CRP 1.1. "Dryland Systems in Central Asia" Program
Cluster: System Sustainability Enhancement
Sub-Cluster: Enhancing WUA role in water allocation and management

Comparative assessment of WUAs Governance role on efficient use of water resources in Ferghana Valley

Period of January, 2014 – December, 2015

Contribution to IDO 4: "More sustainable and equitable management of land, water and genetic resources in pastoral and agropastoral systems"

Activity title: Enhancing WUA role in water allocation and management via institutional interventions
(report for internal use only)

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List of abbreviations

ADB	Asian Development Bank
AIS	Administrative Irrigation System
BAIS	Basin Administration of Irrigation System
BWMO	Basin Water Management Organization
CMO	Canal Management Organization
CGIAR	The Consultative Group for International Agricultural Research
CRP DS	CGIAR Research Program on Dryland Systems
GoU	Government of Uzbekistan
ICARDA	The International Center for Agricultural Research in the Dry Areas
IMT	Irrigation Management Transfer
ISF	Irrigation Service Fee
IWMI	International Water Management Institute
IWRM-FV	Integrated Water Resources Management Project in Ferghana Valley
KhBC	Khojabakirgan Main Canal
MAWR	Ministry of Agriculture and Water Resources
O&M	Operation and Maintenance
SIC, ICWC	Scientific-Information Center, Interstate Commission for Water Coordination
VAC	Village Assembly of Citizens
WB	World Bank
WCA	Water Consumer Association
WUA	Water User Association

Overview

Along CRP 1.1. Dryland System program in Central Asia for 2014-2015, there were carried out research directed towards ***understanding key potentials and limitations of WUAs in Ferghana Valley by assessing the role of institutions (formal and informal***[1]***) as well as find out main determinants that facilitate or impede collective action at WUA level towards reliable and fair water delivery which should bring to water use efficiency***[2]**.**

The main direction of research is going to understand and show the linkage between on-farm water management institutional conditions including economic mechanisms and its impact on improvement the overall water management at on-farm level. Mainly, it links with the institutional and economic environment where the WUAs are operating and identifying what kind of rules, mechanisms and regulations should possess WUAs in order to operate sustainably. The efficient use of irrigation lands requires not only formation of different forms of ownership but also the development of appropriate institutions (i.e. sets of rules) and good governance structures.
There is need to mention that this research is also the topic of Oyture Anarbekov's PhD study at University of Bern, Switzerland.

Research is based on comparative case study approach in Central Asia, particular in Ferghana Valley countries of Uzbekistan and Tajikistan. This approach is proposed in order to better understand the context and overcome the external validity issues. In addition, research is going to compare the water governance and its influence to the overall performance of WUAs as well as identifying the specific cases and driving forces behind of differences in each country of Ferghana Valley through selected case-studies. Two pilot WUAs are selected in each country of Ferghana Valley within one hydrographic Small River or canal system basin. A unit of analysis is WUA located in the head tail and end tail of Small River or canal system.

General hypothesis is that WUAs based in the tail –end of irrigation system should have less problems in organizing collective action, public participation and involvement public into the governance, operating and maintaining on-farm WUA infrastructure due to scarcity to access of water.
In order to accomplish this task, the author employs Collective Action theory Ostrom E. (1990; 1992) to understand what are the key factors that restraint resource users to operate and maintain their on-farm infrastructure as collectively and manage as common pool resource in order to improve their water use efficiencies.

Field methodology based upon three types of approaches to collect data:

a) Key informants interview and observations, i.e. collecting background information for drafting each WUA case-study;
b) Quantitative data collection: using questionnaire;

Annual reports of each WUA's, budgets, protocols of General Assembly meetings, Arbitrage and Revision committees collected in order to better understand the local realities.

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[1] Informal institutions, for instance, included social *khashars (collectively clean drainage systems or fix irrigation scheme. It was a free labor and voluntarily initiated activity).* With the adoption of new rules, these activities are less practiced today.

[2] Water use efficiency is a term commonly used to describe the relationship between water (input) and agricultural product (output). When used in this way the term is, strictly speaking, a water use index. Water use efficiency is also often used to express the effectiveness of irrigation water delivery and use. Need to mention that within this study water use efficiency had meaning of on-time, equitable and reliable water delivery to water users.

I. Introduction

The concept of Water User Associations is not new for Central Asian countries.The movement of establishment of WUAs has started already in beginning of 1990s in order to perform the decentralization of the water management and to improve the water allocation and the water use at the level of on-farm irrigation. The main aim of WUAs activity is to deliver effective irrigation and land ameliorative services to water users, such as stable and reliable water supply and creation of favorable land ameliorative conditions of the irrigated lands at all stages of WUA development (Anarbekov et al 2007).

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 first however, starting from 2009 massive optimization of land process started and today the average size of farmer in Uzbekistan varies between 50 – 75 ha of lands, especially in the conditions of Ferghana Valley. 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 hundreds 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 during the Soviet times was 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 in terms of Uzbekistan and Tajikistan and thousands in Kyrgyzstan who are cultivating different irrigation intensive crops such as rice, wheat and vegetables.

