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## The rising challenge of multiple water resource use at the urban fringes – evidence from Ferghana District of Uzbekistan

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### Abstract

*For agrarian states located in semi-arid regions and depending on irrigation for agriculture the expansion of residential areas means not only a loss of the suitable agricultural lands, but also a competition over water resources. The challenge exists on how to allocate and distribute the water for multiple uses and users. We present a case study on the urbanizing rural areas of Ferghana district in Uzbekistan. Here the rising competition for water among commercial farmers and household water users is also associated with a gender dimension and calls for a change of the water governance structure. While traditionally Water User Associations (WUAs) are set up to govern and manage water resources for farmers, the urban expansion into agricultural areas implies that WUAs must integrate the concerns of non-farmers and multiple water uses within peri-urban communities.*

**Keywords:** Multiple use of water, peri-urban, urban, gender, Ferghana Valley, Central Asia.

### 1. Introduction

Moving towards a water secure world entails challenges connected with conditions of water scarcity, food security, climate change. At the same time, global acceleration of growth of residential areas especially in developing countries [1, 2] and their expansion into agricultural areas show evolving evidence of competition for water among farmers and non-farmers. Challenged by sustainable use of broader range of ecosystem services subsequent growth of urban and peri-urban areas envisage new and expanding demands for water resources [3], entailing both reproductive and productive uses especially by the poor [4, 5]. The integration of these other, competing uses into the planning or proper design of water provision, management and governance systems has been lacking in Uzbekistan [5].

The agricultural sector being the former most dominant sector in the Uzbek Soviet Socialist Republic (SSR) was the core provider of employment and basic livelihoods [6]. After

independence in 1991, Uzbekistan experienced a political and economic transition, which resulted in the transformation of land rights as well as water management and governance systems. These changes triggered social and institutional challenges particularly for the agricultural sector [7]. In Uzbekistan the population growth rate reached 2.7 percent in 2012. At the same time, the total water supply to Uzbekistan was reduced by around 20 percent [8]. The reduction of water resources has impacted agricultural production in Uzbekistan. It led to a contraction of the strategic cotton crop, a diversification of crops and the intensification of planting second crops [9].

The objective of the paper is to highlight the issue of integration of peri-urban households into Water User Associations (WUAs)<sup>1</sup>. The geographical focus of this study is a main district town of a province in the Ferghana Valley, Uzbekistan.

The paper continues with a discussion on the integration of peri-urban agriculture into water governance systems. The next section provides a short background on the complex water resources transboundary setting in Central Asia as well as land and water management reforms and urbanization in Uzbekistan. This is followed by a short study of two settlements of one district town in Ferghana province, showing how peri-urban areas are integrated in WUAs. The conclusion reflects on the importance of adapting WUAs to incorporate multiple water uses in their governance and management set up.

## 2. Framework

### 2.1. Peri-urban farming systems

There is no universally accepted definition of peri-urban [10]. However, peri-urban, "derived from the word peripheral, can be broadly defined as fringe, edge city, urban stretch or sprawl, or bordering villages" [11]; it is the grey area between cities and urbanized rural areas. However, especially within developing countries, the boundary between urban and rural is becoming increasingly blurred not only at the fringes. One sign of this is urban agricultural production [12]. Mougeot states that "urban and peri-urban agriculture can be broadly defined as the production, processing and distribution of food stuff from crop and animal production, fish, ornamentals and flowers within and around urban areas" (2000, 6). Drechsel et al. differentiate urban farming systems as having the characteristics of "(i) open-space (usually but not only market-oriented) production of high-value products on undeveloped urban land, (ii) (mostly subsistence) gardening in backyards of private houses, and (iii) livestock rearing in and/or outside one's own yard (2006, 3).

Since agriculture relies on irrigation, it is important to look at where and how urban agriculture receives its water resources. With the expansion of urban areas into agricultural areas, it is likely that peri-urban and urban households (*dehkans*) will make use of existing

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<sup>1</sup>WUAs are non-commercial and non-profit member organizations, formed by water users (in most cases farmers only) to manage and deliver water equitably, efficiently, and in a timely manner. The integration of other uses and users is often still lacking.

