

## Integration of Villages into WUAs—The Rising Challenge for Local Water Management in Uzbekistan

Nozilakhon Mukhamedova<sup>a,\*</sup> and Kai Wegerich<sup>b</sup>

<sup>a</sup>*International Water Management Institute  
Apt.121, House 6, Osiyo Street, Tashkent 100000, Uzbekistan  
Phone: + 998-71-2370445; Fax: + 998-71-2370317  
E-mail: N.Mukhamedova@cgiar.org*

<sup>b</sup>*International Water Management Institute  
Apt.121, House 6, Osiyo Street, Tashkent 100000, Uzbekistan  
Phone: + 998-71-2370445; Fax: + 998-71-2370317  
E-mail: K.Wegerich@cgiar.org*

Although originally conceived as farmer organizations, today water user associations (WUAs) are expected to incorporate different water users and uses. However, the inclusion of different client groups in WUAs' governance and management structure and the expansion of their service provision appear to present certain challenges.

Using a case study from Uzbekistan, this paper explores whether a recently established WUA is able to integrate small users in village settlements and to provide services to meet the rising water demands of the rural population in Ferghana province. The finding shows that traditional water control, including technical, organizational, political and socio-economic components, is ill equipped to integrate the rural community. This challenge will increase with increasing population pressure and finite resources.

**Keywords:** anarchy, central asia, ferghana valley, gender, multiple use of water, water users.

### 1. Introduction

Conventionally, public irrigation systems have been designated as being for agricultural uses only. Only rarely have multiple uses and users been incorporated in the design phase. Recently, more attention is being given to multiple uses (Meinzen-Dick & van der Hoek, 2001). However, although this is true conceptually, in practical terms the integration of multiple users and uses still presents a challenge, especially in relation to governance and management at local level (Thomas et al. 2011). At this level, attempts have been made to incorporate multiple users and uses into Water User Associations (WUAs), which were originally conceived as encompassing farmers only, with the intention of involving farmers in the governance and management of water for irrigated

\*Corresponding author.

agriculture. As the interests of farmers have historically been paramount, including other users and uses in the governance and management structure as well as expanding the service provision to different client groups is proving to be challenging; and this challenge will increase with increasing population pressure and finite resources.

This paper explores a specific case of whether and how recently established WUAs in Uzbekistan are able to expand their client base and provide services to meet the rising demand from poor rural communities in the context of seasonal outmigration of male laborers and a feminization of rural Uzbekistan. The aim of this study is to draw attention to the changing situation in rural Uzbekistan and therefore provoke a shift in emphasis away from projects focusing solely on farmers and towards projects that target the rural population at large.

The paper continues with a brief framework section on existing water control in Uzbekistan and the growing challenges of new users and uses. The next section provides the background to both the Ferghana Valley and farming systems in Uzbekistan. This is followed by a case study of Yangi Chek and Pakhtakor settlements within the Akhror Mirob Muminjon WUA in Ferghana Province. Here, the special focus is on community (*mahalla*) ditch water masters (*mirabs*), infrastructure, and households' gendered strategies to claim water. The case study section is followed by a short reflection on the representativeness of the findings. The last section highlights the need to shift attention away from water efficiency improvement to reallocation projects and to the incorporation of the rural community at large into water governing bodies.

## **2. The new challenge to water control within irrigation systems**

Mollinga (2003) distinguishes between three dimensions of water control in irrigation systems: technical, organizational, and societal, economic, and political. Treffner et al. (2010, p. 229) state: "Societal, economic and political objectives are implicitly inscribed in controlling organizations and infrastructure." Ertsen (2007), referring to distinctive irrigation schools, highlights the different political objectives of three colonial powers, Britain, France, and the Netherlands, and how these political objectives are manifested both in different water control infrastructure designs and in the setup of irrigation departments. According to Mollinga (2003), changes in one dimension require changes in the other two dimensions. This rarely happens however. For example, Bolding et al., (1995) show how Indian irrigation departments, by simply focusing on technical solutions, failed to adapt to agrarian changes. The political objective of reducing the costs of the irrigation systems by handing them over to farmers (WUAs) was in many cases only a one-dimensional change (organizational) on the local level and often was not accompanied with changes in the other dimensions. With the increasingly popular concept of integrated water resources management (IWRM), which is based on the Dublin principles incorporating environment, participation, gender, and the economic value of water, but also bringing together multiple users as well as multiple uses of water resources, new demands are arising for water management on all levels or scales. Meinzen-Dick and Bakker (2000) identify other users within the

irrigation system: herders, fishermen/women, other residents, as well as drawers of domestic water supply. Domestic water supply may be used for consumptive or productive purposes. Most often, WUAs do not take these domestic uses into account, possibly because domestic gardens are mainly the domain of women. So far, gender research has shown that water decision making and irrigation management are dominated by men almost everywhere in the world (Bustamante et al., 2005; Meinzen-Dick & Zwarteveen, 2001; Shyamala & Rao, 2002). At irrigation scheme level, this might be explained by the WUAs' membership criteria, which is based on landownership. Hence, the challenge for WUAs is how to integrate different users and uses within the organization. Thomas et al. (2011) highlight the difficulty of integrating non-consumptive uses within WUAs. Rising population levels increase the demand side, and closing or already closed basins add to the pressure on water control. It is hypothesized that non-integration of multiple uses and users into governing bodies leads to non-rule conformity and therefore anarchy or informal arrangement.

### 3. Background to the Ferghana Valley and the case study area

Located in the south-east of the Central Asian region (Figure 1), the Ferghana Valley is divided between three former Soviet Socialist Republics: Kyrgyzstan, Tajikistan, and Uzbekistan (Figure 2).



