

# Water User Groups in Central Asia: Emerging Form of Collective Action in Irrigation Water Management

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**Abstract** This paper examines the recent emerging informal Water Users Groups (WUGs) on the Fergana Valley for managing of the water at the former collective farm level and potential for strengthening of the weak Water Users Associations (WUAs) through replication of WUGs formation. Due to the collapse of the Soviet Union, Central Asian states have introduced reforms in different sectors including the water resources sectors. As a part of the water resources management reforms, Water Users Associations (WUAs) formation has implemented to manage water resources infrastructure and water distribution. WUGs have been emerging because WUAs have not been very efficient and effective due to their top-down implementation approach. In future, WUGs are very effective institutional mechanism of water resources management, and a useful support instrument to WUAs.

**Keywords** Water User Associations · Participation · Integrated water resources management · Irrigation · Fergana Valley

## 1 Introduction

The Central Asian states, former colonies of Russia have around eight million hectares of irrigated land, millions depending from irrigated agriculture. The irrigated agriculture uses 90% of 140–160 km<sup>3</sup> of water resources of the region. The most of the irrigation water use are surface water resources, two main rivers Amu Darya and Syr Darya, tens of middle sized rivers from snow melting are supplies water for the to the irrigation systems. The state water management organizations (WMOs)

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are operates, maintains and owns huge network of canals, numerous water reservoirs, pump stations and drainage wells. The ownership of water resources and irrigation infrastructure up to the former collective farm is in hands of the state in all countries. Water management institutions of the region have following levels of hierarchy: transnational, national, regional and local. The water management institutions have very strong path dependency both in their structures and functions and way of doing business (Sehring 2009; Abdullaev et al. 2009a).

The legal framework on water management is consisting of different documents, such as water codes, water laws and government decrees. Although, the legal background on water resources management quite well prepared during the last 15 years of their independence from Russia, the legal situation in water management is similar to the overall legal environment in these countries- legal nihilism is overwhelming. The either the legal documents are not reflecting dynamism of the transition period or their application for everyday life limited due to inefficiency in judicial system.

In the 1990's, the Central Asian states introduced land reforms, transforming collective farms and state farms (locally known as *kolkhozes and sovhoz*) into individual farms or into cooperatives (*shirkats*). The aim of this transformation was twofold: first to abolish the soviet legacy and the second to revive the productivity of the than bankrupt collective farms (Spoor 2004). During the reforms, the organizational structures regulating the water management in the collective farming system were abolished. On- farm irrigation and drainage infrastructure, formerly managed and maintained by collective farms were abandoned and a responsibility was no further delegated. The water distribution became an issue of social interaction, a place of contestation and competition (Wegerich 2000; Veldwisch 2008; Abdullaev et al. 2008). The impact of land distribution on water management on farm level was initially ignored. In the former collective set up, the number of main water users ranged between 10 to 15 units (*brigades*) and water management was linked to the agronomic operations and readiness of the land to be irrigated. Trained and experienced staff, agronomists and hydro-technicians had been employed in every collective farm and were overlooking the irrigation water management. However, with the ongoing de-collectivization, former members of the collective farms as well as citizens with no agricultural experience became individual farmers. The absence of both, experience and incentive systems for collective action for on-farm level water management initially resulted in chaos and distortion (Abdullaev et al. 2006).

Central Asian states influenced by international agencies and due to growing problems on irrigation water management at the former collective farm level have started formation of Water Users Associations (WUAs). The main functions of WUAs have been foreseen water resources management and irrigation-drainage infrastructure operation, maintenance at the former collective farm territories. In all Central Asian countries, WUAs have been established through top-down, bureaucratic manners. The governments have issued decrees on formation of WUAs and within very short period of time thousands of WUAs have registered as non-governmental and non-commercial organizations. However, in practice (de facto) most of them exist in paper (Zavgordnyaya 2006; Wegerich 2006). Although Central Asian states, donor projects have taken an active role in an initial set up of WUAs, were not able to provide sufficient support to develop WUAs into effective organizations that successfully manages water for numerous farmers and that are able to generate sufficient funds for irrigation network operation and maintenance.

At present most of the WUAs in Central Asia are not able to mobilize both in-kind and cash contributions for operation and maintenance of the irrigation and drainage network, have difficulties of managing water within their boundaries and suffering from weak management and governance structures, which are well known problems attributed top down approach to the collective action (Olson 1965; Hardin 1968). The different options for water distribution tested with farmers in the Mahanadi Delta Irrigation Project, the State of Orissa, in India have shown importance of farmer perspectives in effective water distribution (Ghosh et al. 2005).

