SOCIO-TECHNICAL ASPECTS OF WATER MANAGEMENT: EMERGING TRENDS IN CENTRAL ASIA

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ABSTRACT

Water sector during the soviet period has been protected from the financial and political uncertainties due to overwhelming state presence in the sector. The firm trademark of Soviet water management was technology-technical oriented, hierarchical institutions in the sector which are centrally controlled by communist party and water sector ministries. Ideological and political protectionist policies of the soviet government have been crucial on shaping water sector policies. The water management decisions at the different levels were not contested by any of involved parties (different republics, sectors, territories) due to integrated economic structure and strong presence of the state in everyday politics, including in water management. However, collapse of the Soviet Union has brought many uncertainties, political and economical changes, and decline in social infrastructure into former republics. The water sector became playground for multiple actors at the different levels and arenas, making water management a socio-political process. This paper is an attempt to describe how three different dimensions of water management in Central Asia are interacting and shaping each other: local, national and inter-state.

INTRODUCTION

Societal problems are multi-faceted and complex. For instance, natural resources management (NRM) has several components and dimensions that influence each other. The solution to NRM problems requires an understanding of both natural resources systems and their interactions with human (management) systems (Mollinga, 2009). Multi- dimensional societal problems require changing the "business as usual" approach on natural resources management (NRM) research, especially on water resources management. The response to growing NRM problems, particularly in the water sector of the Central Asia has been one of "normal professionalism" (Chambers, 1988) of water sector researchers and engineers. "Normal professionalism" is a standard, disciplinary, limited response to problems, which is reproduced in the education system. This has contributed to the reproduction and continuation of problems and has been generating limited approaches for addressing water management problems.
Characteristics of an inter- and transdisciplinary approach to complex water resources management problems are the following. (1) acknowledges the complexity and heterogeneity of problems and organizations, (2) accepts local context and uncertainty, (3) implies interactive action and is inter-subjective, (4) is in most cases action oriented, making linkages across disciplinary boundaries (Mollinga, 2008).

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This is especially relevant for Central Asia, where water management in the past decades has changed from a centralized, purely technical issue to a debated and contested transboundary, socio- political endeavor (Dukhovniy. 2008, Abdullaev. 2000, Abdullaev et al. 2009). The disciplinary and government-directed research efforts from the Soviet period do no longer suffice for improving water management in modern Central Asia. The old approach no longer applies for the following reasons:

1. Due to the major geopolitical change of the collapse of Soviet Union, both governance and management of transboundary water resources between five countries became more of a political process. During Soviet times water management was regarded as purely 'technical'; the other dimensions were under strict control from a central point, Moscow, and in this sense given and unchangeable. With five sovereign states sharing the central Asian rivers, a new politics has emerged.

2. Post – soviet changes in agricultural policies have brought very serious social changes in rural areas. The ensuing social differentiation of the rural population has been captured by different research studies (Kandiyoti, 2003, Trevisani, 2008). Therefore, previous research on water management when collective farms were the main agricultural producers became irrelevant for today. The community of water users has become internally differentiated through the emergence of larger and smaller farms

3. The environmental consequences of the previous "hydraulic mission" (Allan, 2006) have been catastrophic for the region (Abdullaev et al., 2009). Therefore, research that speaks to a series of problems and concerns, including ecology, equity, and governance, beyond the concept of 'development' in the earlier soviet sense, is needed.

This paper presents a framework for socio-technical[3] analysis of water management and results of its application in the Khorezm region, Uzbekistan[4]. The main element of the framework is the boundary concept[5] "water control" (Mollinga. 2003, 2008) which was applied to capture three interlinked processes in water control: physical, organizational and socio-economic/political.

