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(GDI)

**Reforming Ourselves Rather
than Our Water Resources**

Politics of Water Scarcity at Local,
National and International Levels

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Comments on an earlier draft that were provided by Shlomi Dinar and by Susanne Neubert are much appreciated.

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Foreword

From December 3 to 7, 2001, Germany will host the International Conference on Freshwater in Bonn. The present study on *Reforming Ourselves Rather than Our Water Resources* is intended as a pertinent and scientific input for the Conference. It addresses both the participants of the conference and the wider audience interested in learning more about water and the worldwide discussion process on this important issue on the natural resources management agenda.

The Freshwater Conference is a preparatory step toward the upcoming *2002 review of the implementation of the outcome of UNCED (Rio + 10)*. In Bonn the focus will be on sustainable solutions to the water crisis, and in particular on how to serve the poor by implementing *best practices* in water management.

The German Ministry of Economic Cooperation and Development (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung, BMZ) has asked the German Development Institute (GDI) to coordinate several expertises aimed at providing relevant inputs for the discussion process leading up to the International Freshwater Conference.

The present study is one of five contributions within this context. The focus of this paper is on the implementation of existing concepts and strategies for an integrated water management. Much has already been written about water problems and possible solutions. But why are so many reforms still pending? What is it that makes the implementation of reforms difficult and what elements can be used to accelerate the adoption of modern and efficient integrated water strategies?

This paper calls for a reform in the way water policies are designed. It highlights the politics of water scarcity at various levels, comparing various approaches used at different levels to come up with a better utilization of scarce water resources, and highlighting the pros and cons involved under different conditions.

The paper proposes some broad guidelines for handling reforms in the water sector at the national and international levels. It concludes with a section on recommendations for future action that proposes both possible approaches and sequences of action. In particular in view of its political focus, this study is highly relevant to the discussion to be conducted at the International Conference on Freshwater in Bonn.

Bonn, October 2001

Dr. Susanne Neubert

Abstract

As our world faces more stringent conditions of water scarcity, policy makers at various levels seek solutions of both short- and long-run nature. The good news is that more and more policy makers and water managers are convinced now that the era of supply-driven solutions is coming to an end, and they recognize the need for software-type solutions such as improved institutions, better management, and use of incentives. The bad news is that policy makers still make difficult decisions regarding future directions of water management with inappropriate background and insufficient preparation, targeting in many cases a narrow set of factors. Such policies lead in many cases to increased levels of conflict and continued misuse of the dwindling water resources. This paper highlights the politics associated with various water sector management reforms at domestic and international levels. At domestic level reforms may include, for example, pricing, water rights, and privatization. At international level arrangements may include, for instance, water allocation agreements and handling of externalities (quantity and quality). Since politics of water reforms did not get appropriate attention in the design and implementation of the reform process, this paper calls upon inclusion of political consideration in water sector reforms. Moreover, the paper recognizes the strong interactions between domestic and international politics in the water sector, and suggests comprehensive, rather than specific-localized approaches.

Introduction

The past decade has been characterized by increased awareness regarding the state of the water on our planet. Much was said (which will not be repeated here²) on population growth, on the need to produce more food for more people with less water, on the need to provide equal opportunity in accessing water to poor, on the importance of environmental systems, on the impact of climate change and other aspects of water both as a basic human need and as a factor of production. Many reports have produced by many organizations, mainly evaluating the wrong doing by individuals and governments, and prescribing the ‘right’ paths to sustainable future use of an ever-growing scarce resource.

The overarching message in many of the existing analyses is that our world is on the verge of a water quantity and quality crisis. Depending on the discipline, and the background and long-term objectives of authors, some even suggest how to address the unavoidable increase in the level of conflicts over water (Simon, 2001).³ Ohlsson (1995), places on the front cover of his edited book, a statement by Ismail Serageldin (at that time Vice President at the World Bank that “The wars of the next century will be over water”. A featured article on preventing conflict in the next century (The Economist, 2000:52) includes a box on water fights. It argued that “Water shortages will grow even more serious; the stuff of future wars. ... With 3.5 billion people affected by water shortages by 2050, conditions are ripe for a century of water conflicts.” Whether or not the world will experience water wars is left to be seen, but the fact of the matter is that scarcity and water conflicts have been for centuries and will be with us for the years to come.⁴

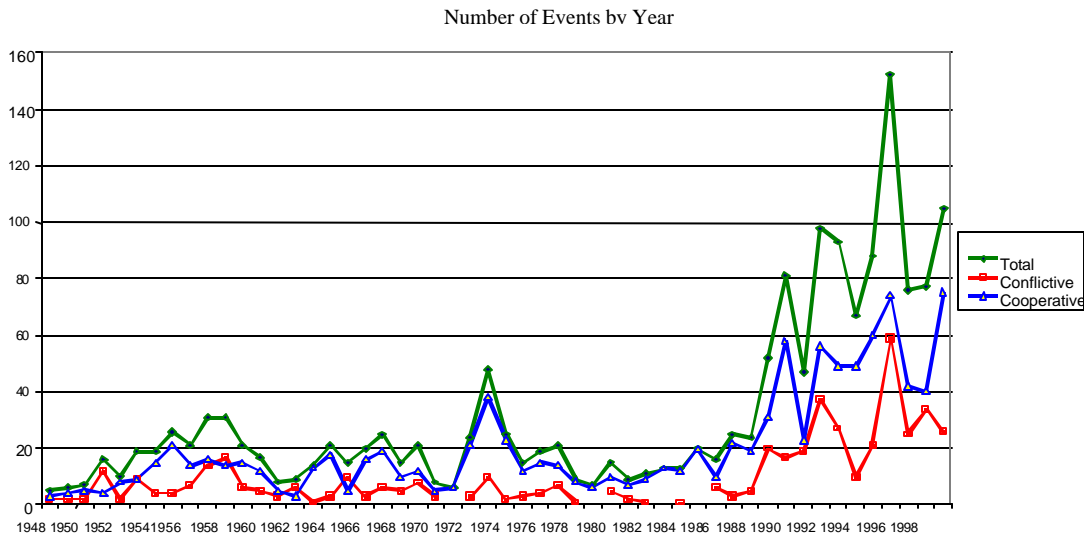
Is it that gloomy? Have been there only conflicts? Or are there also “reasons for hope” (Elhance, 2000)? A recent report (Wolf et al., 2001) developed an index⁵ of conflictive and cooperative events for 263 international river basins. It recorded a total of 1831 events over the course of the past 50 years (Figure 1).

2 To mention few, see: Cosgrove and Rijsberman (2000), Global Water Partnership (2000), Seckler et al. (1998), World Bank (1993), Asian Development Bank (1996), FAO (1995a, b), Liniger (1995), Feder and Keck, (1994); World Resources Institute (2000); (Frederick et al., 1997).

3 The bottom line of Simon’s article is that “For Arabs and Israelis, a regional vision and concrete plan will have to include desalination. A comprehensive plan will be costly, and the United States and other nations should be ready to assist. The price will be small compared to the cost of a conflict.” (which one?).

4 We can refer to many examples at individual, sectoral, and international levels. We can start with the ancient example of *Isaac servants and the herdsmen of Gerar fighting over new well water* (Genesis 20-22). We can add the recent conflict between Oregon farmers and environmentalists (The Washington Times, 2001). And of course we can use the heated conflict between Turkey, Syria and Iraq over the Euphrates-Tigris during the 1990s (Kibaroglu and Ünver, 2000:319).