As elsewhere in the world (Gastélum et al. 2009), WUAs in Central Asia has financial problems due to low profitability of agriculture. In Central Asia states do not support WUAs maintain, operating of the irrigation systems. Many WUAs do not properly function due to absence of financial, technical and staff capacities or merely exist with one or two staff, being not able to implement their crucial function- water distribution (Zavgordnyaya 2006; Wegerich 2006; Abdullaev et al. 2006). In order to overcome problems related to the water management at the local level, water users are steadily and slowly opting for collective action (Kazbekov et al. 2009). They jointly own, maintain pumps, clean tertiary and below level canals and introduce rules for water distribution during water scarce times (Abdullaev et al. 2008), proving that the classic theories of collective action (Ostrom 1992) and property rights (Meinzen-Dick et al. 2000) starting to work in post soviet Central Asian states. Improved collective action at the inlet of the territory canals could help to increase irrigation efficiency by 14% in Niger Irrigation Scheme in Mali (Vandersypen et al. 2009). Strikingly, parallel to such best practices, in most WUAs of Central Asia (Jumaboev 2008), the water users are helplessly complaining about their problems related to water management (Yakubov 2007; Yakubov et al. 2004).

The main focus of this paper is to research on how successful, grassroots collective actions of water users could be potentially linked with WUA structure for improving performance of Water Users Associations. The following section describes conceptual framework and research methodology, approach, followed by section which describes informal water users groups and lessons learnt from research conducted to study their internal dynamics and last section which presents the case study on dissemination of WUGs along three pilot canals in Ferghana Valley.

## 2 Conceptual Framework and Research Approach

This study was conducted within scope of the Integrated Water Resources Management in Ferghana Valley project. The Integrated Water Resources Management in Ferghana Valley project is funded by Swiss Development Cooperation (SDC) and implemented by International Water Management Institute and Scientific Information Center of Interstate Coordination Water Commission in three pilot canals of Ferghana Valley of Kyrgyzstan, Tajikistan and Uzbekistan.

Intensive field works in all three countries of Ferghana valley have helped to find and study successful cases of collective action at the tertiary canal level, where farmers have taken water management into their hands. They have been investing for upgrading of irrigation network, developing and following water distribution rules, controlling the implementation of these rules. Although they have no legal status, WUGs have become strong force on defending water rights of its members. In this

paper authors are presenting results of trials on linking collective actions of WUGs with existing weak WUAs. The main objective of this paper is to describe process of strengthening of weak and top-down WUAs in Central Asia's Ferghana Valley through integration into their structures, grass root WUGs. The lessons learnt from this work could be used as prototype for organization of more inclusive and user-driven institutions in Central Asia and elsewhere.

## 2.1 Project Area: Ferghana Valley

The Ferghana Valley is located in the south-east of the Central Asian region and the eastern part of the Aral Sea Basin. The valley is surrounded by mountains (the Ala-Tau Range in the north, the Tian Shan Mountains in the east and the Alay Mountains in the south), with the exception of the narrow western opening through which the Syr Darya River drains into the lower basin of the Aral Sea. The larger central part of the valley falls within the Republic of Uzbekistan, while the northern and eastern fringes are located in the Kyrgyz Republic and a small area in the valley's west and southwest belongs to the Republic of Tajikistan (Fig. 1).

The Ferghana Valley forms the upper to mid-reach of the Syr Darya River basin, which is formed from the confluence of the Naryn and Kara Darya rivers. The average temperature in the valley is 13.1°C, ranging from −8°C to 3°C in January and 17°C to 36°C in July. Annual precipitation ranges from 109 to 502 mm whereas evaporation ranges from 1,133 to 1,294 mm throughout the Ferghana Valley. The long-term (1970–2000) average annual precipitation for the SFC command area



**Fig. 1** Ferghana Valley—research area

is 175 mm. During the study period (1999–2004), precipitation rates were mostly higher than the long-term average, with the highest value of 330 mm in 2003 and the lowest of 150 mm in 2000. The effective precipitation rates amount to only 15–20% of the totals, because they occur in winter, when only winter wheat is grown due to low temperature and little is stored in the soil through to the start of the crop season.

