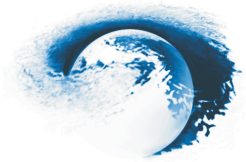

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Incomplete reforms and institutional bricolage in community-based governance of mountain irrigation systems in Tajikistan: A case study in the Pamirs

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About the Publisher

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Abstract

The current paper presents first results of an investigation that looks at the emergence of a variety of institutions, actors and arrangements (both formal and informal) of water governance and their interdependencies, links and impacts on water distribution and management in the post-soviet Tajik Pamirs. Until now, the role of the state, Water User Association (WUA) and local informal institutions at different levels have sometimes overlapped, mutually reinforced and occasionally contradicted each other and thus have challenged community based water governance in the Pamirs.

By applying the eight design principles of long-enduring Common Pool Resource (CPR) Institutions (Ostrom 1990) the study attempts to:
1) get an idea of potentials and limitations of the existing formal and informal institutional bricolage for community based water governance, and
2) discuss possible pathways for its improvement.

The results show that official recognition of grass roots level management of water, minimum interference of local authorities, application of mixed methods of conflict resolution as well as existence of traditional institution of reciprocal and collective voluntary labour exchange and assistance are enabling factors for community-based water governance. By contrast, top down establishment of the WUA, uncoordinated and non-participatory approaches to operation and management along with limited resources and chaotic application of different rules and regulations (formal and informal) result in people losing their feelings of ownership of the infrastructure and institutions that they are associated with, thus impeding effective and fair water management and distribution at local level. Based on these factors there is a vital need for the creation of a platform where all stakeholders could deliberately debate, learn and agree on potential strategies for improved water governance in the Pamirs. Thus, success or failure depends on mutual abilities and efforts of the state and water users on achieving public awareness and resource mobilization (human and material) towards addressing the most pressing commonly agreed challenges of water management and distribution.

Keywords: Water governance; irrigation; common pool resources; institutional bricolage; Tajik Pamirs

CONTENT

1. Introduction

The success of the agrarian sector reform in Tajikistan greatly depends on improvement of irrigation water governance. During two decades of independence along with other sectors of the economy, water management in the agriculture sector faced rapid and radical transition from a centralized planned production to agricultural production oriented toward open markets. The transition was marked by adoption of radical neo-liberal policies, which resulted in an institutional gap that pushed stakeholders towards the establishment of private local institutions that should operate according to the new political reality and radically shrinking state and local resources. The permanent limitation of state financial and technical resources as well as organizational constraints left no other choice than the development of community based water governance in Tajikistan (Oxfam 2007).

A review of the effects of policies in the irrigation sector showed that often uncoordinated, parallel efforts of state, donors and local communities have not led to the establishment of a new, market and private initiative-based water governance regime. Instead, in practice the encounter of different institutional rationales has led to the emergence of institutional bricolage, consisting of a mixture of informal pre-soviet traditional and more formal soviet and market-based rules and regulations for irrigation, which nowadays are governing access to, and distribution of, water for agriculture (Sehring 2009).

This paper presents an analysis of the emergence of community based water governance in one mountain region of post-soviet Tajikistan, through the application of institutional designs principles of CPR theory in context of institutional bricolage concept of post institutionalism.

1.1 Design principles and common pool resources management

Institutional reforms in the management of natural resources in transitional economies are characterized by an emergence of a variety of actors with unclear roles and responsibilities, usually causing inadequate appropriation and degradation of the resources. Common pool resources are particularly prone to mismanagement and degradation since they are subject to utilization and management by a large number of actors who often have heterogeneous values, interests and demands (Nyirenda 2015). The CPRs which vary between forest, fisheries, pasture or water have a shared feature of high subtractability and low excludability, i.e. the resource used by one at a given time cannot be used by another, and the physical characteristics of the resource makes it extremely hard to exclude potential competing users (Ostrom 1990). Water probably is the most ubiquitous and challenging type of CPR to manage sustaianbly, characterized by a vital importance for living beings as well as distinctive biophysical features that makes it hardly manageable within a fixed set of human and physical boundaries.

The complexity of defining clear property rights over CPRs generally has resulted in a perception that collective management of such resources is always subject to overuse and degradation. This idea was initially advocated in Garrett Hardin's (1968) influential work, "Tragedy of the Commons" in which he challenged the ability of individuals to collectively manage shared natural resources. By example of national parks and pastures, Hardin (1968) confuses the CPRs with open access conditions (or so called res nullius), in which, each individual is tempted to overuse the resource while neglecting long-term common benefits that could be derived through cooperative efforts. By questioning the abilities of individuals in sustainable management of common resources, Hardin (1968) recommended state or market-based approaches for managing the commons as the only existing rational option that would avoid competition-driven overuse of natural resource and consequent degradation. He saw the primary solution in the coercive power of the state and/or markets to impose rules that could be followed by individuals to avoid commons tragedy.

