Development *Alternatives,* Inc.

USAID

Water Management in the South Caucasus

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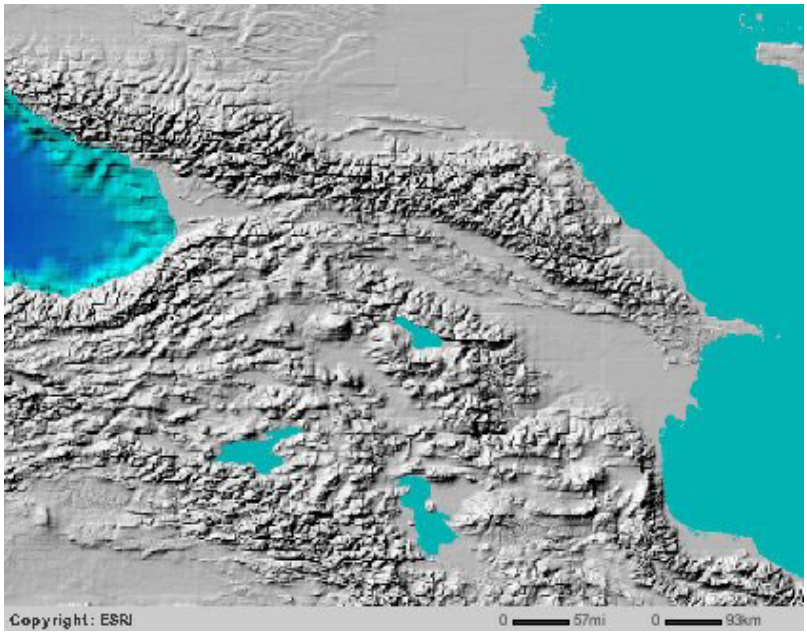

INTERNATIONAL EXPERIENCES IN WATER MANAGEMENT

Laws and Institutional Issues Affecting Water Management in the South Caucasus

Prepared for:
U.S. Agency for International Development
Mission for the South Caucasus

Prepared by:
Development Alternatives, Inc.
January 2002

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Development *Alternatives,* Inc.

Water Management in the South Caucasus

January 31, 2002

Mr. Peter Argo
Director
Office of Energy & Environment
U.S. Agency for International Development
20 Telavi Street, 5th Floor
Tblisi 380003 Georgia

Dear Mr. Argo,

We are pleased to provide to you with the attached report titled "International Experiences in Water Management" for the project activities conducted to date in Armenia, Azerbaijan, and Georgia as part of the Water Management in the South Caucasus Project.

The report is part of a series of activities for Laws and Institutional Issues Affecting Water Resource Management in the Kura-Aras River Basin that address legal and related policy and institutional conditions and experiences relevant to achieving the objectives of the Project.

This report summarizes some of the tasks completed as part of the Activity 5, Improved Legal Framework for Water Management in the Kura-Aras Basin. This report was prepared by Malcolm F. Baldwin, Environmental Law Specialist, based on the short-tern technical assistance and the support of the Water Advisors in each of the three countries. This report is intended to be a focal point of discussions with the local agencies with interest in this subject.

We are pleased to distribute this document to the interested parties in the region on behalf of USAID. Thank you for your assistance in support of this project.

Sincerely,

Paul C. Dreyer, PE
Chief of Party

Enclosure
cc: Dr. Michael Boyd, USAID/Armenia
Mr. William McKinney, USAID/Azerbaijan
Mr. Edwin Stains, DAI/Bethesda
Mr. Vahagn Tonoyan, DAI/Yerevan
Mr. Rafig Verdiyev, DAI/Baku
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TABLE OF CONTENTS

No.	Item	Page
1.	INTRODUCTION	2
2.	BREADTH OF HISTORIC EXPERIENCES	2
3.	EXPERIENCES OF DEVELOPMENT BANKS	2
4.	NATIONAL WATER MANAGEMENT ISSUES	3
5.	EXAMPLES OF LEGAL AND INSTITUTIONAL EXPERIENCES	4
5.1	Mexican Irrigation Management	5
5.2	Integrated Water Management in Sri Lanka	6
5.3	Watershed Management in the United States	6
5.4	Management Water Quality in the Chesapeake Bay	7
5.5	Institutional Strengthening of International Rhine Commission	7
5.6	Management Devolution in Indonesia	8
5.7	Multinational Management of the Danube River	8
6.	LESSONS FROM INTERNATIONAL EXPERIENCES	10
7.	OBSERVATIONS FOR THE KURA-ARAS RIVER BASIN	12

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INTERNATIONAL EXPERIENCES IN WATER MANAGEMENT

1. INTRODUCTION

This report was prepared by Malcolm F. Baldwin, an Environmental Law Specialist, as a consultant to Development Alternatives, Inc. (DAI) for the Water Management in the South Caucasus Project that is funded by the U.S. Agency for International Development (USAID). The report is part of a series of activities for Laws and Institutional Issues Affecting Water Resource Management in the Kura-Aras River Basin that address legal and related policy and institutional conditions and experiences relevant to achieving the objectives of the Project.