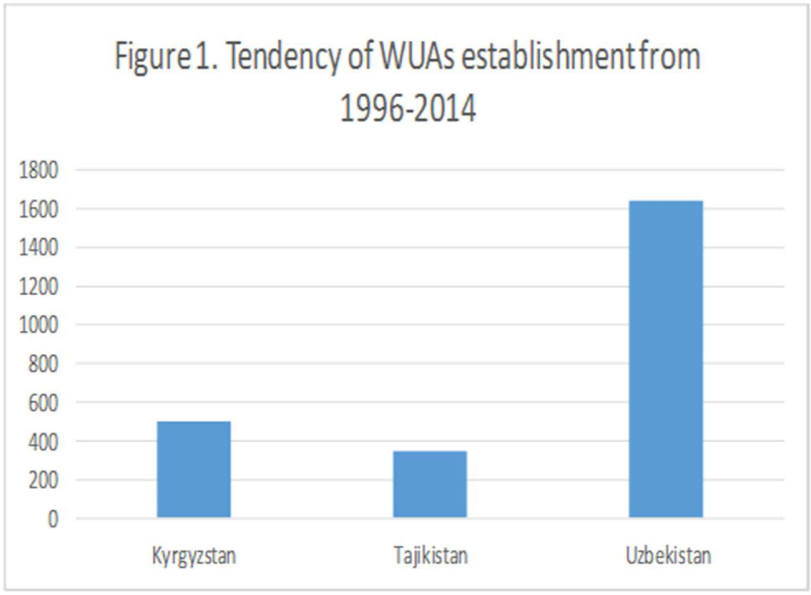

Figure 1 shows the tendency of WUA establishment in three countries of Ferghana Valley starting from 1996 – 2014.

This situation has increased problems with water distribution along the main canals, particularly when water scarcity frequently leads to clashes and conflicts between water users, especially between upstream and downstream 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 in each country. 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. But from another side, there have not been any alternative to propose to build the water management organization responsible for on-farm water management. Each country of Central Asia became independent from planned economy in 1990s, former planned economy is collapsed and there were need to introduce new ways of management natural resources at the level of on-farm water management.

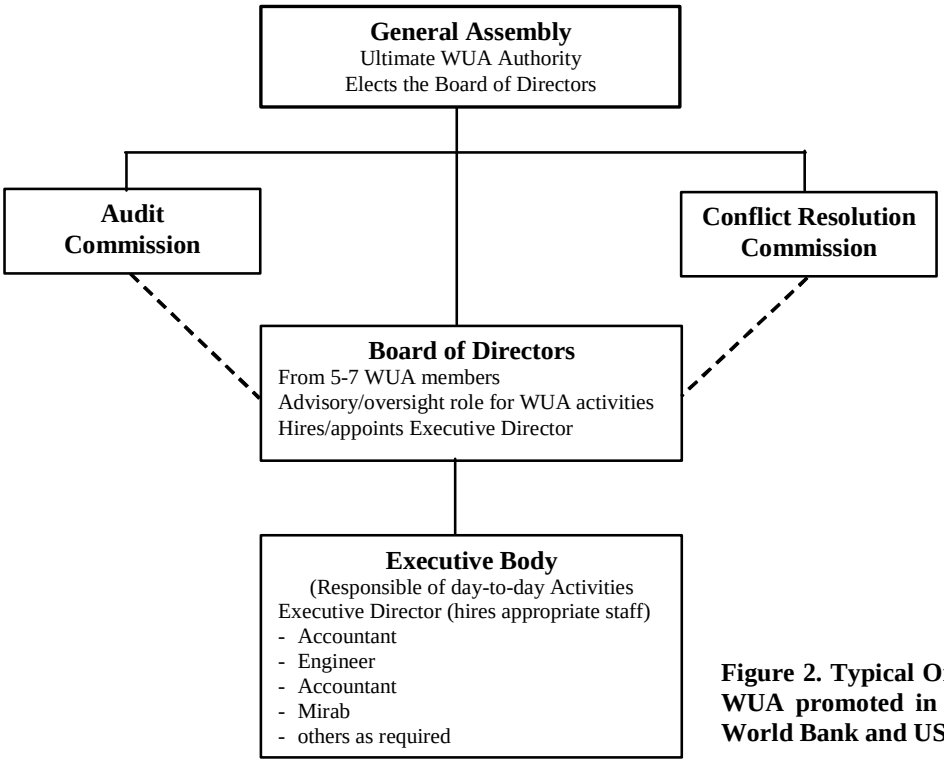

Figure 2. Typical Organizational structure of WUA promoted in the region (source ADB, World Bank and USAID project materials)

II. Problem Statement

The quick institutional change in the irrigation sector however has opened up substantial weaknesses as well. Despite the fact that new institutions (e.g. establishment of WUAs, public participation in the governance of WUA, introduction of irrigation service fee and decentralization of water management) were introduced more than decade ago, these formal top-down imposed institutions are still not well accepted by the majority of resource users (e.g. individual farmers), they are undermined or contradicting by informal institutions (e.g. local traditions, culture, habits) and are still in weak conditions. Majority of water users still perceive WUAs as another form of State Organizations like kholkhozes, mistrust mainly due to transparency of data presented to water users (among them: overall water demand and flow, distribution, allocation, equity in water supply, service fee tariffs calculations, the cost of maintenance of on-farm infrastructure). Additionally, the diverging perceptions of different actors including different power relations within WUAs led to a deterioration of the water governance system within WUAs and the socioeconomic and environmental outputs they generate for farmers/water users. 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 (Gastélum et al. 2009).

Although, in all countries of Central Asia (exempt Turkmenistan) it has been accepted that Water users association (WUA) is the key component in this restructuring process and are in charge of operating and maintaining on-farm irrigation and drainage infrastructure. Most of WUAs are still not able to take full responsibility, organize collective action, persuade water users with data/information and generate sufficient funding for operation and maintenance of its own collective infrastructure. Poor water governance, i.e. public participation and involvement in on-farm water management have led to farmers' dissatisfaction with WUA service, lack of ownership of on-farm infrastructure, conflicts among water users (unsanctioned withdrawals of water by upstream or elite farmers) and between water users and WUAs, mistrust to the work of WUA (data transparency), reductions in crop yields and overall low rate of WUA irrigation service fee collection. Author believe that without proper internal rules and regulations within WUA as well as proper external Governmental support in the form of better legal, technical and financial conditions it is almost impossible to improve water use efficiency at WUA level.

III. The Objectives of the study

This study was undertaken with the aim of contributing to better irrigation water management in Ferghana Valley. It identifies factors and conditions that positively affect the performance of local irrigation water management institutions such as WUA.