Figure 1. Map of Central Asia. (<http://www.lib.utexas.edu/maps/asia.html>)

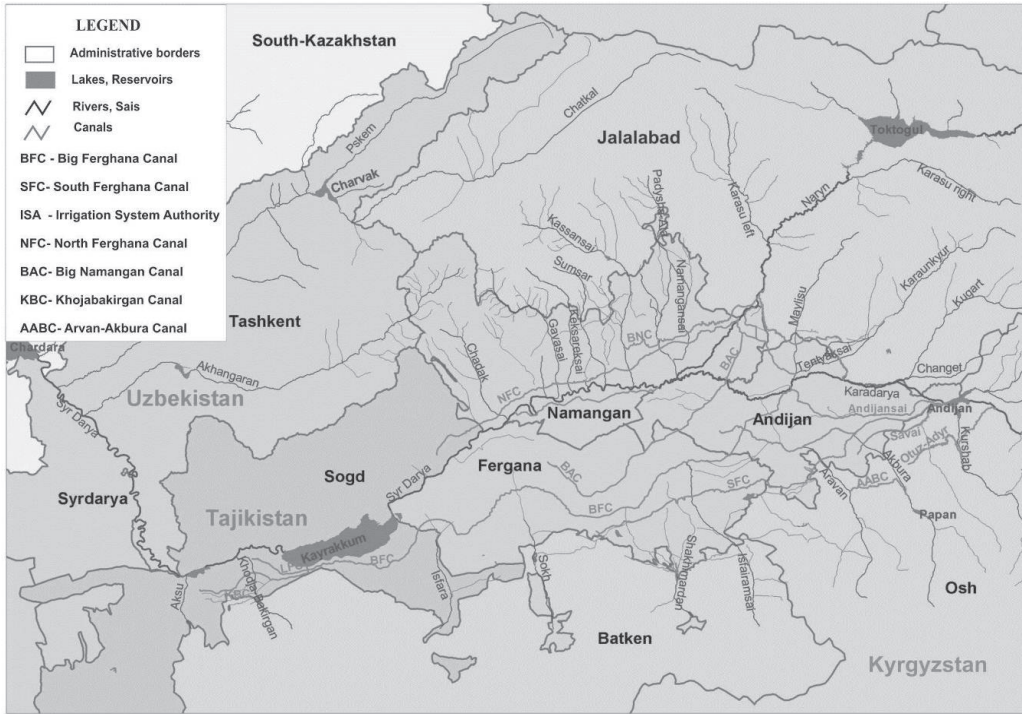


Figure 2. Map of Ferghana Valley.

Geographically, the central part of the valley lies in Uzbekistan, the northern and eastern part belongs to Kyrgyzstan, and a small patch in the west and southwest is located in Tajikistan. Surrounded by the Ala-Tau Range in the north, the Alay mountains in the south, and the Tian Shan mountains in the east, the valley benefits from two main rivers and twenty-two small transboundary tributaries. The two main rivers, the Naryn and the Karadarya, unite in the valley to form the Syr Darya—the second largest river in Central Asia.

The Uzbek part of the Ferghana Valley is divided between three provinces (Namangan, Andijan, and Fergana). Fergana Province—the focus of this case study—occupies 6,800 km<sup>2</sup> and consists of fifteen districts and four major cities (Figure 3).

The province borders Kyrgyzstan to the south-east and Tajikistan to its western side. Fergana Province, with about three million inhabitants, is the most populated province within the Ferghana Valley. In a recent study on Uzbekistan, the Ferghana Valley as a whole was identified as very poor compared to other regions in Uzbekistan (World Food Programme, 2008), with an already high and still rising number of seasonal migrations of men and women (Scientific Information Center, 2011). Reeves (2010) contradicts these migration figures and highlights for one area (Sokh basin) within Fergana province that seasonal migration is gendered and that the majority of labor migrants are men, according to her the migration rate for men was over 98 percent for the period 2000–2005.



Figure 3. Map of Ferghana Province.

During the time of the Soviet Union, a unified approach was adopted to construct infrastructure, including irrigation infrastructure, within the valley (Megoran, 2004). Nevertheless, today, administrative boundary management dominates at the higher administrative level. To manage the water resources within the Uzbek part of the valley, different management organizations have been set up, Basin Irrigation System Administrations (BISAs)—management units at the province level—oversee Irrigation Systems Administrations (ISAs), which manage water resources combining different water sources and allocate these resources to WUAs (Wegerich, 2009; Yalcin & Mollinga, 2007). WUAs allocate and distribute water to farmers (the main crops are cotton and wheat according to state order), gardeners (orchards and vineyards), and rural households (kitchen gardens and extended kitchen gardens (*dekhkan*<sup>1</sup>) (Veldwisch, 2008). In Uzbekistan, farmers, land owners, are predominantly male. Of the 11,126 farms registered in Ferghana Province in 2010, only 516 were women-headed (Scientific Information Center, 2011, p. 112).

<sup>1</sup> The local terminology used in rural areas for various water users differentiates farmers—a farm enterprise growing only cotton and wheat. Gardeners—a farm enterprise growing mainly orchards and/or vineyards, sometimes combined with other crops. *Dekhkan*—a farm enterprise growing any agricultural products on extended household plots, kitchen gardens. *Dekhkan* plots can be maximum 0.35 ha of irrigated lands and 0.5 ha of non-irrigated lands. However, the law does not distinguish between farmers and gardeners (Law of Republic of Uzbekistan on “Farm Enterprises” #662-II, dated 30.April.1998, Article 3.3: A farm enterprise is an independent economic subject with rights of a legal entity. “*Dekhkan* Enterprise” is a small-scale enterprise engaged in commodity production. A *dekhkan* enterprise may exist as a legal entity as well as without legal establishment. (Law of Republic of Uzbekistan on “*Dekhkan* Enterprises” #604-I dated 30.April.1998, Article 1).