5 Wolf et al. 2001 observed a total of 1228 cooperative events, 507 conflict-related events (37 of which were acute), and 96 neutral ones. They used a scale for mapping conflicts-cooperation, starting from a formal war as a most conflictive event (no observations) to unification of the riparian states into one nation as the most cooperative event (no observations). For additional definitions see their report.

Figure 1: Conflict-related and cooperative-related reported events in int'l basins

Source: Wolf et al. (2001); Yoffe (2001)

Two observations in Figure 1 are worth mentioning. First, the number of cooperative events consistently exceeds the number of conflictive events for all except 4 years. Second, there is a trend of increasing conflictive and cooperative events in the last decade.⁶ Are these responses to increased scarcity? Are both cooperative and conflictive events at the international arena a reflection also of domestic reforms in the water and other sectors?

We recognize a strong link between the way water is managed by each riparian country, domestically, and the level of water scarcity at the basin level. We call it externality and we refer both to impact of domestic water management on quantity and quality of the basin waters. One very relevant example (Natchkov, 2000) is the case of the Danube River Basin prior to the Environmental Action Plan that was signed by all Basin Riparian states (at that time-1994). Uncoordinated development and economic activities in the upstream riparian states, and unawareness of environmental pollution regulation in downstream riparian states, created a severe externality and irreversible damages in downstream riparian states (Romania, Bulgaria) and in international water ways (Black sea and its Delta).

6 The authors suggest one explanation for the increase in reported conflictive and cooperative events in the last decade by mainly the global information revolution that better exposed cooperative and conflictive events in the media. Indeed, when a statistical analysis of the difference between cooperative and conflictive events is performed (not presented), the trend is found to be statistically not significant.

Many experts and organizations agree that in order to sustain our water resources, and to bring about a change in the manner that water is managed, reforms have to reshape the sector at local, national and international levels (Global Water Partnership, 2000; World Bank, 1993; Asian Development Bank, 1996; FAO, 1995a, b; World Resources Institute, 2000; World Water Commission, 2000).

The cover page of the World Water Council report (World Water Commission, 2000) says it all (Box 1). It summarizes the many consultations that took place in recent years around the world, involving civil society, academia, government officials, and international development agencies.

Box 1: Prescription for a Water Secure World

• Holistic, systematic approach • Integrated water resource management • Participatory Institutions • Institutional, technological and financial innovation • Full cost pricing of water services • Targeted subsidies for the poor • Governments as enablers and regulators • Private investment and community action • Mobilize political will • Behavioral change by all •

Source: World Water Commission (2000)

The ‘Ten Commandments’ in Box 1 capture much of the thinking on the necessary actions in the years to come. While we may still have some work to do in prioritizing among the items on the list, and implementing them, our ability to follow some of them may make us better off. It is, however, the last two ‘commandments’ that this paper dwells on. No question that these are the most difficult, and should have been put first on the ‘to do’ list. We could even argue that the last two ‘commandments’ are pre-requisites or necessary conditions for a successful implementation of all other eight prescribed reform components in the box.

In the following sections of this paper we will argue that local deeds, interests and reforms affect global performance of the water sector, and that behavior of individuals impacts inter-states water relationship. With increased domestic intra- and inter-sectoral competition over scarce water, we may anticipate conflicts to remain part of the local and international water culture, and therefore we have to change our way of managing local and transboundary water resources to minimize conflicts.

What is the role of policy makers in addressing these ‘intra’ and ‘inter’ sectoral issues? What might be, in particular, the task of the policy makers that participate in the ‘Bonn Freshwater Conference?’ The several days of deliberations, both formal and informal, provide a golden opportunity to galvanize the issues at stake, and to better understand the positions and difficulties various countries face in their water sector reform attempts. This paper attempts to provide a framework that allows policymakers to see the entire water-political picture and to place their ‘cases’ against certain benchmarks, so that they may reach a better level of understanding of where they are, where they may move to, and what would it take to do so.

The next section will set the stage for our main discussion on what could have happened if our world was a perfect / ideal one. We will then contrast the ideal with the actual situation under which reforms in the water sector are designed and implemented. We will highlight the ‘transaction costs’ associated with the imperfect conditions under which policy makers act, the ultimate compromise and its social cost. Then we will provide several examples of ‘good practice’ that will help us focus on the politics of scarcity and derive workable recommendations for reforms, addressing local and international challenges.

Imagine that We Live in a Perfect World

With future forecasts indicating increased world population and less available water needed to produce more food almost every where on the planet, what are the options? There are several alternative reforms. Most call upon a more efficient use of water and have been attempted in the past. Experience tells us that the successful implementation of such reforms is not obvious. Therefore, let us find a shelter, for a moment, and imagine that we live in a perfect world and see what could be done under ‘ideal’ conditions.

Our ideal world is characterized by: parties – individuals and groups – behaving rationally, full information (allowing internalization of externalities and implementation of the principles of user- and polluter-pay), no transaction costs, a preference set that depends only on direct (and not political) consideration, alternatives selected based only on maximization of social welfare, and decision makers having freedom of choice. If the party is a group, it speaks in one voice. What do all these characterizations of our ideal world mean in terms of our ability to implement reforms?

Within such a framework, policy makers are comfortable with calculating efficient first-best water policy interventions.⁷ Let us demonstrate the application of several policy interventions at local and international levels in an ideal world, and then discuss the usefulness of this exercise and the lessons that can be learned from it for our a less-than-ideal world.

We will discuss the means of addressing low water use efficiency in the irrigation and urban sectors as examples of policy interventions in an ideal world. Unaccounted for⁸ water losses values of up to 60% in urban water supply and efficiency⁹ of irrigation systems of about 50% alarm pol-

7 In the absence of taxes or other distortion constraints, a policy that maximizes net benefits is first-best (or *Pareto* efficient).

8 Unaccounted for are quantities of water that go through the system but are not measured in consumers’ meters and cannot be charged for - lost as leaks.

9 Efficiency can be measured in several ways. Here it represents the ratio between the water quantity leaving the reservoir and the water actually passing through the farm canals (technical efficiency).

icy makers. They are aware both of the wastage of water in various sectors, such as the residential and the irrigation sectors and of the possible correcting interventions and their possible effects. Several means exist that allow for improved water use efficiency. They include technical, regulatory, monetary, educational, and ownership, and can be implemented separately or jointly. In our ideal world, it is just a question of adjusting the right policy intervention to the conditions prevailing in various locations. An ‘optimal’ outcome will be obtained because the parties involved behave in a manner similar to that discussed above.

The policy maker can consider several means of intervention, which include technological, regulatory and monetary means, or a combination of the three. With the right mix of monetary and regulatory means, water users may find that they can decrease costs and increase output by adopting such technologies. Technological efficiency of available alternative technological measures, cost of adoption and incentives to conserve, will all determine the level of technological adoption. Because water users are welfare maximizers, they integrate inter-generational considerations into their benefit-cost calculations, rather than being myopic (such as the case in many instances in the real world).