## 2.2 Water Management Features of the Region

The Ferghana Valley one of highly populated and conflict prone regions of Central Asia, shared by three countries, Kyrgyzstan, Tajikistan and Uzbekistan. In the region, the limited land availability is contrasting with very high productivity of both land and water resources. The land productivity in the Ferghana Valley is around \$1,000/ha when average for Central Asia is \$613/ha and water productivity is \$0.17/m<sup>3</sup> for Ferghana region when average water productivity for Central Asia is around \$0.14/m<sup>3</sup> (Murray Rust et al. 2003; Abdullaev and Molden 2004). The Ferghana Valley has around 1.2 million hectare of irrigated land and utilizes around 30% of total water resources of the region and mainly receives it from Syr Darya, the second largest river of the Central Asia.

The water management institutions in the region are although different for the different states have similarities because of their common soviet past. The transition from Soviet system into independent new countries have resulted changes in the water sector as well. At least two states have transformed their water management into hydraulic principles (Uzbekistan and Kazakhstan). Moreover three out of five have introduced irrigation service fees (ISF) before never applied for irrigation during the soviet times.

The water management structures have four tiers: interstate, national, regional and local. The interstate level institutions are responsible for coordinating transboundary water management, an Interstate Coordination Water Commission (ICWC) has been established in 1992 as major institution for interstate water coordination, and Basin Water Organization (BVO) Syr Darya implementing hand of ICWC has been established in the region since late soviet period (1980's). BVO Syr Darya looks after implements water allocation decisions of ICWC which are made by member state representatives. The BVO also operates major water infrastructure (dams, water distribution points, gates, pumps and canals of interstate nature). The ownership of all water infrastructures however is territorial and belongs to the national states. The interstate level water management is regulated by interstate agreement on "cooperation on transboundary water management", signed and ratified by five member Central Asian states in 1992 and updated regularly in different years (1996, 1999 and etc.)

The national level water management institutions are many and their functions are scattered along types of water resources (ground water, surface water, etc.). E.g., in Uzbekistan at least six different organizations are responsible for water management (see Table 1), having some times clashing interests and responsibilities. This is due to recent soviet past when problems were encountered has been mainly solved through creation of new bureaucratic institutions.

The legal documents regulating water management at the national level are those of national laws, codes on water resources and management. During the last decade all countries of the region have updated their water legislation. The legislative

**Table 1** National level organizations responsible for water resources in Uzbekistan

No.	Water management organizations	Functions and responsibilities
1	Ministry of Agriculture and Water Resources Management- Department of Water Resources	Surface water and irrigation water management: policy and financial issues, long term planning and day to day operations
2	State Committee on Geology	Policy and management of ground water resources, mapping, quota for ground water use, planning
3	State Committee on Nature Protection	Control of water resources protection and contamination
4	Hydrometeorology Services of Cabinet Ministers	Forecast of surface water formation, climate and water flow registration
5	State Sanitary and Epidemiology Services	Control of epidemiological situation in water bodies
6	Water and Sanitary Services- Vodocanal	Drinking water and discharge of waste water, treatment, preparation and delivery

changes on water management mainly were to reflect post soviet realities, such as changes in major water consuming sectors such as agriculture and energy, the legal documents also reflects national government's overall socio-political policies.

At the regional level there are water management organizations of either basin water management organizations (Uzbekistan, Kazakhstan) or water management organizations for territory (province, district). In both cases the water management organizations are implementing each state's water policies at the region or basin.

At the local level irrigation water management has been the business of the collective farms during the soviet period. The dense irrigation and drainage network has been developed at the collective farm level during the "hydraulic mission" years (Abdullaev et al. 2009b). After the agricultural reforms in place of collective farms individual farms has been formed. The dense irrigation and drainage network and business of water management has been delegated to the WUAs, established by government. However, WUA had no popular support from water users or state to sustain their operations. Therefore, in most cases at the former collective farm level irrigation and drainage infrastructure becoming obsolete, water management chaotic (Abdullaev et al. 2006).

### 2.3 The Researches Focus

Since mid 1990's region's countries have started their agricultural reforms, former large scale collective farms has been transformed into different forms of individual farming. E.g., in Kyrgyzstan land has been distributed among the former members of collective farms, in Uzbekistan land was allocated through land distribution commissions into larger individual units of not less than 10 ha.

The results of the land reforms has been triggering for the former on-farm water management system. The state water management organizations formerly delivering water to the collective farm gates were forced to deal with amplitude of individual farmers, growing different crops, and applying different agronomic and water management practices. Therefore, the need for a new organizational arrangement to manage water at the on-farm level and to distribute irrigation water between new individual farmers became an obvious necessity.