The intent of this activity is to help establish the context within which the Project operates, to help guide the legal and institutional inquiries and approach of the project's two pilot projects in the Alazani River Basin in Azerbaijan and Georgia, and the Khrami-Debed River Basin in Armenia and Georgia. It is also designed to help stakeholders as well as policy makers to begin laying the groundwork for any future water resource management-related actions and agreements that may be desirable.

Agreements might, for example, be required between key stakeholders within each country to establish effective water resource monitoring and information gathering, or bi-lateral information sharing agreements between Georgia-Armenia or Georgia-Azerbaijan. Ultimately, as with many other international river basins, broader and more inclusive agreements among the five affected countries may be needed.

This discussion provides information on experiences from around the world that highlight the progress and pitfalls affecting integrated water management. It cites approaches and examples that may provide ideas and context for grappling with the policy, legal, and institutional issues likely to arise in the course of the project's two pilot studies and certainly in any subsequent efforts to establish an action program for the Kura-Aras River Basin.

2. BREADTH OF HISTORIC EXPERIENCES

Historic examples of collective, catchment-based, integrated water management can be found in Europe, pre-Colombian America, Asia and South Asia (Sri Lanka) and the Middle East, many dating back well over a thousand years. These systems have been characterized as having several common features: infrastructure for hydraulic systems to balance water demand and supply; an established set of rules; and working understandings that the results upstream and downstream benefited everyone.

Today, with well over 200 river basins shared by two or more countries, we have well known examples of international integrated water management today on the rivers Danube, Nile, Mekong, Indus, and Rhine, and for the Aral Sea. These programs have often taken years, usually decades, of planning efforts to develop their different levels of effectiveness.

3. EXPERIENCES OF DEVELOPMENT BANKS

Recognizing the importance of these experiences, the World Bank, the Asian Development Bank, and the Inter-American Development Bank have each established water policies.[1] The banks, like other donors, seek to break the vicious circle that can prevail if economies do not grow, causing business and investment become more lawless, meaning that social benefits of the capitalist "hidden hand" fail

[1] These began with incorporation of the principles of the Dublin International Conference on Water and the Environment (1992), calling for integrated approaches, stakeholder (including particularly women's) participation, better policies and more emphasis on efficient and effective investments.

to materialize, leading to a disrupted social compact, which further discourages economic growth. Their common thesis: water management significantly affects the economic development potential of individuals, businesses, and communities through impacts on water supply, agriculture, energy, and public health. Hence the banks seek to balance water supply and demand, and "make water use economically productive, socially equitable, and environmentally sustainable."[2]

The development banks' approach, evolving from experience over the past decade, has been to resist trends that have worked in recent years to fragment water management. These forces are at work in the South Caucasus. They include loss of political and economic support for state planning efforts and for state regulatory and management institutions, and rapid population shifts into urban areas that stimulate narrow focus on urgent needs for water supply and pollution reduction.

4. NATIONAL WATER MANAGEMENT ISSUES

There are a host of lessons to be learned from the wide variety of international experiences in water management. No single example fits the needs of the Kura-Aras River Basin, but elements of each can be appropriate for helping to develop integrated water management approaches and techniques suited to the legal and institutional context of the South Caucasus.

At one level there are lessons to be learned concerning the evolution of legal and institutional approaches to integrated water management among downstream and upstream stakeholders. Issues of interest concern the institutional constraints that had to be overcome and the process followed or the influences that led to agreements among stakeholders regarding the kind of management structure to establish. At a very different level one can study the process by which international agreements are reached and the structure established among nations seeking to establish integrated water management. This analysis can focus on what parties did and when to establish international forums for discussion, to establish agreements, and eventually to form a water management regime.

The examples summarized in this report focus particularly on the experiences within a single country where integrated water management needed to overcome institutional constraints of government agencies and reconciliation of competing upstream and downstream users. This is done for several reasons:

- At this stage in the process of addressing the Kura-Aras River Basin needs, it appears that bilateral international agreements, not to speak of trilateral agreements, for establishing a water management regime concerned with either water quality or allocation are likely to require considerable time to evolve.

