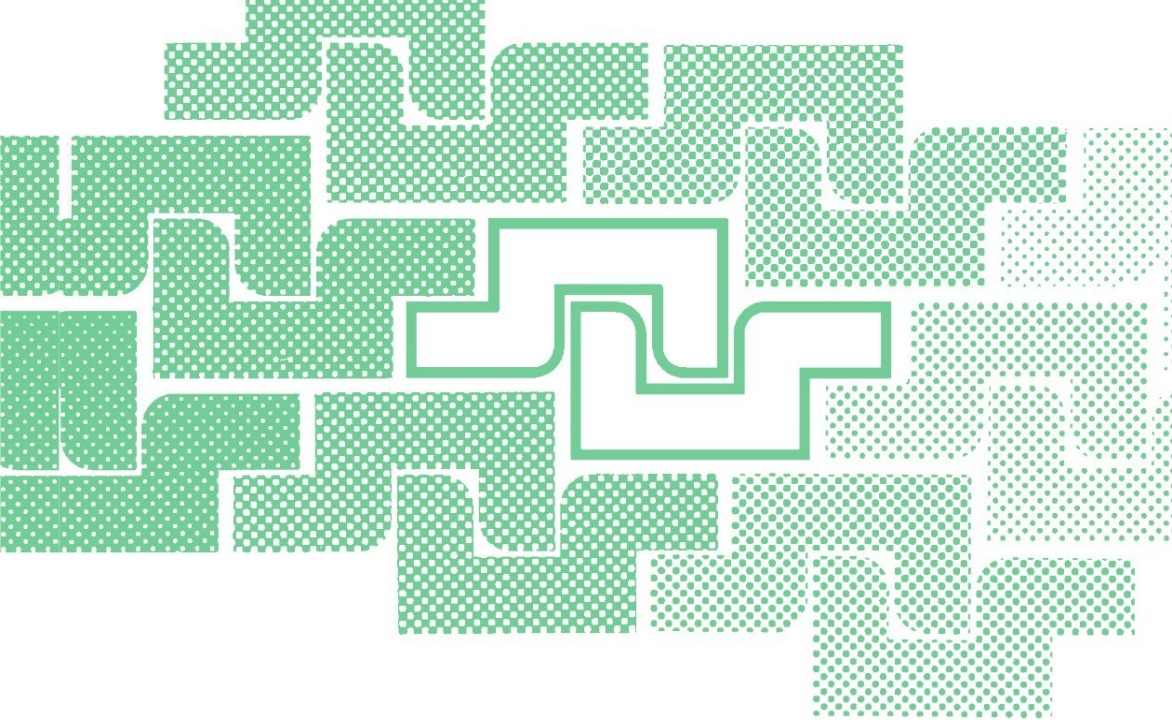

Implementing Integrated Water Resources Management in Central Asia

Edited by

Patricia Wouters, Victor Dukhovny and Andrew Allan

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IV. Earth and Environmental Sciences – Vol. 77

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CONTENTS

FOREWORD

"*Without water there is no life*"

This book is the result of a collaborative project between the UNESCO Centre for Water Law, Policy and Science (formerly the International Water Law Research Institute) at the University of Dundee, and the Scientific Information Center of the Interstate Commission for Water Coordination in the Aral Sea basin (SIC ICWC). The project was dedicated to examining the practical issues of Integrated Water Resource Management (IWRM) in Central Asia, and culminated in a workshop held at Bishkek in February 2004. The workshop brought together some of the leading experts in the field and resulted in important insights into some of the issues surrounding the transboundary and national management of the region's shared fresh water. However, the speed of developments in the region has been so rapid that even in the relatively short time since the workshop took place, significant changes have taken place.

As a consequence of the disintegration of the Soviet Union and the resulting emergence of five newly independent states in Central Asia—Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan—the water resources that in the past were the sovereign domain of a single country (USSR) had become transboundary. This precipitated the need for finding new approaches to manage the now transboundary waters of the two main rivers of the region—the Amudarya and Syrdarya Rivers—in order to meet national demands of the five sovereign States that depended upon these waters. Thus, in September 1991, 1 month after independence, the national Ministers of water resources from each of the five countries concluded and signed a document setting forth the agreed need for joint water management of the basin waters. On February 18, 1992, an agreement was reached on the procedures for such management and the Interstate Commission for Water Coordination (ICWC) was established as the management agency responsible for the joint management of the transboundary waters in the region.