By contrast, Elinor Ostrom (1990) in her seminal work of governing the commons argues that bounded rational individuals acting on the basis of a set of commonly agreed rules can overcome the open access problem. Without devaluing the role of state or market in the management of CPRs, Ostrom empirically showed that groups of people in different forms of associations are able autonomously to create and apply appropriate formal or informal institutions to sustainably manage their commons. The achievement of mutual benefits by multiple users from utilization of CPRs is normally constrained by variety of problems, among which are high transaction costs, free riding, rent seeking and corruption (Ostrom 1992). Nevertheless a wide range of empirical studies by Ostrom (1990) have shown that groups performing successful management of their commons were likely able to alleviate the given problems by crafting institutions which very often have similar conditions and features.

Subject to contextual specificities and distinctions the rules and regulations within sustainable CPR systems can often be characterized by shared conditions and configurations also known as design principles of long enduring CPR institutions (Ostrom 1990). Ostrom (1990, p. 90) defines the design principles as "…an essential element or condition that helps to account for the success of these institutions in sustaining the CPRs and gaining the compliance of generation after generation of the appropriators to the rules-in-use." She warns against a blue print application of design principles and does not claim that they represent a generalized set of rules applicable in any context and situations. Instead, Ostrom (2002, p.1330) proposed to develop "a series of design principles that characterize the configuration of rules that are used". The most important is that institutional development processes must be in place, whereby rules are developed and applied based on the joint understanding, agreement and commitment of the people involved (Ostrom 1992).

Design principles illustrated by long-enduring CPR institutions:

1) Clearly Defined Boundaries

Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must be the boundaries of the CPR itself.

2) Proportional Equivalence between Benefits and Costs

Appropriation rules restricting time, place, technology, and quantity of resource units are related to local conditions and to provision rules requiring labour, material and/ or money.

3) Collective-Choice Arrangements

Most individuals affected by the operational rules can participate in modifying the operational rules

4) Monitoring

Monitors, who actively audit CPR conditions and appropriator behavior, are accountable to the appropriators or are the appropriators.

5) Graduated Sanctions

Appropriators who violate operational rules are likely to be assessed graduated sanctions- depending on the seriousness and the context of the offence- by other appropriators, by officials accountable to these appropriators, or by both.

6) Conflict-Resolution Mechanisms

Appropriators and their officials have access to low-cost local arenas to resolve conflicts.

7) Minimal Recognition of Rights to Organize

The rights of the appropriators to devise their own institutions are not challenged by external government authorities.

For CPRs that are parts of larger systems:

8) Nested Enterprises

Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

Source: Based on Ostrom (1990)

The strength of applying such design principles is that this allows for simultaneous analysis of the conditions of CPRs as well as the performance of the CPR institutions (both formal and informal) that shape the organizational structure of the collective actions with regard to the resource.

1.2 Critiques of the design principles and introduction of institutional bricolage concept

Even though application of design principles in the research on CPRs management has gone through an extensive empirical validation within a variety of regions and contexts (Ostrom 1990; Ostrom 2002), the approach is still subject to scientifically sound critical inquiry and revision (Cleaver and Franks 2005; Cox et.al 2010). Cox et.al (2010) in their review paper of 91 studies which implicitly or explicitly applied Ostrom's design principles discussed a number of findings such as: incompleteness of the principles and need for consideration of local and external socio economic factors in the study of commons; difficulties with generalizations and up-scaling of the design principles findings to broader contexts and higher levels; a need to conceptualize more fluid boundaries; a concern over real participation and empowerment within collective choice arrangements; and concerns about the substitution of existing strong social capital in some cases with additional external sanctioning mechanisms.

Emerging as a response to limitations of design-based institutional crafting, the followers of so-called post or critical institutionalism have been insisting on a more complex approach in studying the commons (Cleaver and Frank 2005; Del Callejo and Cossío 2009; Hall et al. 2013). As an alternative, the institutional bricolage concept which questions the outright validity of the design principles and challenges the mainstream institutionalism approach has been proposed. "Institutional bricolage is a process through which people, consciously and non-consciously, assemble or reshape institutional arrangements, drawing on whatever materials and resources are available, regardless of their original purpose" (Cleaver and Koning 2015, p.4). The core idea behind the institutional bricolage concept as epitomized by critical institutionalists is that they magnify the social embeddedness of CPR management institutions and argue that collective action is shaped by the past and present social realities, power relations and more complex surrounding environment (Cleaver 2000; Cleaver and Franks 2005; Hall et al. 2013; Cleaver and Koning 2015). The exclusively conscious and rational design-based crafting of institutions is questioned and more dynamic and less deliberate, bureaucratic and formalized processes of institutional change is encouraged. It is suggested that institutions normally have multi-purpose natures, and they need not be considered either weak or robust per se, nor be focused soley on the particular resource management issue. Clear authority and sanctioning are not always tangible and feasible, and resource use boundaries and processes may be fuzzy as well as subject to the improvised (ad hoc) emergence, development or replication of management practices. Such institutional development

processes are highly dependent on culturally and socially inherited practices mixed with modern and traditional, formal and informal arrangements (Cleaver 2001; Cleaver and Koning 2015).