Regulatory measures are important, and focus on the development of basic infrastructure and institutions for implementing and monitoring various economic incentives. Since, in our ideal world, there are no transaction costs and no asymmetry of information¹⁰, regulation is an efficient means of policy intervention. As an economic good (Briscoe, 1996), water users can be sent signals regarding the value of water through a variety of economic incentives, including pricing (e.g., volumetric pricing based on the marginal value or opportunity cost of water), and pricing aimed at achieving financial sustainability of the water service (e.g., flat rate or output pricing based on the cost recovery approach). Clear identification and transfer of water rights to the users (in the irrigation sector) is considered to be a supportive mechanism that could help promote efficient and equitable use of water. Definition and implementation of ownership or water rights is an institutional arrangement governing economic activities including water use. These include state, private, common and non-property regimes (Bromley, 2000). The allocation of ownership rights to the water users could also reduce transaction costs, and increase farmers' willingness to invest in water-conserving technologies. A similar argument holds in the case of ownership of the water infrastructure, or land ownership (Feder et al., 1988).¹¹

10 Asymmetry of information exists when the regulator does not have the necessary information about the use pattern of the consumer, who has full information about his/her water consumption patterns.

11 We should stress here that the issue of re-distribution of land and water rights is a very controversial issue in many developing countries. On-going land rights (van Zyl et al., 1996), and water rights (DWAF, 1999) re-distribution in South Africa, and lately in Zimbabwe (The Washington Post 2001), are well known.

Economic Incentives and Water Use Efficiency and Equity

The relation between different economic incentive mechanisms and efficiency measures can be explained with the help of the concepts of marginal benefit (demand), marginal cost (supply), and marginal damage cost (Tiwari and Dinar A., 2001). Economic incentives such as water charges and taxes have mainly been introduced with the aim of generating revenue to partially cover the cost of supplies. The use of incentive-based measures for improving efficiency in resource use is very rare in practice (OECD, 1999), mainly because of the relatively high implementation costs (measurement, enforcement) associated with their application (e.g., Tsur and Dinar A., 1977). However, in our ideal world we will show how they may be very useful in improving water use efficiency.

Pricing

Maximum economic efficiency is attained when the price is set at the level where marginal costs equal marginal benefits. Volumetric pricing is one mechanism through which, tariffs can be designed to achieve efficiency and to account for equity (access of the poor) without involving high transaction costs due to monitoring, measuring and collecting water charges, which in our world do not exist.

Pricing water as an input. The accepted basis for pricing irrigation or residential water is to consider 'water' as one 'input' among others in the agriculture or household production system and charge for water based on the quantity used. The effectiveness of direct water charges on volumetric basis in changing the users' behavior will depend mainly on the price elasticity of demand¹². Pricing of water can also reflect the quality of water, as in the case of wastewater in Israel (Yaron, 1997), where farmers are provided with incentives to substitute fresh with treated wastewater (with appropriate regulation for safety), for irrigation of certain crops.

Pricing of water as an input will reflect the incremental cost (private and social) associated with producing more water. Therefore, the higher the amount used, the higher the price per unit. Users, both residential and agricultural will adjust their use-behavior to the structure of the tariff, and respond by improving their water use practices. One caveat is that in many countries, and especially in the case of irrigation water, the effectiveness of price increase is affected by the difference between the value of unit of water to the user (the shadow price of water) and the actual price charged per unit of water. In many countries, that difference is so big that for any price increase to be effective, it has to be so high, that political considerations may arise that will prohibit it from happening. A quantitative application of such problem is provided by Moore (1999) for

12 Price elasticity of demand is the economic term for the flatness of the demand function, which represents the change in demanded quantity for a given change in the price per unit of the commodity.

the case of Bureau of Reclamation water districts in the Western USA. Equity considerations, the tariff can be designed such that the first slab (height and length) accommodates the basic needs of the poor by having a special low price (Boland and Whittington, 2000).

Water Pricing Based on the Water Productivity of Output. Irrigation water can also be priced on the basis of output per area, i.e., irrigators pay a certain water fee for each unit of output they produce. The basic concept is that farmers' should pay the charge according to the crop productivity or the value of output, or the marginal value product of water per unit of water used. In other words, water pricing in this case is based on the marginal benefit rather than the marginal cost. Output based pricing could also help in promoting the adoption of alternative cropping systems with less water requirements (Kirda and Kanber, 1999; Palanisami, 1999, cited in Johansson, 2000).

Subsidies

Subsidies can be provided either directly to users of water or for a water use technology. Subsidies to the poor are practiced in Chile and administered by the Water supply company EMOS. Pre-identified poor families in Santiago are provided with monthly monetary coupons equivalent to the value of a certain volume of water. The subsidy applies to fixed and variable charges of water supply and sewerage services, and amounts for the first 20 m³ of monthly consumption and varies between 25 and 85% of the bill. (Rivera, 1996). The adoption of subsidy measures for promoting efficient water use is often practiced for promoting environmentally friendly technologies, but it is also used to promote water savings, from which society as a whole may benefit (if the reduction in social cost is greater than the value of the subsidy, it is usually justified). Different types of subsidies such as grants or payments to farmers, budgetary subsidies (e.g., tax credits), provision of extension services, preference loans, debt relief, etc. could be implemented depending upon their effectiveness and suitability to a particular country.

Taxes

Tax incentives are designed to modify behavior by encouraging particular groups or activities, and could be implemented in the form of preferential tax treatment to certain producers or residential consumers through tax credits, exemption or deductions, or through tax benefits provided to investors. Taxes are relevant in the case of negative externalities resulting from water use. For example, the excess pumping of ground water lowers the water table, increases salinity of the aquifer and creates negative regional externalities. The excess withdrawal of water also results in degradation of ecosystems because the minimum water requirement of the ecosystem is not met due to lowering of the water table and reduction of the regional water balance. A tax incentive equal to the marginal environmental damage cost (that can easily be estimated in our ideal world), could be designed and implemented so that the water charge also addresses these ecological concerns. In-

directly, environmental taxes can also be imposed on the water-related inputs such as energy inputs and chemical fertilizers, which also partly influence the level of water use and the level of externality. Usually energy used in water abstraction is highly subsidized and encourages farmers to use more water at a relatively lower cost of extraction (Tiwari and Dinar A., 2001). Such taxes can be designed so that individuals internalize the externalities by improving water use efficiency (WUE) and gradually adopt efficiency measures.

Quotas

The water quota system is used to define the limit on water use or establishes how much to use, when, by whom, and for what purpose water can be augmented and used. When users' behavior is not very responsive to price changes, because of rigid price elasticity, or when uncertainty is involved in the computation of marginal cost and benefit, quota regulation is suggested as one of the measures for controlling water use (Tsur and Dinar A., 1997; Mohamed and Sevenije, 2000). The difference between the quota and pricing system is that in the former case, the marginal social costs associated with each unit of abstraction are assumed to be minimal through the setting of some standards. Likewise, the basic difference between a quota and right allocation is that the former may have various attributes, including a pre-determined price, and be subject to modifications, based on external conditions and number of users, or participants (Tiwari and Dinar A., 2001).

Ownership / rights

“Ownership” or “water rights” refers to the right acquired by the user under government regulation or water law for the abstraction, diversion, use of water, establishment of water infrastructure, or accumulation of proceeds from water tariff collection.

Water rights. A water right is acquired through quota or permits if the water belongs to the government, and through entitlements or sharing resource mobilization if the water belongs to the community. There is also an inter-relation between property regimes and pricing regimes, and water management needs to be understood as a part of the structure of property right regimes (Bromley, 2000). Water rights can be allocated in terms of a share of stream flow, aquifer, or reservoir and in terms of quota or water purchase rights, depending also on the level of infrastructure available.

