

**EXPLORING WATER GOVERNANCE IN KYRGYZSTAN THROUGH THE
PRISM OF IWRM**

By

Jibek Imanalieva

Thesis submitted to the department of International and Comparative Politics
of the American University of Central Asia in partial
fulfillment of the requirements
for the degree of
Bachelor of Arts

Bishkek
2014

Abstract

The subject of this study is the performance of water institutions in Kyrgyzstan from the perspective of a newly introduced paradigm of water management called Integrated Water Resources Management (IWRM). Compared to other paradigms only this one takes into consideration economic, social and environmental concerns supplemented with significant notion of an intense political process occurring in water management. Being introduced already in the Water Code 2005, IWRM today still faces a lot of challenges. In addition to identified effects of neopatrimonial features in water governance in by international scholars, this paper highlights the existence of problems related to fit between institutional arrangements and bio-geophysical systems and to interplay among institutions located at the same level, as well as among those which interact with each other across different levels.

Acknowledgements

I would like to express my deepest gratitude to Emilbek Dzhuraev who supported the choice of my study. Thank you for your guidance and support.

I thank all the professors of International and Comparative Politics department who taught me during this exciting four- year journey into the world of politics.

Last but not least, I thank my friends and my family for their warm support and love.

Table of Contents

Acknowledgements.....	1
Abstract.....	2
Table of Contents.....	3
Introduction.....	5
Paradigms of Water Management: Why Do We Need to Manage Water?	7
IWRM: Conceptualization of Key Terms.....	15
Review of Literature and Conceptual Framework.....	20
Water Governance in Kyrgyzstan.....	29
Conclusion: Fit and Institutional Interplay in Kyrgyzstan.....	43
Bibliography.....	46

Introduction

A pattern of development of any country is significantly dependent on its natural resources. In case of Kyrgyzstan water is perceived as one of such determinants, and therefore it is reasonable to see what impedes successful water policy in this country. Water is considered as a unique scarce resource, which does not have any substitutes so far and is essential for sustaining human life. Indeed, the issues of water resources being always of some concern have gotten especially serious attention in the global agenda since 1990s: such terms as water crisis, water scarcity, and water wars became frequently used in researches, political debates and strategies¹.

Kyrgyzstan being an upstream country located in the area of Aral Sea Basin possesses abundant water resources of national and regional significance. However, after the collapse of the Soviet Union, the financial instability, infrastructural weaknesses, and lack of experience to manage water in sustainable and efficient way are believed to be causes of a crisis situation in which most of indicators of water and land use in the republic have taken a negative discourse over the last years which did not promote raise of agricultural production and its efficiency.

The history of water management policy shows that water was during the long period of time perceived as isolated from economic, social, environmental and political concerns, and that is why the early methods and principles of water management brought negative externalities. It is believed that the “political-institutionalist” paradigm embedded in Integrated Water Resources Management is capable to address the principles of sustainable development, recognizing finally the complex interdependence between water and society.

¹ Jenniver Sehring ,”The Politics of Water Institutional Reform in Neopatrimonial States”, *Politik in Afrika, Asien und Lateinamerika Politikwissenschaftliche Analysen zur Entwicklungs- und Schwellenländerforschung* ,p.17

In February 2002 the Swiss Agency for International Development and Cooperation (SDC) and the Interstate Commission for Water Coordination of Central Asia (ICWC) signed a credit proposal for beginning an implementation phase of a project titled "Integrated Water Resources Management in Fergana Valley (IWRMFV). Moreover, the water reforms which took place in Kyrgyzstan after gaining the independence are believed to be built upon IWRM principles. These reforms are not recognized as being successful; therefore **the research question** of my study is "What are the institutional obstacles on the way towards successful water policy in Kyrgyzstan?" Thus, the institutions of water governance are the units of analysis.

For institutional analysis this paper uses a conceptual framework within "new institutionalism" introduced by Oran Young which suits IWRM in sense that it treats institutions as being "determinants of the course of human-environment relations"². More broadly, the institutions here are defined as "set of rules, decision-making procedures, and programs that define social practices, assign roles to participants in these practices, and guide interactions among occupants of those roles"³. Two large-scale projects by international scholars are dedicated to water governance in Kyrgyzstan. Both of them consider inner-Kyrgyz political arena with complex relationships between formal and informal institutions as determinant of failure\success of water governance. I supplement their argument by stating that the problems of fit and institutional interplay from the very beginning of institutional reforms within water governance system in Kyrgyzstan still challenge the progress

² Oran R. Young, "Why is There No Unified Theory Of Environmental Governance?", the 9th Biennial Conference of the International Association for the Study of Common Property, 2002, <http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/881/young020402.pdf?sequence=1>

³ Oran R. Young, "Why is There No Unified Theory Of Environmental Governance?", the 9th Biennial Conference of the International Association for the Study of Common Property, 2002, <http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/881/young020402.pdf?sequence=1>

towards successful implementation of IWRM. The practice shows that institutional analysis requires a substantive research with interviews taken on a regular basis for several years. Fortunately, there are reliable secondary sources on water institutions in Kyrgyzstan. Thus, this study is based on qualitative methods of research with analysis of primary documents, reports, and secondary sources. The first chapter is intended to explain the progress in water management paradigms in order to highlight the problems addressed to IWRM, as well as the key principles and concepts embedded in it. Then the literature review and conceptual framework will be introduced, followed by the analysis of the Water Code 2005 of the Kyrgyz Republic. And finally, the problems of fit and institutional interplay in the context of Kyrgyz water governance will be discussed.

Paradigms of Water Management: Why do we need to manage water?

Jamie Linton in his recent book called “What is Water? The history of a Modern Abstraction (2010)” claims that “*water is what we make of it*”. At first glance it seems that such statement contradicts the seemingly self-evident truth, that water is water, being just one of the most common natural substances composed of oxygen and hydrogen, which does not have color, scent, and taste. This intellectual “provocation” suggests us to look carefully at ways in which people have perceived water in past and admonishes to think in what way should we perceive it today, in the 21st century and in future to be aware of consequences. ⁴

Water is different from other natural resources in several respects: first, it constantly moves and therefore makes the issue of ownership complicated *-mobility*; second, its availability varies sometimes considerably, depending on climate conditions *-variability*, and third-although it applies to all resources, it is particularly

⁴ Jamie Linton, “What is Water? : The History of a Modern Abstraction”, *UBC Press*, <http://www.ubcpres.ca/books/pdf/chapters/2010/WhatIsWater.pdf>, Foreword by Graeme Wynn.

the case with water-it may be used for numerous economic, technical, cultural, and social purposes simultaneously -*multiplicity*⁵. This multifaceted nature of water implies that management of such resource is quite complicated. Logically, defining what amount of it should be directed into one purpose or another, and how this water could be managed so as to promote the greatest benefit to the society underline the fact that water management is not merely technical process guided by engineers and technocrats, but involves a decision-making process which has its own effects on various stakeholders.

However, the history of water management policy shows that from the very beginning the perception of water itself (as well as perceptions of its scarcity) was subject for a change a lot of times. Thus, current perception of water has not come as a granted, but it is rather a result of long disputes which doubted the image of water as an isolated entity, and raised the awareness of water resource scarcity and complex relationship between water and society. It is reasonable to go through the history of water perception in order to understand what water is today for Kyrgyzstan.

Tony Allan in his analysis of shifts in water management policy highlights five historically successive paradigms and identifies driving forces for each of them. Instead of just “water nexus”, he uses the word “paradigm”, and draws our attention to the necessity to take into consideration the political contexts in which water resources function being allocated. The first paradigm is about pre-modern communities with limited technical capacities. It is believed that ancient advanced cultures emerged because they were able to tame floods and manage irrigation through centralized

⁵ Jamie Linton, “The Social Nature of Natural Resources - the Case of Water”
<http://reconstruction.eserver.org/063/linton.shtml>

bureaucracies.⁶ Thus in general, the management at those times was limited to local secure provision of water. In case of Kyrgyzstan this period is traced to the pre-Soviet period, characterized by traditional means of water management.

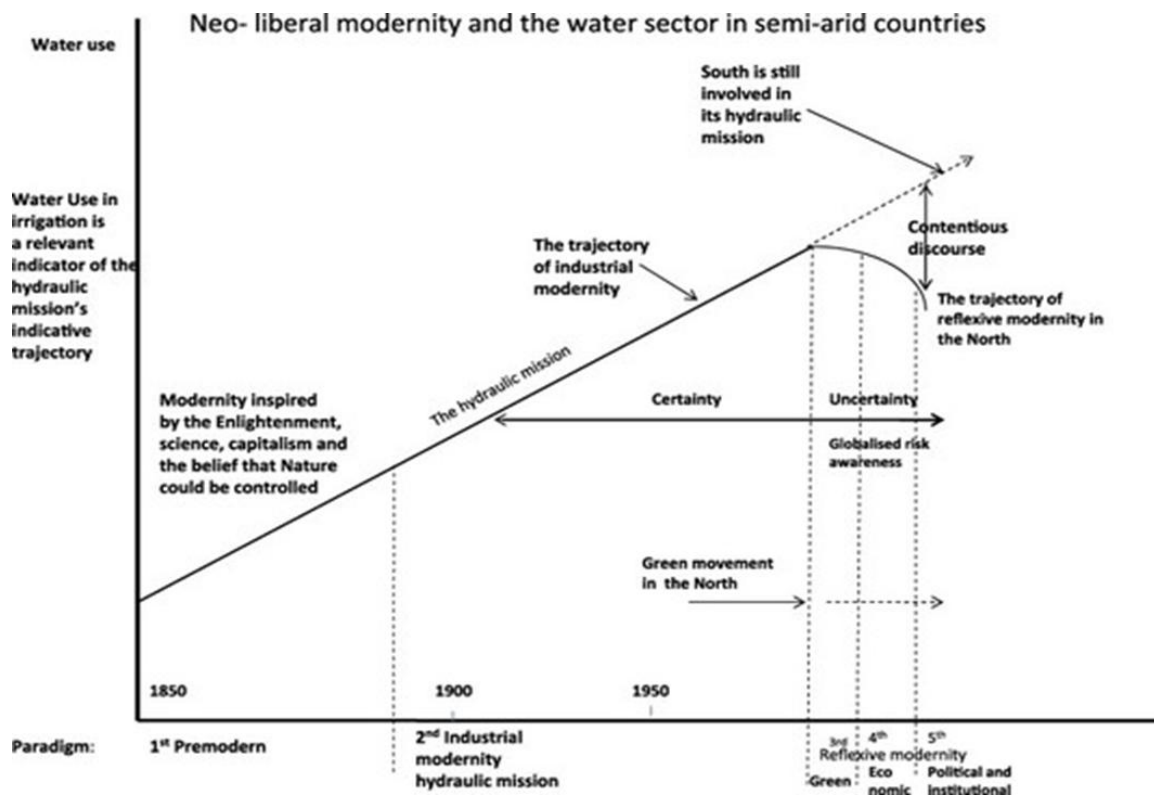


Figure 1: Shifts in water management policy

Source: Tony Allan, *“IWRM/IWRAM: a new sanctioned discourse?”*

The second paradigm can be roughly characterized by one phrase – “Not a single drop of water should reach the sea without being put to work for the benefit of Man”⁷. It stands for the modernity inspired by the European Enlightenment, science, capitalism, and state-building in sense that nature was perceived as something which could be controlled and furthermore, can contribute to the welfare of the state and its