The relatively small number of women farmers does not imply that women without formal land rights do not participate actively in agriculture. In fact, women's engagement in agriculture is even increasing (Kandiyoti, 2003). Due to the declining economic conditions in Uzbekistan and land reforms (targeted at economies of scale and continued high cotton production<sup>2</sup>), and later the optimization of farm sizes, male labor migration to Kazakhstan, Russia, and Korea is reported to have increased rapidly, particularly from the rural areas (ADB, 2005; Mansoor & Quillin, 2006).

In Uzbekistan, the focus on agriculture and therefore also on water management is mainly on farmers following the state order on cotton and wheat. Consequently, most government or donors' policy interventions targeting agriculture focus on these farmers, for example water productivity increases or even building institutions such as WUAs. However, kitchen gardens and extended kitchen gardens contribute to more than 80% of agricultural production (excluding crops such as cotton, wheat, rice) and ensure households' food security in the rural and urban areas (Alimdjanova, 2009).

Here it should be emphasized that since independence the land area allocated to kitchen gardens has increased significantly. Since 2000 the population of the Ferghana province has increased from 2.7 to 3.1 million in 2010, in the same period the number of communities has increased from 312 to 395 (Scientific Information Center, 2011, p. 112). Until recently, settlements expanded into the irrigated areas (Table 1). Kandiyoti (2003) highlights the role of women regarding kitchen gardens and their contribution to household food security. Whereas in the past fertile land was given for the establishment of new settlements within existing agricultural lands, this policy changed recently. "Now the state is building settlements in areas which are not fertile and have not been previously under agricultural production. It is anticipated that the population within the new settlements must improve the land" (Interview with Ferghana Province BISA representative, 15/02/2012).

Table 1  
Changes in land allocations to kitchen gardens in Ferghana Province

Years	Total irrigated area, ha	Including crops and kitchen garden lands (ha)						
		Cotton	Wheat	Alfa-Alfa	Orchards	Other crops	Kitchen garden	Kitchen garden/Total irrigated area %
1980	323,049	188,822	0	39,925	22,487	53,190	18,625	5.77%
1990	354,151	140,698	0	52,821	37,744	68,911	53,977	15.24%
2000	357,736	126,384	90,793	9,977	33,435	147,953	39,987	11.18%
2010	361,978	103,600	111,700	3,718	47,628	144,718	62,314	17.21%

Source: BISA Ferghana Province

<sup>2</sup> In the early years of independence the land reforms in Uzbekistan were intended to stabilize rural livelihoods; therefore each collective farm employee received a land plot (Spoor 2004).

In Uzbekistan, an ‘optimization process’ has led to an increase in farm size and a decrease in the number of farmers. The process sought to increase agricultural productivity and profitability by increasing the land size of farms (Djanibekov, Assche, Bobojonov, & Lamers, 2012), at the same time the process reduced the number of farms significantly. As a consequence, generally one off-take from the secondary canal is utilized by one main user, a cotton and wheat farmer, alone. However, often before or after reaching the farmer’s field, water resources are shared by gardeners, *dekhkans*, or village streets supplying kitchen gardens. Veldwisch (2008) points out that these users, either the group of *dekhkans* or the different kitchen gardeners in one street, are not connected to the WUA, and therefore at this level there is unsupervised and unguided water utilization. Abdullaev et al. (2010, p. 9) report on informal water user groups (WUGs) at the “tertiary canal or village ditches” level. They report very positively about existing informal WUGs, stating that they maintain the ditches, practicing quite accurate water accounting, being a democratic system with members having ‘a say’. However, despite their saying (p. 8–9) that:

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 WUGs is the formation of such groups cannot be done on top-down manner,

they still go on to say:

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; [ . . . ] (5) improving link between WUA, WUGs and local rural communities, e.g. kitchen garden water users.

Current Integrated Water Resources Management Ferghana Valley (IWRM FV) project staff confirm that villages, and therefore kitchen garden users in Uzbekistan, have not been taken into consideration. WUGs have only been established in the Kyrgyz and Tajik territories, mainly in the agricultural areas and not in villages (Kazbekov, personal communication, 2012). Nevertheless, Mirzaev (2012, p. 9) mentions in a Scientific Information Center’s (SIC) IWRM FV project activity report that village involvement and participation in WUA decision making (WUA councils) in the IWRM project areas in Uzbekistan is successful and covers 30% of all WUAs. Mirzaev (2012, p. 14) claims that all of these 160 village committees were part of local WUAs in 2011 and have concluded contracts with them. However, fee collection from kitchen gardens is still low at 19%.

#### 4. Methodology

This research employed a case study approach based on fieldwork using a number of data collection methods. Most data were collected through semi-structured in-depth interviews with WUA staff, farmers, household members, and community leaders as well as through a study of WUA statutory and operative documents, site visits, and participant

observation of both formal water allocation and informal water abstraction practices. The interviews focused on topics relating to allocation, management, users, and uses of water resources as well as participation in WUAs and WUGs along the gender lines of households, farms, and irrigation service provision. A total of fifty in-depth interviews were conducted over a period of three weeks in September 2011, 60% of which were with women (Table 2).

Table 2  
Categorization of interviewees

Interviewee types	Female	Male	Total
WUA staff	3	0	3
WUA <i>mirabs</i>	0	6	6
Village neighborhood <i>mirabs</i>	0	4	4
Farmers	2	2	4
Households	25	8	33
TOTAL	30	20	50

In accordance with the research design, three different village settlements in each of three WUAs were purposely selected within an irrigation system in Ferghana Province, Uzbekistan<sup>3</sup> (Figure 4). The criterion for their selection was that they should be at different locations along the irrigation system to maximize differences in the sample in terms of ease or difficulty of access to water resources. Rather than being representative, the study aims to be a thick description of an irrigation scheme with the focus on water management and/or distribution to rural households.