Research has three objectives:

a) Understand key potentials and limitations of WUAs operations in Ferghana Valley countries by assessing the role of institutions (formal and informal) and related socioeconomic and environmental outcomes in view of enhancing collective action;
b) Comparative assessment of WUAs operation between Uzbekistan and Tajikistan;
c) Introduce potential institutional inverventions to enhance WUA role in water allocation and management.

IV. ACTION SITES

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 (Kyrgyzstan) and a small area in the valley's west and southwest belongs to the Republic of Tajikistan (Fig. 3).

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 FerghanaValley.

Figure 3. Ferghana Valley—research area (Source: UNEP/GRO-Arendal)

The Ferghana Valley one of highly populated, it is estimated more than 10 mln people live in the Valley (2009) 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/m3 for Ferghana region when average water productivity for Central Asia is around $0.14/m3 (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 hydrographic principles (Uzbekistan and Kazakhstan) and now Tajikistan has also taken steps to shift to hydrographic water management principle. Moreover all countries of the region have introduced irrigation service fees (ISF) before never applied for irrigation during the soviet times. It is the new practice of payment for the provided irrigation service with regard to deliver water up to the boundaries of farmers/users.

This brief description along with the presented scheme of the main water delivery and, partially, water disposal in the Fergana Valley (Fig. 4) can provide insight into the complexity of this unique water management system, which hardly has an analogue in the world water management practice. If you superimpose dozens of large and hundreds of small towns, thousands of rural settlements with various industrial, utility and other enterprises, thousands of kilometers of current and communication lines available within the 7 provinces of the three different countries on this scheme, it will be understandable the difficulty of not only harmonization of management of this system but also collection and comparison of data from assessment of all water resources in this area that exceeds 19 thousand km2.

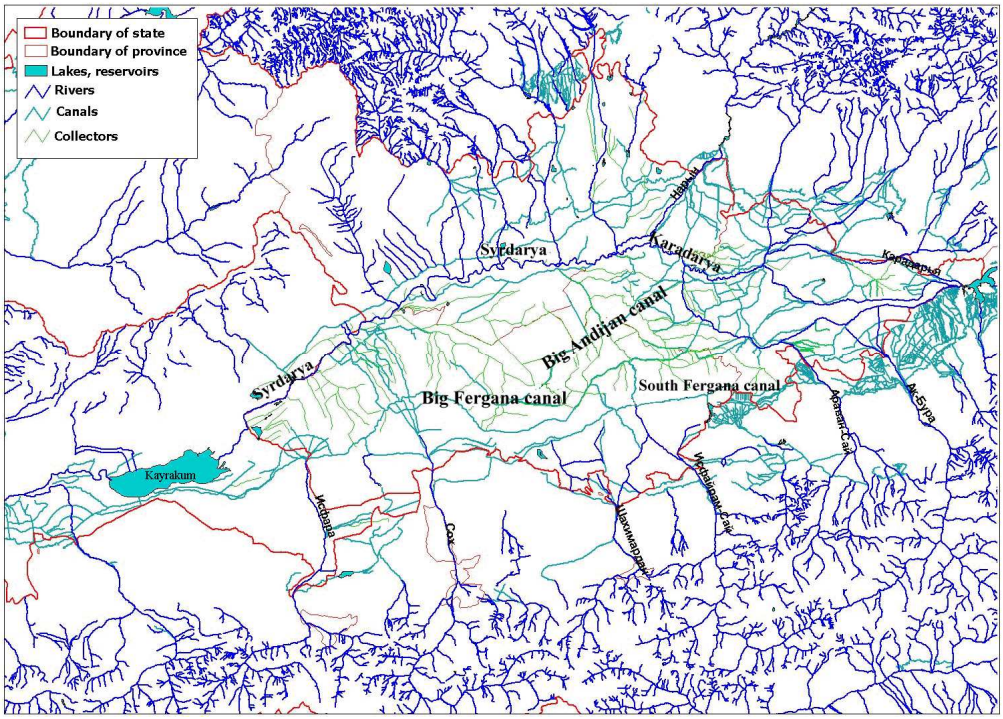

Figure 4. Water management system of the Fergana Valley (source: SIC, ICWC)

Below there is given short information of Provinces where project activities are carried out.

A. <u>Sugd Province, Tajikistan:</u>

Sughd Region is one of the four administrative divisions and one of the three provinces that make up Republic of Tajikistan. Centered in the historical Sogdiana, it is located in the northwest of the country, with an area of some 25,400 square kilometers and a population of 2,132,100 (2008 est.) up from 1,870,000 according to the 2000 census and 1,558,000 in 1989. It was founded in 1924 as part of Uzbek SSR and was become part of Tajik SSR in 1929 (source: http://en.wikipedia.org/).

The region shares a border with the Jizakh, Namangan, Samarkand and Ferghana provinces of Uzbekistan, and the Osh and Batken regions of Kyrgyzstan. The SyrDarya river flows through it. Sughd is separated from the rest of Tajikistan by the Gissar Range (passes may be closed in winter). The southern part of the province is the east-west valley of the upper Zarafshan River. North, over the Turkestan Range, is the Ferghana Valley. The province has 30% of Tajikistan's population and one-third of its arable land. It produces two thirds of the country's GDP.
It was known as Leninabad until 1991, then Leninobod until 2000, then Sughd until 2004 (source: http://en.wikipedia.org).

Figure 5. Map of Tajikistan (Source: http://www.allnationalanthems.com/country/tajikistan)

The economy of Sughd has been growing steadily since 2000, at the average rate of 13.2% in 2008 and 13.3% in 2009. In 2009, farming, trade and industrial production contributed 28.2%, 25.8% and 14.0% to the GRP (gross regional product) of Sughd, respectively. Since 2000, the output of industrial production increased two-fold, at an average annual growth rate of 5–8%.
A free economic zone has been established in the region called Sughd Free Economic Zone.