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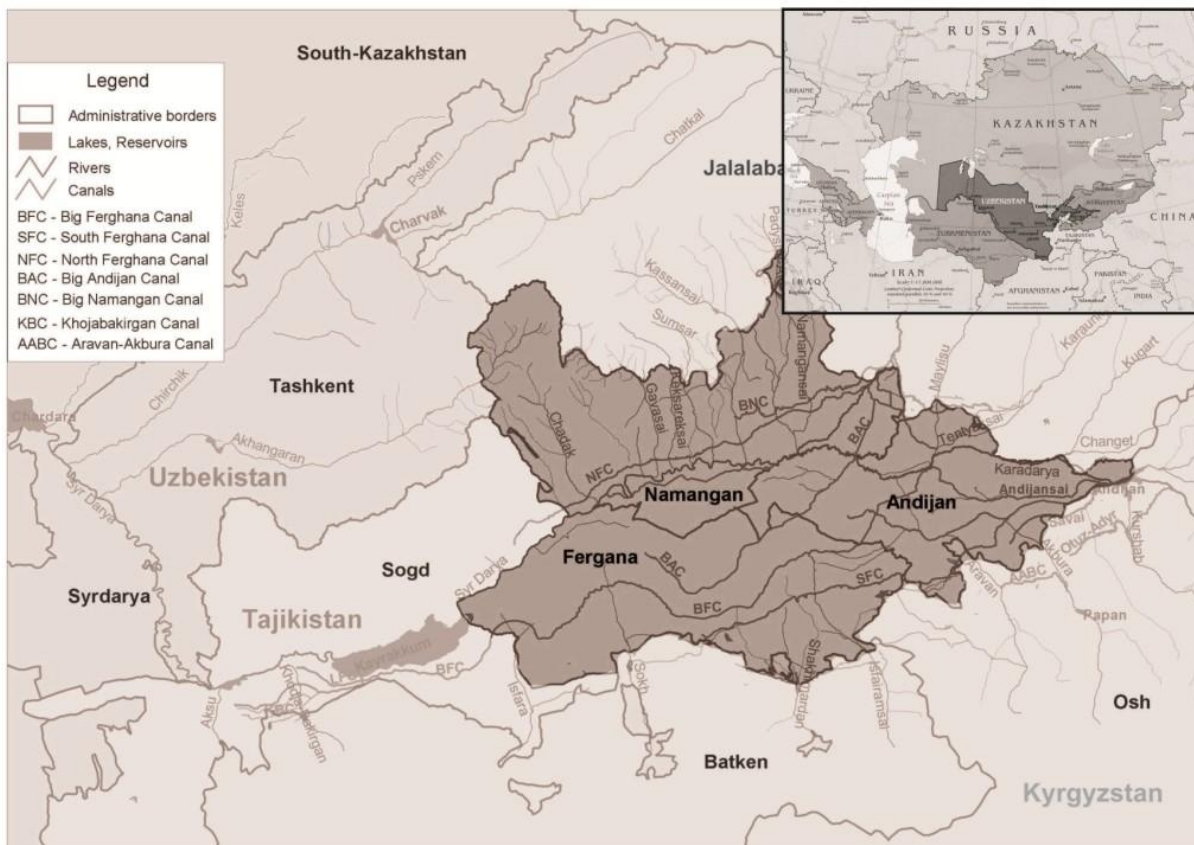
formal irrigation infrastructure. In this context, urban farmers become users of the same water resource as the rural farmers [13].

## ***2.2. Agricultural restructuring and subsistence farming***

Despite the diversity of water users, rarely have WUAs integrated all types of water users in their governance structures. Van Koppen et al. (2006) argue that government policies and donor financing is most often "sectoral and top down" and therefore, fails to account for all water users. The same charge could be leveled at WUAs in Uzbekistan. Additionally, the rapid expansion of urban areas means that it is difficult to include all users in the planning of infrastructure projects. The incorporation of all water users becomes even more difficult if there are prevailing government policies that create potentially conflicting interests on water resources between commercially farming and subsistence farming or non-farming users. Small scale urban and peri-urban agriculture is to a large extent comprised of subsistence farming of households. Rural settlements that have turned from rural into peri-urban continue practicing agriculture in their backyards, a practice referred to as kitchen gardening. Kitchen gardens in the majority of cases are run by women and are not accounted in policies and by WUAs due to a lack of incentives and capacities [4]. Most decision-making in irrigation systems on water allocation and irrigation management is male dominated. As such, a bias may exist among both commercial, subsistence and non-farming users along gender lines [14, 15, 16]. Similarly, small holders with their non-planned uses are often admitted, though their irrigation needs remain unnoticed and underestimated [5].