## 5. Case study

The research was conducted within the Ferghana district of Ferghana Province and covered a purposive sample of three local WUAs: Akhror Mirob Muminjon WUA (2354 hectares in 2011), Yuqori Vodil Yahshi Niyat WUA (1728 hectares in 2011), Nurmamat Quchqorboy Mirob (2457 hectares in 2011) with a focus on water delivery and distribution to and within local village settlements. All three WUAs were established in 2008. Although data was gathered within all three WUAs, here the focus is on the Akhror Mirob Muminjon WUA. The data collected within the other two WUAs was used to confirm the legal and

<sup>3</sup> It was proposed to conduct the research project in the South Ferghana Canal irrigation zone in Andijan Province. This zone is part of the IWRM FV project. Focusing on water allocations to villages within a main canal zone would have been more representative for Uzbekistan. In 2011 the area was under the domain of the project partner SIC, and the province water management organizations prohibited the proposed research. Therefore, the research was conducted within the IWRM FV project area under the domain of IWMI. In 2011, IWMI's IWRM FV project area covered only areas outside the main canal irrigation zone and in the catchment area of the small transboundary tributary Shakhimardan sai (Wegerich et al. 2012). Nevertheless, given that both project areas would have had the same awareness raising on the integration of village WUGs into WUAs, it is to be assumed that there would be little difference regarding governance and integration.



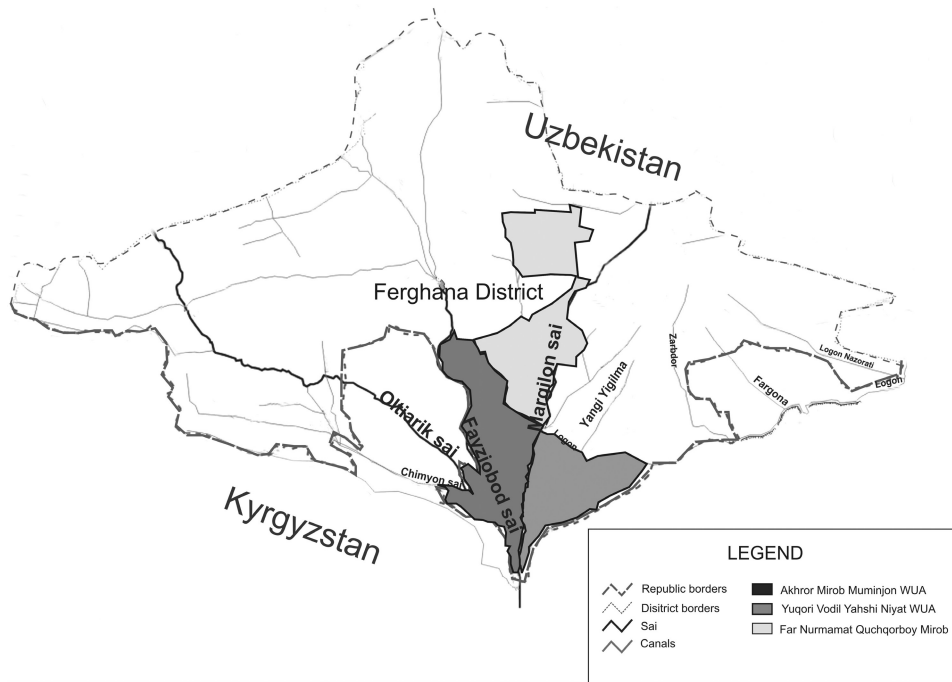


Figure 4. Research area within Ferghana Province.

organizational settings within WUAs as well as to validate general trends on population, outmigration, and gender issues.

In all three WUAs studied (Akhror Mirob Muminjon, Yuqori Vodil Yahshi Niyat, and Far Nurmamat Quchqorboy Mirob), labor migration of 60% of young men (aged 20–35 years) to Russia or Korea were reported (HHF2, HHF3, HHM10, MMM1, FF1; see Annex for details of interviews and profiles of interviewees). “Almost every household in our settlement has at least one person working in Russia or Korea” (HHM7).<sup>4</sup> Although remittances are often the main income for these rural households, the kitchen garden serves not only to ensure stable food security but also to generate income. Interviewees reported growing vegetables (potatoes, tomatoes, cucumbers), grapes, and fruit trees. Some fruits and vegetables are reportedly sold to Tashkent but also to Russia (HHF2, HHF3, HHM10, MMM1, FF1).

As previously mentioned, settlements have expanded in Ferghana Province. In the Akhror Mirob Muminjon alone, a rapid increase can be observed in recent years. A comparison of satellite images from 2010 and 2012 shows that the Yangi Chek settlement within Vodil village at the tail-end (see details below) has increased (Figure 5).

<sup>4</sup> Many families gather money to send their children, brothers, or relatives to Russia or Korea. The reported average salary of young men working in construction in Russia is US\$ 500–700/per month (HHM19, WDM2). The average official minimum wage is far below the internationally recognized poverty line of US\$ 1 per person per day and much lower than the recommended poverty line for Central Asia of US \$2.15 per person per day (World Food Programme 2008, 17), and in addition official wage payments are often delayed.