The entire system of irrigation water management, designed to deal with large collective farms. The land reforms have resulted in a situation, whereby along the main canals, instead of a few, mainly cotton growing collective farms, there are now hundreds of individual farmers who are cultivating different irrigation intensive crops such as rice, wheat and vegetables. This situation has increased problems with water distribution along the main canals, particularly when water scarcity frequently leads to clashes between water users. Often, due to inefficiencies into the irrigation system and water application methods, the amount of water withdrawals into the administrative districts much higher than their water shares—locally called as limits. The governments of the Central Asia mainly have followed the same route on overcoming of “water impacts” of the de-collectivization. They have issued decrees on organization of Water Users Associations (WUAs) in place of liquidated collective farms to fill water management gap. Thousands of WUAs have been registered within a few months. Therefore, WUA has not yet become real organization which could take water management responsibility at the former on-farm level. In Central Asia at the end 1990’s WUAs were organized in a top down, hierarchical manner, using power and resources of the state water management organizations, their formation per se was a much needed step for stabilizing irrigation management at on farm level (Zavgordnyaya 2006; Wegerich 2000). Although the structure of such WUAs involves managing players mainly (Zavgordnyaya 2006) practice showed that the water users were hardly consulted, nor informed about the way water management was reorganized. Therefore, the water users considered the WUAs as another water administration imposed on them, and not a way of introducing collective action water management. The imposition of the state intentions on building water user’s organizations at the local level has been so far not sustainable as elsewhere in the world when states has been imposing changes through top-down manner (Gastéllum et al. 2009).

## 2.4 Research Framework

According to Wegerich (2000, 2006), Veldwisch (2008) and Abdullaev et al. (2008), WUAs in Central Asia are inactive and financially not viable. The WUAs in Central Asia have self-financing issues elsewhere in the world (Gastéllum et al. 2009). Zavgordnyaya (2006), based on research results in Uzbekistan, suggests that the for viable WUAs needs both institutional and technical support from the government, at least at the initial stages of establishment. However, the other factors which determine successful water user’s organizations, such as moderate water scarcity, benefits for participation, clear property rights and social cohesion are (Monsees 2009) also not in place to facilitate further strengthen of WUAs. Especially, the social factors are most important ones because the irrigation water management at former collective arm level is collective action for common pool resource management (Ostrom 1992; Olson 1965). The major problem related to collective action for common pool resources management is excluding non participants or cost of exclusion (Ostrom 1992). Therefore, it is important that the water user groups using the water from the same source (canal, well) to find ways to reduce over appropriation of resource, through clear and enforced rules which specifies who can use the resources (Stern et al. 2002).

The social cohesion at the local level is crafted by both formal and informal institutions (Abdullaev et al. 2009a). Authors have been able to identify and study

successful water users groups (“best practices”) in the project location. The search for such “best practices” has been through: (1) use of local key informants, (2) walk-through surveys and meetings with local water users. Once information regarding existing informal Water Users Groups (WUGs) identified, the project staff have made contacts with WUG leaders to conduct in depth studies to understand how informal WUG operates. The selected and trained local staff has been crucial for the success of the research.. The social events in the village where WUG has been formed has been used as an entry point for the group They have been participating in these social events and observing how local people interact on issues related to the water management. The local staff also has been a bridge to introduce authors with local WUG members. The authors have conducted in each successful WUG case series of group brainstorming sessions, one to one interviews with group leaders and members. The walkthrough surveys in the command areas participation in irrigation events in each WUG has been applied as research methodology. The direct water inflow, crop productivity measurements in selected informal WUG has been instrumental to understand water management performance of the informal WUGs (Kazbekov et al. 2009). Authors have studied in total nine informal WUGs, working successfully on tertiary level were identified during the field works. The leaders and 2/3 of water users of these groups were interviewed for understanding of the process which led to the formation of informal group.