## **3. Background to case study area**

The Ferghana Valley is located in the south-east of the Central Asian region and is shared between Kyrgyzstan, Tajikistan and Uzbekistan. The Uzbek part of the Ferghana Valley is divided between three provinces: Andijan, Namangan and Ferghana). Ferghana Province—the focus of this case study—occupies 6,800 km<sup>2</sup> with total irrigated area of 361,978 ha, according to the State Committee of the Republic of Uzbekistan on Statistics 2010, and consists of fifteen districts and four major cities (Figure 1).

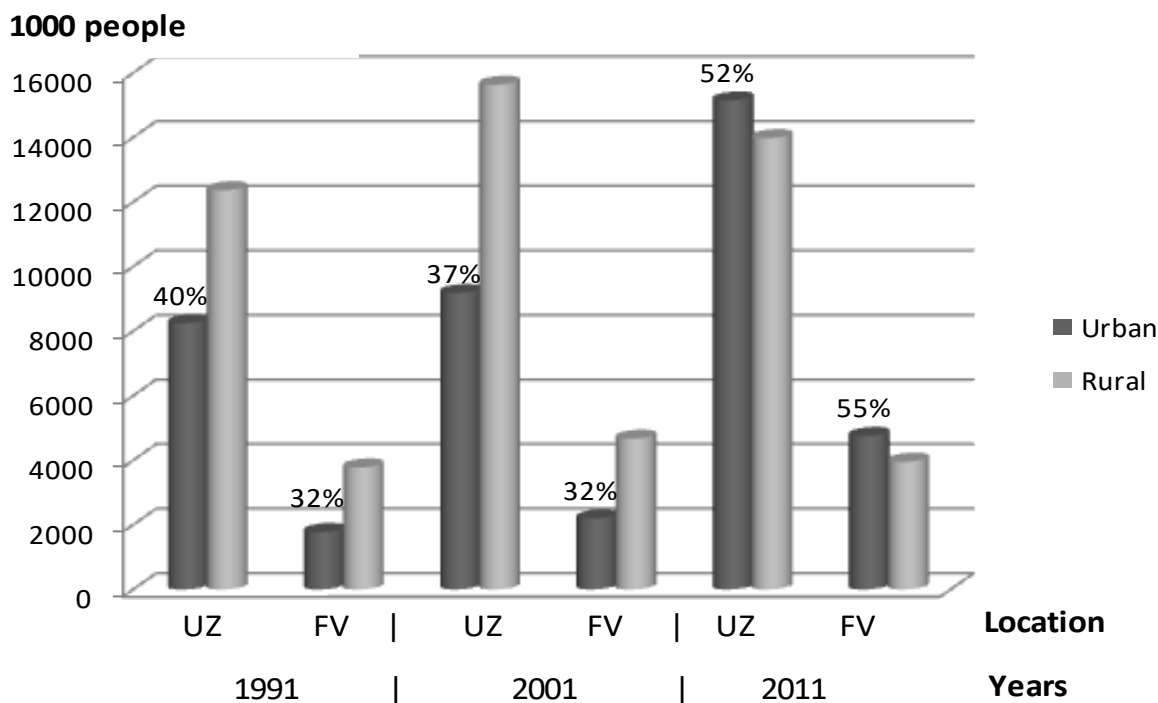


**Figure 1.** Ferghana Province

According to government statistics<sup>2</sup>, until 2008 the rural population has always outnumbered the urban population in Uzbekistan. More recently, a shift in the definition of rural has triggered a sudden rise in urban population. According to official statistics the urban population has become larger than the rural population<sup>3</sup> over time (see Figure 2). Although this appears to be only a question of redefinition of rural population into urban, that happened due to the shift of certain rural areas into urban, it displays the real expansion happening within rural areas due to growth of settlements. However, so far the consequences of this expansion and the increased demand for irrigation or drinking water as well as planning of water distribution and sharing water among the users are not accounted for.

<sup>2</sup>State Statistics Committee of Republic of Uzbekistan. <http://stat.uz/uz/index.php> (accessed January 16, 2013).