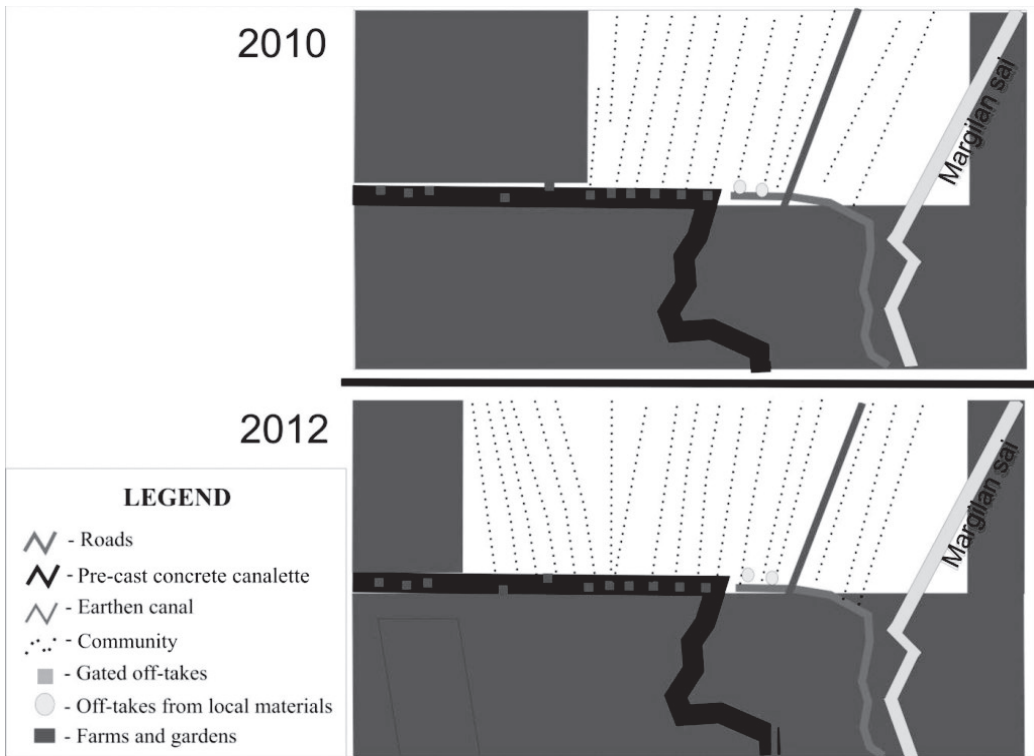


Figure 5. Population growth in Yangi Chek settlement/Vodil village in 2010 and in 2012.

All three WUAs have the same charter, which states: “The association’s founders, farms, *dekhan* farms registered as legal entities, individual households that possess kitchen gardens within the WUA area and who are organized into legal entities can be accepted as members of the WUA” (WUA Memorandum). Common in all three WUAs was that kitchen gardens did not have individual membership, since they are not legal entities, but were rather represented through one appointed representative for a group of settlements (administrative boundaries only). Neither village ditches form legal entities, and therefore they do not have individual representation within the WUAs either. Similarly, *dekhkan* farmers (less than 1 ha of land) are not legal entities and therefore are not represented within the WUA. Therefore, Akhror Mirob Muminjon WUA had thirty-four members only: sixteen farmers, twelve gardeners, one cattle breeder, and five groups of settlements with a total population of 25,000 in 2011. Yuqori Vodil Yahshi Niyat WUA had thirty-six members only: thirteen farmers, eighteen gardeners, one cattle breeder, and four groups of settlements with total population of 10,300 in 2011. Far Nurmamat Quchqorboy Mirob WUA had sixty-five members: twenty-nine farmers, thirty-one gardeners, and five groups of settlements with total population of 6,800 in 2011.

Although these entities are officially WUA members, the WUA is responsible for distributing water only up to the off-take, either that of the registered farmer or of the

settlement ditch. Officially, farmers pay 17,000–25,000 UZS per ha, gardeners 80,000–110,000 UZS per ha, and *dekhkan* farms (kitchen gardens) 500 UZS per 0.01 ha per season (US\$ 1 = 2,800 UZS market rate) to the WUA. The average salary of a WUA water master (*mirab*) providing water to the off-take is 160,000 UZS monthly (US\$57, market rate). Although officially owners of kitchen gardens pay 500 UZS per 0.01 ha per season, the payment does not guarantee that they will receive water.

As already mentioned, water control has technical, organizational, and politico-socio-economic components. To understand the situation in the particular case, it is important to understand the setting; here, we focus on the Akhror Mirob Muminjon WUA and two major settlements: Pakhtakor and Yangi Chek.

The Akhror Mirob Muminjon WUA has seven secondary canals taking water from Shakhimardan sai and distributing water to total of twenty-eight farmers and gardeners as well as five settlements consisting of 3800 households in total. Of the five settlements of Vodil village, two were selected: Pakhtakor, which is at the head-end of a secondary canal, and Yangi Chek, located at the tail-end of a secondary canal (Figure 6). The water supplied through the irrigation system serves not only to irrigate the rural household