- The bilateral agreements to cooperate on environmental and resource protection, however, are already in place for Georgia with Armenia and Georgia with Azerbaijan, and there appears to be no legal barrier to proceeding with bilateral cooperation on basic information sharing and monitoring.

- Successful international water agreements depend on the ability of agencies within each country to foster better management of water resources. Their capabilities depend on the national commitment to the management of the water sector and on the strength of consensus and cooperation among key stakeholders within each country.[3] Experiences to avoid are

[2] Alaerts, p. 4.

[3] Making the same point, at the Southern African Development Community (SADC)-European Union Conference on the Management of Shared River Basins, in Maseru, Lesotho, in 1997, the Conference recommended that: "[t]he political commitment to the water sector should be reflected in SADC governments allocating a fixed minimum of their national

international agreements on water management, such as water allocation agreements among nations that "last only until the first drought, when reduced flow denies some their full share."[4]

- Effective water resource management requires that within each country there is a need to understand the behavior of key institutions, the institutional constraints affecting water resource management, and ways to deal with them. These institutional issues are remarkably similar around the world, whether the water resource lies within or across national boundaries. Problems arising between upstream and downstream users are also similar. Cooperation has been most integrated and advanced at the national levels of water management.

- However, much can be learned, *and should in future be given more focus*, from the process by which international water agreements are developed. Countries in the Southern Caucasus can learn a good deal from international agreement experiences elsewhere. Most international water management regimes that are now in place are narrowly focused, primarily on navigation and/or pollution, like that for the Rhine River. However, there are important and growing exceptions. The intergovernmental Mekong River Commission representing the four lower Mekong Basin states of Cambodia, Laos, Thailand and Vietnam is at the early stages of integrated water management.[5] The Danube River, however, is a particularly appropriate example for South Caucasus project, and this report summarizes the structure established for its ongoing efforts to establish integrated water management.

The key point to recognize is that integrated water management is legally and institutionally difficult and ambitious even within a single country. Complexities arise where rivers cross provincial or state jurisdictions. For example, integrated water management programs in China and the United States, where multiple jurisdictions are involved, have required years of effort and often environmental or economic crises, to establish themselves. However, significant institutional and legal difficulties can arise even within a single state or province. This is because, despite the "win-win" benefits of and needs for integrated water management, integrated water management suffers from fundamental institutional constraints that discourage self-enforceable incentives for sound management. Hence in many places in dire need, such as India, the Philippines, Indonesia, and parts of China, among others, underlying institutional behavior constrains integrated water management.[6]

5. EXAMPLES OF LEGAL AND INSTITUTIONAL EXPERIENCES

As several of the examples below illustrate, success in integrated water management requires recognition of the underlying institutional behavior toward natural resource, including water, management, and what is necessary and possible legally and institutionally in developing integrated water management approaches that will over come them. Powerful, frequently predominant disincentives discourage sound long-term environmental or economic development practices by government agency.

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budgets for the sector, [and] SADC should design appropriate institutional frameworks for integrated water resources management at both national and regional levels." http://www.sadcwscu.org.ls/programme/rtc/rtc1.htm, p. 9.

[4] Kilgour, M, and Dinar, A, *Summary Findings, Policy Research Working Paper No. 1474: Are Staqble Agreements for Sharing International River Waters Now Possible,* The World Bank, Washington, D.C., June 1995.

[5] The World Bank is supporting a seven-year project begun in 2000 to bring the four downstream nations together for improved and sustainable basin management and to support economic growth through irrigation, hydropower, navigation, water supply and tourism. The Mekong River Commission's Strategic Plan calls for "a shift of MRC focus away from managing specific projects to managing water and natural resources in the Basin." Lycos Environment News Service, http://ens.lycos.com/ens/feb2000/2000L-02-14-05.html.

[6] Alaerts, G.J., *Institutions for River Basin Management: the Role of External Support Agencies (International Donor's) in Developing Cooperative Arrangements,* The World Bank, Washington, D.C., 2001. Much of the information and many of the insights for this section are derived from or stimulated by this excellent article, included on the World Bank website. (www.worldbank.org)

5.1 Mexican Irrigation Management

A good example of the institutional problem is Mexico's experience with irrigation policies and practices over the past century. It is one of nine case studies conducted and analyzed by William Ascher in his seminal book on natural resource management in developing countries.[7]

The rural water management problem that arose in Mexico involves combinations of water depletion, over-investment in large-scale irrigation systems, and deterioration of irrigation systems. Underpricing of water has led to over use that has depleted rivers, aquifers and lakes and damaged soils from water logging and salinity. The conveyance efficiency of the irrigation system is about 30 percent versus 50 to 60 percent for comparable systems in California.[8]