Table 1. Districts of Sughd Province

Northern districts of Sughd Province	Southern districts of Sughd Province
1. Asht District 2. Ghafurov District 3. Ghonchi District 4. Zafarobod District 5. Istaravshan (Ura-Tyube) District 6. Isfara District 7. Konibodom District 8. Mastchoh District 9. Spitamen District 10. Rasulov (Jabbor Rasulov) District 11. Shahriston District	1. Ayni (Aini) District 2. Kuhistoni Mastchoh District 3. Panjakent District

CRP 1.1. project activities are carried out in two districts of Sughd Province, it is B. Ghafurov and J. Rasulov districts. One WUA is based in B. Ghafurov and second WUA is in J. Rasulov districts accordingly.

Ghafurov District or Nohiya-i Ghafurov is a district in the northern part of Sughd province, Tajikistan. Its capital is Ghafurov, a town in the south of the district. Other major towns in the district are Taboshar (in the north), Chkalovsk (in the south, between Ghafurov and the provincial capital Khujand), and Kayrakum (Qairoqqum), also in the south, which gave its name to the adjacent Kayrakum (Qairoqqum) Reservoir.

Ghafurov district has an area of 2,700 km² and a population of 339,800 (as of 2014), with 95% classified as rural. It produced 19,500 tons of raw cotton in 2007, accounting for 16% of total cotton production in Sughd province and nearly 5% of Tajikistan's cotton production.

Jabbor Rasulov District or Nohiya-i Rasulov is a district in Sughd province, Tajikistan. Its capital is Proletarsk.
It needs to be mentioned that Sughd province mainly relies on lift irrigation for the cultivation of agricultural goods. Below table illustrates current conditions of water management in the Province and specifically in two districts.

Table 2. Water management in Sughd Province, Tajikistan (Source: Author's own collection)

	Irrigated area of the Province, ha	**Total WUA in the Province**	**Total irrigated area served by WUA, ha**	**Average size of WUA in the province, ha**	**Irrigation method**
Sughd Province	250,000	234	193,600	150-1000	70% lift и 30% surface
B. Gafurov District	30,000	29	26,800	800-1000	88% lift and 12% surface
J. Rasulov District	16,000	21	16,000	800-1000	72% lift and 28% surface

From the table, one can reveal that today there are 234 WUAs are based in the province who provide totally to 77% of potential irrigated area of the Province. However, there is need to point out that Province relies on 70% for lift irrigation in comprarison to 30% of surface irrigation.

B. Uzbekistan: Andijan and Ferghana Provinces

Andijan Province:

Andijan Region is a province of Uzbekistan, located in the eastern part of the Ferghana Valley in far eastern Uzbekistan. It borders with Kyrgyzstan, Fergana Region and Namangan Region. It covers an area of 4,200 km2. The population is estimated to be around 2,756,400 thus making Andijan Region the most densely populated province of Uzbekistan (source: http://en.wikipedia.org). Andijan Region is divided into 14 administrative districts. The capital is the city of Andijan. Other major cities include Asaka (Leninsk), Xonobod, Shahrixon (Moscovskiy), and Qorasuv. The climate is a typically continental climate with extreme differences between winter and summer temperatures.

Natural resources include deposits of petroleum, natural gas and others. As with other regions of Uzbekistan, it is famous for its very sweet melons and watermelons, but cultivation of crops can be

accomplished exclusively on irrigated lands. Main agriculture includes cotton, cereal, viticulture, cattle raising and vegetable gardening. Industry includes metal processing, chemical industry, light industry, food processing. The first automobile assembly plant in Central Asia was opened in Asaka in Andijan Province by the Uzbek-Korean joint venture, UzDaewoo, right now it is obtained by UzChevrolet.

Ferghana Region

Ferghana Region is a province of Uzbekistan, located in the southern part of the Ferghana Valley in the far east of the country. It borders the Namangan and Andijan regions of Uzbekistan, as well as Kyrgyzstan and Tajikistan. It covers an area of 6,800 km2. The population is estimated to be around 2,597,000, with over 71% of the population living in rural areas (source: http://en.wikipedia.org). Ferghana Region is divided into 15 administrative districts. The capital is the city of Ferghana, with an estimated 214,000 inhabitants. Other major cities include Besharik, Khamza, Kokand, Kuva, Kuvasay, Margilan and Rishtan. Ferghana Region has a typically continental climate with extreme differences between winter and summer temperatures. Agriculture is the main economy activity of Ferghana Province, primarily irrigated cotton, sericulture, horticulture, and wine. Animal husbandry concentrates on meat and milk production. Natural resources include deposits of petroleum, ceramic clays, and construction materials. Industry is primarily based on oil refining, fertilizer and chemical production, textile and silk weaving, light industry, clothing and ceramics. The area is also a center for the production of traditional Uzbek handicrafts, especially pottery.

V. GENERAL INFORMATION ON AGRICULTURAL SECTOR

Tajikistan:

The land reforms in Tajikistan have been slow and were partly affected by the civil war. Since the war, the land privatization process has gained pace and has 'gone further in just a few years than Uzbekistan and Turkmenistan have in a decade' (Spoor, 2004: 17). Although the number of private farms has not increased substantially, the growth in the acreage of these farms has been remarkable. 2014 is the year when there has been done the latest land reform in the country. The land remaining is in the process of being allocated to private farms still in Tajikistan; one can also observe that land restructuring process is still continuing in the country. Government has also initiated the Water Sector Reform involving all active Donors to help country to shift towards hydrographic principles of water management establishing Basin Water Management Organizations.

In 1993, a Water Code was adopted for the first time in Tajikistan, later to be replaced by a new one in 2000. It addressed some legal aspects relating to WUA establishment. Nevertheless, WUAs were, until recently, established according to the Law on Public Associations. In November 2006, Tajikistan became the third country in Central Asia to pass a dedicated WUA Law, following the Kyrgyz Republic (in 2002) and Kazakhstan (in 2003).