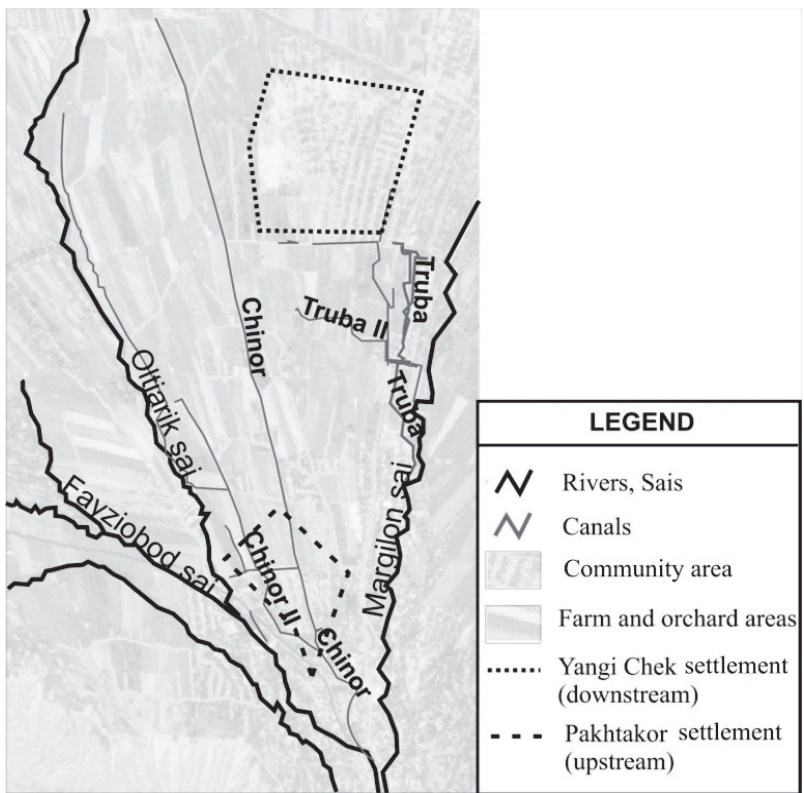


Figure 6. Akhror Mirob Muminjon WUA with two settlements.

gardens but also domestic purposes such as drinking water for people and livestock, washing dishes and clothes (HHF1, MMM1, HHF2, HHF3, HHF4).

Pakhtakor was established in 1980 (after a mudflow destroyed former settlements in 1977). The settlement is structured into three communities (*mahallas*), which all have individual off-takes and ditches. In total, Pakhtakor has about 500 households. Whereas the first community (the furthest upstream) receives water from a separate canal originating in Kyrgyzstan, the two lower communities receive water from a secondary canal (Chinor aryk). After the off-takes to the two communities, the secondary canal reaches the agricultural areas. The two community ditches are earthen, but have gated off-takes. None of the three ditches had water masters.

Yangi Chek settlement in Vodil village was established in 1977 and consists of about 1,000 households during the fieldwork period. Within the settlement, there are ten ditches leading to kitchen gardens (Figure 5). Two canals that take water from the same source provide water first to farmers and after that to these ten ditches. One canal is earthen, providing water to three ditches, and the other is a pre-cast concrete canalette<sup>5</sup>, providing water to seven ditches. Seven of the ten off-takes to the ditches were equipped with metal gates in 2010. All ten ditches behind the off-take are earthen. The ten ditches have eight water masters, each one responsible for the off-takes equipped with metal gates and one serving for the three ditches which did not have metal off-takes and that received water from the earthen canal. Community (*mahalla*) *mirabs*<sup>6</sup> take water from the main hydropoint that divides water to farm lands and households. Community *mirabs* are elected during the annual spring celebration of *Darashona*.<sup>7</sup>

Even though it is clearly spelled out in Uzbek law that drinking water needs to have priority over agricultural water needs, during the cotton season (May-November) officially water is allocated first to cotton farmers (WDM1, WMM1, MMM1, HHF4, HHF3). Given the cotton priority policy as well as the financial incentives for the WUA water masters to supply cotton/wheat farmers and gardeners first, it is understandable that the water supplied to the communities or community ditches at the head or at the tail are not sufficient.

<sup>5</sup> A pre-cast concrete canalette is a concrete ditch.

<sup>6</sup> *Mahalla mirabs* are community water masters. The boundaries of *mahallas* could vary from location to location. In the study area, within the same settlement, the term *mahalla* made in one case reference to a group of streets and in another case to one street only. Similarly, *mahalla mirabs* were responsible for either a group of streets/ditches or for one individual street/ditch. For consistency reasons the term *mahalla mirab* is used.

<sup>7</sup> *Darashona* is an annual celebration of the arrival of spring. According to various opinions, men and women participate in *Darashona*. Men usually discuss all the work that has to be done before the vegetation season starts and have the opportunity to voice their opinion during the elections of *mahalla* staff members. Women contribute by preparing food for this event and in some cases vote to appoint a woman to handle women's issues and support in various community events. *Mahalla* staff usually include: *mahalla aksakal* (elder) and his assistants: *postbon* (watchman), *mahalla mirab*, and *mahalla-dasturhonchi* (a woman responsible for women's issues and various events). During the celebration, *hashar* (community joint work, which also includes the cleaning and repair of canal infrastructure) needs and timing are discussed and decided upon. The celebration is also used by WUA staff to spread information about the rules, fees, and warnings connected with irrigation and maintenance of irrigation facilities.

In Pakhtakor settlement at the head-end of the secondary canal, one of two metal gated off-takes, diverting water to the community ditch, was broken by the village residents. Although the WUA director ordered the community elders to pay a fine and to repair the off-take, the village residents did not comply. At the time of the research, the off-take had already been broken for one year (WMM1, HHM18, HHM19). In the two head-end off-takes, ditch water masters are not employed (WMM1, WMM3, HHM13, HHM18). The WUA water master responsible for providing water to farmers explains the situation as follows: “There are no water masters here, only in Yangi Chek. You cannot make people pay here” (WMM1). The WUA water master’s statement also implies that the Pakhtakor residents do not pay the 500 UZS per 0.01 ha per season.

