nature but they fail to develop the viewpoint that all these issues are only resolved through the dimension of "rivers". This viewpoint provides a new focus connecting people, food and nature on a common ground, "rivers"

In the publication it is highlighted that lands formed because of erosion of mountains by rivers and the transportation of sediments to downstream areas are land frequently visited by flood and inundation. Cumulative efforts of people on these lands have enabled them to live there. Human activity in turns has affected and transformed the rivers. Considering the above viewpoints, according to the authors, the report is an attempted to help deepen discussions on specific challenges such as floods, water use, navigation, the environment and sediments discharge, and will lead to more active comprehensive river basin management.

Contributions: 7

Keywords: Japan, water vision, water management, river basins, flooding.

## Chapter VI.

### Overall conclusions

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Some 300 publications reviewed for this study have been organized under eighteen main topics listed in Table 6.1. The three most popular topics appeared to be management of international river basins, participation of water users in the management and maintenance of water systems, and concerns within countries. The later includes topics centred in worries and issues of national concerns. These three accounted for 121 publications, and represented 40 percent of the total documents reviewed. However, this is likely to be due to the biases inherent in the selection process for the documents for this review. It is highly unlikely that a comprehensive review of the global grey literature would result in similar breakdowns.

The topics with less number of publications were biotechnology, hydropower and interpersonal communication applied as a strategic tool in the implementation of water management projects. These topics added six publications and represent 2 percent of total number reviewed.

**Table 6.1 Distribution of the number of publications by topics covered.**

Topics	Number of Publications	Percentage/300 (%)
<b>Total</b>	<b>300</b>	
International conflicts	60	20.0
Participation of water users	31	10.3
National concerns	30	10.0
Gender issues	28	9.3
Performance assessments	28	9.3
Economic value of water	23	8.6
Vision and planning for the next century	22	7.3
Privatisation and private sector involvement	20	6.6
Food and agriculture	13	4.3
Environment	11	3.6
Laws regulation	10	3.3
General descriptions of water resources	10	3.3
Sustainability	7	2.3
Pollution control	5	1.6
Communications	3	1.0
Hydropower	2	0.6
Biotechnology	1	0.3
Recreation	1	0.3

The documents reviewed were then further classified by continents. Highest numbers of documents were concerned with Asia (20 percent), and only 3 percent referred to Australia. This is shown in Table 6.2

**Table 6.2. Distribution of documents by continents.**

Continents	Number of Publications	Percentage/ 300 (%)
Asia	59	20.0
America	27	9.0
Africa	11	3.6
Europe	7	2.0
Australia	3	1.0
<b>Total</b>	<b>107</b>	<b>36.0</b>

In addition, main issues discussed in the documents have been listed in Table 6.3 under 13 categories

**Table 6.3 Main topics and problems mentioned in the publication reviewed.**

Topic	Issues discussed
1. <i>Privatisation</i>	<ol style="list-style-type: none"> <li>1) Lack of adequate infrastructure</li> <li>2) Lack of financial support</li> <li>3) Lack of political support</li> <li>4) Conflicts with decision making process</li> <li>5) Conflicts with establish structures</li> <li>6) Equity of water distribution</li> <li>7) Lack of adequate administrative structures and procedures</li> <li>8) Absence of follow ups of projects established</li> <li>9) Lack of funding in local communities to afford water administration.</li> <li>10) Need for better training and education regarding water management and administration.</li> <li>11) Conflict in power structures.</li> <li>12) Equity conflicts in the use of water in communities.</li> <li>13) Equity conflicts in ownership, legal decision making and representation</li> </ol>
2. Assessment of irrigation performance.	<ol style="list-style-type: none"> <li>1) IWMI indicators to analyse procedures and not focus only on inputs and outputs.</li> <li>2) Inadequate maintenance of infrastructure</li> <li>3) Need to develop a database for each country/ state for evaluating irrigation performance</li> <li>4) Need to establish follow up procedures</li> <li>5) Training to conduct assessments of irrigation performance</li> </ol>
3. Pollution	<p>Needs for</p> <ol style="list-style-type: none"> <li>1) Control</li> <li>2) Assessment</li> <li>3) Cost</li> <li>4) Prediction</li> <li>5) Protection</li> <li>6) Regulations</li> <li>7) Assessment of health problems in urban and rural areas</li> <li>8) Assessment of tropical diseases associated with water</li> <li>9) Wastage management</li> </ol>
4. Law	<ol style="list-style-type: none"> <li>1) Enforcement and application of laws</li> <li>2) Formulation of regulations</li> <li>3) Control of fees</li> <li>4) Training for implementing of laws</li> <li>5) Creation/ improvement of the judiciary system for implementing existing laws.</li> </ol>
5. International legislation of water protection and use.	<ol style="list-style-type: none"> <li>1) Enforcement of international regulations.</li> <li>2) Encouragement of established regulations for shared water bodies</li> <li>3) Establishment of general level of minimal protection measures</li> <li>4) Consideration of the social/cultural concerns for water management</li> <li>5) Different water uses</li> <li>6) Establishment of international agreements</li> </ol>