One of the basic aims of allocating property rights in the context of changing demand patterns is to provide incentives to users to trade water in order to maximize the social net benefits. Users would not only be encouraged to conserve water, but would also trade the surplus or conserved water among themselves and with other sectors and receive higher economic benefits. The successful trading of water takes place through the creation of Water Users' Associations (WUAs) as

has been done in Mexico, where users are granted rights for water use and use of irrigation infrastructures. Water markets also help users allocate the scarce resource more efficiently, and diversify crops (Tiwari and Dinar A., 2001).

Rights on water infrastructures. The rights over physical infrastructures such as those below the main canal or secondary canal can be handed over to the “water users groups” (both in irrigation and rural water supply) for operation and maintenance. The advantage of such a system is that operation and management responsibility is shared between the government and users and technical efficiency could be improved because of ownership and better coordination in operation and management.

Rights to collect and use of revenue to the user groups. In addition to handing over responsibility for Operation and Maintenance (O&M) of irrigation infrastructures and for water use as one of the production inputs users may be provided rights to create their own financial autonomous association and participate in decisions and investments. Users could be granted rights over regulation and collection of water charge, and re-direct part of the revenue collected for investing in improved efficient water application technologies in their own perimeter.

Arrangements Among States on a Water-Course Level

In our perfect world, not only are individual users well behaved, but also countries speak in one voice, and face a similar situation as we described earlier regarding the decision-making process, by individuals. On a water-course level, cooperation among the riparian states will lead to improved water use efficiency, maintaining equity among the riparian states at acceptable levels. In our ideal world, since externalities exist among riparian states of the same water course (both impact on quantity and quality), the parties can agree on a set of measures, to maximize total water course benefits, and rest assure that these benefits will be allocated equitably amongst themselves. The benefit-allocation rules will take into account each riparian contribution to the cooperative arrangement and the benefits at the status quo level. In our ideal world, income transfers between riparian states allow flexibility in prioritizing among cooperative arrangements.¹³

Using economic terms, for a regional / water course cooperative arrangement to be attractive to the participants, and to be economically sustainable, the arrangement needs to fulfill several requirements. It requires individual and group rationality, that is, the regional cooperative outcome for each participant is preferable to the non-cooperative outcome, and to participation in any par-

13 As was suggested by one reviewer, even in an ideal world there might be situations where mutual arrangements among riparians are hard or even impossible to obtain. One situation is where there is a significant disparity between the riparians. For example, when one state is very rich and the other is very poor, the prospects for mutual interest in cooperation is less apparent.

tial cooperative arrangement that includes a subset of the regional participants. The regional cooperative arrangement also guarantees that all costs or gains are fully allocated.

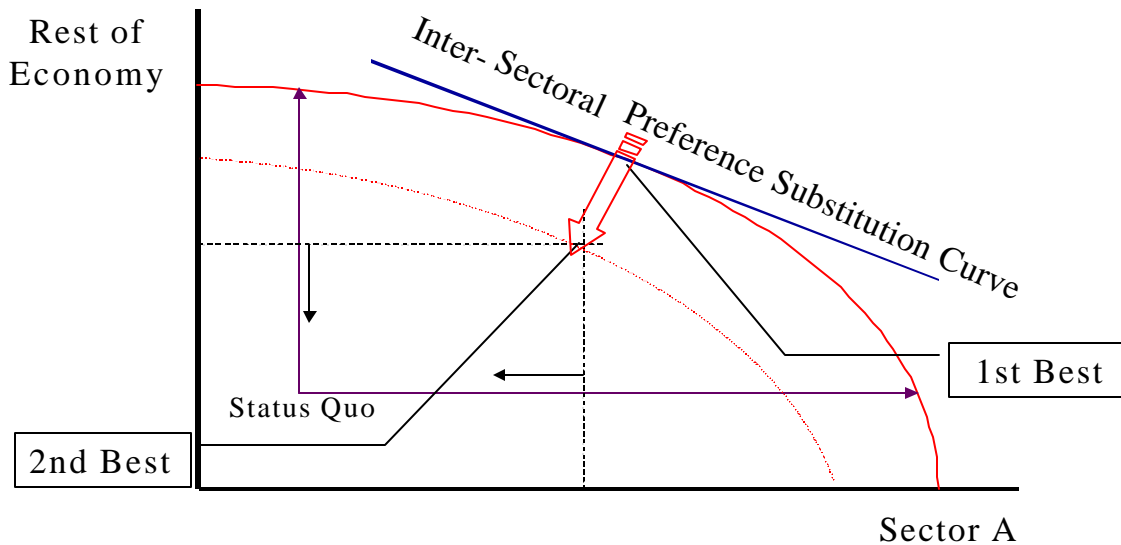
Therefore, the set of cooperative arrangements among riparian states is quite large. They can agree on allocation of the water among themselves, taking into consideration their individual relative advantages in water utilization, such that the regional benefits are maximized. Then regional benefits can be allocated to the satisfaction of the riparian states. The riparian states can also identify individual or joint projects in various water-related sectors, each involving either all riparians or a partial list of the riparians. Because they are rational, as we assumed in our ideal world, the aggregate sum of benefits will be allocated in either case. On the water-course level, riparian states will share data and information, establish monitoring and enforcement mechanisms, and basically, follow rational policy interventions that were discussed earlier at state level.

Reality and Proximity-Departing from our Ideal World

Because we do not live in an ideal world, we cannot assume that the above policy interventions will be implemented in the way they were described. Such implementation schemes usually ignore the information and knowledge and the transaction cost needed for their implementation. The implementation schemes also underestimate distortions arising from political relationships among individuals, organizations, and states, and ignore strategic interests, egoism and run after power. Therefore, in most cases policy makers actually consider second- or even third-best¹⁴ interventions (Figure 2).

14 In the presence of distortionary constraints, such as taxes that distort input and output decisions, a policy intervention that maximizes the total net benefit subject to these constraints is second-best efficient. When political distortions exist, the policy intervention that maximizes total net benefits subject to taxes and political distortions is third best.

Figure 2: First- and Second-best solutions to public choice decisions.



The solid outer curve in Figure 2 represents the economy's (comprised of sector A and the rest of the economy) benefit possibility frontier. Any combination of benefit production below that curve is considered efficiently inferior, but may be politically feasible. The dotted inner curve represents a benefit possibility frontier that can be obtained when there are distortions in the economy. In any case, as is shown in Figure 2, both the second-best and, of course the first-best outcomes are superior to the status quo situation. The distance between the first-best and the second-best outcomes of the reform that is described in Figure 2, represent the economy/social loss due to political economy considerations. A reform's success can be measured by the proximity between these two points. The closer the distance between the points, the more successful is the reform.

Among several examples of the 'proximity issue' the one that will best illustrate it is the case of the political process of rate design reform by the Blue Ribbon Committee (BRC) in Los Angeles, California (Hall, 2000). The process of rate reform started with a suggested marginal cost rates that are economically and financially outperforming, but politically infeasible. The process ended with a combination of increasing block rates and partitioning of customers into subgroups to accommodate for needs and interests—with the final rate being less efficient but politically feasible. The proximity measure includes not only the water saved, compared with the status quo, but also the time and public funds lost in shaping the new acceptable rate.