⁶ Timothy Moss, Jens Newig, “Multi-Level Water Governance and Problems of Scale Setting the Stage for a Broader Debate”, *Environmental Management* (2010) 46, pp. 1-6

⁷ Molle, F.; Mollinga, P.P. and Wester, P. “Hydraulic bureaucracies and the hydraulic mission: Flows of water, flows of power”, *Water Alternatives* 2(3), <http://edepot.wur.nl/12837>

population.⁸ This period called **industrial modernity** was manifest as “**hydraulic mission of the mid-20th century**”, standing for belief that all problems of water scarcity could be solved by constructing more structures: e.g. dams for water storage or canals for water distribution⁹. The idea of hydraulic mission refers to the “commitment” of many twentieth-century politicians and planners to bring progress and development through colossal hydro-projects. Some scholars ironically call this period as one being of engineers- in India in 1950s, for example, Arthur Cotton and other pioneering engineers were “worshipped as saints”, and dams became ‘the temples of modern India’ , as they were called by Indian prime minister Jawaharlal Nehru¹⁰. Thus, the clearest peculiarity of “hydraulic mission” is that the dams and canals were perceived as icons of progress and development.

There was a plenty of cases in the post-war period of the 1950s-1960s throughout the globe which illustrate industrial modernity paradigm. François Molle, Peter P. Mollinga, and Philippus Wester distinguish between three distinct, but interrelated forms of hydraulic mission that actually brought this mission to its “apogee”:

1. a re-enactment of the 'Oriental despotism' of ancient times in the Soviet Union and communist China
2. an (often) state-led massive capital investment in hydropower dams in western countries (together with irrigation in countries like Spain, Australia, and western US)
3. “postcolonial despotism” in newly independent “third-world” countries

⁸ Jamie Linton , “What is Water? : The History of a Modern Abstraction”, UBC Press, <http://www.ubcpress.ca/books/pdf/chapters/2010/WhatIsWater.pdf>, Foreword by Graeme Wynn

⁹ Brian and Lynne Chatterton, “The politics of water”, *Dryland Farming Organisation in West Asia and North Africa*, <http://www.drylandfarming.org/Water/waterhome.html>

¹⁰ Molle, F.; Mollinga, P.P. and Wester, P “Hydraulic bureaucracies and the hydraulic mission: Flows of water, flows of power”, *Water Alternatives* 2(3), <http://edepot.wur.nl/12837>

The common feature of all these forms is that the State is a “provider” and “designer” of development here. Moreover, such kind of development helps to sustain legitimacy of non-democratic regime in the country.¹¹ In the Soviet Union one of the most significant epitomes of hydraulic mission was the “Big Volga Project” launched by Stalin¹². The scale of the project can be underlined by the fact that the Volga River is 3700 km long (is longest in Europe) and flows through thirteen regions and autonomous republics in today’s central Russia. The overall goal of the project stated in planning sessions was to make Volga the largest inland waterway in the world with a basin of 9 million km², 25 percent larger than the Amazon.¹³ Needless to say it was ambitious, but the effects of “Stalinist transformation of nature” allowed Paul Josephson to argue that the Soviet leadership used “brute force technology” to achieve stated goals: “Tens of thousands of square kilometers of towns, homes, cemeteries, farmland, and forest were submerged.”¹⁴

Central Asia as a part of the Soviet Union also witnessed the hydraulic mission. In 1953 Khrushchev launched his “virgin-land” policy aimed at intensifying the agriculture production, and called for the expansion of irrigation in Central Asia. That project was not the only one being of a large scale-there was a grand plan to dam the northern rivers (it was called “Siberian River Reversal”) and make them flow backward step by step to the populated agricultural lands of Central Asia¹⁵. In 2009, the presidents of Kazakhstan and Uzbekistan proposed the resurrection of this plan; however such step is considered as financially unviable, and is unlikely to be carried

¹¹ *ibid*

¹² Paul Josephson, “*Industrialized Nature: Brute Force Technology and the Transformation of the Natural World*”, 2002

¹³ Paul Josephson, “*Industrialized Nature: Brute Force Technology and the Transformation of the Natural World*”, 2002

¹⁴ *ibid*

¹⁵ Molle, F.; Mollinga, P.P. and Wester, P “Hydraulic bureaucracies and the hydraulic mission: Flows of water, flows of power”, *Water Alternatives* 2(3), <http://edepot.wur.nl/12837>

out¹⁶. In China such “transformation of nature” echoed in what Judith Shapiro called as “Mao’s War against Nature”. This case also brought negative results: the Sanmenxia dam displaced 400 000 people and resulted in salinization, siltation and substantial financial losses.¹⁷ To sum up, this “hydraulic mission” is argued to be inspired not only by actual need in electricity, irrigation and production, but also by search for national symbols, and competition between countries (especially between the US and the USSR during Cold War period).

If to draw the overall picture of this process of shift in perception of water management policies, one should remind that major shifts occurred after the industrial modernity period are called by scholars as parts of “reflexive modernity”. Its principle does not stand in contradiction with “simple modernity” (industrial modernity), but it rather implies changes within the modernity-while simple modernity is limited to production, reflexive one deals with its side effects, the dangers or “bads”.¹⁸

Due to a gradual recognition of negative impacts of the “hydraulic mission” the certainty that the interests of the state, its development agencies, the irrigators, the power generators, etc., were engaged in essential and appropriate activities became strongly doubted. Thus, the **third shift** in water management occurred. It was inspired by the green movement, for which the environmental considerations were primary. In western countries the activists of green movement succeeded in persuading governments and voters in industrialized semi-arid regions to allocate water to the environment and reduce allocations to agriculture.¹⁹ However in developing countries,

¹⁶ Eelke Kraak, “Central Asia’s dam debacle”, 2012, <https://www.chinadialogue.net/article/show/single/en/4790>

¹⁷ Molle, F.; Mollinga, P.P. and Wester, P “Hydraulic bureaucracies and the hydraulic mission: Flows of water, flows of power”, *Water Alternatives* 2(3), <http://edepot.wur.nl/12837>

¹⁸ Beck, U., A. Giddens and S. Lash, “Reflexive Modernization: Politics, Tradition and Aesthetics in the Modern Social Order”, *Cambridge: Polity Press*, 1994

¹⁹ Tony Allan, “IWRM/IWRAM: a new sanctioned discourse?”, SOAS Occasional Paper 50

it had very limited influence on water policy-making.²⁰ General time framework for this period is perceived to be 1970s and 1980s, but in Central Asia much attention to environmental degradation was given only after the collapse of the Soviet Union and resulted in creation of the Fund for saving the Aral Sea in 1993 by five new independent countries. However, the cooperation in the framework of IFAS is not fully visible on practice, and the policy implementation of this organization today is perceived as weak and inefficient²¹. Thus, environmental concerns in Central Asia remain as policy rhetoric.

The next shift was followed in the 1990s by the **fourth paradigm**, in which a further set of principles gained currency. This shift was inspired by economists, who emphasized the economic value of water, and brought a new dimension for this resource.²² A range of institutions such as the UNCED, the World Water Council and the Global Water Partnership through global conferences and meets such as at Dublin (1992), or Global Water Fora in The Hague (2000) developed the idea of water as being chiefly an economic value and as a scarce economic input. This paradigm still implies a widely debatable issue in developing countries. In the context of Central Asia, upstream countries are believed to consider water as an economic good, whereas downstream ones emphasize that water is a public good, which should be free of any payments, as every human being has inborn right to consume it.

The last, the **fifth paradigm** is a discourse of water management, which considers economic, social and environmental concerns and supplements them with a

http://www.waterintegritynetwork.net/index.php?option=com_mtree&task=att_download&link_id=142&cf_id=61

²⁰ *ibid*

²¹ A.Sh.Djailoobayev, "National Report on the Regional Water Partnership(Kyrgyz Republic)", Report for Global Water Partnership, http://www.gwp.org/Global/GWP-CACENA_Files/en/pdf/kyrgyzstan.pdf

²² "Hydraulic Mission to IWRM: Paradigm Shifts within water sector development", http://www.saciwaters.org/CB/PRM/PRM/IV.%20Readings/1.%20Readings%20on%20Key%20Concepts/1.2%20Hydraulic%20Mission_%20Narayanan%20NC.pdf

significant notion of an intense political process occurring there. Thus, this paradigm argues that water users have interests, and they do not want their interests to be threatened by engineers or economists, who can contradict their immediate security by various activities.²³ The fifth paradigm has brought forward such approaches as participation, consultation, and inclusive political institutions which should be able to mediate conflicting interests of water users and water agencies managing water. Tony Allan states that in practice the central thing which corresponds to this paradigm is a relatively new concept called Integrated Water Resources Management (IWRM). IWRM is introduced in Kyrgyzstan as well. In February 2002 the Swiss Agency for International Development and Cooperation (SDC) and the Interstate Commission for Water Coordination of Central Asia (ICWC) signed a credit proposal for beginning an implementation phase of a project titled "Integrated Water Resources Management in Fergana Valley (IWRMFV). Moreover, the water reforms which took place in Kyrgyzstan after gaining the independence are believed to be built upon IWRM principles. Therefore, this paper takes IWRM as a prism for analyzing Kyrgyzstani water governance. The next chapter is going to review the literature on water governance in Kyrgyzstan and to set up a conceptual framework which suits IWRM's perspective of institutional analysis. But before this, it is reasonable to give the definition of IWRM and key concepts within IWRM.