<sup>3</sup>Decree of the Cabinet of Ministers of Republic of Uzbekistan No.68.dated 11.02.2004 "On additional measures on improving administrative-territorial arrangement of settlements in Republic of Uzbekistan".



**Figure 2.** Dynamics in population growth during 1991-2011 in section of urban and rural population of Uzbekistan (UZ) and Ferghana Valley (FV)

According to Alimdjanova (2009), in Uzbekistan kitchen gardens contribute to more than 80 percent of agricultural production (excluding crops such as cotton, wheat and rice) and ensure households' food security in the rural, peri-urban and urban areas [23]. Most often, young women are responsible for the management of kitchen gardens [17].

During the Soviet period, agricultural production was organized in crop specialized state owned large scale collective farms, varying in sizes between 2000 and 8000 ha. Within Ferghana Province were a total of 120 collective farms in 1975, which changed to 162 by 1991. After independence in 1991, Uzbekistan slowly privatized its agricultural lands while simultaneously keeping its state order system for cotton and introducing one for wheat in order to gain grain independence. As a result, the number of farms increased to 215,776 with an average size of 27 hectares in 2008, and resulted in a 20 percent decline in labor employment in the agriculture sector largely due to dismemberment of collective farms [18]. A farm and land consolidation initiative named as "farm optimization process"<sup>4</sup> increased the average size of farms to 80 hectares, resulting in a dramatic decrease of farms.

<sup>4</sup> Farm optimization is a governmental program introduced in Uzbekistan since 2008 and still on-going, in which the lands of small farm holders are consolidated for obtaining the optimum land use for maximum agricultural productivity

The Ferghana Province had a total of 25,617 farms in 2007, and due to the optimization process the number of farms decreased to 11,126 farms in 2010 and up to 66,134 by 2012. This action exacerbated the decline of agricultural labor employment and quickened the pace of seasonal labor migration comprising of 98 percent of male farm workers [19]. In the late 1990s, there was some pilot testing of WUAs. Since its independence, around 16 different WUA projects have been launched in Uzbekistan. However, only in 2002 the Cabinet of Ministers approved the procedure of establishing WUAs. By the beginning of 2008, the creation of WUAs was almost completed in the country. In 2009, the Water Law was amended and WUAs had to be renamed as Water Consumer Associations (WCA). The law stipulates that “Members of WCA may be farmers, self-government institutions, as well as other water consumers”, including legal entities.

So far, only one, the Integrated Water Resources Water Management (IWRM), project has attempted to integrate small landholders – in particular, household kitchen gardens within villages – into the decision-making process. Mirzaev (2012) mentions that the involvement and participation of rural village settlements in WCA decision making (WCA councils) in the IWRM project areas in Uzbekistan is successful and covers 30 percent of all WCAs. The author explains that all of these 160 village committees were part of local WCAs in 2011 and have concluded contracts with the village communities [20]. However, these collective contracts do not always guarantee a stable fee collection from kitchen gardens which are seen as indirect clients of the WCAs. Low fee collection observed in majority of WCAs could be explained by incompatibilities of the governance structure of WCAs as will be explained below in the case study that focuses on the Ferghana province.

Of the 11,126 farms registered in Ferghana Province in 2010, only 516 were women-headed [21]. Since 2000, the population of the province has increased from 2.7 to 3.1 million in 2010; in the same period, the number of settlements (community centers) has increased from 312 to 395 [21]. Until recently, settlements expanded into irrigated areas (Table 1). Total irrigated area occupied by agricultural crops cultivated by the farms has been decreasing while from 1980 to 2010 years, at the same time, kitchen gardens have increased in their territory according to the percentage share of kitchen gardens in total irrigated area.

**Table 1.** Changes in land allocations to kitchen gardens in the Ferghana Province

Year	Total irrigated area, ha	Irrigated crops and kitchen garden lands (ha)						Percentage share of kitchen gardens in total irrigated area
		Cotton	Wheat	Alfa-Alfa	Orchards	Other Crops	Kitchen garden	
1980	323049	188822	0	39925	22487	53190	18625	5.77%
1990	354151	140698	0	52821	37744	68911	53977	15.24%
2000	357736	126384	90793	9977	33435	147953	39987	11.18%
2010	361978	103600	111700	3718	47628	144718	62314	17.21%

Source: Compiled by the author using the data from State Committee of the Republic of Uzbekistan on Statistics.