While agreeing with calls for greater fluidity in resource boundaries issues, Haller (2007) disagrees with the argument that Ostrom is overemphasizing the importance of formalization of institutional arrangements. Instead, through a variety of successful cases Ostrom demonstrates the significance of informal institutions embedded in specific cultural environments and underlines the prominence of indigenous knowledge (Haller 2007). Indeed, the fallacy is that collective and concise agreement on particular rules that were clearly understood, followed, monitored and in case of non-compliance sanctioned is considered as an absolute formalization of institutional arrangements (though this was never claimed as such by Ostrom and colleagues).

Considering the need for more comprehensive approaches in the study of institutional development (Ostrom and Basurto 2010), there is valid ground for flexibility in commons research. To avoid oversimplification and idealization of the institutional development process (Bruns 2009; Merrey and Cook 2012), instead of contraposing the two concepts of institutional design and bricolage, the given paper attempts to apply them both as complementary and mutually reinforcing (Komakech and van der Zaag 2011). The concept of institutional bricolage would help to show a structural "messy middle" (Mehta 1999; Steimann 2011; Cleaver and Koning 2015) of diverse arrangements reflected in a mixture of informal practices and bureaucratic processes that have emerged as a response to chaotic situations in the transitional period since the collapse of the Soviet Union. On the other hand, the core design principles of CPR institutions which have made a great contribution towards our understanding of the potentials and limitations of community based natural resources management (Mehta 1999; Ostrom 2002; Cleaver and Franks 2005; Merrey and Cook 2012) will also be applied to analyse the emerging mix of governance institutions and their effects on the management of locally shared water resources.

2. Research context and methods

This case study is based on two months of field work in Summer 2013, in Porshinev jamoat (local municipality) of Gorno-Badakhshan Autonomous Oblast (GBAO), Tajikistan (see Figure 1). Comprised of 9 villages, Porshinev is the largest jamoat in GBAO. According to the local statistics department, Porshinev has a population of 7,952 people living in 1,308 households[1]. Situated at an elevation around 2,100 meters above sea level, the average rainfall in Porshinev municipality ranges between 200 and 400 mm per year (Breu 2006).

The irrigation system in Porshinev is extensive and complex (Wood et al. 2009). A variety of main and tributary canals deliver water from the nearby transboundary river and from surrounding

[1] Porshinev statistics department data (2015)

springs and deep mountain valleys. The system is subject to a high temporal and spatial variability, reflected especially in the seasonal availability of water resources, upstream and downstream geographical differences and variable access to infrastructure. The two major perennial sources of water are distributed unevenly among the nine villages. The villages of Vozm, Barchid, Kushk, Buved, Midenshor and Khosa use water from from Barchid gorge, whereas the remaining three villages (Tishor, Pashor and Jiryoj) obtain water from adjacent Tishor and Jiryoj gorges (Wood et al. 2009; see Figure 2).