In the case of Yangi Chek settlement, the recently (in 2010) installed water control infrastructure (a pre-cast concrete canalette through the farmers’ fields as well as the construction of off-takes) has increased the amount of water supplied to the settlement as well as eased allocation between the community ditches. Although the technology to bring water has improved, this still does not mean that water is sufficient for the six ditches in Yangi Chek settlement that receive water from the canalette. Nevertheless, compared with the three ditches that receive water through the earthen canal running to the farmers’ fields, the situation is better. However, water rotation has still to be applied between the seven ditches (HHF4, HHF6, HHF7 WMM2, WDM1). Each off-take is supposed to receive water for one to two hours depending on the size of the garden, which usually varies from 0.06 to 0.16 ha. *Mahalla mirabs* do not take responsibility for water delivery to the kitchen gardens, it is the users which are guarding their water supply. If the *mahalla mirabs* closes the off-take, this does not mean that they are not re-opened without authorization. “Then the water masters go and close that off-take and we go and open it again, or could be a noble person who would open it [. . .] when there is not enough water, we just go and open it” (HHF12). The off-takes are opened, although it is clear to the persons opening them that other streets will receive less water. “Women can open the small ditch; for example I open the small ditch at the start of our *mahalla*. We are situated at the start of the street, but there are other streets that are deep inside the settlement and they are always in need of water” (HHF15).

The community ditches are still earthen. With water not plentiful and demand high, it is not astonishing that most ditches in Yangi Chek settlement have their own *mahalla mirabs*. These *mahalla mirabs* are not WUA employees, with the exception that a WUA *mirab* might take on this responsibility as well, as was the case in Yuqori Vodil Yahshi Niyat WUA (WDM2, WAF1, WMM4, WMM5). It was explained that “usually *mahalla mirabs* are elected from within the street and from those who are currently jobless. Before, the *mahalla mirabs* were leaders or elders within the communities; today, these are mainly young people” (HHF8). Although women are active in using and taking the water for their kitchen gardens, they do not participate in the election process. “It’s a men’s gathering and they elect. I don’t much like going. I have my husband go to those meetings” (HHF11). It was reported that households pay 1 kg of meat per 0.01 ha per season (about UZS 17,000) to the ditch water master (WDM1, WDM2, FF1, MMM1, HHF6,7, WMM2); this

amount it in addition to the UZS 500 that every household is supposed to pay to the WUA. However, having the ditch in water-scarce tail-end areas within the village settlement, households pay 1,000 to 2,000 UZS a week to the ditch water master.

To divert water into the kitchen gardens, households use “stones, plastic bags, hay, which allow also neighbors to manipulate these off-takes and to use the water without any control even with ditch water masters present” (HHF4, HHF12, HHF15, HHM14, WMM2, WMM3). “In cases of *mahalla mirabs* handling water allocation between households where there are no proper technologies, they cannot guarantee the provision of water to everybody because of the lack of control, there are cases of households at the head and middle ends stealing water and heavy seepage” (FF1, MMM1, WMM2, HHF6, HHF7, HHF4, HHF5). “The neighbors that are situated before the others, they just take the water saying that their garden did not drink enough, then the neighbors get into an argument” (HHF6, HHF7). It appears that often it is the women of the household who steal water rather than the men. Being aware that taking water without authorization can lead to conflict between men, households may send women to reduce the conflict potential. “I don’t let my sons [25–28 years old] go out for water as it’s dangerous and there are cases that neighbors start fighting over water” (HHF16). “Usually my dad goes and asks for water, and my mother usually just goes and opens whenever she needs it. My dad never does it without permission. If my mother asks my dad about it he will forbid stealing water. So my mother does it together with her elder daughter-in-law in the way that my dad doesn’t know. Negotiations are usually done by men. Women are more into stealing” (HHF4). Even though, this quote would suggest that young and elder women would steal jointly, it appears that mainly young women (25-35 years old) are taking the water. A young woman from the tail-end of one street stated “Very often I go and open the water in the beginning of the street even if it’s not our turn as otherwise our kitchen garden does not get enough water” (HHF20). A male elder within the community confirmed that stealing was mainly done by young women “The main conflicts arise when the *kelin* (young bride/daughter-in-law of the household) goes out and opens the water when she is not supposed to. Either the male neighbor complains and then might get into trouble with the husband or with other men from the *kelin*’s household, or he holds his peace and does not say anything, letting the *kelin* take the water” (HHM10). Elder women take a different role. Elder women take charge of enforcing the contracts with the *mahalla mirabs*, the WUA *mirab*, or even at higher administrative levels. An elder woman stated “We go out to talk with the *mahalla mirabs*. If he does not solve the problem, we don’t give him his money” (HHF7). “We address the *mahalla mirabs* or the village elder. Once, the women from my street gathered together and also convinced me to go to the village mayor, and if not to the district governor, to complain about the water issue. The next day the water was distributed. There was also a case that the [women of the] street behind us went with complaints to the district governor” (HHF7, HHF4). The WUA *mirab* confirmed: “Women sometimes come out and complain to me that there is no water. I tell them that if I have water from my boss I can distribute.

From where can I provide additional water? Once they addressed the WUA director. Within one hour the director called me and begged me to take these women out of his office. There were five women, and they even wanted to go up to the district governor. Finally, they got what they wanted, and I provided additional water.” When it comes to guarding water, particularly at the tail-end, young and elder women join hands. “We go out with all our women of the family and then we guard the water. We usually gather with several neighbors and go at night to open all the outlets and bring the water to our households” (HHF9). It appears that tail-end households seem to realize that because of their position along the ditch/street individual activities would fail to succeed. Hence, women from different generations of different households join to guard water supply to their kitchen gardens.

## 6. Conclusion

Overall, the data show that individual households are not represented, and *mahallas* are underrepresented in WUAs. This neglect may be built into the Soviet priorities and current rationales of projects within Uzbekistan. Most agricultural water projects focus on water efficiency and the productivity of farmers and/or on integrating farmers within WUAs. Hence, small users, kitchen gardens, are ignored and therefore also the focus on reallocation of water or priority setting for the overall rural livelihoods.