From its beginnings in the early 1990s, the international cooperation of the Central Asian countries in the field of water resources has further developed and matured, primarily through the efforts of the ICWC as a focal coordinating joint body. Through years of cooperative endeavors the approaches to water resources management adopted in the region have emerged as relatively unique in many ways. There are very few other examples from the world's 250 transboundary basins where water resource planning and regulation takes place at the interstate level, and where continuous efforts related to

the allocation of water resources are undertaken on a regular basis. Following is a list of some of the major achievements accomplished over the course of recent years:

- Three international agreements between the Central Asian States, signed by the Heads of State, and two framework agreements on water management, were adopted during the last decade demonstrating the political will to engage in collaboration aimed at achieving a conflict-free water allocation between the parties.
- The ICWC has maintained continuous water management, planning, and control with respect to the utilization of transboundary rivers through both its operational bodies and the mechanism of regular (quarterly) meetings of the parties. In addition to addressing annual and seasonal water allocation matters, these meetings consider strategic concerns, including the improvement of management systems, implementation of information and data monitoring systems, integrated management of water resources, and so forth. In total, 43 meetings of the ICWC have been held.
- Despite extreme weather variations over the last few years, including two particularly humid and three exceptionally dry years, the ICWC has succeeded in preventing conflicts relating to water management, allocation, and use through extensive and well-coordinated actions. As a result of these efforts the total annual water withdrawals in the region have been reduced from 110 to 103 km^3.
- The regional Information System and information portal that integrate systematic data from both national water institutions and basin water-management organizations were established with the support of the European Union and the Swiss Development Agency.
- The countries of the region have established effective advanced capacity-development systems in the form of the regional Training Centre and its national branches. Over the last 5 years, more than 2000 medium- and higher-level experts and specialists from water-management institutions and water user associations received training. In addition, 2500 farmers receive annual training through a network of demonstration plots.
- The so-called "integrated water resources management" approach (IWRM) was recognized as the most appropriate method of ensuring sustainable water use and development in the region in the context of growing water scarcity. Accordingly a wide range of specific measures for rational water use have been implemented at the national level. The implementation of IWRM in the three selected irrigation systems in Kyrgyzstan, Tajikistan, and Uzbekistan demonstrated the effectiveness and practicability of this approach.

However, as evidenced by the joint activity progress reports and outside observers, some of the ICWC activities, especially those related to the elaboration of regional water policy and further improvement of relevant legal frameworks, have not advanced as much and as quickly as was initially hoped. These concerns were addressed in detail at the workshop in Bishkek, which brought together all ICWC members, including leaders of the five national water departments, managers of the two river basin organizations, as well as prominent international and local experts. Their papers published in this book analyze both the current state of the water management of transboundary water resources in the Aral Sea basin, its strengths and weaknesses, and discuss ways to further improve the overall effectiveness of transboundary regional cooperation in the field.

The opening paper by Professor Tarlock provides a general review of IWRM principles and assesses their evolution from the perspective of current world development trends. These trends, in his opinion, are formed by a shift in the understanding of water resources as public property to a perception of water as a factor in sustainable development at the intersection of competing interests.

It should be noted in this respect that historically the Central Asian tradition gave priority to nature in water demand management and in determining the limits of acceptable water withdrawals from rivers. This tradition also imposed strict limitations on water use and distribution. Public water management in the context of the Islamic Sharia law included both appointment of water managers by the public, public participation in all water activities, water distribution rules "from root water users to upper levels" and public arbitration of all water disputes, all of which are features of the modern IWRM.

Current efforts to reach an appropriate balance between, for example, commercial energy interests and irrigated agriculture face almost impossible challenges in the context of the existing upward trends in energy prices, along with the decline of agricultural production prices (exacerbated by the destructive impact of agricultural subsidies in developed countries). Consequently, different approaches are needed achieve a proper balance between competing demands and here the unique experience of the USA–Canada International Joint Commission is instructive.

The emphasis of modern transboundary water law on the principle of equitable and reasonable use causes problems of implementation because of the lack of precise criteria implicit in the concept. New approaches to the application of equitable and reasonable use have recently emerged as demonstrated by the Legal Assessment Model (LAM), developed by the water resource experts from the University of Dundee. Other tools to address water

sustainability issues have also been put forward in the Central Asian region, including those proposed by V. Prikhodko and I. Rusiev, which link national socioeconomic development and scenario forecasting.