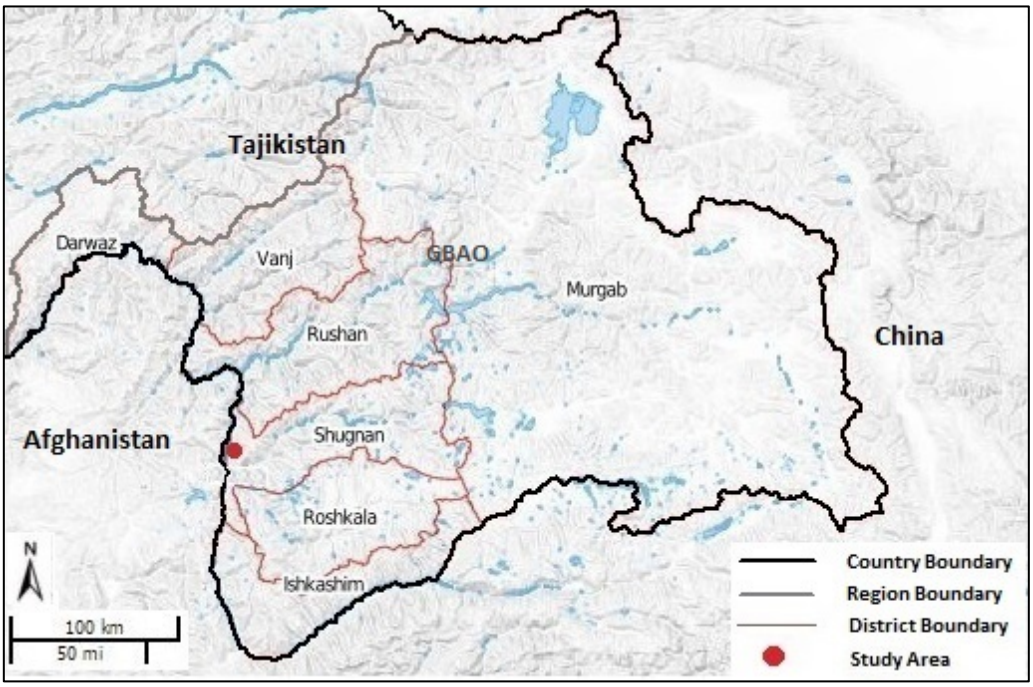

Figure 1: Location of the study area, GBAO, Tajikistan.
Source: Author's, adapted from http://www.pamir-gis.info/

The availability of water depends on annual precipitation so duration of irrigation season varies between the years. Generally, the irrigation season lasts between mid of April to mid of October, with the highest demand being in June and July (MSDSP 2009). Along with such biophysical variability, irrigation management is complicated by a small amount of agricultural land highly fragmented among a large number of competing users. The irrigated land in Porshinev is just over 400 hectares, allocated among nearly 800 individual farms and over 1,000 households[2]. The land is allocated primarily through two types of tenure: land shares for individual farming from reorganized former state farms; and household plots, or so called, kitchen gardens' that are under individual ownership, inherited from the former Soviet times. People's main source of income is from remittances, mixed subsistence agriculture, state employments, and private sector.

[2] There is no consistency in data sources regarding amount of arable land and number of farms in Porshinev. Nevertheless, based on data from statistics department, regional land committee as well as of the land reform and cadastral project the following rough estimates were done.

2.1 Methods

A qualitative ethnographic approach was chosen for data collection. The author joined the local WUA to volunteer in fundraising activities while simultaneously obtaining daily insights into the water problems and activities in the study area. This approach helped build trust with WUA staff and water users as well as develop a liaison with concerned organizations and competent experts. A combination of data collection methods was applied: semi structured key informant interviews, participant observation in WUA meetings, and continuous transect walks through the villages. In total, 26 interviews were conducted, of which 11 were in-depth questionnaire-based semi-structured interviews with the village leaders /water masters' from all nine villages. Also three open group disscussions were organized with water masters, historians and fellow water users. Because the surveys/interviews took place in the middle of irrigation season, results were partially constrained by the busyness of water users and concerned experts. The remaining interviews were based on open-ended discussions conducted in offices or directly in the field. Water users were interviewed during transect walks in which the author examined local infrastructure or observed cropping activities and water sources. Additional discussions were held with representatives of local community based NGOs, local historians, elderly community leaders, the head of the local farming association, representatives of the cadaster and land reform project, the deputy head of OblVodkhoz[3] (regional water management authority), and a former hydrological technician from the sovkhoz (former state farm). Secondary data were also collected from the WUA archive, donor projects reports, and state administration departments.