### 3 Results and Discussions

Noticeably, the research revealed different reasons for formation of informal WUGs, some of the groups have been cooperating because they were part of former collective farm brigade, other groups has been formed because they were from the same extended family, the other group has been formed because they grow the same water thirsty crops. In spite of different reasons for formation of WUGs, they have a thing in common for all groups—the groups have a leader who is responsible for all water related issues at tertiary level. In most case studies of informal WUGs the leader was initiator of formation of the WUG. The second most important feature of the informal WUGs is strong ownership of irrigation system within their area (tertiary canal or village ditches). WUGs members have been investing on upgrading of their irrigation network and guarding each meter of irrigation canals and ditches from deterioration. In few informal WUGs, the leaders have been practicing quite accurate water accounting system, which provide more transparent water distribution. More striking comparison of informal WUGs and top-down WUAs is that each member has “a say” in matters of water management. The relationships of the members of WUGs are more of flexible, with no or few authoritative by the leader. The relationships between members of the informal water users groups has been nurtured since long time through local social networks such as neighborhood, social events, mutual support and trust. The social networks supporting interaction between WUG members are rather indigenous fabric of social life in the localities than exogenous intervention by state or projects. Therefore, the main lesson from the studies of informal WUG is the formation of such groups cannot be done on top-down manner. The sustainable water users organizations at the grass root levels can be build on existing social networks.



The success of informal WUGs could be a step towards strengthening of the weak WUAs. However, authors are aware of the fact that the social network which is the core of informal groups hardly can be nurtured artificially or up scaled and an attempt to upscale the social phenomena may fail due to the differences in social characteristics of different areas even within one WUA. However, growing concern over poorly performing WUAs, which do not operate as they should and increasing social frictions over the water management at the former collective farm left no options than testing WUGs as for a way to improve performance of WUAs.

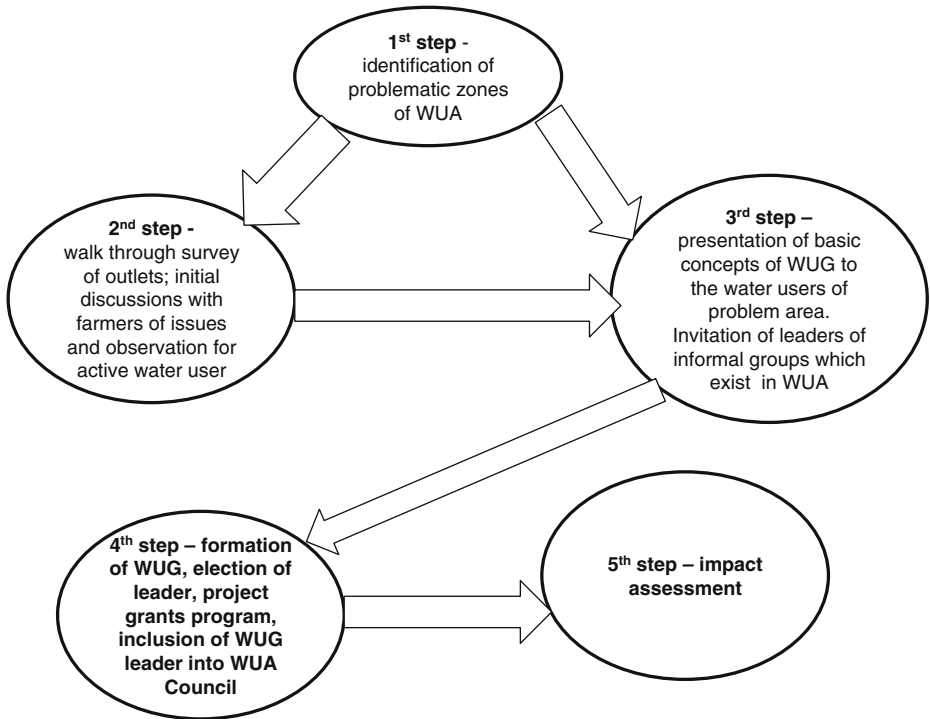
After the careful analysis of internal dynamics and enabling incentives, the project researchers have come to the conclusion that the WUGs can efficiently operate, if those enabling incentives such as leadership and strong ownership of irrigation network is provided either by external players (government, project) or by WUA management WUGs can become a grassroots organization of water users with borders and under umbrella of WUA.

### 3.1 How to Replicate Success of WUGs into WUAs?

Within the framework of IWRM FV project four major interventions were identified for replication of the success of informal WUGs: (1) formation of the Water Users Groups (WUG) in the areas where they do not exist; (2) inclusion of WUG leaders into the WUA councils–governance branch; (3) provision of seed money for irrigation network rehabilitation where WUGs have established; (4) facilitation of self propelled initiatives with other WUAs to establish its own WUGs; (5) improving link between WUA, WUGs and local rural communities, e.g. kitchen garden water users