The papers of the water ministers from the region reflect specific approaches adopted by each country with respect to its water development agenda. All of them, however, show an appreciation of the importance of jointly agreed rules and procedures in the Aral Sea basin. Some essential aspects of the river basin management are highlighted in various papers. The report by Zh. B. Bekbolotov (Kyrgyzstan), as well as the paper by Sh. Mukhamedjanov (SIC ICWC) underline the significance of the main objective of IWRM, that is improvement of water productivity along with the use of water reserves, and highlight the application of water charges as an efficient economic tool in achieving this objective. The underestimation of the importance of drainage (A. A. Djalalov, Uzbekistan) also has a considerable impact on water productivity.

Almost all countries of the region (papers by A. A. Djalalov, A. A. Nazirov, A. Sh. Djaloobayev) consider the transition to hydrographic method of water management and the establishment of WUA as first steps toward IWRM. However, it should be remembered that the hydrographic method alone, without public participation, is fraught with the risk of replacing the "administrative hydro-egoism" of upstream users with "professional hydro-egoism", i.e., a complete lack of public supervision of the activities of water management institutions. The hydrographic approach combined with public participation and vertical interlinking of all levels in the administrative hierarchy are demonstrated in the first large scale project of IWRM in the Fergana Valley (a joint project involving the Swiss Agency for Development and Cooperation, the International Water Management Institute, and the SIC ICWC) (paper by A. A. Nazirov et al.).

It would be unwise, however, to think that the introduction of IWRM is limited only to institutional, legal, and financial reforms of water management. As demonstrated by the experience gained in implementing the Fergana Valley project, technical and managerial tools play an important role in improving management efficiency (papers by A. I. Tuchin, M. Kh. Khamidov).

Minister A. A. Nazirov (Tajikistan) analyses in his paper a range of key issues that must be addressed in developing an appropriate legal framework for water resources management in the region:

- consideration of long-term multipurpose reservoir regimes and their interrelationship with the interests of the energy sector, irrigation, and the environment;
- specific operational procedures of the Basin Water Organizations (BWOs) relating to situations of water scarcity and floods;

- a need to establish a Water-Energy Consortium as a region-wide economic and financial mechanism to coordinate the operational regimes set up by the ICWC and the energy demand interests of upstream countries;
- a need for long-term agreements between riparian states on both the Amudarya and the Syrdarya rivers, that take account of their future development.

Minister T. A. Altiyev (Turkmenistan) addresses the role of strategic and national planning in water development aimed at meeting the interests of riparian countries concerned. Using his country as an example, he looks at the unique experience of the world's largest canal, the Karakum.

Serious environmental and socioeconomic problems of the lower reaches of a transboundary river is dealt with in a paper by Dr. T. K. Kamalov, the former leader of Karakalpakstan—the most water stressed zone in the entire Aral Sea basin. In his opinion, the implementation of IWRM at the basin level should ensure a sustainable water supply to this environmentally and socially disadvantaged part of the basin. The mechanisms for implementation of such management are discussed in detail in the report of Yu. Khudaiberganov, chief of the BWO "Amudarya," a basin that has experienced particular difficulties as a result of two consecutive dry years.

The fundamental principles of the BWO operation are presented in the paper by M. Kh. Khamidov, chief of the BWO "Syrdarya." These principles form the basis for attaining sustainable development of transboundary water resources in the region through the implementation of IWRM at the basin level by providing for:

- integration of national legal frameworks with regional agreements;
- mechanism for reaching consensus during negotiations;
- application of economic mechanisms;
- consideration of environmental requirements;
- further enhancement of the independent status of regional water organizations.

More than 2 years have passed since the workshop in Bishkek and considerable progress has been made toward the introduction and practical implementation of IWRM in the Aral Sea basin. The IWRM-Fergana Project has successfully proceeded to its third phase, which anticipates a wider uptake of this approach in the Fergana Valley and in other projects as well; the justification for the project "IWRM in lowlands" was made on the basis of the former. With the help of the Asian Development Bank, the ICWC has moved forward in elaborating general approaches to the revision of the interstate agreements on the Syrdarya River and on a range of other draft agreements. The spirit of collaboration is being strengthened, and this gives confidence that IWRM

will actually be developed and properly implemented in the Aral Sea basin as a whole.