²³ "Hydraulic Mission to IWRM: Paradigm Shifts within water sector development", http://www.saciwaters.org/CB/PRM/PRM/IV.%20Readings/1.%20Readings%20on%20Key%20Concepts/1.2%20Hydraulic%20Mission_%20Narayanan%20NC.pdf

IWRM: Conceptualization of key terms

IWRM-the fifth paradigm

Integrated Water Resources Management has undoubtedly gained currency and prominence since the 1992 Dublin and Rio de Janeiro international conferences which covered the issues of water, environment and development.²⁴

It is defined by the Global Water Partnership (GWP) as “a process which promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment.”

Its strategies are based on the four Dublin Principles presented at the World Summit in Rio de Janeiro in 1992:

1. (Ecological) Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment;
2. (Institutional) Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels;
3. (Gender) Women play a central part in the provision, management, and safeguarding of water;
4. (Economic) Water has an economic value in all its competing uses, and should be recognized as an economic good.

It is important to explore the meaning of “integration” or rather of “integrated”, because it is argued by experts that often this “integration” is problematic as a concept, and thus is misunderstood by some policy-makers.²⁵ The experts argue that

²⁴ Tony Allan, “ IWRM/IWRAM: a new sanctioned discourse?”, SOAS Occasional Paper 50
http://www.waterintegritynetwork.net/index.php?option=com_mtree&task=att_download&link_id=142&cf_id=61

²⁵ Roberto Lenton, Mike Muller , introduction to Integrated Water Resources Management in Practice, ed. Roberto Lenton, Mike Muller (Global Water Partnership, 2009)

integration is not an end in itself, and concept of integration does not entail neither trying to connect and manage “everything together with everything else”, nor abandoning entirely a sectoral decision-making.²⁶ “Integration” is rather chosen to describe the “holistic” kind of management.

Basically, the “integration” concept embodied in IWRM is seen as taking place between the natural and human systems²⁷. Within the natural system, integration is sought between “freshwater and coastal zone, land and water, “green water” and “blue water,” surface water and groundwater, water quantity and quality, and upstream and downstream”²⁸. The rationale behind it is the recognition that the hydrological cycle is a unitary one and that separate bodies of water flowing in rivers and underground, falling to the earth as rain, accumulating in lakes and aquifers, and being evaporated from the earth’s surface, are interconnected.²⁹

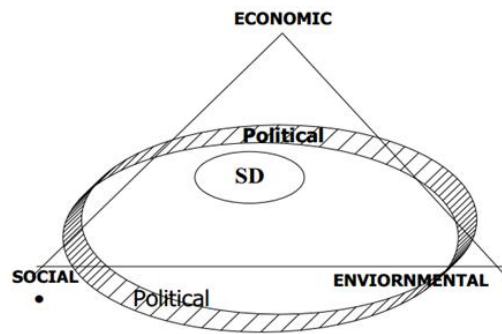
In order to get a comprehensive understanding of human system it is convenient to link IWRM with the concept of sustainable development illustrated in Figure 2 because basically, the Dublin Principles promote the sustainable development. The figure shows that economic, social, and environmental concerns determine the goals and actions of sustainable development. However, without consideration of political issues, it is impossible to achieve success, because political decision making process directly influence on the balance of three spheres.

²⁶ Ibid

²⁷ D. J. Bandaragoda, “Stakeholder Participation in Developing Institutions for Integrated Water Resources Management: Lessons from Asia”, <http://cdm16658.contentdm.oclc.org/cdm/fullbrowser/collection/p267501ccp2/id/3375/rv/singleitem>

²⁸ D. J. Bandaragoda, “Stakeholder Participation in Developing Institutions for Integrated Water Resources Management: Lessons from Asia”, <http://cdm16658.contentdm.oclc.org/cdm/fullbrowser/collection/p267501ccp2/id/3375/rv/singleitem>

²⁹ Roberto Lenton, Mike Muller , introduction to Integrated Water Resources Management in Practice, ed. Roberto Lenton, Mike Muller (Global Water Partnership, 2009)



SD: Field of Sustainable Development

Figure 2: Sustainability triangle

Source: “Hydraulic Mission to IWRM: Paradigm Shifts within water sector development”

There are three key elements which are believed to be the signs and drivers of a shift towards IWRM:

1. Integrated Water Resource Management (IWRM), in association with River Basin Management (RBM) meaning a shift from administrative to resource-based management;³⁰
2. Participation and stakeholder involvement meaning from centrally administered to user-based management institutions;³¹
3. Privatization/liberalization meaning from state to market-driven regulation.³²

The first element supports the fact that rivers do not follow administrative boundaries. According to IWRM it is imperative to manage a catchment area as a whole, as well as to take into account the surface -groundwater interactions. Moreover, such management over a catchment area “as a whole” does not deny the need for different institutions at different levels, e.g. at the levels of river, primary canal,

³⁰ Hydraulic Mission to IWRM: Paradigm Shifts within water sector development”, http://www.saciwaters.org/CB/PRM/PRM/IV.%20Readings/1.%20Readings%20on%20Key%20Concepts/1.2%20Hydraulic%20Mission_%20Narayanan%20NC.pdf

³¹ Ibid

³² Ibid

secondary canal, tertiary canal.³³ The key condition is that management at each level should cover the whole respective hydrological unit.³⁴

The second element implies participation used as a “means” of trying to involve a community to implement a project efficiently and effectively, and to initially mobilize a community to enhance its capacity.³⁵ Thus, the communities take the initiative to learn their opportunities, and to participate in activities for their own benefit, because their interests are directly involved in water management.³⁶ Practically, in most of the countries pursuing IWRM, this participation finds itself through the unit of Water User Association (WUA), which is defined as “a non-profit organization that is initiated and managed by the group of water users along one or more hydrological sub-systems regardless of the type of farms involved.”³⁷ A lot of studies show that the WUAs’ participation in developing countries is quite problematic, and if to use Sherry R. Arnstein’s “ladder of citizen participation” (figure 3) to demonstrate IWRM’s aspiration of participation, it can be regarded as tokenism due to being limited only to informing, consulting, or placation.

The third element is closely linked to the second one, because it implies both decentralization and privatization in order to place a certain responsibility for water resources management at the lowest administrative level, with central government

³³ E.Herrfahrdt, M.Kipping, T.Pickardt, M.Polak, C.Rohrer, C.F.Wolff, “Water Governance in the Kyrgyz agricultural sector: on its way to Integrated Water Resources Management?”, Bonn 2006, <http://dspace.cigilibrary.org/jspui/bitstream/123456789/26069/1/Water%20governance%20in%20the%20Kyrgyz%20agricultural%20sector.pdf?1>

³⁴ Ibid

³⁵ D. J. Bandaragoda, “Stakeholder Participation in Developing Institutions for Integrated Water Resources Management: Lessons from Asia”, <http://cdm16658.contentdm.oclc.org/cdm/fullbrowser/collection/p267501ccp2/id/3375/rv/singleitem>

³⁶ Ibid

³⁷ “How to establish a Water Users Association? Practical steps for social mobilizers”, http://www.yemenwater.org/wp-content/uploads/2013/02/04_iwmi_2003_howto-wua.pdf

retaining regulatory and supportive roles. In the context of IWRM such scenario satisfies the subsidiarity principle, which as a rule advocates increased accountability,

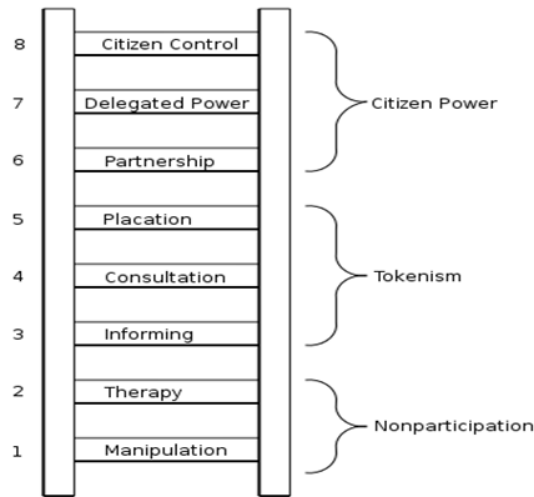


Figure 3: A Ladder of Citizen Participation

Source: Sherry R Arnstein, “A Ladder of Citizen Participation”

credibility, effectiveness of management institutions as well as full consultation and involvement of users in the planning and implementation of water projects.³⁸ Privatization is believed to minimize inefficiencies in water service delivery by pricing water at its full cost, accounting for the cost of withdrawing and delivering the water, as well as the opportunity cost and both economic and environmental externalities associated with using that water.³⁹ From this perspective, proper laws and policies should establish clear water use rights and create “markets for these rights to be traded” in order to allow efficient and sustainable use of water.⁴⁰ To sum up, this

³⁸ Mei Xie, “Integrated Water Resources Management (IWRM) – Introduction to Principles and Practices”, World Bank Institute (WBI), 2006, <http://www.pacificwater.org/userfiles/file/IWRM/Toolboxes/introduction%20to%20iwrn/IWRM%20Introduction.pdf>

³⁹ Ibid

⁴⁰ Mei Xie, “Integrated Water Resources Management (IWRM) – Introduction to Principles and Practices”, World Bank Institute (WBI), 2006,

element stands for not only financial sustainability of water use, but for its full economic sustainability in a long-term. The next chapter is going to introduce literature review and conceptual framework.

Review of the literature. Conceptual framework

Basically, the literature dedicated to water issues in Kyrgyzstan can be roughly classified into two streams by the focus of their research. The first stream has a focus on interstate relations among Central Asian countries, because all main rivers in Kyrgyzstan, e.g. Naryn, Talas, Chuy, Sary Dzhas are transboundary with Kyrgyzstan located up stream. The problem there is analyzed usually from the conflict perspective considering the past (Soviet) joint centralized system of the water management, and from the technical perspective, emphasizing the hydrological and financial aspects including infrastructure problems. These are research works by Olli Varis, Virpi Stucki, Kai Wegerich, Muhammad Mizanur Rahaman who accentuate the complexity of water, and argue that the problem of Central Asian waters is not a physical scarcity of water resources, but rather their governance.

The second stream of literature is intended to explore water management itself, and for the convenience use a national level of analysis. Within it some scholars rely on the dependency connection between water resources and irrigative agriculture, and highlight therefore ineffectiveness of water management to promote economic growth and social stability. These are mostly reports by national and international water experts made for international donor organizations.

Another part of literature exploring water management is one that opens a window for political research, as it promotes a shift from “water management” to

“water governance”, underlying a decisive role of institutions and actors involved in it. One of the reasons, why a study of water governance of Kyrgyzstan has gained wide scholarly attention is that, although natural fresh waters of the highest quality are abundant in this country, this vital resource is not delivered as of a proper quality for drinking, irrigation, and household needs to a significant rural part of the population. A study on institutions of water management here is not entirely new.