While studying informal groups, project researchers find out that previously areas where the groups were organized had constant problems over water distribution. They were mainly in the areas with less water availability. Therefore, the decision was made that replication of WUGs formation with IWRM FV project should also target areas of water scarcity and conflict within selected WUAs. For strengthening of WUA was tested within command areas of those three pilot canals in Ferghana Valley, one in each country of the region. In consultation of WUA specialist, maps of problematic areas within its territory have been identified as first step on up scaling of WUGs. Based on research described above, the guidelines on establishing of WUGs have been developed (Kazbekov and Abdullaev 2006). The steps include: identification of problematic zones of WUA, where most water distribution problems occur; walk through survey of outlets; initial discussions with farmers of issues and observation for active water users; presentation of basic concepts of WUG; meeting with water users to elect WUG leader; impact assessment studies (see Fig. 2). The main objective of the guidelines was application of Social Mobilization and Institutional Development approach (Ul-Hassan et al. 2005) for replication of the experience of successful, informal WUGs to the areas where such groups does not exist. For implementing this task group of local people, called as “social mobilizers” with knowledge of the research area has been selected and undergone training on SMID strategy for establishing of WUGs for period of October 4–15, 2005.

After the training of “social mobilizers”, IWRM FV project staff have conducted meeting with local project teams which were formed for implementation of the project within each pilot canal and discussed WUG replication strategy (Kazbekov



**Fig. 2** Steps of WUG formation

and Abdullaev 2006). In the beginning of WUG replication processes, trained “social mobilizers” have visited those of tertiary canals where water management has been considered as a problem by WUA staff, local authorities and water users themselves. They hold series of meetings with all water users who are depending on these tertiary canals. The social mobilizers have helped to analyze the problems and causes of those problems. The “social mobilizers” have invited leaders of informal WUGs to share experience on water management in their groups with water users of problem areas where groups has not been formed.

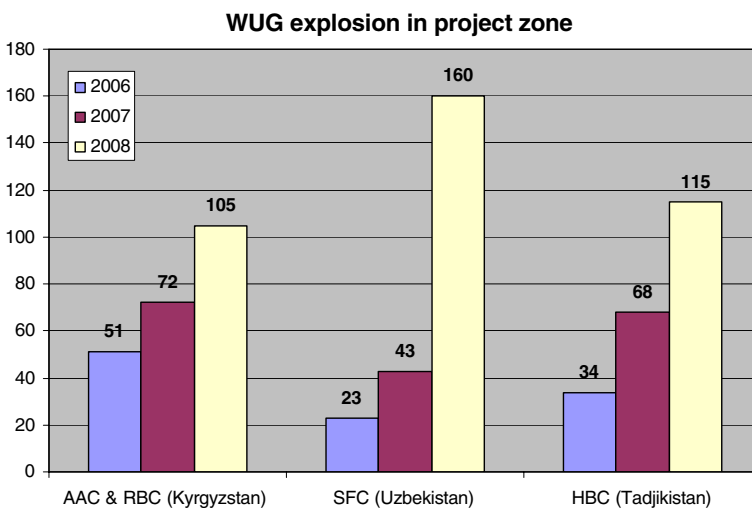
As an incentive for formation of WUGs in these places project have launched small grants program. The main aim of small grants was to generate collective action in the problematic areas of WUAs. The amount of the grants was not more than 500 US dollars and it was granted only for the rehabilitation of territory level irrigation network. The other condition of the grant was that applications were accepted only from WUGs not individual water users or WUA management. This external incentive may lead formation of water users groups very quickly for getting grants. The selection committees have been established in each pilot canal area, the members of this committee has been nominated from each WUA, along the canal, representatives from project, “social mobilizers”. They have developed following criteria for selection of proposals: (1) WUG has to contribute 50% cost of the rehabilitation works, (2) grants can be released only if WUG is taking operation and maintenance responsibilities for rehabilitated infrastructure, (3) grant will be

released in portions, first 300 US dollars immediately and 200 US dollars only, if WUG is operational throughout one season and complained with its contributions. In total more than 100 of grant applications in each pilot canal area has been received and reviewed by selection committees. The commissions have pre-selected 60–70% of application and visited to the pre-selected applicant WUSs to check the proposed rehabilitation sites and meet with WUGs. This helped to see if WUG is indeed operational and assess if proposed rehabilitation plan will benefit whole group. The decisions on funding of proposed rehabilitation plans were made by voting of the selection committee members after the presentation of pre-selected WUG leaders of their projects.