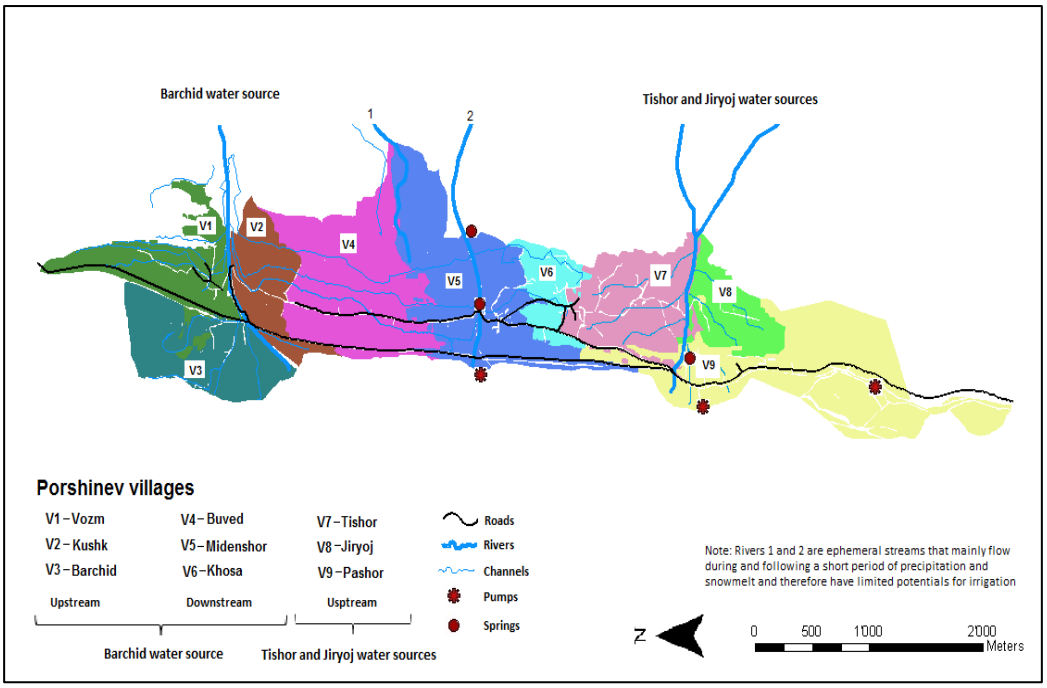

Figure 2: Water sources and irrigation infrastructure in Porshinev, GBAO, Tajikistan. ***Source: Author's, adapted from MSDSP 2009.***

[3] OblVodkhoz - a regional branch of former Ministry of Melioration and Water Resources.

Key variables for data collection and analysis were derived from the eight design principles identified by Ostrom (1990) from observation and analysis of long enduring CPR institutions and the post-institutionalism concept of institutional bricolage (Cleaver 2000; Cleaver and Franks 2005; Hall et al. 2013).

2.2 Land and water sector reforms

Over the last two decades many efforts have been made to introduce new market based approaches of governing land and water in Tajikistan. In the land sector, state farms reorganization and land distribution aimed at poverty reduction and hunger alleviation resulted in the emergence of individualistic subsistence farming. Despite exclusive state ownership of land, different forms of land tenure, land management and usage rights were recognized (Robinson et al. 2010). The land was distributed not only to former state farm employees but also to a wide range of professionals from bankrupt industrial and social sectors, leading to a considerable increase in the scope of individual farming (Breu 2006). At the local level, the reforms were conducted by jamoats, newly established state organs for land management, and simultaneously emerging local level Dehkan Farms Associations (DFA)[4]. However, the farm reorganization process was challanged by lack of adequate resources, weak technical capacity and harsh economic conditions of the actors concerned (Sehring 2009).

As part of the water sector reform, ownership of water resources and infrastructure remained with the state. Yet, inability of the state to manage the infrastructure led to de facto transfer of irrigation networks to local communities, simultaneously providing both opportunities and challenges for community based water governance (Bichsel 2009). The custody rights over intra village field water infrastructure were vested to informal community based institutions, while water delivery infrastructure from water source to distribution points remained with the RaiVodkhoz[5]. Despite efforts to define rules and delegate responsibilities within newly established/reformed institutions, improvement of local water governance did not occur. For example, WUAs were introduced primarily through a top down approach promoted by donors (Fox 2012) while state agencies were cosmetically reorganized at the same time as they were weakened by emigration of professional staff and decreasing financial resources (Sehring 2009).

At the grassroots level, the operation and management of water was organized around villages and tabaqs[6] (cluster of households in the neighborhood). Here the local water governance was

[4] Dehkan in Tajik means peasant. DFA has a nominal role in Porshinev limited to supporting the state in tax and data collection and facilitating symbolic cooperation between the local farmers.

[5] RaiVodkhoz - a district branch of former Ministry of Melioration and Water Resources.

[6] Tabaq is an informal unit within the villages composed of several neighbouring households. This informal administrative division is used for a wide range of village affairs including water management issues.

characterized by revision of traditional rotation- based water distribution practices and reinforcement of the hashar (traditional collective voluntary work) institution. Thus, the transition period reforms created an institutional gap that pushed rural populations to develop and establish local institutions that should operate according to new realities with the available meager state and local resources. Consequently, an institutional bricolage has emerged mixing informal traditional and more formal Soviet and market-based rules and regulations of water management and distribution (Sehring 2009), these being led sometimes by the state authorities and sometimes by WUAs and local informal communities (Hill 2013).

3. Assessment of the water governance in Porshinev based on design principles of long-enduring CPR institutions

3.1 Clearly Defined Boundaries

Despite the complexity of water governance system in Porshinev the boundaries of the entitled users, the water sources as well as infrastructure are clearly known based on historical location of people's lands and households. Regardless of membership in WUA, everyone is entitled to water formally recognized by the state and also informally by the communities. State protection of everyone's water use rights, on one hand, and voluntary membership in WUA, on the other hand, makes it difficult to formulate the appropriators' rights and responsibilities within a single institution - thus leading to some of the observed contradictions and misunderstanding in local community-based water governance.