Ascher explains that these results have occurred not because government policy makers and managers were technically ignorant, nor simply corrupt and greedy, but because other policy and institutional incentives predominated over decisions favorable to sustainable water management. After the Mexican Revolution the government encouraged distribution of subsidized water to the undercapitalized communal groupings (*ejidos*) and small farms. By 1940, the *ejidos* controlled some 60 percent of irrigated land. The government provided cheap water on an "ability to pay" principle. Subsidization became an entrenched government policy that soon applied to large farmers as well. Despite internal reports in 1960 criticizing the lack of revenue that was harming investment in operation and maintenance, subsidies persisted as part of overall efforts to promote agriculture. This was true even though higher fees would have provided sustainable operation and maintenance with minimal impact on the production costs of large or even small farmers. By 1980 subsidies and deterioration of irrigation systems meant that only 15 to 25 percent recovery of operating costs, causing the ministry to reduce maintenance budgets, which further damaged the system.

The resulting crisis led to reform by the end of the 1980s. Reform involved creation of water user groups like those being created in the South Caucasus. The government decided that rather than simply raising water prices it would adopt "[t]he far more clever strategy… to transfer irrigation districts over to user groups, who gained a large degree of control just as they had to take on more responsibility for financing water costs."[9] While the transfer process was slow, due to needs of water districts for training and financial accountability capabilities, even with partial transfer to the 80 districts water users covered 57 percent of operation and maintenance costs in 1991, and up to 80 percent by 1994. Notably, along with the user groups, the government changed the legal status of the *ejidas* and gave members rights to sell land and use it as collateral, creating incentives for better land management and water use.

Reforms came with crises, when there was no choice but to reform, and when the lessons of big government's mismanagement of natural resources were sinking in around the world.

Why had these lessons been so slow to learn? First, irrigation costs in Mexico were high in part because the government agencies favored large dams and canals over smaller wells, tanks and pond systems. The former, of course, required major government involvement that was favored for several reasons: it offered opportunities for government to control who received the benefits – large farms or the *ejidas*; it provided opportunities for government to obtain political credit for providing irrigation benefits; it provided employment opportunities, with their political benefits; and it created dramatic symbols of development progress.

Second, irrigation policy and management was wrested in the control of institutions with distinctly different priorities than long-term agricultural productivity. The various agencies put in charge of

[7] Asher, William, *Why Governments Waste Natural Resources: Policy Failures in Developing Countries,* The Johns Hopkins University Press, Baltimore, 1999.
[8] Ascher, p. 130
[9] Ascher, p. 137

irrigation had no incentives to collect revenues for the water provided. Having no discretion over the spending for irrigation they had no incentives to collect fees that would pay for upkeep. Moreover, credit banks and the ministries of agriculture were motivated to do what they could to increase farmer incomes, not to make farmers pay more. Finally, irrigation policy and management was for years in the hands of a major construction-oriented agency, not of the agriculture ministry.

With these insights into government and institutional behavior in mind, examples below illustrate the diversity of models for basin-wide management, estimated by Alaerts to cover some 20 different types among the several hundred basin agencies operating worldwide.[10] They illustrate in particular the importance of institutional structures and getting the incentives right for sustainable management.

5.2 Integrated Water Management in Sri Lanka.

The Mahaweli River, Sri Lanka's largest (though small by international standards), has had billions of donor dollars invested in hydro electric dams, and years of effort have gone into development of effective upstream catchment area management. Despite successes – Sri Lanka gets about 60 percent of its power from the Mahaweli dams -- efforts have been far more difficult to achieve than one would expect from within a single small country where the government owns in some form 80 percent of the land. Actions have been led by the Mahaweli Development Authority, which has statutory independence, a clear and focused objective, and an increasingly market-oriented management approach that makes it very different from other government agencies. Constraints on progress in catchment management have largely been due to lack of ownership incentives for farmers to invest in and comply with best practices (especially on steep slopes), ongoing lack of effective extension services for technical assistance to farmers, and overlapping and confusing legal mandates of government agencies responsible for land and water use in the Mahaweli River Basin. On the other hand, Sri Lanka's management efforts have incorporated truly integrated water management objectives and efforts to engage stakeholders in planning and decision-making. Sri Lanka's environmental impact assessment procedures for large investment projects, for example, include a fairly high level of public participation.