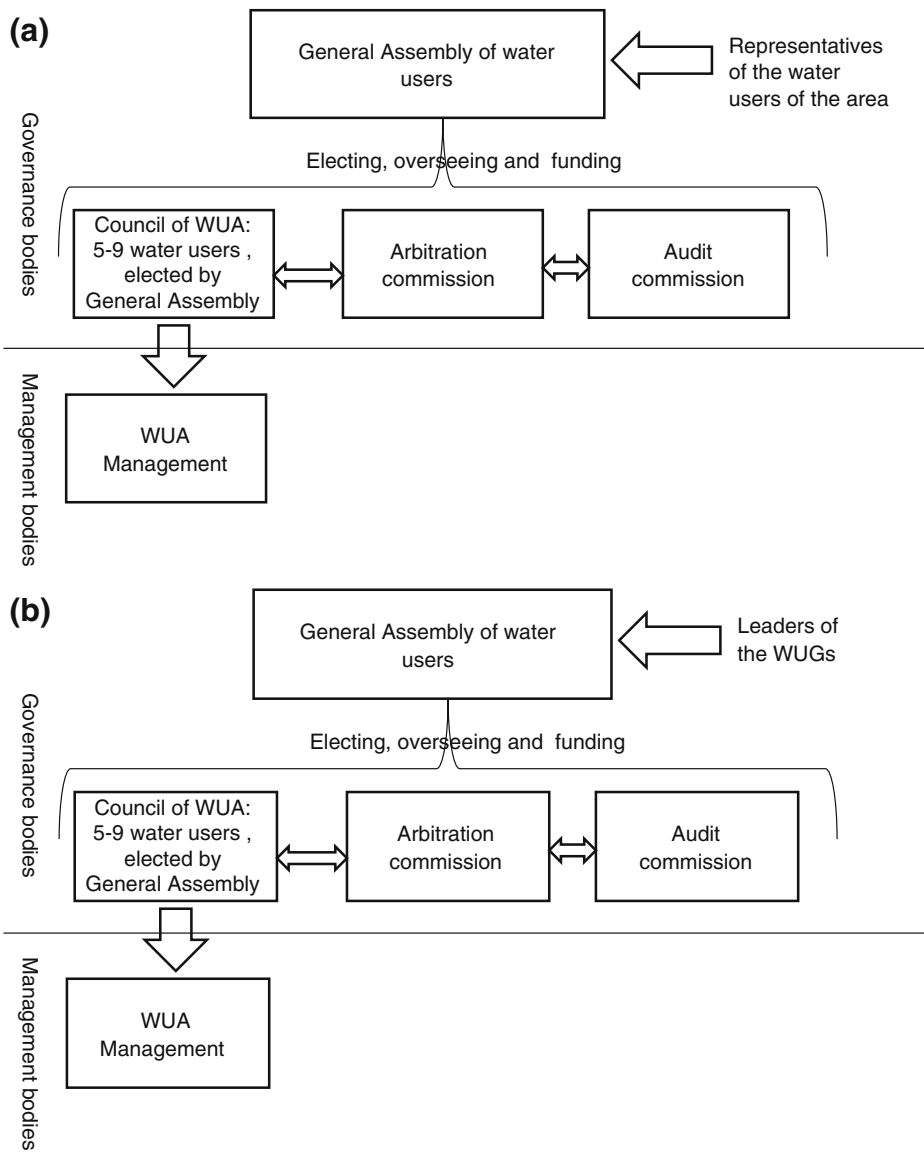
This approach has been helpful for sustaining newly formed WUGs. The “social mobilizers” in the locality have been also instrumental on checking if WUGs are indeed formed and operational through surveys and groups discussions with water users of concerned area. The process of the rehabilitation works has been crucial for forming group identity and linking individual water users into one irrigation network.

The social mobilization conducted by the “social mobilizers” and incentives provided by project has been instrumental on establishment of WUGs along the pilot canals, e.g., in 2006 51 WUGs has been formed along Aravan–Akburu and Right Bank Canal and has been increased to 105 in 2008 (Jumaboev et al. 2009), the same tendency was observed in other two pilot canals (See Fig. 3).

The next step taken for inclusion of WUGs into the WUA structure was decision of General Assemblies of WUAs to include leaders of WUGs into the Council of WUA. This decision was made in WUA's where in 50% of the irrigated areas water user groups have been formed. In the top down WUAs, the council members were elected from water users, in most cases they were not active participant of WUA governance processes (Fig. 4a). In most WUA Councils do not properly function and members were absentee during the meetings (Yakubov et al. 2004; Zavgorodnyaya 2006). Therefore, all aspects of WUA functioning was done by management body—



**Fig. 3** WUG formation along the pilot canals in Fergana Valley (Source: Jumaboev et al. 2009)



**Fig. 4** **a** WUA structure before WUG formation with Council consist of elected water users **b** WUA structure after WUG formation with Council consist of water user group leaders

by Director of WUA or Chairman of WUA alone was struggling to drive whole organization.