The University of Dundee UNESCO Centre for Water Law, Policy and Science now works with the region to enhance the capacity of water resources experts through the implementation of the innovative "Water Law, Water Leaders" program. This is designed to foster the creation of a new generation of local water leaders through the development and delivery of UK postgraduate degrees at the local level. The idea of "taking the Masters to the river" is aimed at encouraging regional cooperation through the establishment of regional knowledge hubs. This approach is unique and demonstrates the foresight and vision emanating from the region. With the global water challenge growing more complex every day, it is encouraging to see the progress being made in Central Asia. For more information on the Water Law, Water Leaders program, see www.dundee.ac.uk/water.

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INTEGRATED WATER RESOURCES MANAGEMENT—INTERNATIONAL BEST PRACTICE

INTEGRATED WATER RESOURCES MANAGEMENT: THEORY AND PRACTICE

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I. INTRODUCTION: ENVIRONMENTALLY SUSTAINABLE RIVER USE: A NEW PARADIGM

1. From Commodity to Dynamic Ecosystem

Water resource planning and management are undergoing a paradigm shift. Historically, rivers have been viewed as communities to be exploited to the maximum extent possible for economic development. Water resource planning has primarily been an engineering exercise to achieve the optimum development of river basins for hydropower, flood control and consumptive use. Throughout the world, countries have constructed large-scale multiple-purpose dams and irrigation systems. Both international and domestic water law has supported optimum development by (1) creating semi-exclusive national rights to divert and store water and (2) and encouraging unilateral national water resources development. Water management meant the enforcement of existing entitlements and adherence to the original project purposes. The traditional vision of a river system of a commodity to be put to the optimum or maximum use remains the dominant paradigm in many parts of the world such as China, Central Asia, India and other areas as a matter of choice or necessity. However, the traditional paradigm is slowly being replaced by the alternative paradigm of ecologically sustainable development (ESD).

The basic reason for the paradigm shift is that multiple-purpose development has imposed substantial environmental costs and increased social inequity in many river basins. In recent years, there have been many efforts to measure the historically ignored costs of intensive river basin development.[1] The process of environmental accounting has led to a more radical ecological ideal of managing river systems to maintain some measure of a river's historic ecological services,[2] such as those provided by floods and seasonable flow variations, as well as to support a wide range of consumptive uses in a more efficient, sustainable manner.

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The newer ecological integrity vision is less clearly articulated than multiple-use development because it rests on a more complex view of the human role in the functioning of natural systems.[3] It starts from the premise that we must try to integrate human uses of a river system with the maintenance of its natural environmental sustainability,[4] both in the design of new projects and the re-engineering and operation of existing facilities.[5] It is not a simple river preservation concept but rather tries to adapt the emerging international norm of environmentally sustainable development (ESD) to water use and management. For example, the 1998 Report of the United States Western Water Policy Review Advisory Commission adopted a following of sustainable water use:

> Sustainable water resource management builds on the long tradition of state and federal management to conserve water and apply it to a wide range of beneficial uses, but the achievement of sustainability also presents new challenges for which past management practices and institutions often provide limited guidance.[6]

The Commission identified the core element of a sustainable water policy as follows: we need to define hydrologic baselines for individual basins and watersheds that reflect the full range of valued waster uses, including ecosystem uses.[7] Thus, environmentally sustainable water use is not a simple river preservation concept. Although some aquatic scientists want to subordinate human use to the normative river,[8] most visions of environmentally sustainable water management recognize the need to maintain and sometimes expand consumptive uses. ESD requires water resource regimes which strike a new balance between in and out-of-stream uses and reduce the economically irrational subsidies that have characterized much water use in water-stressed countries.

There is a high degree of recognition students of water policy and large segments of water use community that future water policy will be guided by three substantive principles[9]: (1) the more efficient use of existing supplies, (2) the use of more sophisticated, less environmentally intrusive technologies to develop new supplies, and (3) the restoration of degraded aquatic ecosystems to maintain and recapture valuable ecosystem services.[10] In addition, there is a widespread consensus that water resource planning should not simply be closed dialogue among experts but should be more inclusive. Participation in the planning and management of water should be expanded to include diverse stakeholders, user communities, cultural minorities and others often excluded from access to these decisions and supporting information in the past.[11] These objectives require countries to adopt new planning and management strategies and to support them with more effective national water laws and international agreements.