5.3 Watershed Management in the United States

Integrated water management in the United States is most well known and developed under the Tennessee Valley Authority. For the Tennessee Valley in the 1930s the "no action" alternative of regular and costly flooding was widely recognized as economically and socially costly, and the economic potential of management for power and, later, recreation, was attractive. Moreover, strong federal leadership and investment in river basin development was politically acceptable in the depression era and through the 1950s. Today, however, the TVA experiment remains unique in the United States for its breadth, dominant federal structure, and its pervasive regional impact.[11] With the advent of the Reagan Administration in 1981all Federal River Basin Commissions were abolished. In today's political climate, dominated by more "market based" and decentralized management approaches, two other United States examples, the Everglades (water allocation) and the Chesapeake Bay (water pollution), illustrate the legal and institutional complexities of integrated water management.

5.4 Managing Water Quality in the Chesapeake Bay

Protection of the Chesapeake Bay, the largest estuary in the United States, from pollution became a regional priority for a number of Middle Atlantic states and the federal government by the mid 1970s. Fishing and recreation stakeholders, active NGOs, and economic academics had steadily highlighted

[10] Alaerts, p. 9

[11] The Bonneville Power Authority on the Colombia River is the other, although less comprehensive and large, example, but there again the impetus for river basin management was the development of electric power resources. Less comprehensive, but significant, have been the state-federal agreements for allocation and use of the Colorado River among upstream and downstream states, ratified and established by U.S. Supreme Court, without whose presence no agreement would have been possible. Similarly, the U.S. Supreme Court took the leading role in establishing the Delaware River Basin Commission.

its immense economic value.[12] Protection by riparian states and the federal government against rising levels of industrial and domestic pollution proved inadequate because of high levels of nutrients runoff from farm into the distant tributaries of the Bay. The Chesapeake Bay watershed spans parts of six states and the District of Colombia, covering 64,000 square miles. A Chesapeake Bay Agreement was signed in 1983 by the states of Pennsylvania, Maryland, Virginia, the U.S. Environmental Protection Agency, and the District of Colombia with amendments since.

Today the Chesapeake Bay's Executive Council, made up of State Governors, the D.C. mayor and the EPA Administrator, meet annually to establish policies and directions for restoring and protecting the Bay's resources, most notably by reducing nutrients by 40 percent through a program of tributary strategies that attack nutrients at their upstream sources.[13] An agreement among four states and the District of Colombia addresses pollution control and waste treatment systems along the Potomac River, just one of the tributaries. Other efforts to manage the Bay's water resources come from agreements between the riparian states of Maryland and Virginia, which both directly benefit from the Bay. They have various agreements to protect fisheries, monitor pollution, and to restrict shoreline development. A strong citizen environmental organization, the Chesapeake Bay Foundation, has been a critical element in successfully developing public awareness programs, and it has led and coordinated efforts with state and federal agencies for citizens to conduct regular pollution monitoring of streams entering the Bay. Industry associations have been active in pollution reduction, spurred by the federal government's public disclosure of their toxic releases into the Bay (the Toxic Release Inventory program).

The federal government has provided essential critical coordination, analyses of watershed data and often behind-the-scenes leadership under the Environmental Protection Administration's Chesapeake Bay program. Fifteen federal agencies have formal agreements with EPA to support the program through a Federal Agencies Committee that meets regularly to coordinate federal actions and support EPA. Modest federal funding has helped broker agreements among the upstream states (and the District of Colombia) affecting the Bay's resources and in expanding the reach of the awareness program particularly to the upstream states whose farms and communities substantially affect the Bay's pollution levels but do not directly benefit from the Bay's resources. Currently nutrients come from farms, septic and wastewater treatment plant discharges. A vexing problem is how to establish incentives for upstream residents to curb this pollution when they fail to receive direct benefits from a healthy Bay.[14]

5.5 Institutional Strengthening of the International Rhine Commission[15]

Covering a watershed of some 200,000 square kilometers, the Rhine is the largest West European river with nine riparian states. It provides significant water for drinking, irrigation, transportation, industrial, hydroelectric, and recreational functions. The evolution of its management authority, primarily for pollution control, provides a helpful chronology of how key institutional barriers were overcome. That began with initiation of the International Rhine Commission (IRC) in 1950, which provided a forum for user nations at least to communicate concerns about growing downstream (Dutch affecting) pollution problems. In the early 1950s the IRC began to inventory pollution problems, establish an international monitoring network, publish results annually, and analyze trend data. Only by 1963, however, and the Treaty of Bern, was the IRC converted from a research organization to one empowered as a forum to discuss problems and propose international agreements on pollution regulations. Its structure grew, a three-year President was appointed, and annual plenary

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[12] Commercial shellfish and finfish harvests alone were nearly $196 million in 1997. http://www.Chessapeakebay.net/econintr.htm, the website of the Chesapeake Bay Program.