Therefore, election of WUG leaders into WUA Council (Fig. 4b) would give them platform to represent their water users in daily basis and also take responsibility on organizing water management within WUA in better way which reflects interests of different groups.

The inclusion of the leaders of WUGs into the Council has been step towards transformation of top-down, state mandated institution—WUA into grass root organization of water users. However, one realizes that this is not linear and easy process. Although the process of WUG formation has been very positively received by both WUA leadership and water users in the study areas there were few problems faced during the WUG formation. One problem observed was reluctance of WUA leadership share power with water users groups, because they were get use to weak Council when no need to discuss decisions. This was an important obstacle for inclusion of WUGs into WUA structures. In order to elevate the situation, immediately after the elections of WUA Councils, the leaders of WUA and WUGs have been trained by project team on communication skills, team work and roles and responsibilities of council members.

Efforts described above helped to create understanding between WUA and WUG leaders through more clear understanding of roles each part should play in WUA. While Councils started working the differences were further elevated due to the regularity of meetings, WUG leaders has been assigned to help WUA increase water services fees collection, signing agreements between WUA and WUGs, developing system of measures to stop illegal water withdrawals. These all helped them to become more familiar with WUA operation.

In other hand WUG leaders were also crucial on bring up concerns of their water users, problems related to the water distribution. They were actively presenting points and views of their water users during the meetings and insisting to take actions from WUA management. The discussions over the budget and use of water users money has been frequently brought up during the several Council meetings (Notes from Council meetings of WUA Isan, WUA Japalak in 2006–2007 made by authors).

WUA with WUGs are no more an organization established or induced by external interests. It has developed roots in the community through WUGs. Community leaders (*Aksakals* in local language) who are leading these informal water user groups are now sitting in the governing Councils of the WUA, the formal organization. This makes WUA a community organization, legally accepted by the government but owned and led by the farmers. Thereby WUG has become a corner stone of WUA governance.

The formation of the WUGs has helped to activate the WUA; many rural land owners often lease the land to seasonal farmers or to a neighbor. Hence, not all land users are owners of the land. This has created problems for the WUA, when they have to involve them in common activities. WUG leader coming from the same locality knows the real water user and land owners, as they have to deal with then almost on daily basis. Knowing this inside story, WUA council can make correct decisions and implement them without fail. Important to note that formation of WUGs has become an institutional base for the introduction of volumetric ISFs, which was desire of water users (Yakubov 2007) but could not be implemented due to the large numbers of water users.

#### 4 Conclusions

There are hundreds of thousands of WUA in Central Asia which were formed to fill institutional vacuum at the former collective farm level after the land reforms.

However, these WUAs have not become an organization of water users. They may collapse, if appropriate measures are not taken. At present Central Asia is known as region with tense transboundary water problems (Abdullaev 2000; Kemelova and Zhalkubaev 2000; Sievers 2002), if urgent measures are not taken huge problems also may arise at the lower levels of water management of each country of the region. One of attempts on improving WUA performance through formation of grass root water groups were taken within scope of IWRM-Ferghana<sup>1</sup> project. This is important to note that the integrated water resources management (IWRM) approaches should be applied for improving water management. The IWRM facilitated by strategic approaches to improve water accounting (Turner et al. 2009).

The intensive field works in all three countries of Ferghana valley have helped to find and study successful cases of collective action at the tertiary canal level, where farmers has taken water management into their hands. They have been investing for upgrading of irrigation network, developing and following water distribution rules, controlling implementation of these rules.

The experience of informal groups has encouraged project staff and local partners to experiment with replication of WUGs formation in the other problem areas of WUAs in the three pilot canals of Ferghana Valley. The main aim of the work was strengthening of weak and top-down WUAs in Central Asia's Ferghana Valley through integration of lessons from informal water users groups which were used as prototype for more inclusive and user-driven institutions.

While project has been initiator and main force behind this institutional innovation, it was a local indigenous knowledge that has helped to start this activity. As results WUA has become more sustainable organizations. The transaction costs of WUAs to distribute water has been considerable reduced, the maintenance of the tertiary and lower outlets became better and more regular, the water distribution has improved, water users started to cooperate for solving common agronomic issues.

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