The water management in Central Asia has attracted attention of both mass media and politicians around the world since collapse of the Soviet Union. Initial interest to the water problems of the region was related to the "Aral Sea crisis"- environmental Armageddon of 20th century. The problem was outcome of decades long "fight" against nature, when water resources has been diverted from main rivers into millions of hectares of irrigated land to develop irrigated agriculture . After the collapse of the Soviet Union, Central Asian states have been very quick to confirm their commitment to keep Soviet

[3] Socio-technical analysis was borrowed from Mollinga (2003) for describing two interlinked parts of water management systems: the first is infrastructure and the second is the human factor in managing water.

[4] This research has been conducted within the framework of the BMBF (German Ministry of Education and Research) funded project *Economic and Ecological Restructuring of Land- and Water Use in the Region Khorezm (Uzbekistan): A Pilot Project in Development Research*.

[5] "Boundary concepts are words that operate as concepts in different disciplines, refer to the same object, phenomenon, process or quality of these, but carry different meanings in those different disciplines" (Mollinga. 2008)

era water allocation arrangements between states of the region. This was that time only way to keep piece and calm in already turbulent region. In the beginning this worked very well, states of the region have formed interstate organizations for coordinating water related issues.

The impacts of the socio-economic decline in 1990's have had long term implications for water sector. The level of funding for operation and maintenance of the large scale water infrastructure has been greatly declined. Earlier well paid staff of water management organizations started to leave water sector in hundreds due to low salaries and declined prestige of the water sector. The national states having great economic difficulties due to the re-building of nationhood has not been able always provide enough support to the water sector. These radical changes have been crucial for changing soviet type, centralized water management more to socio-technical process. Although, states in Central Asia still tries to have tight and firm control over the water management at the different hierarchical levels more and more water management becoming more of socio-political process.

At present water management in countries of the Central Asia could be characterized as quasi-state water management, with multiple dynamics: growing social dynamics at the grass-root levels and growing hydro political tensions at the regional (interstate) level. The different levels are interlinked, any changes in one level affects other two. Therefore, in this paper dynamics of the water management at different levels are presented in context of its impact on other water management levels. E.g., any changes at the hydro politics at the transboundary will have immediate impact on everyday politics of water management due to reduced flows or changes in water regimes of main irrigation and drainage systems. The national state policies will reflect those hydro political changes and will enforce new set of rules, orders in order to cope with emerging problems, e.g., attempts to introduce water saving irrigation for increasing water efficiency, etc. This enforcement brings changes again into everyday politics of water management. This is cyclic process and every time changes in one level bring changes into the next level. Therefore, those who work on transboundary water management issues should take into account this interrelated nature of water management.

METHODOLOGY AND CONCEPTS

The centerpiece of the research framework applied in this research is socio-technical analysis was borrowed from Mollinga (2003) for describing two interlinked parts of water management systems: one is infrastructure and second is human factor in managing water. The boundary concept[6] of "water control" (Mollinga. 2008) has been applied to link technical, managerial and socio-economic- political aspects of the water management (figure 1). Different dimensions of the water control are interlinked, changes in one dimension result changes in the other two (Mollinga. 2003, 2008). The

[6] "Boundary concepts are words that operate as concepts in different disciplines or perspectives, refer to the same object, phenomenon, process or quality of these, but carry (sometimes very) different meanings in those different disciplines or perspectives. In other words, they are different abstractions from the same 'thing' " (Mollinga.2008)

border concept is applied for analysis of everyday water management, state policies and hydro politics.