Based on a Presidential Decree, Irrigation service fee (ISF) in Tajikistan has, from 1996, been charged equally to both those who rely on water lift irrigation and those who use gravity water. Due to a high reliance on pumped irrigation, ISF in Tajikistan are the highest in Central Asia.

All WUA in Tajikistan pay for 1 m3 of water to the State 1.77 diram (1 USD = 6.8 Tajik Somoni, source: Oanda. com 2015) and separately for the service of WUA based on ha, in average it is 30-35 Tajik Somoni in Sughd Province. Hence, the provision of 1,000 m3 of water to Tajik farmers cost more than four times the amount in Kyrgyz and Uzbek study WUAs. Consequently, the price sensitivity of local farmers to such high water tariffs results in very poor ISF collection rates.

Up to 2014, around 380 WUAs have been established in the country (source: Agency for Melioration and Irrigation of Republic of Tajikistan), supported by local and central governments, local

communities, and I/NGOs through a series of projects on water management that have either finished implementation and/or on-going. According to Sehring (2006) since there is a general trend for WUAs to be formed with the assistance of donor organizations. Those without any assistance are usually not registered. In addition, the process of dismantling large cooperatives is still ongoing in Tajikistan. Hence, the structure of existing WUAs is continually changing. Specifically starting from 2014, there is started process of further dismantling deqkhan farms in Tajikistan. According to the new restructuring process, the average or even maximum size of deqkhan land should be around 10 ha of land. Today, Sughd Provincial Basin Water Management (BWMO) organization is under and reporting to the Agency for Melioration and Irrigation at Government of Tajikistan. Agency is responsible for the Operation and Maintenance of Irrigation and Drainage systems of the country. The policy of Water Resources of the country will be done by Ministry of Energy and Water Resources. There were also changes in the management of water resources of the province and rayons. Although comprehensive water resources strategy has been prepared in 2013, country has fully implemented the strategy.

Uzbekistan:

Unlike in the Kyrgyz Republic, land reforms in Uzbekistan have been slow (Kandiyoti, 2003). Following the collapse of the USSR, the majority of local collective farms were transformed into cooperative farms/shirkats, where the old Soviet-management style remained (Spoor, 2004). This type of farm was dominant in Uzbekistan until 2005. The number of private farms was growing during the last 8-10 years. Private farms lease their land from the government on a long-term basis (between 10–50 years). Farmers with lands previously used for cotton and wheat cultivation are obliged to grow these crops and fulfill the set state quotas. Therefore, the production system for wheat and cotton has changed little since Soviet times, with the government purchasing these crops from farmers at below market. Because cotton and wheat are considered to be strategic products, most inputs for their production such as seed, fertilizer and fuel are subsidized and provided by the state through a centrally controlled distribution network of local outlets. These two crops are also given first priority when allocating and delivering irrigation water. Meanwhile, the situation of private farms specializing in other products such as orchards and vegetables, is the opposite: farmers are responsible for all inputs, as well as the marketing of their products and receive second rate or almost no water allocation (see Kandiyoti, 2003).

Due to the dominance first of shirkats and later the individual farming system in the last decade and government subsidies for production of the two strategic crops, on-farm irrigation infrastructure and services in Uzbekistan have deteriorated less compared to the Kyrgyz Republic and Tajikistan. Today the average size of farmer in Ferghana Valley part of Uzbekistan is 40-50 ha and in other part of the country it reaches 70-80 ha of land.

With its Decree No. 8, in 2002 the Cabinet of Ministers addressed “Measures for the reorganization of agricultural enterprises into individual farms” by introducing new institutions and governance structures – namely, an irrigation service fee (ISF) and the concept of WCA (Water Consumer Associations) – to shift the rights of managing irrigation canals at the on-farm level from government agencies to local resource users (i.e. farmers) (See Hamidov et al 2015).

VI. FINDINGS FROM THE FIELD IN 2014 -2015

Tajikistan:

Research has been conducted in the Khojabakirgan river basin. Water resources of the Small river Khojabakirgan are formed from the glaciers in the territory of Kyrgyz Republic and fully used for irrigation. Based on agreed water allocation between Kyrgyz Republic and Tajikistan from 1962, from the total annual water flow 21% of water used by Kyrgyz Republic and 79% is used by Tajikistan. Water resources of Khojabakirgan is used to irrigated more than 14,000 ha of land in Sughd Province as well as for drinking water purposes of cities Khujand, Chkalovsk, villages: Ovchi Qalacha, Kostakoz, Uzbek kishlak. The total volume of water intake in the head of water gates form 80,0 mln m3 in the water scarce years and 180 mln m3 in water abundant years.

Two pilot WUAs have been already selected in 2013 based upon agreed criteria along Khojabarkigan main magistral canal in Sughd Province. A unit of analysis is WUA located in the head tail and end tail of canal system. Because Khojabakirgan canal itself provides water for two districts, it was rational to choose one WUA from upper district, i.e. B. Ghafurov and second WUA from the tail part of canal, J. Rasulov district (please see figure 6 map of the location of WUAs along main canal). The name of WUA which is based in B. Ghafurov District is "Obi Ravoni Ovchi Qalacha" and name of WUA which is based in J. Rasulov District is "X. Olimov" successor of WUA "Gulyakondoz".