Although the WUA mandate corresponds to political boundaries of Porshinev jamoat (Hill 2013), the administrative division of the villages in terms of access to water infrastructure and water sources has a more complex structure. As mentioned earlier, the villages of the jamoat are disproportionately fed by water from two main gorge streams and partly from few springs and a large transboundary river, distributed in varied forms including primary and tributary canals that traverse villages both horizontally and vertically. In this context, seasonal hydrological variability makes the boundaries of the resource and the users somewhat vague, and requiring occasional revision. For example, neighboring tabaqs in Midenshor village use water from two sources: 41 households are irrigating from Tirwethak canal shared with other three upstream villages, while the adjacent 38 households use an ephemeral spring called Hokimbek chashma[7].

[7] Chashma in Tajik means spring.

Photo 1: Landscape and local land use. Porshinev, GBAO, Tajikistan.
Source: Author's, 2013

Due to low levels of precipitation in recent years (Wood et al. 2009), Hokimbek spring now dries up earlier, leaving dependent 38 households without water in the middle of irrigation season. Facilitated by WUA the villages served by Tirwethak canal agreed to revise their water schedules and to share water with 38 households who suffer from inadequit water supply. As compensation, the assisted households were requested to contribute labour in future annual rehabilitation of the infrastructure they used in Tirwethak canal. Similarly to previous case, 87 households in Pashor village that share a single spring for irrigation, during water scarcity revise their water distribution practices. To ensure everyone has adequate water supply and to lessen pressure on the spring, 24 households are requested to use water from the river which is compensated by the remaining households in the form of payment for electricity fees accrued from pumping.

While both of the examples clearly support the need for looser conception of the users and resource boundaries (Cleaver and Franks 2005; Haller 2007; Cox et al. 2010), in both cases such flexibility is subject to conditional and deliberate negotiation by the actors involved. Consequently such processes can hardly be called spontaneous and improvised, as normally critical institutionalists would argue. Indeed, revision of boundaries was conditioned by stipulation of benefits and costs that appropriators gain and bear as part of commonly negotiated water distribution processes.

3.2 Congruence between appropriation and provision rules and local conditions

The degree of appropriation and provision rules adequacy to local conditions is challenged by a great variability in hydrology, lack of water accounting system, deteriorated infrastructure and seepage water loss, absence of accurate land shares data and crops cultivation plans. Generally, during water abundance in the beginning of spring almost no restriction on water use is applied while in scarcity season, wedz[8] (quota) rule restrict the water use both in time and space (Wood et al. 2009). Spatial variability of villages location reflected in the form of upstream and downstream villages is subject to misbalanced water use usually ignoring the local hydrological conditions.

None of the villages reported congruence between appropriation and provision rules of water management and distribution. Vagueness of per household water consumption makes it almost impossible to determine water user's inputs and outputs. Current rules stipulate equal per household labour contribution and fee payment regardless of land share owned and water obtained. Such unfairness gets even worse with the regard to maintenance of canals crossing several villages. Normally, those are downstream villages who contribute unjustifiably more labour to ensure the water is delivered to their lands while upstream villages only sketchily participate in the work.

Only in the case of water pumping like in Pashor village there is a balance between consumption and obligations of water users. The reason behind is that the amount of water delivered is based on time of pumping and energy consumed (Wood et al. 2009) which is easy to calculate and accordingly charge. The possibility for overconsumption or stealing is excluded and noncompliance behavior is easy to monitor and prevent. Thus clear count of exact amount of water to be delivered from one hand and accurate calculation of costs from other leaves no any other choice for appropriators except proportional water consumption adequate to accrued costs.

3.3 Collective Choice Arrangements

There is three layered decision making arena in Porshinev intertwining each other according to level of competence and scopes of jurisdiction. The jamoat has a typical state centered approach of decision making and appointment of executive authorities in coordination with upper level of vertical power structure. The local collective choice arrangements are mainly based on WUA at municipality level and village organization on communities' level. Due to high level of population there is no direct representation of users in the WUA management and people are represented by

[8] Wedz - traditional water restriction rules, applied depending on climate and weather condition of particular year.

the mirjuy's[9] (master of the canal) and/or head of the villages. The head of the village which is in charge of all community affairs can be either democratically elected or persuasively selected among active villagers. Between the villagers one can hardly find a person exclusively engaged in farming or irrigation providing people with manifold livelihoods and interests (Merrey and Cook 2012) e.g. out of nine mirjuy's seven are simultaneously employed by the state or engaged in private entrepreneurship in Porshinev.

Water issues are normally discussed during irregular general village affairs meetings. Despite the possibility of discussing and voting for specific issues, decision is rarely done during village meetings due to people passivity from one hand and difficulty of consensus attainment from the other. The decision making of WUA is characterized by open voting and unanimous consensus of mirjuy's. As for communities level all the decisions are done by the head of the village in consultation with heads of tabaqs. Written recording of meetings proceedings are irregular, lack standardized format and timely delivery to water users. This causes wide interpretation of decisions and further mess and mismanagement of water distribution.