2. The Factors Driving the Paradigm Shift

Three primary changed conditions drive the paradigm shift. The first changed condition is the growing consensus that the earth's climate is warming and that this warming can distort normal water allocation patterns. The precise impacts on specific basins and sub-basins are difficult to predict because the climate change models suggest that the impacts of climate change will vary greatly among the earth's regions. Any watershed or river basin prediction must deal with high levels of hydrologic, economic and political uncertainty. However, the general risks that arid areas face can be stated with some confidence, although the geographic and temporal scale of the change is uncertain.

Some regions, such as sub-Saharan Africa, may experience decreased precipitation and more extended droughts.[12] Areas with present abundant supplies such as the Mekong basin may face new conflicts because of the combination of population pressure and a decreased annual run off. Other regions will see increased precipitation and more frequent and more severe floods. Increased precipitation is not necessarily a blessing because it may not translate into more available water supplies in all regions. In water-short areas with historically variable rainfall patterns, increased precipitation may actually exacerbate efforts to provide reliable water supplies. More precipitation may fall as winter rain rather than snow, and thus the snowpacks may melt earlier as warmer average temperatures mean that Spring runoffs will come earlier and evaporate faster. In addition, nations and regions may have to adapt to series ecosystem changes and these must be factored into any adaptation strategy. However, this will be difficult at the present time because the state of climate change research does not permit managers to go from large-scale models to specific basins and from basin models to regional predictions.

The second changed condition is the winding down of the era of large dam and water project construction. The 2000 publication of the Report of the World Commission on Dams recommended a more rigorous assessment of proposed new dams and that much attention be focused on the re-operation of existing dams and irrigation systems and on the promotion of more sustainable water storage and use technologies. The Report adopts, in large measure, the environmental and social critique of large dams of large dams, especially in developing countries. For example, it found that irrigation dams have typically short of physical targets, did not recover their costs and have been less profitable in economic terms,[13] and they displace large populations. The story is more dismal for ecosystem effects. Dams inundate large areas and kill terrestrial plants and displace animals; reservoirs may account for between 1% and 28% of all green house gas emissions. Large dams compromise the dynamic aspects of rivers that is fundamental to maintaining the character of aquatic ecosystems.[14]

The third changed condition is the growing pressure to improve or restore degraded aquatic ecosystems. A series of influential studies in the United States, Europe and the Middle East[15] has recently led to the radical idea of managing river systems to maximize ecological functions. The newer ecological integrity vision is less clearly articulated than multiple uses because it rests on a more complex view of the human role in the functioning of natural systems, including floods. It starts from the premise that we must try to integrate human uses of a river system with the maintenance of its natural environmental sustainability both in the design of new projects and the re-engineering existing projects. The current focus is on river restoration because so many large systems have been modified. The newly developing science of conservation biology furnishes the scientific underpinnings for the vision. In brief, all river systems-modified and natural must be seen as dynamic, ever-changing functioning ecosystems which serve a variety of functions from the maintenance of consumptive uses to the provision of valuable ecosystem services.[16]

II. INTEGRATED WATER RESOURCES MANAGEMENT

1. History of Concept

The current thinking in the world water community is that ESD should be implemented by Integrated Water Resource Management (IWRM). IWRM is not a totally new concept. Nor, is it a substitute for making hard political choices about alternative water use options. There is a long history of treating river basins systems as single units and trying to plan and execute comprehensive management regimes characterized by integrated dams and irrigated systems. IWRM builds on this long tradition of river basin planning, with deep roots in the United States and the former Soviet Union, but tries to correct the environmental and social myopia of previous planning and water resources development models as well as to introduce greater public involvement and economic discipline into water management and allocation practice. It focuses much more on developing a wider range of alternatives to achieve long-term environmentally and socially sustainable water uses compared to previous planning models and practices. IWRM is river basin or catchment area-focused, and thus it can be confined to the national level or expanded across national boundaries.

IWRM was endorsed in Agenda 21, the environmental action plan for the 21st century agreed to at the 1992 United Nations Rio de Janeiro Conference on Environment and Development (UNCED). It is also one of the six principles adopted at the 1992 Dublin Conference on Water and the Environment.