So far I have come across two different large-scale research projects on water governance in Kyrgyzstan conducted by international scholars. The first project titled as “Water Governance in the Kyrgyz agricultural sector: on its way to Integrated Water Resources Management?” is done within German Development Institute by a team composed of two political scientists, two geographers, one social anthropologists, and one economist. This study is distinguished from others by taking IWRM as a normative model, and their multidisciplinary approach indeed corresponds to integration of social, economic and environmental sectors with consideration of subsidiarity principle. Their paper was intended to find “a gap (or gaps) between norm and reality” and to elaborate on recommendations on how to further develop Kyrgyz water governance in a direction towards IWRM. Concerning water reforms perspective, I summarize several findings discussed there:

- Far-reaching reforms promoted by international donors find it difficult to adapt to the “inner-Kyrgyz political arena”.

- Institutional change is slow because of omission to consider coexistence of formal and informal institutions.

- Behavioral change and mind change, being crucial for successful reformation, have not yet reached the higher levels of water administration. On the positive side, there is rising willingness of farmers to pay irrigation fees.

Jennifer Sehring argues that aforementioned research does not produce an original input from political science and sociology, as it is rather uses the perspective of institutional economics. She presents her project titled “The Politics of Water Institutional Reform in Neopatrimonial States. A Comparative Analysis of Kyrgyzstan and Tajikistan”, in which refers to new institutionalism approaches of political science and argues that politics of water institutional reforms in both countries is influenced by the neopatrimonial regime bringing following findings:

- On the national level, agenda setting and leadership in policy formulation are dominated by the president despite relatively open decision-making institutions

- On the meso- level, the water administration is characterized by hierarchy, patronage, and no accountability to the target group

- On the local level, WUAs are incorporated in their logic of patronage, as water management is closely nested in the institutions of local governance

- In general, international donors’ strategies are nice to read but have no concrete consequences for existing power structures

The main argument drawn from these findings is that new institutions have been established: laws have been approved, WUAs have been registered, and fees have been introduced, etc. However, these policy decisions are either not at all, only partly, or only on paper implemented due to the “institutional bricolage” logic: although formal displacement of old institutions occurred, actors in decision making as well as in implementation influence the outcome of reform by considering only the certain rules, which seem appropriate to them, accordingly neglecting the rules which seem inappropriate.⁴¹

⁴¹ Jennifer Sehring, “The Politics of Water Institutional Reform in Neopatrimonial States. A Comparative Analysis of Kyrgyzstan and Tajikistan”, *Politik in Afrika, Asien und Lateinamerika Politikwissenschaftliche Analysen zur Entwicklungs- und Schwellenländerforschung*

Some examples of “bricolage logic” in Kyrgyzstani water governance brought by the author are:

- Fees are paid not because of the logic of market economy, but because the patron (e.g., an aksakal) with his informal authority demands it
- A formal democratic WUA is established, but the way it distributes water is already predefined by the land plots allocated before to the village elite
- The acceptance of WUA rests on a respected villager being its head.

Thus, J. Sehring states that water reforms in Kyrgyzstan contain different elements derived from pre- Soviet, Soviet, and post-Soviet institutions, underlying the impossibility to have a blueprint on how to bring water institutional reform to success. Nevertheless she points out five aspects, which are crucial to consider: sound sequencing of reforms, avoiding marginalization of the meso level, paying attention to the complexity of informal institutions, avoiding a dogmatic IFS approach, and finally adopting a long-term perspective. The main aspiration of this project can be summarized as “Do not fix the pipes; fix the institutions that fix the pipes”, not simply through technical designing and fixing, but through considering political processes as well.⁴²

Both projects made their own contribution to the study of water governance in Kyrgyzstan. The first study intended to find the gaps between IWRM and reality by using multidisciplinary approach to investigate integration within ecological, sectoral and regulatory areas of governance, but was criticized by the second one for the lack of analytical perspective in political aspect of the issue. The second study investigated neopatrimonial features of water institutional reforms which took place in Kyrgyzstan

⁴² Jenniver Sehring, “The Politics of Water Institutional Reform in Neopatrimonial States. A Comparative Analysis of Kyrgyzstan and Tajikistan”, Politik in Afrika, Asien und Lateinamerika Politikwissenschaftliche Analysen zur Entwicklungs- und Schwellenländerforschung

after gaining the independence. It uses “classical” model of new- institutionalist analysis through historical and sociological perspectives, and does not use the concept of IWRM, and rather criticizes it for being an “aggregation of trendy words” with no clear operational directives for implementation⁴³. However, the first chapter of this thesis demonstrated that what this paradigm consists of came through the long experience of questioning sustainable use of water resources, and gradually trying to find a better way of managing them. Thus, as a water management paradigm, IWRM deserves today to be something that we should strive for. As the title suggests, this paper intends to explore institutional features of water governance through the prism of IWRM. However, it will also be critical of IWRM in sense that it will not use IWRM itself as a normative model, but rather apply a conceptual framework proposed by O. Young which will also demonstrate the challenges to the pursuit of successful fifth paradigm. The advantage of this framework is its applicability to the “skeleton” organization of environmental governance. It suits IWRM, because they both are focused on the role of institutions as “determinants of the course of human-environment relations”⁴⁴. More broadly, the institutions here are defined as “set of rules, decision-making procedures, and programs that define social practices, assign roles to participants in these practices, and guide interactions among occupants of those roles”⁴⁵.

Oran Young is recognized as a core scholar in the study of environmental governance and resource regimes, to the study of which a growing attention over the

⁴³ Jenniver Sehring, “The Politics of Water Institutional Reform in Neopatrimonial States. A Comparative Analysis of Kyrgyzstan and Tajikistan”, Politik in Afrika, Asien und Lateinamerika Politikwissenschaftliche Analysen zur Entwicklungs- und Schwellenländerforschung

⁴⁴ Oran R. Young, “Why is There No Unified Theory Of Environmental Governance?”, the 9th Biennial Conference of the International Association for the Study of Common Property, 2002, <http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/881/young020402.pdf?sequence=1>

⁴⁵ Oran R. Young, “Why is There No Unified Theory Of Environmental Governance?”, the 9th Biennial Conference of the International Association for the Study of Common Property, 2002, <http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/881/young020402.pdf?sequence=1>

last 30 years was given.⁴⁶ In his search for “unified theory of environmental governance” he raises the problem within the “new institutionalism”. He argues that although different approaches in study of environmental governance (e.g. small-scale systems with bottom-up perspective and macro-level systems with top-down perspective) have common core of concerns, there is no vibrant dialogue between them due to divergent choices regarding research strategies, conceptual fixations, and conflicting methodological practices, and as a consequence there is little progress made towards the development of a unified theory in environmental governance as such.⁴⁷ Finally, he argues that issue is complicated by the fact that institutions operate at many levels of social organization and therefore vary in terms of consequences they produce.⁴⁸

In 1999 as his contribution to the development of a unified theory, O. Young introduced the problems of institutional **fit**, **interplay**, and **scale** in the Science Plan of the Institutional Dimensions of Global Environmental Change project as analytical themes for studying global environmental change.⁴⁹

The problem of **fit** underlines a proposition that the performance of institutions is determined substantially by the congruence or compatibility between the attributes of the relevant institutions on the one hand and principal properties of the ecosystem on the other hand.⁵⁰ Briefly it is about the match between governance systems and biophysical systems that are believed to be not just linked, but truly interdependent

⁴⁶ Arild Vatn, Paul Vedeld, “Fit, Interplay, and Scale: A Diagnosis”, *Ecology and Society* 17(4): 12, <http://www.ecologyandsociety.org/vol17/iss4/art12/>

⁴⁷ Oran R. Young, “Why is There No Unified Theory Of Environmental Governance?”, the 9th Biennial Conference of the International Association for the Study of Common Property, 2002, <http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/881/young020402.pdf?sequence=1>

⁴⁸ Oran R. Young, “The Institutional Dimensions of Global Environmental Change”, *Public Administration and Public Policy*, Vol. 2

⁴⁹ Timothy Moss, Jens Newig, “Multi-Level Water Governance and Problems of Scale Setting the Stage for a Broader Debate”, *Environmental Management* (2010) 46, pp. 1-6

⁵⁰ Oran R. Young, “The Institutional Dimensions of Global Environmental Change”, *Public Administration and Public Policy*, Vol. 2

and complex.⁵¹The scholars of multi-scale governance, e.g. A. Vatn, P. Vedeld, T. Moss, J. Newig, J. Paavola, T. Kluvankova-Oravska, A. Gouldson, typically distinguish between *spatial*, *temporal*, *functional* (mis-)fits, and functional type consisted of “*threshold behavior*” and “*cascading effects*” subtypes.⁵²

Spatial fit refers to the notion of boundaries, e.g. when institutional (management) and ecological boundaries do not coincide.⁵³ Such mismatch usually takes place through three possible scenarios: first, institutional jurisdiction is too small or too large to cover the area subjected to the institution; second, institutional jurisdiction is unable to cope with actors or drivers important for maintaining the ecosystem; and third, institutional arrangements can be too large when they tend to provide centrally defined blueprints which ignore existing local biophysical circumstances.⁵⁴ Timothy Moss, who is known for his investigations on “fit” in the water management, argues that spatial misfits are often responsible for negative externalities, “benefiting free riders and harming others beyond the reach of the responsible institution”.⁵⁵ He also argues that it is hardly possible to create a perfect spatial fit due to several reasons: first, it is difficult to define territorial boundaries of a natural resource considering its complex interdependence with broader ecosystems; second, a resolution of one problem of spatial fit often creates new ones due to having higher transaction costs, as the number of actors, scales, and interactions grow; and

⁵¹ Arild Vatn, Paul Vedeld, “Fit, Interplay, and Scale: A Diagnosis”, *Ecology and Society* 17(4): 12, <http://www.ecologyandsociety.org/vol17/iss4/art12/>

⁵² Arild Vatn, Paul Vedeld, “Fit, Interplay, and Scale: A Diagnosis”, *Ecology and Society* 17(4): 12, <http://www.ecologyandsociety.org/vol17/iss4/art12/>

⁵³ J. Paavola, Tatiana Kluvankova-Oravska, Andrew Gouldson, “The Governance of Biodiversity: Ecosystems, Institutions and the Interplay of Actors, Levels, Frameworks and Regimes”, 2008