Based upon selected WUAs in Sughd Province along main canal Khojabakirgan and collected background information for the WUAs case-studies, there were made progress with the hiring local consultants to start the quantitative data collection using questionnaire in 2014. The approach of data collection in each WUA has been elaborated by identifying categories of water users to interview as well as number of them. Need to mention that in both WUAs, clear explanation of the research project objectives and outcomes have been explained to WUAs leaderships. In each selected WUA, i.e. WUA Obi Ravoni Ovchi Qalacha in B. Ghafurov District as well as WUA X. Olimov, successor of WUA Gulyakandoz in J. Rasulov district, there have been identified 40 water users (totally in two WUAs 80 respondents) to interview using the designed questionnaire (Annex 2). Local consultants have been trained on each questions specific aim and approach how to ask each question of the questionnaire. The survey started in the mid of May, 2014 and accomplished by the end of September, 2014. Ground trothing of collected data has been done in Autumn, 2015.

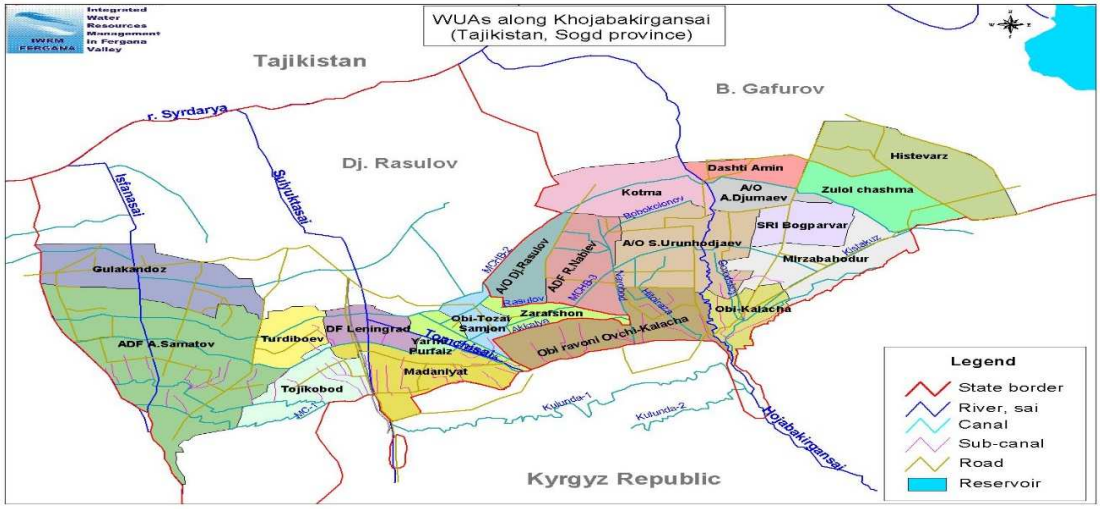

Figure 6. Created WUAs along Khojabakirgansay (source : IWRM-FV project)

A. Case-study WUA Obi Ravoni Ovchi Qalacha, Ghafurov district

WUA has been formed as NGO in 15.05.2009. Total irrigated area is 1,250 ha, out of which 1,080 ha is occupied by Deqkhan farms, 70 ha is occupied by presidential land owners and 100 ha is occupied by kitchen-garden land owners. The main source of water is considered Khojabakirgan magistral canal (KhBC). During the period of 2013-2014, WUA had only 50 deqkhan farmers in the territory of WUA with whom they had a contract. Starting from 2015, WUA has become responsible to provision of water resources to 500 deqkhan farmers as part of farmers' dismantlement process in the country which was initiated in the beginning of 2014. WUA has in average total yearly water use plan around 10,200.000 m3 of water. The total length of WUA canals is 18 km, totally there are installed 17 water flume meters in WUA. Totally, WUA has 6 staff: 4 permanent (director, accountant and two mirabs) as well as 2 temporary staff (temporary hired seasonal mirabs). The highest body of WUA is considered the General Assembly comprised of all deqkhan farmers as well as WUA Council comprised of 13 members. Deqkhan farmers are paying for each 1 m3 of water 1.77 diram which goes to State and for WUA irrigation service fee is 30 Tajik Somoni per hectare. The director of WUA is Raimjon Akhmedjanov, who used to work before as economist at local authority of B. Ghafurov District.

Figure 7. Map of WUA Obi Ravoni Ovchi Qalacha

Table 3. Main water users of WUA Obi-Ravoni Ovchi Qalacha, 2015 (source: Director of WUA)

#	Land users	Quantity, number, pcs	Area, ha
1	Deqkhan farmers as of 2015	503	1,000
2	Presidential land owners	105	70
3	Kitchen-gardens	1,500	100
4	Other water users		80
Total			**1,250**

[3] Need to mention that in Tajikistan the process of dismantlement of deqkhan farmers is still going on. WUA Obi Ravoni Ovchi Qalacha is expecting to have around 100 deqkhan farmers after accomplishment of the process of dismantlement.

Total population, who is living in the territory of WUA, is 9,010 people. There are 11 secondary level on-farm irrigation canals and 68 tertiary level on-farm irrigation canals in the territory of WUA. In a year, there are usually carried out 8 khashars[4] in the WUA. Unfortunately, on-farm irrigation infrastructure hasn't been transferred to the balance of WUA which creates problem of on-farm irrigation and drainage infrastructure ownership problem.

The highest body of the WUA is General Assembly of Water Users. This body meets once a year to accept the Annual Reporting as well as approve new operational year's action-plan together with its budget. There are 40 members of the General Assembly (10 members are women). The next level of Governance body is WUA Council which is comprised of 13 members (2 of them are women). The executive body of WUA is considered WUA Directorate, i.e. WUA staff.

Water users pay for WUA irrigation service based on area. The general assembly of WUA has approved for 2014-2015 the following rates: a) payment to State for each 1 m3 of water 1.77 diram and b) for WUA irrigation service fee 30 somoni/ha. The average ISF collection within WUA is 55% in 2014 September data. There are two specialists who has professional diploma in their sphere.
Above background information shows that WUA has been formed legally and everything has been put in the paper as proper functional WUA. However, below, it can been seen that although WUA Obiravoni Ovchi Qalacha considered one of the promising WUA in the head part of Khojabakirgan Canal there are still many weaknesses especially with regard to its water governance which effects its water use efficiency.