[13] The Chesapeake 2000 agreement guides the Bay Program partnership through 2010 by outlining 93 commitments to a wide range of integrated water management actions. (See basic website above.)

[14] It is the classic upstream-downstream problem that was sought to be solved in the 1998 Syr Darya River Basin agreement for Kyrgyzstan to withhold water in winter and release it in summer in return for coal from Kazakhstan and natural gas from Uzbekistan.

[15] This section summarizes Dieperink, C., *International Regime Development: Lessons from the Rhine Catchment Area,* TDRI Quarterly Review, Vol. 12 No. 3, September 1997, pp 27-35, www.info.tdri.or.th/library/quarterly/tet/s97_4.htm

sessions were established for delegates from all riparian states. By 1972 the Dutch, the energetic down stream nation most engaged in empowering the IRC, obtained approval for ministerial level conferences on Rhine pollution, which have been held periodically since 1972.

Today perhaps the most vexing institutional conflict concerns the requirement for unanimity versus the Dutch-preferred majority rule for approving recommendations. Nevertheless, in its narrowly defined role, and with policies that encourage active involvement of highly professional NGOs, the IRC has established action programs that harmonize pollution reduction policies and reduced pollution concentrations of key pollutants and reductions in heavy metals, with hopeful efforts to restore indigenous salmon to the Rhine.

5.6 Management Devolution in Indonesia

Alaerts discusses a contrasting integrated water management experience that became the administrative structures of the river basin management system established in 1974 on the Citarum river near Jakarta. A river basin authority was established that soon became poor and under the financial and administrative control of the central government's Ministry of Public Works. The basin authority leased major irrigation, water supply, and other infrastructure investments and recovered at least some costs from water supply sales to cities, industries, and for hydropower. Since 1999, however, water management has become less centralized, with the devolution of authority and finance to local governments, farmer water user associations established to pay for water use, introduction of water pollution charges, and greater supervisory roles over management by stakeholder associations. A continuing complication is the autonomous status of the hydroelectric dams.[16]

5.7 Multinational Management of the Danube River

The Danube, Europe's second longest river and unusual in flowing west to east like the Kura-Aras, rises in the Black Forest of Germany and empties into the Black Sea through a Romanian delta significant for its vast wetlands. Its watershed drains 817,000 square kilometers that includes all of Hungary, nearly all of Austria, Romania, Slovenia, Slovakia, and Serbia, much of Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Moldova, parts of Germany and Ukraine. Some 60 of its 300 tributaries are navigable.

Problems: Today the Danube provides invaluable navigational, hydroelectric, agricultural, ecological and aesthetic assets, but it suffers from rising levels of nitrate, ammonia, and heavy metals that threaten water supplies, deteriorating and in some places irretrievably contaminated ground water, damaged ecosystems and particularly wetlands, severe eutrophication of lakes, accelerated runoff and erosion harming reservoirs, and degradation of Black Sea ecosystems. Most damage comes from untreated municipal waste (less than half the lower and middle Danube households are connected to sewerage systems, a third of municipal waste is untreated), dirty and often toxic industries built and operated under a careless socialist system, agricultural practices, actions, and reduced wetlands and forest areas.

International agreements: Evolution of the present regime for international water management reflects over a hundred years of international engagement. As early 1856, in the Treaty of Paris that settled the Crimean War, a European Commission was established to control the delta, and the Treaty of Versailles confirmed it in 1919. Abolished by Nazi Germany during World War II, a new Danube Commission was established by the Communist-bloc nations after the war. After the war there were a series of navigation agreements within the Soviet bloc, hydroelectric agreements between Germany and Austria, and Soviet bloc fishing agreements in the 1950s. A declaration against Danube River pollution (Bucharest-Declaration) was signed by a number of countries in 1985. But in 199, after the breakup of the Soviet Union, Austria and Hungary led strong international efforts to establish a protection regime for the river and its watershed. When the UN/Economic Commission for Europe's

[16] Alaerts, p. 8.

sponsored Convention on the Protection and Use of Transboundary Water courses and International Lakes was signed in Helsinki in 1992 it became a mandate and framework (to be considered the Framework Convention) for a new Danube River Protection Convention

The Danube River Protection Convention (DRPC): The DRPC (formally the Convention on Cooperation for the Protection and Sustainable Use of the Danube River) was signed in Sophia in June 1994. Adopted by the eleven countries in the river basin, the DRPC entered into force in October 1998.[17] The scope and objectives of the DRPC are broad. It calls on Parties to take “"all appropriate legal, administrative and technical measures to at least maintain and improve the current environment and water quality conditions of the Danube River and of the waters in its catchment area and to prevent and reduce as far as possible adverse impacts and changes occurring or likely to be caused." [18] Like the “Framework Convention” (which has not been accepted by any state in the South Caucasus) it adopts the polluter pays and cautionary principles.[19] It seeks to improve and harmonize legal provisions concerning water discharge, hazardous substances, and input of nutrients and pesticides from non-point sources. It specifically embraces protection measures to ensure ground as well as surface water quality and quantity. It calls on Contracting Parties to set emission limits for industrial sectors and application of “best available techniques,” waste discharges governed by permits, national and international levels of EIA.