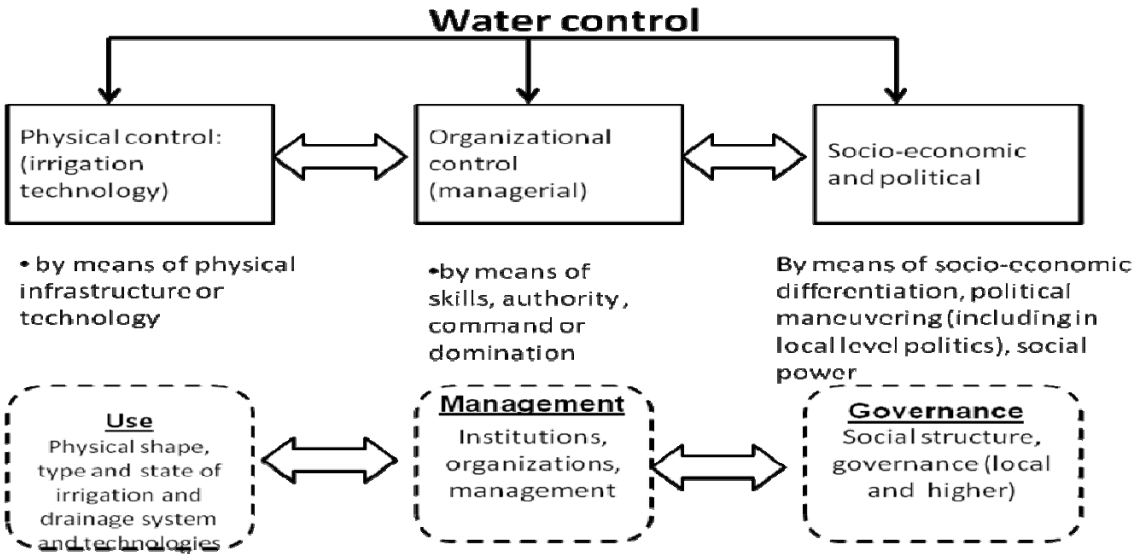

Figure 1. Water control (adopted from Mollinga .2008)

The socio-technical analysis has helped to look into the water management not only with eyes of engineer, but also link it with dynamic social structure of water resources management. The framework was applied for period of 2001- present times, when author have conducted extensive work on water management in the region (Central Asia). In this paper author applied water control concept into three levels of water management: everyday, politic of water policies and hydro politics of Central Asia. This is both interesting and challenging exercise the same time.

This concept was earlier applied for mainly to the everyday politics of water management (Mollinga. 2003). However, in this research the concept will be looking into those of three interlinked levels of water management in Central Asia. Three levels of water control: everyday water management, state policies and regional hydro politics are interlinked and shape each other. Everyday politics of the water management has become more of contested due to the multiple players and presence of state via different intermediaries, such as implementation of state quota (Uzbekistan, Turkmenistan), provision of subsidies (Kazakhstan, Turkmenistan) heavy presence of state officers (almost all states), the state policies on water management has been also dynamic although its central goal remains the same- keeping control over the water management at different levels. The hydro politics has been dynamic, transformed from being state centric during the Soviet times into more of dynamic and contested due to competing interests of independent states (figure 2). At three different levels common and connecting process is water control: this is the process of using, managing and governing of the water management for purposes of the economies.