In line with institutional bricolage concepts, the given example clearly demonstrates embeddedness of community water governance within multipurpose traditional village management structure, comprising of mixed formal and informal institutional arrangements and diverse actors, not necessarily devoted to specific resource use and occasionally acting on spontaneous and ad hoc manner. Whereas referring to contrasting historical pre Soviet and Soviet times experiences, current absence of clear (formal or informal) reputable authority capable of rules enforcement (Hill 2013), lack of communication and semi opaque interpretation and application of institutional arrangements is perceived by the local actors as a main cause of community based water governance failure.

3.4 Monitoring of the resource condition and appropriators behavior

The mandate for monitoring of water resources conditions and users behavior can be found within a variety of official legal acts (Oxfam 2007) delegating inspection duties to such institutions like jamoat, RaiVodkhoz, WUA and others. Lack of financial and technical resources to cover high transaction costs of monitoring leaves no other choice except of community based monitoring.

[9] Mirjuy in tajik means master/ruler of the canal. In WUA management structure every village is represented by one Mirjuy.

Photo 2: Water source and irrigation canal in the mountain gorge, Porshinev, GBAO, Tajikistan. *Source: Author's, 2012*

In general, there is no separate monitoring of the resource condition in Porshinev so the violation or destruction of the resource is inspected on ad hoc basis during rehabilitation or irrigation activities. The monitoring of appropriators behavior on the communities level is dispersed among WUA staff like mirob[10] (master of water), mirjuy's and fellow water users. The activeness of water users monitoring depends on the village location and water shortage severity and conducted on rotation basis either individually or in groups. The effect of monitoring by the assigned mirjuy's and mirob is meager as they have no enough resources, strong credibility, widespread agreed arrangements and accurate information for rules enforcement. On the other hand the individuals hardly manage to make continuous monitoring of water flow in canals of several kilometers length. Consequently a sort of twofold monitoring system of water use has emerged where a minor role of mirjuy's and the mirob is supplemented by inter and intra village monitoring of fellow water users. Sensibly, such double check approach supposed to ensure more effectiveness and security but in reality chaotic, biased and inconsistent implementation does not successfully prevent the incidence of violation and conflicts.

3.5 Graduated sanctions and conflict-resolution mechanisms

There is no widely agreed, accepted and codified set of graduated sanctions for water user's misbehavior in Porshinev. The most commonly known sanctions within the villages are fines for free riding in maintenance work. Applied occasionally those are considered as a compensation for absence in the communal work rather than penalties. The other instrument that communities use

[10] Mirob in tajik means water master who is assigned by the WUA to manage and coordinate the work of Mirjuys

for sanctioning is a social pressure reflected in a behavior discussion and censure by the elderlies and village leadership. Though relatively efficient for intra village castigation it has almost no impact on inter village level abuses. Thus, more severe violations like water stealing or overuse among the villages are rarely sanctioned even if revealed.

In fact, neither WUA nor the communities have clear formal procedure for sanctioning the water users condemned in rules violation while the claims of suffering users particularly in downstream villages for proper sanctioning are well-known. According to local WUA during last three years of its operation only three persons got formally sanctioned in the form of written warnings on unacceptability of rules violation. The infringements varied between water steeling, animal's penetration on water and flooding neighborhood lands.

In reality, it is very hard for the communities or WUA to discover and properly record the immediate violation. If it happens, the WUA representative issues warning and in case of recurrence submits documents to local authorities for further formal investigation and sanctioning. Yet, very often the violation discovered by individuals themselves usually lead to abrupt conflicts, including assault and even battery among water users thus deserting formal procedure of investigation and sanctioning.

Despite of occurring water conflicts, so far no court cases have been observed in Porshinev. Instead, a variety of mixed approaches are applied based on available formal and informal resources where traditional characteristics of reciprocal respect and reputation play an integral role. Similarly to Usangu case in Tanzanian described by Cleaver (2001), in Porshinev, in most of the cases conflict participants together with mirjuy's have managed to mediate the struggles by referring to formal authorities and appealing to traditions, religion and brotherhood. As Lecoutere (2010, p.10) argues: "…. pragmatically responding to resource problems, actors creatively blend elements of diverse institutions. While doing so, more bureaucratic institutions gain 'social embeddedness' as they are used as a reference, even when problems are solved outside the bureaucratic system".