The DRPC has provisions for emission inventories, monitoring programs, reporting, consultations among parties, information exchange (monitoring, regulations, accidents, best available technique experience, river conditions), information protection, public information, research and development, and mutual assistance. The Convention established the International Commission for the Protection of the Danube River (ICPDR) to implement its objectives and requirements, help settle disputes.[20]

Key legal and institutional tools of the DRPC are the provisions of the Convention itself and the leadership of the ICPDR in developing and executing its Joint Action Program, which contains the technical development and projects for priority actions by the parties. The Joint Action Program reflects the Strategic Action Plan developed by the ICPDR and approved by the Parties (last in 1994).

Guidance to national governments and root causes to address: The legal framework for setting priorities and measuring progress is the Common Platform for the Development of National Policies and Actions for Pollution Reduction. That document provides a comprehensive guide to national governments seeking to develop and justify a protection and management program. Particularly relevant to the countries in the South Caucasus is the analysis of root causes within each of the transition countries for the pollution problems in the Danube. Summarizing from the list and discussion, the key factors are:

- Socio-political transition reforms and general economic recession, including the policies of “self-sufficiency at any cost,”
- Unclear land ownership, where privatization of land use may have occurred without ownership rights,
- Incomplete legislation, regulations, standards and norms, leaving weak regulatory regimes that increased environmental problems and caused conflicting demands for water,
- Low public ecological awareness, education and training, particularly in the middle and lower Danube regions,

[17] *See*, http://www.internationalwaterlaw.org/RegionalDocs/Danube1994.htm
[18] Article 2.2.
[19] The “polluter pays” principle requires the polluter to bear the costs of pollution prevention, control and reduction, and the precautionary principle established in this Convention (slightly different from the Caspian Convention) requires that action to prevent or reduce water-related diseases not await fully-proved scientific findings that it resulted from a potential contributor.
[20] Composition, structure, leadership, procedures and obligations of the ICPDR are provided for in the DRPC Annex IV.

- Lack of financial sustainability of institutions, for which implementation of "full-cost pricing of natural resources and self-financing of regulatory institutions represent the only options" for sustainable development.

- Absence of a national strategy for integrated water management,

- Lack of economic instruments and incentives for improved management and treatment (or avoidance) of wastes that make application of "polluter pay" problematic,

- Lack of master plans for water resources management at the sub-basin level that makes investment priorities and responsibilities for action unclear,

- Inefficient environmental policy enforcement and compliance, which obviously discourages investment in clean technology and abatement measures,

- War and displacement of populations in the region, notably in former Yugoslavia.[21]

The breadth of the effort to establish integrated water management in the Danube River Basin is matched by the complex array of programs, strategies, and structures involved – understandably more difficult to manage given the number of nations and the vast difference in income (and GNP per capita) levels. (For example, Germany versus Bosnia.)

For the countries in the South Caucasus perhaps much can be learned from the differences between European and United States approaches to cross-boundary water basin procedural and structural approaches to integrated water management.

6. INSTITUTIONAL LESSONS FROM INTERNATIONAL EXPERIENCES

From these kinds of international experiences in water resource management the lessons that appear to be most relevant and appropriate to the three countries of the South Caucasus include the following:

- *Impetus for water management reform does not evolve inevitably from growing understanding of the benefits of such reform but from some other precipitating event or actor.*
    - This might be a pollution crisis or scare with energetic downstream populations or economic resources at stake (like the Rhine River, or the Chesapeake Bay), an allocation crisis or widely perceived environmental and resource problem affecting a critical resource (the Aral Sea, the Danube, or the Florida Everglades), or a significant political shift energized for reform (the Tennessee Valley Authority) backed by engagement of donors with substantial funds (the Mahaweli development). In most cases the most potent sustaining impetus for developing an integrated water management structure comes largely from downstream users facing urgent needs for new allocation, pollution management, and other related reforms.
- *Whatever the impetus for integrated water management, action depends on vastly increasing the information on the physical, political, and economic aspects of the basin.*
    - Gathering and sharing basic water quality and quantity information among stakeholder interests and users is an essential step, as this project well recognizes, to establishing in country and international understanding of the needs for integrated water management.