So far we discussed the general aspects associated with reforms and the impact of political factors. In the next two sections we will address more practical issues associated with reforms in the water sector at the sector/country level, and with water sharing arrangements in the international

arena. There are several reasons why these two levels should be discussed side by side. First, in many cases it can be shown that there are externalities between domestic and international levels. For example, water use patterns at the country level affect water availability for the rest of the basin riparians, thus, affect the nature of a possible basin allocation arrangement.¹⁵ In the same way, basin allocation arrangements affect the availability of water to each riparian state. Thus, it may create a need for reform of the water sector at the national level for some of the riparians. Second, water sharing agreements are also a type of reform. Although not driven exactly by the same variables as reforms at the national level, international water sharing arrangements, via the negotiation process present many similar political aspects, such as power, coalition formation, etc... Many international sharing arrangements reflect the end of a negotiation process that started as a participatory process of interested parties at national levels of the riparian states, such as in the case of the Danube (Natchkov, 2000). Finally, international cooperative agreements, such as basin water agreements, create winners and losers domestically; therefore, they generate supporters and opponents, exactly as in the case of domestic reforms. The internal struggle between these groups shapes the possibility and nature of international cooperative agreements among basin riparian states (Milner, 1997).

The political economy of domestic water reforms

Because of the different physical characteristics of water systems and the various institutional and cultural frameworks within which water policies have to perform, considerable variation remains among reforms in different countries. Such differences include the reformed items, the pace at which countries are moving toward implementing reforms, the level of the reform and the degree of targeting of environmental and social objectives. As one would expect, political pressure frequently affects the process. Political influence on development in the water sector has often led to unforeseen social and economic consequences.

Reforms in the water sector can be expressed either in terms of monetary values (e.g., higher or lower prices) or quantity of water (e.g., higher quotas, or more hours of supply) or improved level of the service (e.g., cleaner water) provided to various consumers or producers (interest groups). Therefore, each reform can be described as a set of physical and monetary values, relevant to a particular interest group. Since reforms are usually associated with changes in status quo, the values of the reform parameters can be expressed in terms of incremental change between the status quo and the (potential) implementation level of the reform. The larger this increment (positive or negative), the higher are the stakes the group will attach to the reform (supporting or opposing).

15 As reported in Kiraboglu and Ünver (2000:316), Turkey claims that Iraq has first to improve its water use efficiency in the irrigation sector to an acceptable level before claiming additional basin water.

The political factors affecting the process of implementing a reform are not less important than the reform objectives. Most frequently, careful packaging and proper sequencing of reform interventions may lead to more acceptable and successful reforms. Examples of several country-level reforms in the water sector can be found in Dinar A. (2000), and are summarized later in the paper. In the following sections we will discuss the importance of each step in the process.

Identification of the affected groups and the reforms

Potential losers and winners should be identified at the outset. Possible interest groups include the various sectors, such as irrigation, residential, industrial, and environment. Then within each sector distinction may be made between rich and poor, big and small, etc... For a reform to be endorsed by a given group, its incremental welfare should be positive. For a reform to be endorsed by a number of groups, the incremental welfare for each combination of groups should not be lower than the sum of welfare values of all individual groups that support the reform.

Groups' influence on the reforms

Institutional reforms, such as pricing, or right assignments, or privatization, are associated with changes in the distribution of power and benefits, and inevitably create considerable political opposition. The conventional view of institutional change is that either it is in the interest of economic efficiency or it merely redistributes income (Bromley 1989). In this regard, interest groups form and attempt to influence the decision making process so that the end result best serves their interests. Powerful political groups may slow, divert, or even stop an *a priori* desirable reform. The larger the number of parties with opposed interests and/or with similar influence of reciprocal magnitude, the more complicated the implementation process is likely to be.

It is expected that both political opposition on the part of some parties, and political support on the part of other parties will affect the reforms. Active opposition or support can affect the level of achievement and the time frame for implementation of a particular reform. The actual achievement level of the reform will be the outcome of that process.¹⁶ There are various means by which parties interfere in the reform's implementation process. It should be noted that some parties may support or oppose a given reform in a passive way.

16 Other potential determinants of performance outcome include variables such as implementation capacity, the policy environment, resource endowments and its initial allocations, the overall economic environment, and natural factors.

Groups' transaction cost of influencing reforms' level of achievement

The cost of influencing for a particular party is a function of its existing political power, and of the magnitude of change it wishes to obtain in the proposed reform. Parties can influence policy makers by demonstrations, by meetings and presentation of their political positions, or simply by monetary means of future support of a policy maker that affect his/her immediate decision. Parties have relative advantages in influencing a reform. Different groups may have different costs associated with a similar activity leading to the same level of influence. The characteristics that affect the relative advantages of that group may include the organizational level of the group and the concentration of the group members in strategic locations.

The level of reform achievement

To determine the level of achievement of the reform, one needs to define impact variables relevant for the reform. This, of course is not an easy task. There is also a time perspective that has to pass before one can return to the country and measure level of achievement. If done it too early, it may not capture any level of achievement and erroneously lead to a conclusion that the reform failed.

Politics of regional / International water sharing arrangements

There are 276 river basins in the world that are shared by two or more riparian states. This makes states interdependent on one another in terms of water use and water development projects. Therefore, any unilateral action taken by one state, as opposed to a cooperative action, in terms of water use or project development, may mean the difference between peaceful and conflicting relations over the shared source of water. The situation becomes even more complicated as geographic locations of riparian states affect the relationship, as political and economic aspects such as domestic politics and military power are factored in, and as historic use and projected demand and utilization among parties conflict. All in all, in regions where water is extremely scarce or in regions where water is distributed unequally, water availability may become a security concern. All these factors deem the water conflict equation a very complex one and thus may provide obstacles to an arrangement for the sharing of the resource (Dinar S., 2000). While only seven minor skirmishes have been waged over water, cases of conflict and tension are numerous (Hamner and Wolf, 1998 in Green Cross International 2000:55; Wolf et al., 2001).

In the Euphrates-Tigris basin, for example, tensions in 1975 and in 1990 (over the filling of the Ataturk Reservoir) brought Turkey, Syria and Iraq to the verge of armed conflict by the different riparian states (Kibaroglu and Ünver, 2000:319). In addition, in 1988 Mauritania and Senegal were also in the midst of a serious water-related conflict over traditional territorial arrangements and state boundaries that impacted water sources (Green Cross International, 2000:84 and 95).

To understand the reasons and prospects of such conflicts it is best to look at other concepts that affect peace as part of the security equation, that include cooperation and negotiation in addition to war and conflict. That said, on the one hand one must consider the many variables that affect security issues in addition to water. Conflict and instability among nations is not necessarily caused by a water conflict among the nations involved. In the sense that the water conflict can't be regarded as the ultimate variable for the cause of conflict (but rather is due to domestic and regional causes) water is a dependent variable. In the case of the Mountain Aquifer in the Jordan Basin and the Ganges-Brahmaputra-Meghna Basin, the conflict over water exacerbates the already existent political conflict among the respective nations or was caused by the political conflict. However, while water is not the sole cause for instability, an attempt to manage the political conflict without an attempt to resolve the water conflict will result in failure on the political front (Dinar S., 2000).

On the other hand, if conflict among nations is initiated solely by a disagreement regarding the utilization of a critical resource, such as water, security may be undermined. At the same time if negotiations over that strategic resource among nations fail, security may also be undermined. In the Tigris-Euphrates basin the independence of water in relation to the regional security is also apparent. While Turkey, Syria and Iraq have had historical differences, the water issue has exacerbated the tensions among them to near armed conflict as was mentioned above. The other manner in which we can appreciate the independence of water in relation to security is a party's realization that cooperation over water may lead to cooperation in other domains. In the Mekong Basin, the concerned parties regarded water as a mechanism to foster regional peace and development, while in the Jordan River Basin, the United States regarded cooperation over water by the parties as a mechanism to initiate peace in the region (Dinar S., 2000).