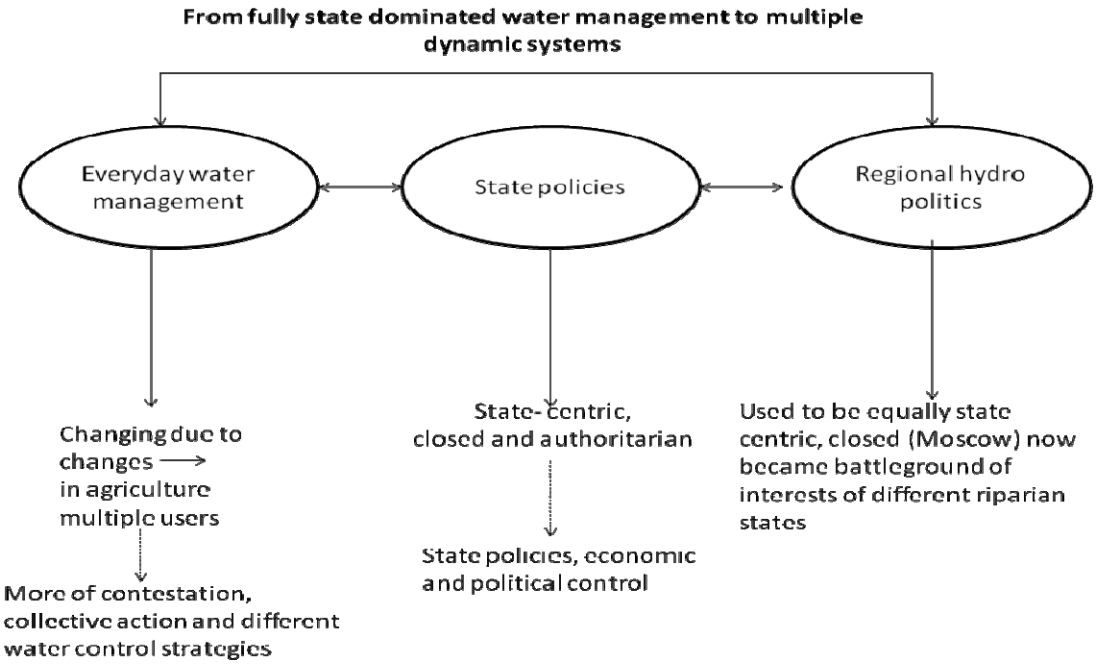

Figure 2. Water control at three levels of water management: everyday water management, state policies and regional hydro politics

The three dimensions of the water control (use, management and governance) differently reflected on three levels of water management (everyday, state and hydro politics). The everyday politics although has a governance dimension, it is overwhelmed by use and management dimensions, the state water policies are overwhelmed by governance, management and hydro political level by use and governance dimensions (figure 3). Therefore, application of the water control concept will consider these differences at the different water management levels.

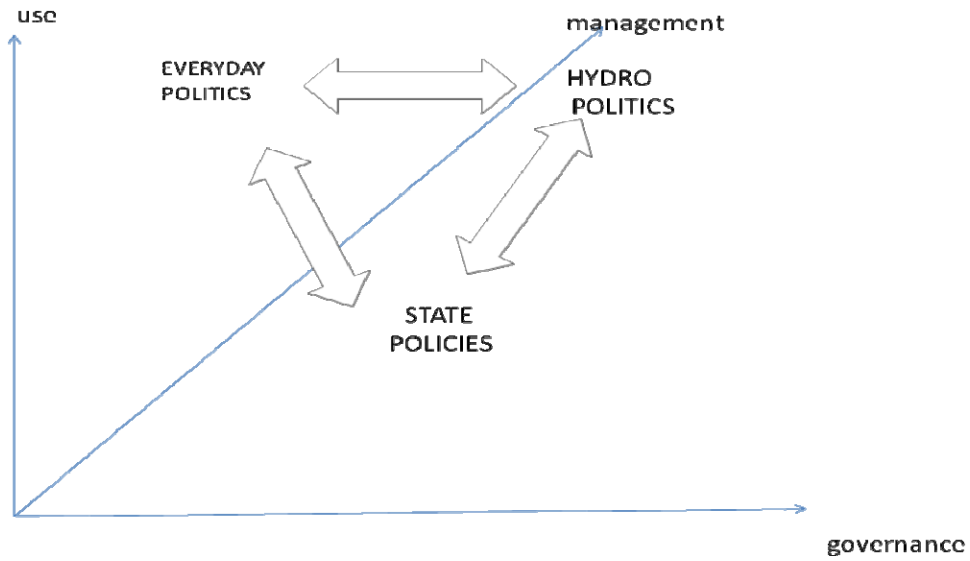

Figure 3. Three dimensions of everyday, state and hydro politics

The research on a water control at three different levels should highlight on-going processes and trends at each level. E.g., at the grass root level it is important to understand application of the water control strategies by different players, at the state level, it is to understand politics of state water policies and at the transboundary level, it is to research application of different water control strategies by different states as response to the changing hydro politics.