⁵⁴ Arild Vatn, Paul Vedeld, “Fit, Interplay, and Scale: A Diagnosis”, *Ecology and Society* 17(4): 12, <http://www.ecologyandsociety.org/vol17/iss4/art12/>

⁵⁵ Timothy Moss, “Spatial Fit, from Panacea to Practice: Implementing the EU Water Framework Directive”, *Ecology and Society* 17(3): 2, 2012

third, organizing management structures around the physical geography of a resource alone poses a risk of ignoring its political, socioeconomic, and cultural geographies.⁵⁶

Temporal fit problem relates to time. It occurs, for instance, when social systems respond too slowly to rapidly changing environmental systems.⁵⁷ Such type of mismatch is believed to complicate many resource management problems and may therefore constrain options for societal development in general.⁵⁸ Temporal misfit usually occurs when institutions were formed too early or too late to cause desired ecosystems effects or when institution makes a decision which assumes a shorter or longer time span than this embedded in the biophysical system affected.⁵⁹

Threshold behavior basically involves a fast qualitative change of either a single process or the response of a system⁶⁰. Within functional misfit it refers to the failure of institutions to avoid abrupt shifts in biophysical systems or to recognize and respond adequately to such disturbances.⁶¹ For instance, if a policy on fisheries “focuses on “optimal management” of only one fish species, then the overall system of interacting species can easily collapse”.⁶²

Cascading effects stand for the “chain” of effects. Within functional misfit it means inability of institution to buffer or, in contrast, to trigger the further effects among biophysical or social and economic systems.⁶³ More precisely, it happens when

⁵⁶ Timothy Moss, “Spatial Fit, from Panacea to Practice: Implementing the EU Water Framework Directive”, *Ecology and Society* 17(3): 2, 2012

⁵⁷ J. Paavola, Tatiana Kluvankova-Oravska, Andrew Gouldson, “The Governance of Biodiversity: Ecosystems, Institutions and the Interplay of Actors, Levels, Frameworks and Regimes”, 2008

⁵⁸ Ibid

⁵⁹ Arild Vatn, Paul Vedeld, “Fit, Interplay, and Scale: A Diagnosis”, *Ecology and Society* 17(4): 12, <http://www.ecologyandsociety.org/vol17/iss4/art12/>

⁶⁰ E. Zehe, M. Sivapalan, “Threshold behavior in hydrological systems as (human) geo-ecosystems: manifestations, controls, implications”, <http://www.hydrol-earth-syst-sci.net/13/1273/2009/hess-13-1273-2009.pdf>

⁶¹ Ibid

⁶² Arild Vatn, Paul Vedeld, “Fit, Interplay, and Scale: A Diagnosis”, *Ecology and Society* 17(4): 12, http://www.ecologyandsociety.org/vol17/iss4/art12

⁶³ Ibid

institutional response to changes is misdirected, nonexistent, inadequate, or wrongly timed.⁶⁴ The examples of cascading effects can be climate anomaly shifting rainfall between regions and affecting economic system, or abrupt shifts in soil humidity causing salinization and then substantially affecting socioeconomic systems.⁶⁵ O. Young, T. Moss argue that fit between institutions alone is unable to solve the problem of multi-level governance, and interplay of institutions is essential to take into consideration.⁶⁶

The problem of **interplay** is based on proposition that institutional arrangements interact with one another and “become both more common and significant as the number of discrete governance systems grows in any given social setting”.⁶⁷ O. Young distinguishes between *horizontal* and *vertical* types of interplay to question the existence and quality cooperation and coordination among institutions.

Horizontal interplay should take place among institutions at the same level of social organization.⁶⁸ Such interactions can occur among different ministries, each of which is responsible for certain policies regarding water management, or among different local institutions, (e.g. among local self-government, district commission on irrigation and drainage, district water inspectorate etc.).

Vertical interplay refers to interactions among institutions at different levels of social organization, e.g. international, national, regional, and local. Thus, it can be an indicator of success of multi-level governance, because in water management, as a

⁶⁴ Arild Vatn, Paul Vedeld, “Fit, Interplay, and Scale: A Diagnosis”, *Ecology and Society* 17(4): 12, <http://www.ecologyandsociety.org/vol17/iss4/art12>

⁶⁵ *Ibid*

⁶⁶ Oran R. Young, “The Institutional Dimensions of Global Environmental Change”, *Public Administration and Public Policy*, Vol. 2

⁶⁷ Arild Vatn, Paul Vedeld, “Fit, Interplay, and Scale: A Diagnosis”, *Ecology and Society* 17(4): 12, <http://www.ecologyandsociety.org/vol17/iss4/art12>

⁶⁸ *Ibid*

rule, it means coordination and cooperation among policy-making, regulation, and enforcement bodies.⁶⁹

These concepts introduced by Oran Young open an analytical perspective to look at challenges which occur in Kyrgyzstani water governance with the introduction of IWRM principles promoting a shift from administrative to resource-based management and active stakeholder involvement. The next chapter divided in two parts is aiming to give an overview of water governance in Kyrgyzstan.

Water governance in Kyrgyzstan

Water resources of Kyrgyzstan and their use

Kyrgyzstan is situated in a rather arid, continental region. Nevertheless it possesses abundant amount of ground and surface waters: long-term average actual renewable water resources are estimated as 23 620 million m³ per year.⁷⁰ Annual average volume of total water resources makes up 2,458 km³ including 50 km³ of surface river runoff, 13 km³ of potential reserves of ground water, 1,745 km³ of lake water, and 650 km³ of glaciers.⁷¹ Mountains are natural accumulators of atmospheric water, predominantly during winter season, between October and April, which in turn is a source of rich river network.⁷² Thus, the main water source of rivers is melt waters of temporal and eternal snow, as well as the glaciers. Moreover, the supply of fresh water preserved in the mountain glaciers being 650 billion m³ exceeds 12 times rivers flow resources in the country.

⁶⁹ Lena Horlemann, Ines Dombrowsky, "Institutionalizing IWRM in Developing and Transition Countries – The Case of Mongolia", Helmholtz-Centre for Environmental Research, 2010, https://www.ufz.de/export/data/global/26161_DP_9_2010_Horlemann_Mongolia.pdf

⁷⁰ UN-Water Country Brief, Kyrgyzstan, (FAO AQUASTAT), http://www.zaragoza.es/contenidos/medioambiente/onu/1026_eng_res6_unwater_briefs_kyrgyzstan.pdf

⁷¹ N.E. Mamatov, M.K. Cusupov, B. Raimcanov, "Water Resources Problems in Kyrgyzstan", http://www2.dsi.gov.tr/english/congress2007/chapter_3/86.pdf

⁷² Ibid

In total there are 8,208 glaciers of different sizes on the territory of Kyrgyzstan, they cover approximately 4.2% of the republic territory. The main glacier centers are concentrated in the extreme east, in the basin of the river Sary-Jaz and in the south of the Zailiy ridge. There is stable intensive reduction of glacier surfaces due to the trend of climate warming. According to forecast, by 2025 the territories of glaciers will be reduced by 30-40% resulting in water volume diminishing by 25-35%.⁷³

Ground waters play an important role in water supply of urban areas, settlements, and industry. In total, on the territory of Kyrgyzstan 34 fresh water aquifers were explored, their operational reserve is estimated to be 3,5 km³ per year. Operational potential of groundwater is 13, 7 km³ per year, of which 2, 5 km³ are not connected with surface waters. It is possible to extract 4, 0 km³ of ground water, including 2, 9 km³ for irrigation needs.⁷⁴ However, today present groundwater extraction ranges from 0, 7 to 0, 9 km³ per year.

There are 34 water reservoirs in the country. The biggest and most significant ones (13 out of 34) cover the total area 378, 2 km³ and contain volume of water 23.41 km³. Over recent 10 years many main canals, dams and other structures lost their design and operating reliability due to the lack of financing for maintenance of irrigation systems. As a whole, capacity of primary and secondary canals reduced 25%.⁷⁵ Problems with dam safety are being intensifying.

There are 3500 rivers and rivulets related to main seven basins - Syrdarya, Amudarya, Chu, Talas, Ili, Tarim, and Lake Issyk Kul. Total average long-term natural river flow is 44, 5 km³ and 47, 23 km³ with return waters, of which: 35 km³ (74%) in growing period and 12, 23 km³ in autumn-winter and early spring periods.

⁷³ Ibid

⁷⁴ A.Sh.Djailoobayev, "National Report on the Regional Water Partnership(Kyrgyz Republic)", Report for Global Water Partnership, http://www.gwp.org/Global/GWP-CACENA_Files/en/pdf/kyrgyzstan.pdf

⁷⁵ Ibid

Operational flow of surface sources includes waste and return waters flowing from irrigated lands to water sources both by surface and underground. Most of the rivers across the country's borders to neighboring states: Kazakhstan, Tajikistan, and Uzbekistan, as well as to Xinjiang Uyghur Autonomous Region in China. For that reason, downstream riparian countries, in particular Kazakhstan and Uzbekistan depend on Kyrgyz water resources. Water flowing from Kyrgyzstan amounts to 31, 34 km³ per year, of which 22, 3 km³ come from the Syrdarya river basin.⁷⁶ In turn Kyrgyzstan receives water from water objects of interstate use in the amount of 402 million m³, including 325 million m³ from Uzbekistan (7 objects) and 77 million m³ from Tajikistan (Kairakkum reservoir)⁷⁷. The most problematic international relationships take place over Syrdarya basin resources. In 1992 water officials reached agreement on maintenance of pre-defined water shares which were approved during the Soviet period. The Heads of State affirmed this decision in 20 September 1995 in Nukus and in 19 April 1996 in Kyzylorda. Water in the Syrdarya basin is allocated in accordance with the Framework Agreement of 17 March 1998 between four states for the use of water and power resources from Naryn-Syrdarya reservoir system and the annually signed agreements.