The struggle to gain access to water (often a strategic or critical resource) has always been one of the main concerns of states. The intensity of the conflict over freshwater are determined by (a) the degree of scarcity, mismanagement and/or misallocation of water in various sub-basins; (b) the fact that water respects no political boundaries and is often shared among two or more states making them interdependent on one another; (c) the geographic and historical criteria of water ownership *vis-à-vis* states; (d) the protracted conflict that underlies the water conflict (e) the amount of alternative sources or options to a negotiated agreement and the desperation of the parties to an agreement; and (f) the relative power of the parties (see also Gleick, 1998; Dinar A. and Wolf, 1997). As such, by itself, the unequal distribution or scarcity of water does not necessarily lead to interstate conflict. It is, however, when severe scarcities of water are experienced or anticipated by one or more states, or when water is perceived to be overexploited or degraded by others at a cost to oneself, that states may become prone to conflict or instability (Elhance, 1999:4).

Water not only respects no political boundaries but also does not discriminate among strong and weak parties. This means that the weakest party, militarily and economically, may be in control

of the origins of the source or encompass the majority of the waterway in its territory – meaning that geography plays an important role in the international relations among nations over water. To a large extent, the physical geography also determines the nature and degree of dependence of each riparian state on the shared waters as well as the urgency of its need for cooperation with other riparian states. The fact that many of the physical parameters of a shared basin can be substantially altered by intentional or unintentional human activity sets the stage for both conflict and cooperation among the affected riparian states. As military and economic power on the one hand, meets hydrological and geographical power on the other, the two, can produce an interesting case for war and peace (Dinar S., 2000).

The hydrology of an international river basin links all the riparian states, creating a complex network of environmental, economic, political and security interdependencies (Elhance, 1999:13). Since water is a finite resource and a vital resource both its quality and quantity become an issue of contention among nations. In this situation of interdependency states may act differently. As we observe from experience, some states opt for cooperation while other states are still in the midst of conflict over the resource. In the pursuit for what may cause parties to conflict over water or make cooperation difficult, and in search of what may mitigate the conflict and make cooperation more possible we may gain some insight from several examples that will be presented later.

So far we discussed both the behavior and opportunities of individuals and parties in an ideal world, that affect reform processes (both at local, national, and international levels), and the conditions that exist in the real world. One important empirical finding that we realize so far is the social opportunity loss, which is the difference between the social benefits under ideal and real world conditions.¹⁷ It is expected from a reform in any sector, including the water sector to minimize such differences. In the next section we will review the reform process (at the country level) and the int'l negotiation process (at the river basin level), and will evaluate its impact on the direction of reform and its likelihood of success.

17 This difference is similar to the difference between 1st best and second best, or between 1st best and 3rd best, that we discussed earlier.

Political Dimensions of Actual Reforms in the Water Sector: Design, Implementation, and Likelihood of Success¹⁸

Over the last decade, attentions to the political aspects of reforms in the water sector, and actual attempts at reforming various aspects of the sector, have yielded a surge in the published literature. We could use some of the experience in actual reforms at various levels to support and demonstrate the issues that we reviewed earlier.

Reasons for Reform

Reasons for reforms can vary according to the particular situation. However, in most cases, water reforms in a particular sector appear to be associated with a larger reform agenda. For example, pricing reforms are often complicated by financial crises and low cost recovery of the investment in the water system that affect the fiscal budget. Such a situation is described in the case of Pakistan (Wambia, 2000), where the central government has to subsidize the budgets of the irrigation departments. Morocco is another case (Diao and Roe, 2000) where the public budget used to be the sole source of funding of water services provided mainly by irrigation districts. The Republic of Yemen case (Ward, 2000), in which macroeconomic measures accompanied the water reforms, provides a good example of the importance of having a wide-ranging agenda for reform.

Institutions and Reform

During both the design and the implementation stages of a reform, the institutions that govern the sector have to be accounted for cautiously. As Bromley (2000) suggests, reforms must be understood as part of the property regimes in which water users, water suppliers, and regulators are embedded. Existing bureaucracies have to be acknowledged and also engaged in the reform process, as has been the case in Brazil (Azevedo and Asad, 2000), where the various interest groups play a major role in both the design and the implementation stages of the reform.

The power system that comprises political parties, electoral systems, interest groups, and the dissemination of information has proven important in planning and implementing water reforms. Tsur (2000) suggests that a social cost is associated with asymmetry of information that can affect power relations. As a result, a pricing reform, for example, can produce solutions that are sub-optimal, that is, of a second-best type.

18 This section is based largely on country case studies reported and reviewed in Dinar A. (2000), that provide the empirical basis for the analysis in this section.

Another aspect of governance is the structure of the electoral system that provides support for or opposition to the proposed reform. The voting systems in water districts (McCann and Zilberman, 2000) provide a good explanation for the differences in water pricing implementation levels. Here we can also draw on Milner (1997), from a reform not related to water, who compares the process of establishment of the Trade Liberalization and NAFTA in Mexico and the US in 1989-1993. Milner's conclusion is that President Bush had a harder time in the US than President Salinas in Mexico in negotiating domestically and ratifying the agreement. While Salinas was able to move forward faster because his party controlled a large majority of the legislation and he needed only a majority vote from his Senate for ratification, Bush has much more difficult task caused by a divided executive-legislative control because the US Congress was controlled by the opposition party (Milner 1997: 208).

Support for and Opposition to Reform

Because reforms change the status quo, one can expect both support for and opposition to reform agendas by various affected groups. Water institutional reforms generate active involvement by various interest groups that may be affected directly or indirectly. In some cases, as described by Hewitt (2000), the implementing agency may not have a reform agenda that coincides with that of the government, which initiates the reform. For example, stakeholder analysis by Strand (2000) of the parties involved in a proposed pricing reform for Honduras' Capital City Tegucigalpa, shows that the public agency (SANAA) in charge of water supply to the city would be a major opponent to the reform, mainly seeking continued power of water administration. In the particular case of Tegucigalpa, external pressure, by International development agencies was the main support for the proposed reform, and apparently was not sufficient. Additional support from domestic political powers such as the President, and relevant Government Ministries, and pulling SANAA and its employees towards support in the reform, would likely help moving the reform forward. A similar situation is described in the case of Pakistan. Wambia (2000) analyzed instances in which certain agencies and ministries within the government that administered the reform opposed it because some reform outcomes might affect them. The ministry of Irrigation in Pakistan and its provincial offices were strong opponents to the reform process of the water sector in the country. Part of the reform included transfer of rights and power from the Irrigation Departments to Area Boards, taking a vast amount of rent out of the hands of Provincial Irrigation Departments. In the specific case of Pakistan, the approach that has been used prioritized the reform set into subsets, each with likely achievements, and implementation costs. The overall reform achievement is considered to be a third-best compared with implementation of the full set of reforms. However, under the conditions in Pakistan, this was the feasible route and phases of implementation.¹⁹

¹⁹ In the mean time, with the Military regime in power in Pakistan, priorities have changed and certain reforms have been put on hold.

The reform process frequently involves the creation of temporary coalitions by previously rival groups (Williamson 1994). In other cases, groups that support or oppose the reform early in the process may change their positions later in the process. Hall (2000) describes such situation in the case of rate reform in Metropolitan Los Angeles.