EMPIRICAL EVIDENCES: DYNAMICS OF WATER MANAGEMENT AT THE DIFFERENT LEVELS

Grassroots level (everyday politics) water management

The "everyday politics" of water resources management refers to the contested nature of day-to-day use of water resources (Mollinga.2008). The land use and management during the Soviet times was mainly in form of collective farms. The grassroots level of water management is that of former collective farm level where instead of large scale collective and state farms individual farming units has been formed during the 15 or so years of de-collectivization/individualization of agricultural production. Individualization of agricultural production system have resulted on more individual responsibilities and plurality of the production (Trevisani.2007, Veldwisch. 2008) which have resulted formation of different groups, stratification of community and society. This has been further exacerbated due to limitations of the water management system, which was designed to supply water for collective farming unit with centralized decision making (Veldwisch. 2008). Hence water distribution became an issue of social interaction, a place of contestation and competition (Veldwisch. 2008, Abdullaev et al. 2006, and Wegerich. 2000). As result, different groups started to apply different water control (Mollinga. 1998, 2003) strategies for getting access (Ribot and Peluso.2003) to the water at the former collective farm level. The result of this had been seen on water distribution: it became unequal both spatially, between uses and users (figure 4).

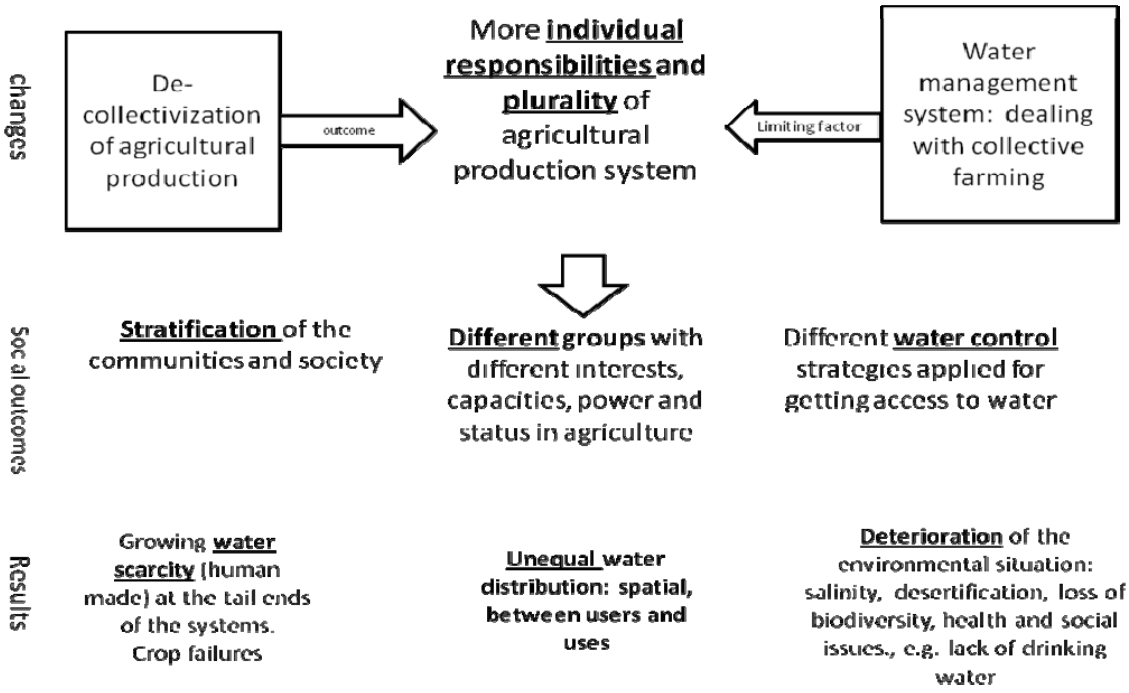

Figure 4. Dynamics of water management at grass roots level (Abdullaev at al. 2008)

Unequal water distribution result on growing water scarcity (human made) at the tail end of the irrigation systems leading to frequent crop failures (Abdullaev et al.2006, Wegerich. 2000). The social and environmental consequences of this has been growing salinity, desertification, drying of lakes and decline in biodiversity at the tail end of irrigation systems (Molden et al.2007). The grass-root water management became more of socio-technical rather than state- overwhelmed techno-technological process. The pressure of the changes at the grass root levels has been transformed into next level of water management- national level water policies.