A1. Results of field survey with water users of WUA ObiRavoni Ovchi Qalacha:

As was stated above, approach to survey water users was based upon head and tail water users not only within one main canal Khojabakirgan but also to get views of water users from inside WUA. Research has chosen respondents also based on head and tail within WUAs.

WUA Obi-Ravoni Ovchi Qalacha:
Totally has been interviewed 40 water users within WUA Obi Ravoni Ovchi Qalacha (table 4).

Table 4. Category of interviewed water users

#	Category of water users	Number of interviewed people	Location of water user in WUA		
			Head	Middle	Tail
1	Deqkhan farmers	25	8	8	9
2	Presidential land owners	9	3	3	3
3	Head of Makhalla Committee representing kitchen-garden plot owners	6			
Total		**40**			

Below analysis demonstrates water governance aspects of WUA and its strengths and weaknesses for effective water management at WUA level. Below analysis are based mainly on responses of deqkhan farmers who are basically owners of WUA, who are basically maintaining (funding) it and who are basically occupying the major land area within WUA which it serves.

Research has revealed (figure 8) that the main violations in WUA Obi-Ravoni Ovchi Qalacha is stealage of water 44% of respondents responded that it happens often within WUA and non-payment

[4] Khashar – collective action directed towards the cleaning of on-farm irrigation and drainage networks

for WUA membership as well as irrigation service fee, i.e State price for 1 m3 of water and membership fee for the service of WUA per ha.

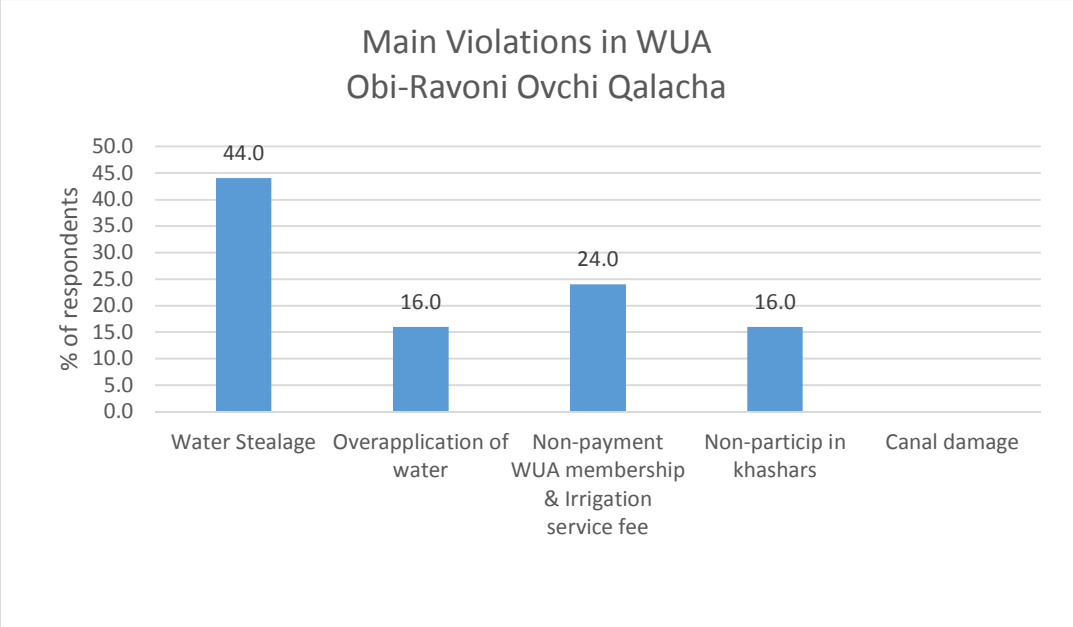

Figure 8. Main violation of rules within WUA Obi Ravoni Ovchi Qalacha

Below table with figure illustrates the tendency of membership fee rate increase in WUA Obi Ravoni Ovchi Qalacha. There was gradual shift towards the raising the WUA irrigation membership fee from 16 somoni/ha in 2010 up to 30 somoni/ha in 2014 (please, look to figure 9). Although, this shift was considered to improve the financial situation of WUA but it didn't much influenced, according to figure 10.

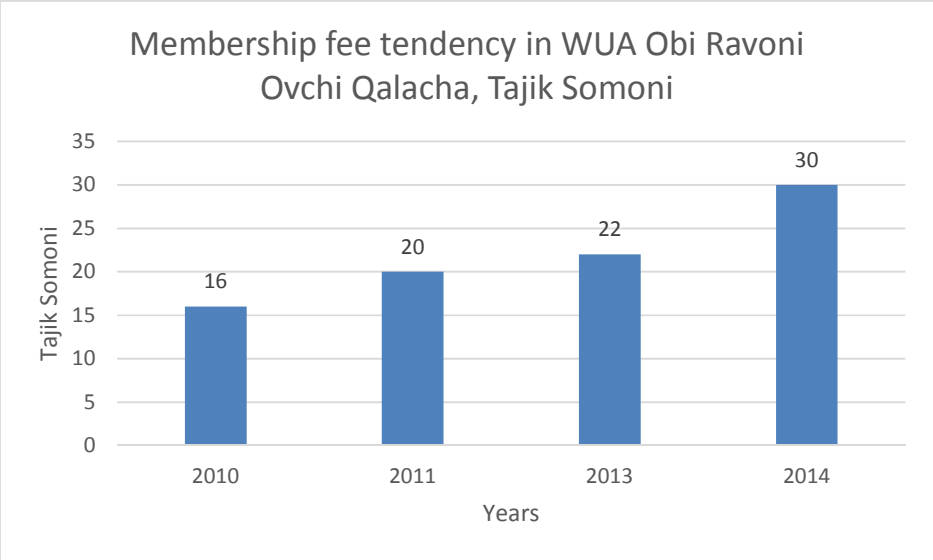

Figure 9. Tendency of membership fee increase in WUA Obi Ravoni Ovchi Qalacha

The overall membership fee collection in WUA Obi Ravoni Ovch Qalacha is illustrated in figure 10. The low collection rate is associated with the fact that not all pay the membership fee and it is also linked with the situation related with water use in WUA. Figure 11 illustrated the picture of actual vs planned water use within WUA. From the figures below, one can reveal that there is a either mismanagement, improper water use planning as well as management process but it could also linked with the situation related with violations of rules and regulations accepted within the WUA. Water users have reported in the survey that there are cases when head tail water users inside WUA sometimes get water and don't pay or sometimes they are themselves approach the management of Main Canal Khojabakirgan.