Compensation

A major component of the reform agenda is the existence of a mechanism that addresses negative impacts of the reform on various sectors, or that allows a fair share of the reform outcome to be allocated to powerless groups. As Haggard and Webb (1996), and Williamson (1994) suggested, adequate compensation mechanisms are an important part of a reform. In the case of water pricing reforms for example, several groups, such as the poor, or the environment, may need more attention. Boland and Whittington (2000), Strand (2000), and Van Humbeeck (2000) address the importance of adequate attention to the poor, by accommodating their basic needs, as was suggested earlier, by appropriately adjusting the first slab of the tariff structure.

International Influence on Domestic Reform Processes

International influence may be critical in the reform design and in the implementation process. Such influence may take the form of pressure to comply with a structure imposed by an international development agency as part of a large investment project. It can also take the form of incentives that come from regional cooperation through a regional trade agreement.

Loan conditionality. These are common features in structural adjustment projects that enhance price reforms in various sectors (for example, agricultural pricing policies as described in Krueger, Schiff, and Valdes 1991). Other types of conditionality can be found in big national water resource projects that include large components of institutional or pricing reforms, as was the case in Pakistan (Wambia, 2000) and Mexico (Kemper and Olson, 2000).

Trade and other regional agreements. Although not yet common or widely used in the water sector, several trade agreements that affect the agriculture sector may impose the restructuring of a price system in one country as part of a condition for that country to join the regional agreement. An example of such regional pressure is the recent initiative in Europe, known as the European Water Framework Directive. This is a legislative piece that will guide European water policies in the coming decade. Water pricing reforms, as part of that directive, are expected to follow common rules that the member countries agreed upon. In the specific case of the European Union, water-related economic dependencies (agriculture) and likely water-related environmental externalities are a driving force behind that regional agreements.

Reforms and Cooperation Experiences in Various Int'l Basins

Both conflict and cooperation combine a mix of economic and political impetus. Some scholars see conflicts to be the hallmark of the social interaction, and cooperation to be rare; others believe that relations between various interest groups resembles a variety of rules, norms, and a wide spectrum of political interest, all of which lead to cooperative ambience (Stein, 1990). Analyses of conflicts situations and cooperative solutions suggest that the general observations made by Stein (1990) hold also for the case of water, which is a source for conflict, but also a good reason for cooperation.

Sharing scarce water resources has taken a variety of forms. Starting with full cooperation and ending with full-scale conflict there is always the acute question of 'why a conflict' and 'how to enhance cooperation'. Sharing of water resources is a global problem, where international river and lake basins comprise nearly 50 percent of the world's continental land area (United Nations, 1978)²⁰. In Africa, Asia, and South America, this proportion rises to at least 60 percent (Barrett, 1994). Therefore, water sharing in international basins affect a vast majority of the world population.

The economic and political burden of unresolved international water conflicts is very significant. Economic development of river basins are delayed or stopped, short- and long-term damages to parties occur as a result of a unilateral action taken by another party, and additional indirect social costs may also be the result of such conflicts.

According to Krutilla (1969) coordinated development of international water brings results for the cooperating parties, which are in some sense superior to those which each could have achieved acting unilaterally. Cooperative participation in design and scale, and mutually planned sharing of costs and attendant benefits, are likely to lead to more effective exploitation of the river's potential in such an undertaking than if each party were to take an independent course of action, ignoring off-site effects. In general, where interdependencies exist, pooling the resource potential of an entire river system offers a wider range of technically feasible alternatives, and by avoiding duplication, an opportunity to select the most economical combination of sites and measures for attaining mutually desired objectives.

However, cooperation over shared water resources not always proceeded smoothly and in some cases is not materialized. Failure to cooperate is usually explained by (a) technical complexity of the cooperative project, (b) ill defined rights and responsibilities of each riparian, (c) existence of differing goals that can not be represented by a simple balance of costs and gains to the riparians concerned, (d) existence of wider considerations among the riparians and other stake holders, (e)

20 For an updated classification of international river basins see Wolf et al. (1999).

asymmetric information, and (f) enforcement limitation (points e and f from Just and Netanyahu, 1998). Additional elaboration on existing conflicts and reasons for cooperation of several cases of Middle East River Basins (Jordan, Euphrates, Nile) are analyzed in Scheumann and Schiffler (1998).

Although water-sharing conflicts are very common, there is a large number of cases (probably surpassing the number of conflicts) where cooperative solutions were found. Some times cooperation is established only between a subset of the riparians. A partial list includes one case involving twelve of the 15 riparian countries (Danube), three cases of nine riparians (Niger, Nile, Congo), three of seven riparians (Zambezi, Amazon, Rhine), four of six riparians (Chad, Volta, Ganges-Brahmaputra, Mekong) two of five (La Plata, Elbe), nine of four riparians, thirty of three and at least 148 of two, (Source: Panel of Experts on the Legal and Institutional Aspects of International Water Resources Development (1975, quoted by Barrett on page 2, Annex VII).

According to Just and Netanyahu (1998: 3), "... in practice, multilateral agreements on the management of non-trivial trans-boundary watercourses including riparian countries are a rare exception rather than the rule." After reviewing the various problems encountered in international river basin cooperation, Just and Netanyahu (1998) suggest that in cases with economic externalities (where one riparian's action affects another or other riparians' outcome—such as upstream-downstream pollution), due to the relatively high transaction costs, the choice of partial group of riparians rather than the entire group of riparians, may be optimal.

Presently, some international river basins are effectively jointly-managed. To what extent regional cooperation in managing international waters can lead to a better water situation is a serious question. The answer to this question depends on the potential opportunities embodied in cooperation and collaboration *vis à vis* water development and management, and other related regional issues of interest to the countries.

What is becoming increasingly clear as patterns of international water conflict begin to emerge is that a variety of factors tend to preclude cooperative management within basins. (Here we use the term cooperative management also to address the resolution of conflicts, which need a certain degree of cooperation.) These factors may include unequal power and hostile political relations between riparians, or an especially large number of riparian states (Bingham et al. 1994; Dinar S., 2000).

Operational Framework for International Freshwater Conflict and Cooperation

The search for a framework and an operational way to involve the parties in a process, seeking a stable agreement over international water issues, includes several aspects. These aspects have been analyzed in the negotiation and cooperation literature, and in conjunction with the notions of

justice, stability, and fairness (e.g., Hipel, 1976; Kilgour and Dinar A., 2000; and Just and Netanyahu, 1998). We will be focusing on several general important aspects that will also be demonstrated by examples.

Various outcomes can become more attractive as the scope of the issues is widened ('expanding the cake') and as the number of the parties increase (Riaffa, 1982). The assumption that the more riparians involved renders the management of conflicts difficult, raises the question about the accord. The issues at stake are not always tangible, and the need by the parties for the recognition of rights, in principle, are often of a symbolic nature and are influenced by cultural patterns or previous historic experiences. In the case of the water agreement between Jordan and Israel (Hadaddin, 2000; Haddadin, 2001) The long 'unofficial' history of cooperation in the management of the Jordan River Basin contributed to the successful completion of the water agreement of 1994. Another principle that was also used in the case of the Jordan, is the 'Linkage' principle, that is, linking the water issue to other issues that the parties are interested in solving. In the case of the Jordan River Basin, water was one issue in a wider agenda of the piece agreement between The Jordan Hashemite Kingdom and Israel (Haddadin, 2000).