Agriculture represents by far the most important water-consuming sector in Kyrgyzstan. It accounts for 96 % of total water use, whereas municipal and industrial water uses share the remaining portion, with 3% and 1 % respectively.⁷⁸ Because of its important supply function for neighboring states, and decision to allocate water in accordance with the development of irrigated lands, Kyrgyzstan has committed itself

⁷⁶ Ibid

⁷⁷ Ibid

⁷⁸ UN-Water Country Brief, Kyrgyzstan, (FAO AQUASTAT), http://www.zaragoza.es/contenidos/medioambiente/onu/1026_eng_res6_unwater_briefs_kyrgyzstan.pdf

in international agreements not to consume more than 24, 7% of the total annual surface runoff; approximately this amounts to 11, 9 km³ per year.⁷⁹ It is argued that such amount is not enough for development of irrigated lands in perspective, because comparison of actual specific water diversion over last years with average weighted irrigation norm planned under existing crop patterns shows that up to 40% of lands suffer from water deficit.⁸⁰ However, the most significant factor which shapes demand for water in irrigated agriculture is natural conditions. In the national report for Global Water Partnership (GWP) it is stated that “out of total 1 million 66 thousand ha of irrigated lands only 240 thousand ha (22, 5%) are irrigated from reservoirs, while water availability of 826 thousand ha is not guaranteed”⁸¹. It is caused primarily by the fact that these 826 thousand ha are irrigated by natural, non-regulated stream-flow of small and large rivers.⁸² The availability of water is also dependent on season, thus, the average monthly water availability factor in May here is 0, 9; in June -August it is 0, 54-0, 58, whereas in September (which is the worst provided with water) it is not more than 0, 45.⁸³ The UN Commission for Sustainable Development has estimated that index of “Arable lands per capita” in Kyrgyzstan is 0, 3 ha per capita. Such index characterizes Kyrgyzstan as zone of unsustainable land use. The calculation announced in the Ministry of Agriculture and Land Reclamation of the Kyrgyz Republic does not bring a positive forecast: “While having population growth rate as 1, 4% per year, arable lands will decrease to 0, 2 ha/capita by 2025, and having 2, 5-2, 6

⁷⁹ E.Herrfahrdt, M.Kipping, T.Pickardt, M.Polak, C.Rohrer, C.F.Wolff, “Water Governance in the Kyrgyz agricultural sector: on its way to Integrated Water Resources Management?”, *Bonn 2006*, <http://dspace.cigilibrary.org/jspui/bitstream/123456789/26069/1/Water%20governance%20in%20the%20Kyrgyz%20agricultural%20sector.pdf?1>

⁸⁰ N.E. Mamatov, M.K. Cusupov, B. Raimcanov, “Water Resources Problems in Kyrgyzstan”, http://www2.dsi.gov.tr/english/congress2007/chapter_3/86.pdf

⁸¹ A.Sh.Djailobayev, “National Report on the Regional Water Partnership(Kyrgyz Republic)”, Report for Global Water Partnership, http://www.gwp.org/Global/GWP-CACENA_Files/en/pdf/kyrgyzstan.pdf

⁸² Ibid

⁸³ Ibid

ton of grains per 1 ha, the country will lose food independence, i.e. enter a zone of risk land use. With the following decrease to 0, 15 ha/capita the country would reach food catastrophe or famine”⁸⁴

The period from 1991 to 2012 is marked by significant water losses increased up to 23-40% from the total water withdrawal due to the ineffective water use and damage of some canals, and by reduction in quantity and duration of irrigation of agricultural crops (compared to scientifically based standards)⁸⁵. In sum, the Ministry of Agriculture and Land Reclamation of the Kyrgyz Republic argues that most of indicators of water and land use in the republic have taken a negative discourse over the last years which did not promote raise of agricultural production and its efficiency.⁸⁶ The next section is aiming to look what actors are formally entitled to decide and implement water policy according to the Water Code of the Kyrgyz Republic 2005.

Administrative structure of the water governance in Kyrgyzstan

Reports made by national and international water experts state that after the adoption of the new Water Code 2005 the system of administration dealing with water management was not reformed fully, although formally the principles corresponding to the IWRM were included in this code.⁸⁷ In other words, what was written on the paper was not implemented adequately in practice. However, it is still reasonable to

⁸⁴ A.Sh.Djailoobayev, “National Report on the Regional Water Partnership(Kyrgyz Republic)”, Report for Global Water Partnership, http://www.gwp.org/Global/GWP-CACENA_Files/en/pdf/kyrgyzstan.pdf

⁸⁵ UNECE Report, “Национальный Диалог по Водной Политике в Кыргызстане в Сфере ИУВР: Процесс и Результаты за 2008-2013 годы”, http://www.unece.org/fileadmin/DAM/env/water/meetings/NPD_meetings/2013/Kyrgyzstan/pb_rus.pdf

⁸⁶ A.Sh.Djailoobayev, “National Report on the Regional Water Partnership(Kyrgyz Republic)”, Report for Global Water Partnership, http://www.gwp.org/Global/GWP-CACENA_Files/en/pdf/kyrgyzstan.pdf

⁸⁷ UNECE Report, “Национальный Диалог по Водной Политике в Кыргызстане в Сфере ИУВР: Процесс и Результаты за 2008-2013 годы”, http://www.unece.org/fileadmin/DAM/env/water/meetings/NPD_meetings/2013/Kyrgyzstan/pb_rus.pdf

know what this Water Code implies for management of water resources in Kyrgyzstan in order to understand what problems it actually has. The administrative structure of water governance, i.e. its bodies and their competencies is prescribed and regulated by the legislation on structure of the Government of Kyrgyz Republic, the Water Code, the laws “On Water”, “On Environmental Protection” and several other provisions, such as the laws “On Licensing”, “On Drinking Water”, “On Tariffs for Services on Delivery of Irrigation Water”, “On subsoil”, “On Water User Associations”.

On the top of hierarchy the President, Government and Parliament exercise mainly strategic, regulatory, and legislative functions in the water sector. Thus, the competences of *the government* are:

- Approval of the territorial boundaries of the main pools in accordance with the hydrographic principle of water resources management
- The creation of the National Water Council
- Approval of regulations on Basin Councils
- Appointment of the specially authorized state bodies for the purposes prescribed by this Code
- The establishment of a monitoring system of water resources
- Development and implementation of state water programs, their investment and financing
- Approval of prospective assessments of the state of water resources in the context of climate change. In short, government’s main functions are the coordination of interaction between ministries and administrative departments, as well as development and implementation of state water programs.

The National Water Council, which resumed its activities after the long break only in February 2013, serves as a national supervisory and coordinating body and is responsible for preparing strategic documents related to water policy.⁸⁸ It is composed of the heads of ministries, administrative agencies and other public authorities, which are responsible for water management along with financial issues, and national security. The Chairman of this council is the Prime Minister of the Kyrgyz Republic, and his deputy is the Head of the State Water Administration. The National Water Council reviews the National Water Strategy at least once every five years and submits amendments or additions, if such were made, for approval to the president.⁸⁹ Thus, the president is also involved in the legislative process.

The National Water Council in its turn establishes *the Basin Water Council* in each basin area in order to fulfill the function of coordination and regulation of water sector relationships. Each Basin Water Council includes representatives from the Basin Water Administration and from the regional (basin) authorities of such state institutions as the State Agency on Environment Protection and Forestry, the State Agency on Geology and Mineral Resources, the Department of sanitary and epidemiological surveillance, as well as from regional state administration, NGOs, and water users including the WUAs. The main responsibilities of the Basin Water Councils are: development of basin plan and submission of it to the National Water Council; preparation of procedural rules' projects on activities of basin council, which then go for approval to the government; coordination of activities in water sector

⁸⁸ UNECE Report, "Национальный Диалог по Водной Политике в Кыргызстане в Сфере ИУВР: Процесс и Результаты за 2008-2013 годы", http://www.unece.org/fileadmin/DAM/env/water/meetings/NPD_meetings/2013/Kyrgyzstan/pb_rus.pdf

⁸⁹ E.Sakhvaeva, "Отчет по институционально законодательной оценке Кыргызской Республики на предмет Интегрированного Управления Водными Ресурсами и бассейнового планирования", 2012

inside the main basin area; and also approval of staff of commissions on irrigation and drainage of basin and local levels.

The competencies of *the Parliament* include development and adoption of the water legislation with a right to make amendments and additions to it; as well as ratification and denunciation of international treaties in the field of water relations, approval of annual subsidies for irrigation and drainage, and finally determination of the amount of payment for the use of water resources.

The executive vertical of structure is comprised of three levels: national, basin (oblast) and district (rayon). According to the Water Code the highest executive responsible for the usage and regulation of the water resources in the Kyrgyz Republic is *the State Water Administration (Государственная Водная Администрация)*. Today its functions, i.e. monitoring, controlling, administrating the use of water resources and of irrigation, drainage infrastructure are temporarily given to *the Department of Water Management and Reclamation (Департамент Водного Хозяйства и Мелиорации)*, which is a subordinate unit of the Ministry of Agriculture and Land Reclamation of the Kyrgyz Republic. It evolved from the former Ministry of Water Management which dissolved in 1996. Besides executive functions, high ranking officials of this body also participate in policy formulation and lawmaking by developing draft proposals and expert assessments.⁹⁰ The department has its branches at regional and district levels which are upward accountable to it (see Figure 4) and called as *the Basin Water Management Department (BWMD)* in the seven regions (oblasts) (till 1997 they were called as Oblast Water Management Department), and *the District Water Management Departments (DWMD)* in the 40 districts (rayons). It

⁹⁰ Jenniver Sehring, "The Politics of Water Institutional Reform in Neopatrimonial States. A Comparative Analysis of Kyrgyzstan and Tajikistan", Politik in Afrika, Asien und Lateinamerika Politikwissenschaftliche Analysen zur Entwicklungs- und Schwellenländerforschung

is interesting, that in fact BWMDs are formed by administrative-territorial principle, not a hydrological one. It was explained by the fact that administrative boundaries in Kyrgyzstan match with hydrological ones, however the experts argue that this is not a case.⁹¹ The task of the BWMD is mainly the supervision and control of the DWMD. While the BWMD is responsible for all channels crossing more than one district, big rehabilitation projects and for coordination with neighboring BWMDs, as well as for development of a plan for water usage together with national and international agencies, the DWMD is basically main implementation agency, which at least in theory has direct and formal contracts with individual and collective water users on water delivery.⁹² Due to the greater amount of practical work and dependency on environmental conditions, the staff number of DWMD is relatively high compared to the BWMD: for instance, the DWMD of Sokuluk has 100 -115 employees, depending on the season.⁹³

Within the Department of Water Management and Reclamation, BWMD and DWMD the Kyrgyz Government with the help of international donors has established *the WUA Support Units*, which were entitled to provide technical assistance to existing WUAs in order to strengthen their capacities and to promote the creation of new

⁹¹ K.Valentini, E.Orolbaev, "Отчет о Поддержке Реализации и Интеграции ИУВР в Кыргызстане: инвестиционные стратегии, планы и финансовая политика", «Содействие интегрированному управлению водными ресурсами и трансграничному диалогу в Центральной Азии» Проект ЕС-ПРООН (2009-2012)

⁹² E.Herrfahrdt, M.Kipping, T.Pickardt, M.Polak, C.Rohrer, C.F.Wolff, "Water Governance in the Kyrgyz agricultural sector: on its way to Integrated Water Resources Management?", Bonn 2006, <http://dspace.cigilibrary.org/jspui/bitstream/123456789/26069/1/Water%20governance%20in%20the%20Kyrgyz%20agricultural%20sector.pdf?1>

⁹³ Jenniver Sehring, "The Politics of Water Institutional Reform in Neopatrimonial States. A Comparative Analysis of Kyrgyzstan and Tajikistan", *Politik in Afrika, Asien und Lateinamerika Politikwissenschaftliche Analysen zur Entwicklungs- und Schwellenländerforschung*

WUAs.⁹⁴ As a rule, small staff teams of these support units are composed of a WUA support specialist, a water management specialist, and an engineer.⁹⁵

Besides the Department of Water Management and Reclamation and its structure, several other state agencies are included in the water administration. Thus, *the Ministry of Emergency Situations* is responsible for the protection of the population and industrial facilities from emergency situations of natural or technogenic character, including harmful effects of water factor.⁹⁶ For that the Water Code endows it with responsibilities to participate in the National Water Council and the Basin Council; to harmonize different proposals on creation of national system of information about floods, mudflows and drought; to prepare together with the State Water Administration a plan for case of flood and mudslides and to update it periodically. The main department of hydro meteorological service of this ministry monitors the status of natural surface waters.