As highlighted by the situation in Ferghana Province, the rural population is increasing rapidly. This has led to an expansion of the irrigated area under kitchen gardens from about 5% in 1980 to 17% in 2010. Although within Soviet agricultural production kitchen gardens had already some significance, after independence and with less rural employment as a result of the dismantling of collective farms and a steady increase in male seasonal outmigration, kitchen gardens are significant not only for agricultural production but also for securing the livelihoods of rural households.

Probably because of the combination of the priority given to cotton and wheat farmers, the economic hardship in rural communities leading to an outmigration of male season laborers, but possibly also because of the culturally protected role of women in Uzbek society, women have become more active in irrigation and water management within the village boundaries. It appeared that the new roles of women are often defined according to age groups, while young women (*kelins*) irrigate, elder women negotiate with men, including *mahalla mirabs*, WUA *mirabs* and director or other local authorities. Increased involvement of female small water users challenged traditional irrigation-specific gender roles as well as village norms. So far, these new roles for women have not been institutionalized within the village setting (*mahalla* staff) or within the organizations that have been set up (WUAs). Therefore, women irrigators are still operating outside the new institutional setting and the traditional setting. Being outside these settings excludes them, but non-involvement can also be an advantage and enable them to manipulate the settings.

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### Annex: Details of interviews and profile of interviewees referenced in the paper

Code	Interviewee	Location	Name of the WUA	Date of interview
HHF1	Household member female	Leshoz	Yuqori Vodil Yahshi Niyat WUA	17.09.2011
HHF2	Household member female	Kaptarkhona	Yuqori Vodil Yahshi Niyat WUA	17.09.2011
HHF3	Household member female	Near the hydropoint and gardens	Akhror Mirob Muminjon	14.09.2011
HHF4	Household member female	Okhumboboev mahalla/Yangi Chek	Akhror Mirob Muminjon WUA	14.09.2011
HHF5	Household member female	Tail end of the Okhumbabaev/Tinchlik mahalla, Yangi Chek	Akhror Mirob Muminjon WUA	18.09.2011
HHF6	Household member female	Beruni Mahalla/Yangi Chek	Akhror Mirob Muminjon WUA	18.09.2011
HHF7	Household member female	Beruni Mahalla/Yangi Chek	Akhror Mirob Muminjon WUA	18.09.2011
HHF8	Household member female	Mahalla parallel to Yoshlarobod Mahalla/Yangi Chek	Akhror Mirob Muminjon WUA	18.09.2011
HHF9	Household member female	Okhumbabaev, Mahalla/Yangi Chek	Akhror Mirob Muminjon WUA	18.09.2011
HHM10	Household member male	Along the road near the entry of the Truba2 canal	Akhror Mirob Muminjon WUA	14.09.2011
HHF11	Household member female	Beruni Mahalla/Yangi Chek	Akhror Mirob Muminjon WUA	18.09.2011
HHF12	Household member female	Near Chinor arik Pakhtakor village	Akhror Mirob Muminjon WUA	23.09.2011
HHM13	Household member female	Chinor canal, lives in a household close to the hydropoint in the division	Akhror Mirob Muminjon WUA	23.09.2011

HHM14	<i>Household member male</i>	<i>Chinor canal, the household is elevated from the canal</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>23.09.2011</i>
HHF15	<i>Household member female</i>	<i>Along Chinor canal</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>23.09.2011</i>
HHF16	<i>Household member female</i>	<i>Okhunboboev mahalla/Yangi Chek</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>14.09.2011</i>
HHM17	<i>Household member male</i>	<i>Upper mahalla of Qora Yantoq</i>	<i>Yuqori Vodil Yahshi Niyat WUA</i>	<i>16.09.2011</i>
HHM18	<i>Household member male</i>	<i>Kaptarhona</i>	<i>Yuqori Vodil Yahshi Niyat WUA</i>	<i>17.09.2011</i>
HHM19	<i>Household member male</i>	<i>Kaptarhona</i>	<i>Yuqori Vodil Yahshi Niyat WUA</i>	<i>17.09.2011</i>
HHF20	<i>Household member female</i>	<i>Mahalla parallel to Yoshlarobod/ Yangi Chek</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>18.09.2011</i>
WDM1	<i>WUA director</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>13.09.2011</i>
WDM2	<i>WUA director</i>	<i>Yuqori Vodil Yahshi Niyat WUA</i>	<i>Yuqori Vodil Yahshi Niyat WUA</i>	<i>16.09.2011</i>
WAF1	<i>Accountant</i>	<i>Yuqori Vodil Yahshi Niyat WUA</i>	<i>Yuqori Vodil Yahshi Niyat WUA</i>	<i>15.09.2011</i>
WMM1	<i>WUA mirab</i>	<i>Chinor canal 1</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>24.09.2011</i>
WMM2	<i>WUA mirab</i>	<i>Truba canal</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>14.09.2011</i>
WMM3	<i>WUA mirab</i>	<i>Chinor canal 2</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>23.09.2011</i>
WMM4	<i>WUA mirab</i>	<i>Kaptarhona canal</i>	<i>Yuqori Vodil Yahshi Niyat WUA</i>	<i>19.09.2011</i>
WMM5	<i>WUA mirab</i>	<i>Korayantok canal</i>	<i>Yuqori Vodil Yahshi Niyat WUA</i>	<i>16.09.2011</i>
MMM1	<i>Mahalla mirab</i>	<i>Yangi Chek village</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>16.09.2011</i>
FF1	<i>Farmer female</i>	<i>Fayzabod and Chinor canals</i>	<i>Akhror Mirob Muminjon WUA</i>	<i>14.09.2011</i>