The collapse of the collective farm system left rural men and women with few employment opportunities beyond poorly paid jobs in agriculture. Given the reduced and low paid employment opportunities in rural areas seasonal migration especially among men has increased [19]. Women, as the traditional caretakers, took over the farming activities within the households. Thus, the increase in the kitchen garden area mean an increase of substance farming performed by women.

#### 4. Data and Methods

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, one third of which consisted of female respondents (Table 2).

**Table 2.** Categorization of interviewees

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

In accordance with the research design, three different village settlements in each of three WUAs were purposely selected within an irrigation system in the Ferghana Province, Uzbekistan<sup>5</sup>. 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.

<sup>5</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 [22]. Nevertheless, given that both project areas

The authors focused on the Vodil village, the main district town in the Ferghana District, which is located in the Ferghana Province. The village is situated in the area which previously was occupied with farm lands at the same time the location of this settlement is in the tail-end. The agricultural areas of the town as well as the settlement households receive water through a canal irrigation system. The town had a population of about 25,000 across five settlements (mahallas)<sup>6</sup> in 2011. Some of these settlements are new and therefore are located on tracts of land between established farms, on what was once also irrigated agricultural land. Most households use the water supplied through the irrigation system for domestic (including drinking water) as well as productive purposes.

The agricultural areas in proximity of the town were shared by 17 cotton and wheat farmers, 1 cattle breeder and 12 gardeners (growing fruits and vegetables) in 2011<sup>7</sup>. While there is no data available for 2011 on the number of individual households, and therefore backyards, in 2009 the number of households was 7,225<sup>8</sup>. All of the farmers and settlements are covered within one WCA which is named Akhror Mirob Muminjon. Under the WCA responsibility are seven secondary canals, some earthen and others concrete, as well as 50 fixed water off-takes and 62 water off-takes (constructed from local material) to the users. The WCA has eleven employees of which six are responsible for allocating water between the different off-takes.

## 5. Results and Discussions

The WCA Akhror Mirob Muminjon has 35 members were documented in total<sup>9</sup>. While each individual agricultural water user is part of the WCA, each individual settlement is counted only as one member. It is important to note that, officially, all WCA members have the same rights. This suggests that households within rural settlements are consistently underrepresented and even likely to be misrepresented [17]. This becomes particularly clear during the cotton season (May-November). Although Uzbek law states that drinking water needs have priority over agricultural water needs, during the cotton season the WCA allocates water to cotton farmers first.

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would have had the same awareness rising on the integration of village WUGs into WUAs, it is to be assumed that there would be little difference regarding governance and integration.

<sup>6</sup> Interview with Director of Akhror Mirob Muminjon WUA by the author. Vodil, Ferghana district, Ferghana Province, 13, September 2011.

<sup>7</sup> Authors' personal observations of the first author during the visit of Akhror Mirob Muminjon WUA in September 2011.

<sup>8</sup> Ibid.

<sup>9</sup> Authors' personal observations during visits to Akhror Mirob Muminjon WCA in September 2011



Even though the WCAs, according to their water allocation policy, have to first give the priority to state order crops and to the populations living on the territory covered by the WCA, the actual water distribution include many additional uses and users of water. The WCA staff and the members explain this by technical, organizational and location related issues as well as the uses and users excluded from the WCA policies.

Here, the focus turns to two settlements: Pakhtakor, which is at the head-end of a secondary canal, and Yangi Chek, which is located at the tail-end of a secondary canal. The Pakhtakor settlement, with about 500 households, was established in 1980. The settlement has three fixed off-takes and three tertiary ditches. All of these ditches are earthen. Each ditch community forms its own independent community; however, the three canal water units are recognized as one unit.

The farmers are supplied with water according to their size of land and limits based on crop types. The WCA covers an irrigated area of 1,745 ha which although according to legal papers include settlements, however, WCA water masters cannot estimate the actual needs of irrigated kitchen gardens. The staff of WUA Mukharram aka commented:

*“If you give 100 liters to the farmer we have to minus 15-20 of water loss. The water that is provided, even if it is measured well from its source, does not reach the promised numbers to the farmers and to the households. The farmer and the mahalla always cover the water entries of each other and only if we monitor the water all the way to the point during several days of irrigation, then they might come to a solution but it’s very rare”.*

According to the WCA director, the WCA should control the water allocation to the off-takes of Pakhtakor. However, in reality little control is possible. For example, one of the metal-gated off-takes which diverts water to the community ditch was broken by village residents. The WCA director ordered the community elders to pay a fine and repair the off-take, but the community residents did not comply. At the time of the research, the off-take had already been broken for one year.