State level policies (Politics of water policy)

The politics of water policy refers to the contested nature of policy processes at the level of sovereign states (Mollinga. 2008). As Rap (2007) describes it for the example of Mexico, the water policies, like other policies, are negotiated and re-negotiated in all phases and at all levels. Immediately after its independence some states of Central Asia have tried to sustain presence in agriculture (Uzbekistan, Turkmenistan) with consequent state- overwhelmed water management for irrigated agriculture but Kazakhstan and Kyrgyzstan where state in the beginning have left alone agricultural production solely to the producers. However, later (sometimes in mid 2000s) all states of the region have returned in different forms back to control of agriculture in different forms. The water management policies for agriculture shaped and influenced by states role in water management for different sectors: agriculture, energy, etc. The water sector is considerably re-shaped by nation building notion of the different states. The sectoral reforms, institutional changes brought more pressure on water management, mostly reducing flow of financial means, changing previous leading position of the water agency. The states of the region are translating their national policies into everyday

water management (grass- roots) decisions and into hydropolitics (inter- state). E.g., national food security, energy independence issues are translated into agricultural policies such as state quotas for cotton and wheat (Uzbekistan, Turkmenistan), price control mechanisms (Kazakhstan) and etc. which have impact on daily water management practices. Similarly the same state policies have a reflection on behavior of the countries in the meetings of interstate organizations, countries dependent on irrigation defends water allocation for summer months for irrigation, energy scarce countries of upstream (Kyrgyzstan and Tajikistan) are trying to develop their energy sector.

Interstate level (Hydro politics)

Hydropolitics is a phrase that has been coined in the literature on international water conflicts, (cf. Waterbury.1979; Ohlsson.1995 in Mollinga. 2008). Elhance (1999 in Mollinga. 2008) explains hydropolitics as "the systematic study of conflict and cooperation between states over water resources that transcend international borders." Immediately after the collapse of the Soviet Union, 5 Central Asian states have organized Interstate Coordination Water Commission (ICWC) and states of Central Asia agreed to continue with the principles of water allocation that had prevailed in the USSR (Wegerich. 2008). The interstate relations were and are constructed to serve political goal- ensuring stability and preventing conflicts in the region and of course to give enough space to water bureaucracies to deal with water sector separate from other sectors. However, at the end of 1990's different countries of the region started to bring their national interests into the discussion table. The energy interests of the upstream countries (Kyrgyzstan, Tajikistan) came into conflict with irrigation water for the tail end countries (Kazakhstan, Turkmenistan and Uzbekistan). The water management at the regional level (Central Asia) became more of hydro politics (Abdullaev.2009a). The factors which influences interstate hydro politics depends from agricultural reforms, irrigation policies, regional cooperation and other polices of riparian states. The states of the region are overwhelmingly using all forces: political (regional, international forums), economical (gas, oils supplies, etc) in order to achieve more control of water management at the interstate level.

CONCLUSIONS

Interstate water management in Central Asia is seen mostly through prism of interstate relations only, ignoring of inter-related nature of water management at different hierarchical levels. Analysis of the water management at grass-root, national policies and interstate levels shows that changes have taken place in each level for last 15 or so years. The changes mostly related to the in increased attempts on water control by different players: different water users (grass roots), sectors (national) and states (interstate). Therefore, hydropolitics at the interstate levels is camouflaged or open reflection of those inter-related nature of the water management at different hierarchical levels.

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