**Table 6.3 Continue . . .**

Topic	Issues discussed
6. Locals' participation	1) Lack of involvement of local people. 2) Lack of awareness of local people in water management needs and goals. 3) Education and training on local water issues. 4) Assessment of why local people do not participate in water management. 5) Inclusion of opinions and knowledge of local people in design, establishment and evaluations of water management projects.
7. Gender issues	1) Necessity of incorporating gender issues. 2) Objective consideration of women's roles 3) Gender biases in land tenure 4) Formulated of appropriated legal regimes to consider women's ownership of land/water. 5) Lack of equity in the access to services. 6) Empowerment women
8. Institutions.	Need to have efficient institutions for: 1) Decision making 2) Follow up 3) Quality control 4) Collection of fees and tariffs 5) Maintenance of infrastructures
12. Water supply to urban areas	1) Quality 2) Availability 3) Sustainability 4) Wastage 5) Management
13. Need for data bases	Absence of 1) Reliable data bases to measure water availability 2) Reliable data to measure levels of contamination 3) Reliable data bases to measure quality of water

It is interesting to note that nearly all documents analysed referred to the absence of efficient institutions and plans for managing and administering water resources, either explicitly or implicitly. This inefficiency affects the design, implementation and evaluation of water projects worldwide. Many documents also noted a very close relationship between water distribution and power. Powerful groups and people often control water sources and the distribution of water in irrigation systems: they determine who gets water, when and in what quantities.

Not surprisingly, the need of having efficient and effective institutions to manage water resources was highlighted. This appeared to be a global necessity. Many times water projects that were thoroughful conceived do not succeed because of lack of appropriate administrative and financial support. Appropriate management of water resources require institutions that are organized and adapted specifically for its water administration and management, and not vice versa. This means administrators must have good knowledge and understanding of both, administrative and technical considerations.

Furthermore, since water is an important component of the environment, it is important to ensure effective communication with other areas of environment management within each country. For example better interactions are desirable between water institutions and other institutions responsible for managing agriculture, livestock, forestry, environment, industry, etc.

The documents also generally emphasized the importance of having reliable and adequate databases to ensure efficient water management and use. The current databases are often not reliable enough for water planning management and decision-making. Countries that do not have reliable and appropriated data bases must make a serious attempt to develop them. Availability and access to reliable data is an essential prerequisite for rational water management.

The documents also point out the absence of follow up and evaluations in many water management projects. Follow up are needed at all levels of water management, including timely maintenance and proper operation of water infrastructures. It is necessary to establish both goals short and long term. The progresses in terms of achieving these goals need to be regularly monitored. Timely actions need to be taken to overcome any constraints identified by monitoring evaluation. Long-term training and capacity building are recommended to improve the planning, design and implementation of water projects.

Most documents identify and analyse the problems encountered, often quite clearly. What is more necessary is to identify realistic and cost-effective solutions, and then ensure that these are implemented properly.