Political considerations are not ignored as constraining variables, but during the problem-solving process the parties should act from a situation of symmetry. Force demonstration, or veto by one participant is sufficient to paralyze the process, but the expectations of the other participants generates an atmosphere that is often conducive to the realization by the opponent to refrain from using veto power. This usually facilitates the emphasis on agreement on areas of interest. The history of India-Bangladesh Ganges (Nishat and Faisal, 2000) negotiation in the last 30 years was full with such force demonstration, which stalled the process many times.

If the parties bring their own solutions to the negotiating table, and even if the joint fact-finding and analysis have provided a good documentary background from other cases and from their own past experience, it is expected that through the particular nature of the dynamics of problem solving, the participants become members of the epistemic community able to invent and develop new shared solutions. The India-Bangladesh Ganges agreement of 1997 (Nishat and Faisal, 2000) is used again as a good example to the role of a Joint Rivers Commission, charged with management of technical aspects of water sharing, while negotiations at the political level continue. The Joint Rivers Commission brought up many technical issues for consideration by the political level, many of which were adopted and advanced the process.

In the case of water resources there are several aspects that need to be further addressed in the process:

Desegregation of the issues at stake into relevant categories or baskets.

The introduction of many baskets to which the sides attach different values may be seen as more complex but at the same time opens up more opportunities for trade-off. This point is exactly parallel to the ‘expanding-the cake’ idea that was introduced earlier. The only difference is that desegregation expands the cake by ‘artificially’ splitting the agreed upon issues rather than broadening the set of issues.

Recognition of seasonal and yearly fluctuations of water as a factor of instability

This calls for addressing technologically sound solutions, such as data sharing, to alleviate the fears for the basic needs of the parties in the treaty. The India-Bangladesh Ganges Treaty of 1997 is exactly designed to address such instability (Nishat and Faisal, 2000).

Economic efficiency and flexibility of water allocation

Because of the multi-dimensional nature of water, only a comprehensive cooperation arrangement will yield a sustainable agreement. If the agreement fails to demonstrate a clear and sustainable benefit to any of the riparians, under various state of nature, it will not be efficient and some riparians may ‘defect’. The Jordan-Israel 1994 water treaty (Haddadin, 2000), for example, includes a very detailed allocation and compensation rules, leading to mutual economic efficiency, but failed to provide appropriate flexibility (during drought years, where flows are diminished) because they are quoted in absolute terms. The India-Bangladesh 1997 treaty, although criticized now for not being efficient economically, provides the water allocation flexibility as allocation rules are quoted in shares of the actual flow (Nishat and Faisal, 2000).

Stake holders

A broad range of directly and indirectly related stakeholders should be brought into the process. They may include: domestic (e.g., indigenous communities, local, provincial and national public and private actors); trans-national (e.g., riparian, regional and international, governmental and non-governmental actors). Again, we can refer to the process of reaching the Danube Environmental Action plan (Natchkov, 2000). The domestic and international dialogue/negotiations have been transparent, and inclusive, which is being referred to as the main reason for a successful outcome.

Implementation and enforcement

Under certain conditions, and mainly given the background and history of the conflict among the riparian states, different implementation schemes may be more effective. Here we give brief examples: Interim / permanent stages and enforcement mechanisms with third parties involvement ("neutral expert," each side appointing a negotiator to work with a mutually accepted mediator), special courts for arbitration, etc; Or, enforcement by the riparians themselves including monitoring activities; joint resource management mechanisms; regularization of tradable water rights and tribunals (e.g., the US-Canada International Joint Commission – LeMarquand, 1977); or enforcement by both, such as the participation of relevant institutions – riparian, regional, international – (e.g., the Mekong Committee – Radosevich, 1996; Browder, 2000); and others directly and indirectly involved parties. An interesting dynamic process of implementation can be seen in the Scheldt Belgium-Dutch River Basin agreement of 1993 (Actors involved: Flemish, Wallon, Brussels, Dutch and French Governments). Although the agreement was signed in 1993, mainly addressing water quality standards, a more comprehensive implementation agreement was developed – that included also linking additional issues directly and indirectly related. Final implementation of occurred in 1997 (Meijerink, 1999).

Recommendation and Prioritization for Policy Makers²¹

So far, we discussed various experiences with politics of both domestic water reforms and international conflict and cooperation. Some practical lessons are summarized in the following sections.

Conditions for Successful Domestic Reforms

Based both on theory and practice, several major factors have to be in place to ensure a successful reform outcome.

According to Cordova (1994:277): “A reform program will be successful if there is economic rationality in its design, political sensitivity in its implementation and close and constant attention to political-economic interactions and social-institutional factors [during its implementation], so as to determine in each case the dynamics to follow.”

The timing of a reform is also important. Two hypotheses (Williamson 1994) – the crisis hypothesis and the honeymoon hypothesis – are offered to account for the time factor in the reform

21 See also DSE (1998a, b) for additional aspects that include also the involvement of donor community.

implementation process. The crisis hypothesis suggests that public perception of a crisis is needed to create conditions under which it is politically possible to undertake the reform. The honeymoon hypothesis suggests that it is easier to implement a reform immediately after a government takes office.

Williamson and Haggard (1994) suggest additional factors to help implement successful reforms. These include the commitment of a strong government; the creation of an independent, dedicated, and professional reform implementation team; the use of the media to convey the reform messages; the use of alternative policy measures to allow for sustainable reform consequences; an efficient reform program leading to low transition costs; the implementation of safety nets for the poor and those who were ignored; and the introduction of compensation packages to those who may be hurt by the new policies.

Country water reforms should be launched after extensive public awareness campaigns. A certain level of capacity for all parties involved, is needed to be in place for implementation of reforms.²² This means that the implementation process should include also educational activities. Reformers should communicate a clear economic rationale, develop a broad agenda, adjust to institutional and political reality, and take account of traditional customs and social structures. Successful reform programs must include compensation mechanisms negotiated with stakeholders. Reformers should precisely identify their objectives. Reforms should be well prepared, because once they are implemented, they are hard to modify.

The implementing agency, which can be either an existing government unit, or ad-hoc agency, must be sensitive to political events when putting the reforms in place. The agency should package and sequence the reform components to minimize opposition. It should be aware of other political events, such as elections; seek external support; and mobilize supportive stakeholders as much as possible.

Int'l Cooperation

Several broad issues could be brought as a basis for international water conflicts and cooperation. They include: (1) institutional structure for managing potential conflicts, and (2) developing incentives for voluntary cooperation.

The lessons learned from past experience suggest that integrated international water management will be best implemented before conflict develops within a river basin. In doing so, river basin

22 Suggested by a reviewer and is much appreciated.

cooperative development plans will be more stable if quality and quantity issues, and surface- and ground water sources are linked.

Creating incentives for voluntary cooperation in an international river basin can be done either by identifying a broad set of issues of interest for all riparians, by ensuring an attractive outcome, or by providing trade-offs or linkages. The role of a third party in the process of resolving existing conflicts, or preventing conflicts from occurring is also crucial.

A list of rules of thumb (Bingham et al., 1994) for reducing the likelihood of conflicts and laying the basis for international river basin cooperation, in addition to the strategy outlined earlier, may include:

- Focusing on interests underlying each riparian's position;
- Sharing information;
- Developing strategies for joint fact finding (what-if scenarios and their effects on all riparians);
- Expanding the set of alternative development options;
- Preventing asymmetrical outcomes;
- Developing mechanisms for transparent and fair allocation of joint gains from cooperation, and;
- Fair / just setting of the entire procedure of conflict resolution and cooperation consideration.

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