Following institutional bricolage concepts, situation in Porshinev shows partial, chaotic and spontaneous application of sanctioning mechanisms within community level formally enfolded traditional practices of conflict resolution. Though avoidance of costly bureaucratic conflicts resolution mechanisms is valued, lack of proper dispassionate sanctioning does not reduce the conflicts. According to Cleaver and Franks (2005) in the situation where closed social relationship exist at least basic adherence to rules is expected and further coercion in the form of sanctioning of non-compliance is redundant. But this is not always the case and basic compliance with the rules is likely insufficient in a situation with extreme water scarcity and complex systems spread within a numerous locations. By itself basic compliance can be differently interpreted as minor water overuse perceived by upstream villages can be considered as substantial overconsumption by downstream villages, since they have additional factors of water stress (e.g. seepage loss

increased by longer canal distance). Thus, if not properly sanctioned, even minor water overuse is sufficient for unexpected social unrest and discouragement of collective action within even such homogenous communities like in Porshinev. Ignorance of mutual respect and interests and disappointments are prevailing so sanctioning is considered by most of the respondents in downstream villages as an imperative tool for stopping abuses in Porshinev. Contrary to Cleaver's and Franks's (2005, p.14) statement that: "the exercise of depersonalised punishments would erode social trust and relations of reciprocity" the lack of punishments as appear in Porshinev erodes them even more.

3.6 Recognition of Rights to Organize

There is an official recognition of self-organization rights and grass roots management of rural water systems in the country. The key requirement by the state is that management of the resource should not contradict official laws and regulations directed at efficient use and protection of natural resources. In Porshinev, water related self-organization activities are embedded within a wider social structure like village organisation that discretionary applies a variety of traditional and contemporary approaches in water management and distribution. For example, it is up to the local communities to decide on the amount of labour to be mobilized for hashar, amount of water fee to be collected and method of water to be distributed.

Though water distribution schedules are endorsed by the jamoat it is very rare that it interferes in the local decision making which happens only as a last resort in a case of unsettled disputes. According to respondents the influence of state on the performance of both the WUA as well as of local communities is rather minimal than negative and is limited to surface coordination of inter village water distribution debates. Happening barriers or contradictions are rarely intentional while caused by overall incompleteness and inconsistency of the reformed water governance system.

3.7 Nested Enterprises

The water governance system in Porshinev is quiet complex thus subject to nesting of variety activities within different enterprises. In principle, the management of water on tabaqs level led by the head of the tabaqs is further upscaled to village level management by mirjuy's and later to jamoat level coordination by mirob and WUA management staff. All this is framed within a formal legal and administrative structure of the jamoat which has mainly nominal representation within community based water governance. As demonstrated in the analysis of previous design principles regardless of management level or scale most of the relevant institutional arrangements are subject to overall mass, discrepancy and overlapping, applied on ad hoc and improvised basis. However, for effective nesting of institutional arrangements communication, deliberate negotiation and

coordination is vital what is obviously missing within the current institutional bricolage of community based water governance causing persistent disappointment and failure.

4. Conclusions

Current discussion demonstrates that community based water governance in Porshinev that has emerged during continuous reforms of transition period is characterized by a semi structured mixture of institutional arrangements borrowed from the state, donor driven WUA and local communities. Genuine recognition of communities self-organization rights and flexibility in application of diverse arrangements has allowed maintaining the water system despite of well-known shortcomings and disappointments. Inter village water scheduling discussions facilitated by the jamoat and WUA, mobilization of collective community based voluntary labour in hashars and application of mixed methods of conflict resolution makes up a backbone of grass roots level water governance in Porshinev.

Application of the design principles within a current institutional bricolage has had a number of implications for the analysis of community based water governance. The fluidity of the resource and users boundaries is resultant from concise negotiation, conditionality and adjustment; the proportionate equivalence of appropriation and provision rules are not found except in few cases of water pumping where clear water consumption and cost calculation was feasible; collective choice mechanisms are fitted within existing multifunctional social structures while clear authority of rules enforcement are missing; monitoring, sanctioning and conflict resolution processes regardless of nested enterprise are highly mixed, partly and sporadically applied and poorly communicated. Such ad hoc and improvised application of different rules and regulations is considered as disorder and mess rather than acceptable condition by most of the people in Porshinev. Therefore co-existence of variety institutions with unclear liable party for the specific outcome as in case of Porshinev results in confusion where negotiation and agreement becomes extremely difficult. As a consequence such negligence, uncoordinated application and institutional mismatch are hampering achievement of truly community based water governance and thus hindering effective and fair management and distribution of commonly shared water resources.

The patching of different institutional arrangements is not a problem per se if changes are properly negotiated, agreed and timely delivered to people concerned. Common understanding and agreement on clear patterns of water management institutional arrangements in line with proper rules enforcement mechanisms can bring security and order which is missing in case of Porshinev. Shared commitment and resource mobilization by formal authorities and the communities directed at an inclusive and endurable dialogue over community based water governance challenges is needed. Otherwise disorder that causes social tensions, poor livelihood and resource degradation as rooted in the never ending transition cannot be avoided.

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