[21] Common Platform for the Development of National Policies and Actions for Pollution Reduction May 2000. http://www.icpdr.org/pls/danubis/DANUBIS.navigator.

- But international experiences also highlight the needs for analyses and widespread understanding of the competing government policies that may be at work in the basin within each country. Institutional behaviors and potential constraints that may need to be overcome even to share data and to develop national consensus on needs for investment, allocation systems or pollution standards, and coordination among local and central government agencies. Effective international cooperation will be far easier to develop if, within each country, the central government's institutional framework and competing interests are understood with procedures established to reconcile them.

- Lastly, there must be understanding by stakeholders and policy makers of the economic values at stake. The World Bank's experience includes analyses of the economic and financial costs of the "no action" alternative, where stakeholders in a basin do not cooperate, at the basin and sub-basin level. In the three countries of the South Caucasus there appears to be limited appreciation at the policy level of the economic values of the Kura-Aras water resources, the costs of mismanagement, and how concepts of integrated water management could enhance economic growth and welfare of each country.[22]

- *Ultimately, whatever legal and administrative structures are established to oversee integrated water management, successful experiences in integrated water management increasingly highlight needs for simple, clear, and fair administrative management structures.* This can be achieved by establishing:

  - *A few and very clear legal mandates*. Clarity of governmental mandates by statute is an obvious need to avoid costly institutional rivalries and decision-making paralysis. Mandates that set priorities, rather than case-by-case balancing of competing interests, help provide predictable results.

  - *Separation of government regulatory from operational duties*. This is a step required to provide a system of checks and balances.

  - *A body or a process to ensure representation of otherwise unrepresented environmental or natural resource interests*. In developed countries these externalities are well represented by environmental or social NGOs with financial capabilities and legal standing, but elsewhere these interests must be otherwise represented. An example is the policy and planning body established in the Tarim basin, China, to represent the downstream forest as a "user."[23]

  - *Procedures to ensure that the principles of "good governance" (transparency, public participation, and agency accountability) are rigorously applied.* Application of these principles has proved essential for the cooperation of stakeholders in accepting agreements whose success demands maximum self-enforcement.

  - *Decentralized operations:* As illustrated by the Indonesian example, and by the Mexican irrigation example, decentralized management, in accordance with centralized coordination, is increasingly necessary to ensure that stakeholders have the proper incentives for integrated approaches.

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[22] Recognition of the economic values of Armenia's water resources was, however, highlighted by Gagik Martirossyan, Advisor to the Prime Minister, Chairman of the State Committee of the Water Management Administration, *Armenia's Water Resources Management: Current Situation and Future Prospects, Questions and Answers,* Yeravan, Armenia, June 13, 2001.

[23] Alaerts, p. 12

- *International experiences highlight the need for applying a variety of legal and administrative management tools.* The legal and administrative tools that the responsible authority can employ include pricing and other market mechanisms for allocating and conserving water, and other economic incentives for conservation of water, energy, and reduction of pollution, and public disclosure of monitoring information. Effective and efficient enforcement of required licenses for water use and discharge by the regulating agency is essential.

7. OBSERVATIONS FOR THE KURA-ARAS RIVER BASIN

There are several observations and working hypotheses related to the Kura-Aras River Basin, such as:

- Effective integrated water resource management approaches *within* each country are necessary for effective trans-boundary integrated water resource management.

- Present water management and enforcement regimes within each country are legally and institutionally weak, but stronger regimes will be essential to establish integrated water management and agreements.

- The development of effective management regimes requires thorough understanding of the present practices, constraints on, and perspectives of economic stakeholders in water resource management.

- Small-scale sub-basin pilot studies are an effective way to identify actual economic values of the resources and the economic, social, and political factors at play among stockholders and water users that a water regime must address.

- Understanding the norms and behaviors affecting stakeholders on the ground will inform policy makers of the most effective legal and economic incentives likely to spur integrated water resource management.

- Strong central government leadership and management enforcement have been essential elsewhere in moving toward integrated water management even within a country, and for development of agreements across borders.

- Ministries of Environment/Nature Protection are among the weakest agencies in the three countries, and reliance on them for integrated water resource management as currently empowered and supported is problematic.

- Over time it is highly desirable to gain the understanding and cooperation of ministries of finance, together with ministries of environment and agriculture, in efforts to establish integrated water management agreements. Issues of environmental and water management finance, as well as understanding of the economic values at stake (losses from mismanagement, and gains from management), require engagement of and support from the powerful finance ministries.