The Yangi Chek settlement with about 1,000 households was established in 1977. Two canals provide water first to farmers and second to the settlement. Within the settlement, there are ten ditches leading to kitchen gardens. One canal is earthen, providing water to three ditches, and the other is concrete, providing water to seven ditches, equipped with metal gates. All ten ditches behind the off-take are earthen. As a tail-end settlement with farms at the head, provision of water resources is sufficient only for minimum irrigation and is often not stable because of prioritized farms at the head of the canal. Because of established water scarcity issues in the Yangi Chek settlement, the men in each ditch community elect one person, *mirab*, responsible for bringing water to their particular off-take. Nevertheless, water turn rotation still has to be applied between the ditches to meet the minimum requirements of the community. Usually it is considered that if the *mirab* closes the off-take it should not be reopened without proper authorization from him. A female representative of the settlement comment their desperate need for water in such a way:

*“Usually the tamorqas (kitchen gardens) were a bit empty during the Soviet Union times only some fruit trees were planted like apricots and some grapes. Now people are planting everything that is possible for their personal consumption and for selling in bazaar: from peas to herbs. I think the problem with water provision is growing, as people are not leaving a plain space, but try to plant as much as possible and that requires water”.*

Although women are active in using and taking the water for their kitchen gardens, they do not participate in the election process of the *mirab* due to the fact that *mirab* water masters are always men and it is inappropriate traditionally to participate in such an election. The patriarchal construction of gender roles is seen in most of the comments made by the interviewees:

*“My wife has not worked anywhere and I did not allow her to work since we married. I have kitchen garden and she looks after it”.*

Due to the scarcity of water, there is a lot of water theft between ditches and within ditches.

The only female farmer in WCA complained:

*“Men of the settlement can open the water during the night whenever they want, and you cannot protect the water. I always think that in our mahalla there is plenty of water and that the farmer ‘s land is not provided enough”.*

Stakeholders reported that because water theft could lead to conflicts especially between men, young women are sent to open gates and to take water. A water master of the WCA informed:

*“Households nowadays send women to negotiate during water allocation. Women can shout more and can make scandals. The women discuss over water with men, as if the two men would argue on water it might lead to a fighting. With women it is easier, another man will not beat a woman, as they make scandals and at the end they are provided with water. They can even write to the hokimiyat (local government authorities). The women sometimes come out and complain to me that there is no water. I tell them that if I will have water from my boss I can distribute. From where can I provide additional water?”*

Elder women, within the ditch community have a different responsibility. They try to enforce contracts with the *mirab*, the WCA, or even at higher administrative levels. It was also reported that particularly at the tail-end of the ditch community, women from across generations join hands in guarding their water access. Exaggerated by male seasonal migration, the role of women in irrigation has increased. From the words of an elderly women it is obvious that women consider the water allocation issues seriously as they are now responsible for the kitchen gardens:

*“Usually women go out to deal with the conflicts, as now many men left to Russia and Korea. We [women] go out to talk with mirab, if he does not solve the problem we don’t give him his money.”*

However, decision-making in the villages still done along traditional lines and along with the new institutions set up to manage water, have not adapted to the new roles and responsibilities of women.

## 6. Conclusion

The case study showed that peri-urban users are not integrated within WCA, neither regarding representation within the governing body nor in the day to day management of the water resources. As a consequence, the settlements have broken WCA rules and even water management infrastructure. This highlights that, with the urban expansion, the governance and management structure as well as the infrastructure of WCAs must be adapted to meet the new challenges of settlement expansion and multiple demands on water resources. Failure to do so could result in social disobedience. Allocation of water to villages rather than farmers becomes especially important during drought years.

Given the expansion and increased importance of kitchen gardens for the majority of the rural population for livelihood security, it is necessary to reprioritize on their respective water needs and towards better integration in WCA. Donors as well as the government have to adapt their policies, project and recommendations to these changes.

## 7. Acknowledgement

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