The State Agency on Environment Protection and Forestry is generally responsible for protection of water fund, and should perform such functions as supervision of compliance with the rules on of wastewater discharge, development and periodic updating of strategies for adapting to climate change at least once every five years, and other related ones.

The State Agency on Geology and Mineral Resources is responsible for management, regulation of use and protection of ground waters. The Department of Sanitary and Epidemiological Surveillance under the Ministry of Health is responsible

⁹⁴ E.Herrfahrdt, M.Kipping, T.Pickardt, M.Polak, C.Rohrer, C.F.Wolff, "Water Governance in the Kyrgyz agricultural sector: on its way to Integrated Water Resources Management?", Bonn 2006, <http://dspace.cigilibrary.org/jspui/bitstream/123456789/26069/1/Water%20governance%20in%20the%20Kyrgyz%20agricultural%20sector.pdf?1>

⁹⁵ Ibid

⁹⁶ K.Valentini, E.Orolbaev, "Отчет о Поддержке Реализации и Интеграции ИУВР в Кыргызстане: инвестиционные стратегии, планы и финансовая политика", «Содействие интегрированному управлению водными ресурсами и трансграничному диалогу в Центральной Азии» Проект ЕС-ПРООН (2009-2012)

for development of sanitary norms and rules for the protection of surface and ground waters' pollution. It determines the quality of surface water for economic, drinking and domestic uses in accordance with the sanitary and hygienic standards. In addition to these agencies specialized government organizations dealing with issues of standardization, metrology, state statistical reporting and monitoring also participate in water management. These ones are, for instance, *the National Institute of Standards and Metrology of the Kyrgyz Republic*, and *the National Statistical Committee of the Kyrgyz Republic*.

The local state administrations, which are subordinate to the president and government, have regulative and supervising functions as well. They are prescribed to protect the rights of water users and to supervise whether the territorial regulations concerning the maintenance and exploitation of zones of sanitary protection of water sources and lands of water fund are properly implemented or not. Organization of necessary measures for prevention of emergency situations on their prescribed territories, e.g. floods or mudflows, and elimination of their consequences is also their competency.

Stakeholders involved in the water management

Formally, *the Water User Associations* (WUAs) today appear to be the primary stakeholders responsible for water management on the local level. Their organizational structure, rights, and competencies are defined in the law on “WUAs and Federations of WUAs”. This law defines WUAs as “a non-profit organization, acting in the public interest for the purpose of operation and maintenance of certain irrigation system in order to provide irrigation water for owners and users of agricultural land”.⁹⁷ The Federation of WUAs is defined as “a non-profit organization, established by two or

⁹⁷ Translation by the author from the Law of the Kyrgyz Republic on “Water User Associations and Federations of Water User Associations” (as amended by the Law of March 30, 2013 N 46)

more WUAs in order to implement joint management, operation and maintenance of the main irrigation systems”.⁹⁸ The object of their competencies, e.g. irrigation system, is indeed a complex thing-it is a broad network which includes irrigation and drainage canals, pipelines, hydraulic structures, pumping stations, boreholes, ponds and reservoirs with related roads, buildings, electrical transmission lines and other infrastructure, including all trackside of lands allocated for the maintenance, operation and repair of irrigation systems.

According to the law, the key management bodies in the WUA structure are: the WUA General Assembly, the WUA Council, and the Audit Commission plus the Commission on Disputes Resolution established by the General Assembly. *The General Assembly*, being the highest administrative body, is entitled to such responsibilities as approval of the WUA Charter, election and approval of the WUA Council members, as well as approvals of the annual WUA budget, and annual plan of the WUA with irrigation schedules. The Assembly is headed by the chairman of *the WUA Council*. The responsibilities of the managing body, e.g. council, include the supervision of executive body, preparations of the agenda for general assembly, preparation of annual reports and balance sheets, and generally setting out the rules and procedures.

The executive body of the WUA Council is called as *the Direction of the WUA*. It is responsible for preparation of draft budgets, draft plans for maintenance and operation of irrigation systems, conduction of the register of members and non-members of the WUAs, which should be reviewed and updated each year (and include a description of the size and location of the land each WUA member and non-member within the WUA service area, logs of the amount of received water, as well as of

⁹⁸ Translation by the author from the Law of the Kyrgyz Republic on “Water User Associations and Federations of Water User Associations” (as amended by the Law of March 30, 2013 N 46)

requests for irrigation water's supply); hiring and firing staff of the WUA administration and oversight of their activities.

The Audit Commission monitors the financial and economic activities of the WUA Council, its chairman and Direction of the WUA. This commission composed of at least three people is elected from among members of the WUA by direct vote for a term of three years. The Commission on Disputes Resolution consisting of five members is elected by General Assembly for a three-year term. In their turn, these members select the chairman from among themselves. Sources of income for WUAs are: WUA members' contributions, as well as income from people, who are not being members of the WUA, have supply of irrigation water on a contractual basis, donations, and grants from the government and other sources which do not contradict to the legislation of the Kyrgyz Republic.

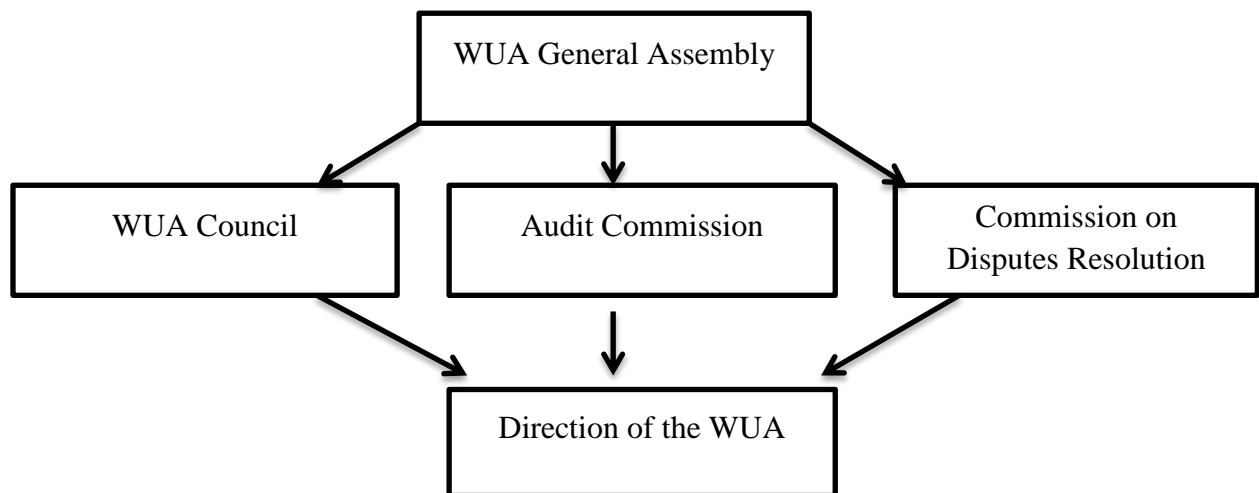


Figure 4: Organizational structure of WUAs in Kyrgyzstan

*Source: own compilation*⁹⁹

Besides the WUAs *the local self-government* executive bodies (aiyl okmotus) established in 1996 still play a certain role in the water management at the local level,

⁹⁹ The compilation is based on the Law of the Kyrgyz Republic on "Water User Associations and Federations of Water User Associations" (as amended by the Law of March 30, 2013 N 46)

due to the fact that prior to the establishment of the WUAs the responsibilities for maintenance and operation of irrigation systems (i.e. secondary and tertiary channels) were transferred to them.¹⁰⁰ In districts with operating WUAs they deal indirectly with water management, thus providing support and assistance to WUAs. In districts without any WUAs, a water specialist within *aiyl okmotu* assists farmers with planning their water needs, and submits necessary data to the District Water Management Department.¹⁰¹ In general, the *aiyl okmotus* in districts without any WUAs are supposed to promote establishment of WUAs.¹⁰²

Conclusion: Problems of Fit and Institutional Interplay in Kyrgyzstan

The previous chapters have presented the water problems and key state actors involved in water governance in Kyrgyzstan with their functions as it prescribed by the Water Code adopted in 2005. Although experts argue that a lot of contradictions exist in this document, it is clear that the general trend within this code and other related laws shifts water governance towards decentralization, stakeholder participation, adoption of pricing system and resource-based management. However, today this document has not realized all its propositions yet, though almost 10 years have passed already.

The Figure 3 (p.35) illustrates that the administrative structure of water governance is indeed complex, because along with “strictly” water-related organizations, other agencies dealing with political and socioeconomic issues are

¹⁰⁰ E.Herrfahrdt, M.Kipping, T.Pickardt, M.Polak, C.Rohrer, C.F.Wolff, “Water Governance in the Kyrgyz agricultural sector: on its way to Integrated Water Resources Management?”, Bonn 2006, <http://dspace.cigilibrary.org/jspui/bitstream/123456789/26069/1/Water%20governance%20in%20the%20Kyrgyz%20agricultural%20sector.pdf?1>

¹⁰¹ E.Herrfahrdt, M.Kipping, T.Pickardt, M.Polak, C.Rohrer, C.F.Wolff, “Water Governance in the Kyrgyz agricultural sector: on its way to Integrated Water Resources Management?”, Bonn 2006, <http://dspace.cigilibrary.org/jspui/bitstream/123456789/26069/1/Water%20governance%20in%20the%20Kyrgyz%20agricultural%20sector.pdf?1>

¹⁰² *Ibid*

involved. In addition to quite fragmented institutional arrangement, the problem of spatial fit was addressed only superficially to the water reforms, as already in 1997 the previous institutions with direct executive responsibilities over water resources management, e.g. Regional (*Oblast*) Water Management Departments were merely renamed into *Basin* Water Management Departments without any substantial changes in structure. As it was mentioned earlier, the core idea of establishing institutions on basin level is an intention to find maximum compatibility between hydrological and governance units in order to avoid misdirected, inadequate, or wrongly timed policies. The Department of Water Management argued that this was the case for Kyrgyzstan, because administrative and hydrological boundaries mostly coincide.¹⁰³ However, the hydrological map of Kyrgyzstan demonstrates that Chuy River for example crosses along three regions and do not coincide with administrative boundaries.¹⁰⁴ And this is not the only case. The possible solution for the problem of spatial fit could be an effective management of smaller hydrological units, e.g. canals (primary, secondary, tertiary) on the local level through the active involvement of the WUAs. However, the lack of qualified staff in WUAs due to elections regarding the WUA Council guided by informal rules regarding the WUA Council, make effective communication upward the organizational structure nearly impossible.¹⁰⁵

The Figure 3 also illustrates that even if there are more institutions involved in water management, the State Water Administration is to be regulatory body, which would unite Department of Water Management and Melioration, State Water Inspectorate and National Committee on Irrigation and Drainage. Today this

¹⁰³ Jenniver Sehring, "The Politics of Water Institutional Reform in Neopatrimonial States. A Comparative Analysis of Kyrgyzstan and Tajikistan", Politik in Afrika, Asien und Lateinamerika Politikwissenschaftliche Analysen zur Entwicklungs- und Schwellenländerforschung

¹⁰⁴ Ibid

¹⁰⁵ Ibid

institution still does not exist, and its functions are given “temporarily” to the Department of Water Management and Melioration.¹⁰⁶ Thus, this branch of institutions remains to be incomplete.

Different water experts who wrote reports for international organizations (e.g. Djailoobayev, Sakhvaeva, Orolbaev) state that one of the biggest problems in Kyrgyz water governance is a lack of coordination among different institutions, because there is often duplication of responsibilities, and lack of information channels among them. The duplication of responsibilities often leads to policy gaps.¹⁰⁷ The interesting point brought by J. Sehring is that the ministries often take extra-responsibilities in order to get more financial resources from the budget.¹⁰⁸ The biggest challenge as pointed out by the Director of the Institute of Water Problems and Hydro energy is the adoption of clear coherent national water strategy in Kyrgyzstan, which is still in the process of drafting.¹⁰⁹

¹⁰⁶ Herrfahrtdt, E., M. Kipping, T. Pickardt, M. Polak, C. Rohrer, and , C. F. Wolff, “Water Governance in the Kyrgyz Agricultural Sector: on Its Way to Integrated Water Resources Management?” Bonn, 2006. <http://dspace.cigilibrary.org/jspui/bitstream/123456789/26069/1/Water%20governance%20in%20the%20Kyrgyz%20agricultural%20sector.pdf?1>.

¹⁰⁷ Sakhvaeva, E. "Отчет по институционально законодательной оценке Кыргызской Республики на предмет Интегрированного Управления Водными Ресурсами и бассейнового планирования." 2012.

¹⁰⁸ Jenniver Sehring, “The Politics of Water Institutional Reform in Neopatrimonial States. A Comparative Analysis of Kyrgyzstan and Tajikistan”, Politik in Afrika, Asien und Lateinamerika Politikwissenschaftliche Analysen zur Entwicklungs- und Schwellenländerforschung

¹⁰⁹ http://www.ipp.kg/files/roundtables/RT_15_Dec_rus_ed.pdf

Bibliography:

- Национальный Диалог по Водной Политике в Кыргызстане в Сфере ИУВР: Процесс и Результаты за 2008-2013 годы" *UNECE Report*.
http://www.unecce.org/fileadmin/DAM/env/water/meetings/NPD_meetings/2013/Kyrgyzstan/pb_rus.pdf.
- Allan, Tony. "IWRM/IWRAM: A New Sanctioned Discourse?"
http://www.waterintegritynetwork.net/index.php?option=com_mtree&task=att_download&link_id=142&cf_id=61.
- Chatterton, Lynne. "The Politics of Water."
<http://www.drylandfarming.org/Water/waterhome.html>.
- D. J. Bandaragoda. "Stakeholder Participation in Developing Institutions for Integrated Water Resources Management: Lessons from Asia."
<http://cdm16658.contentdm.oclc.org/cdm/fullbrowser/collection/p267501ccp2/id/3375/rv/singleitem>.
- Djailoobayev, A. "National Report on the Regional Water Partnership(Kyrgyz Republic)", Report for Global Water Partnership." ,
http://www.gwp.org/Global/GWP-CACENA_Files/en/pdf/kyrgyzstan.pdf.
- Herrfahrtd, E., M. Kipping, T. Pickardt, M. Polak, C. Rohrer, and , C. F. Wolff. *Water Governance in the Kyrgyz Agricultural Sector: on Its Way to Integrated Water Resources Management?* Bonn, 2006.
<http://dspace.cigilibrary.org/jspui/bitstream/123456789/26069/1/Water%20governance%20in%20the%20Kyrgyz%20agricultural%20sector.pdf?1>.
- Horlemann, Lena, and Ines Dombrowsky. "Institutionalizing IWRM in Developing and Transition Countries – The Case of Mongolia." 2010.
- "How to Establish a Water Users Association? Practical Steps for Social Mobilizers."
http://www.yemenwater.org/wp-content/uploads/2013/02/04_iwmi_2003_howto-wua.pdf.
- "Hydraulic Mission to IWRM: Paradigm Shifts within Water Sector Development."
NC Narayanan.
- Jennifer Sehring. "The Politics of Water Institutional Reform in Neopatrimonial States." *Politik in Afrika, Asien Und Lateinamerika Politikwissenschaftliche Analysen zur Entwicklungs- Und Schwellenländerforschung*, 2006.
- Josephson, Paul. "River Dams." In *Industrialized Nature: Brute Force Technology and the Transformation of the Natural World*. 2002.
- Kraak, Eelke. "'Central Asia's Dam Debacle'." *Chinadialogue*, 2012.
<http://www.chinadialogue.net/article/show/single/en/4790>.

- Lenton, Roberto, and Mike Muller. Introduction. Edited by Mike Muller. In *Integrated Water Resources Management in Practice*, edited by Roberto Lenton. Global Water Partnership, 2009.
- Mamatov, N., M. Cusupov, and B. Raimcanov. "Water Resources Problems in Kyrgyzstan." http://www2.dsi.gov.tr/english/congress2007/chapter_3/86.pdf.
- Mei Xie. "Integrated Water Resources Management (IWRM) – Introduction to Principles and Practices." *World Bank Institute*, 2006.
<http://www.pacificwater.org/userfiles/file/IWRM/Toolboxes/introduction%20to%20iwrn/IWRM%20Introduction.pdf>.
- Molle F., Mollinga P.P., and And Wester P. "Hydraulic Bureaucracies and the Hydraulic Mission: Flows of Water, Flows of Power." *Water Alternatives* 2, no. 3. <http://edepot.wur.nl/12837>.
- Moss, Timothy, and Jens Newig. "Multi-Level Water Governance and Problems of Scale Setting the Stage for a Broader Debate." *Environmental Management*, no. 46 (2010).
- Moss, Timothy. "Spatial Fit, from Panacea to Practice: Implementing the EU Water Framework Directive." *Ecology and Society*, 2nd ser., 17, no. 3.
- Paavola, J., T. Kluvankova-Oravska, and Andrew Gouldson. "The Governance of Biodiversity: Eco- Systems, Institutions and the Interplay of Actors, Levels, Frameworks and Regimes." 2008.
- Sakhvaeva, E. "Отчет по институционально законодательной оценке Кыргызской Республики на предмет Интегрированного Управления Водными Ресурсами и бассейнового планирования." 2012.
- U.Beck, A. Giddens, and S. Lash. "Reflexive Modernization: Politics, Tradition And Aesthetics in the Modern Social Order." 1994. Cambridge: Polity Press.
- "UN-Water Country Brief, Kyrgyzstan."
http://www.zaragoza.es/contenidos/medioambiente/onu/1026_eng_res6_unwater_briefs_kyrgyzstan.pdf.
- Valentini, K., and E. Orolbaev. "Отчет о Поддержке Реализации и Интеграции ИУВР в Кыргызстане: инвестиционные стратегии, планы и финансовая политика EU-UNDP Project."
http://centralasia.iwlearn.org/dokumenty/project-docs-ru/component_kyrgyzstan-ru/expert_financial%20policy_ru/files/Expert%20on%20financial%20policy_RU.pdf
- Vatn, Arild, and Paul Vedeld. "Fit, Interplay, and Scale: A Diagnosis." *Ecology and Society* 4, no. 17 (2012). <http://www.ecologyandsociety.org/vol17/iss4/art12>.
- Wynn, Graeme. "What Is Water?" Introduction to *What Is Water? : The History of a*

Modern Abstraction", by Jamie Linton. :
<http://reconstruction.eserver.org/063/linton.shtml>.

Young, Oran. "The Institutional Dimensions of Global Environmental Change. *Public Administration and Public Policy* 2.
https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&cad=rja&uact=8&ved=0CFkQFjAE&url=http%3A%2F%2Fwww.eolss.net%2Fsample-chapters%2Fc14%2FE1-34-10.pdf&ei=rDBkU7_bIYjU4wTZ04HYBQ&usg=AFQjCNHjL3dGHCOQAhDc1S0rwa_7YmHfJQ&sig2=YquFgHeKGR--uDtIJXMIHA&bvm=bv.65788261,d.bGE

Young, Oran. "Why Is There No Unified Theory Of Environmental Governance." 2002.
<http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/881/young020402.pdf?sequence=1>.

Zehe, E., and M. Sivapalan. "Threshold Behavior in Hydrological Systems as (human) Geo-ecosystems: Manifestations, Controls, Implications." <http://www.hydrol-earth-syst-sci.net/13/1273/2009/hess-13-1273-2009.pdf>.