Table 5. Budget of WUA Obi Ravoni Ovchi-Qalacha for its membership fee for 2010-2014, thou somoni

	2010	2011	2012	2013
Planned	16,850	18,850	20,720	22,720
Actual	5,161	13,000	16,580	16,800

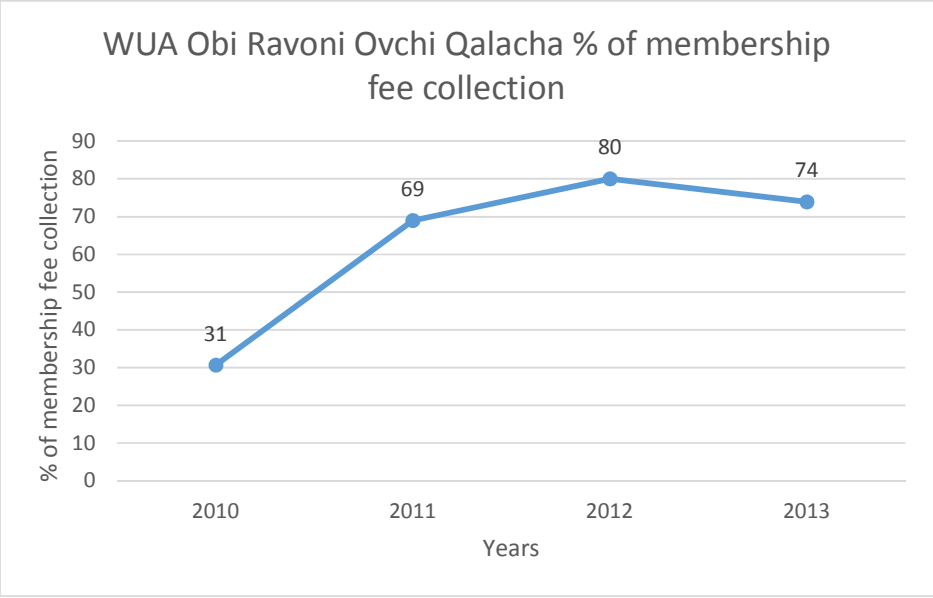

Figure 10. Percentage of WUA membership fee collection inside WUA Obi Ravoni Ovchi Qalacha

Below table 6 illustrates situation with regard to actual versus planned water use inside WUA Obi Ravoni Ovchi Qalacha. From the table, it is clear that there is a high deviation between planned versus actual water use. And it is linked due to the fact that head water users don't oblige with the accepted rules and regulations within WUA.

Table 6. Actual versus planned water use within WUA Obi Ravoni Ovchi Qalacha

	2010	2011	2012	2013
Planned water use, mln m3	13060	13023	12893	10508
Actual water use, mln m3	6660	6460	5398	3944

% of actual water use vs planned water use	51	50	42	38

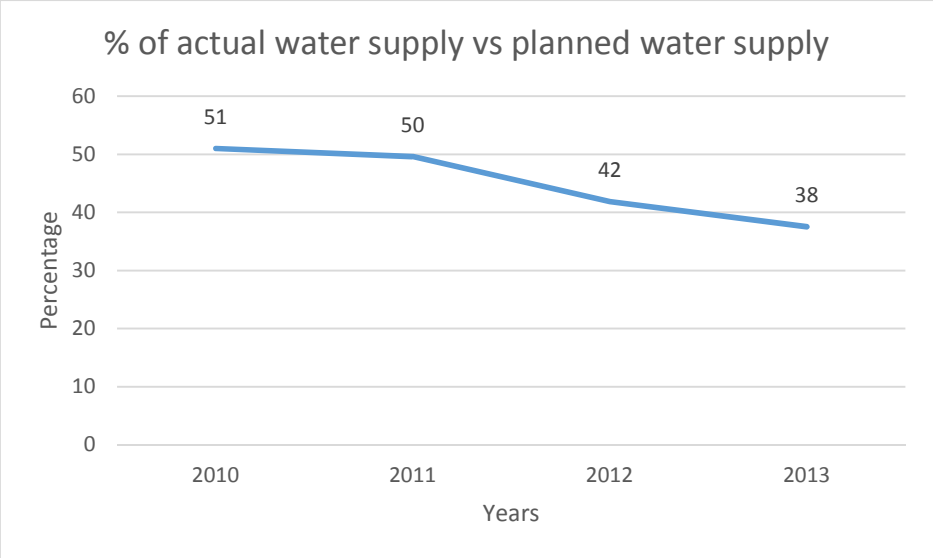

Figure 11. Illustration of actual versus planned water use in WUA Obi Ravoni Ovchi Qalacha

One of the main rule breakers, based upon survey, it was revealed that water users who, are based in the head of canals. However, interviewers also informed that basically all steal water inside. So it means there is poor work of WUA Obi-Ravoni Ovchi Qalacha Governance body who should be responsible for equitable, reliable and efficient use of water resources. The interesting finding is that there is also power relations in water allocation inside WUA. Some water users indicated that relatives of local authority people are among the people who break the rules within WUA. However, Director of WUA mentioned that it is impossible to have such a situation.

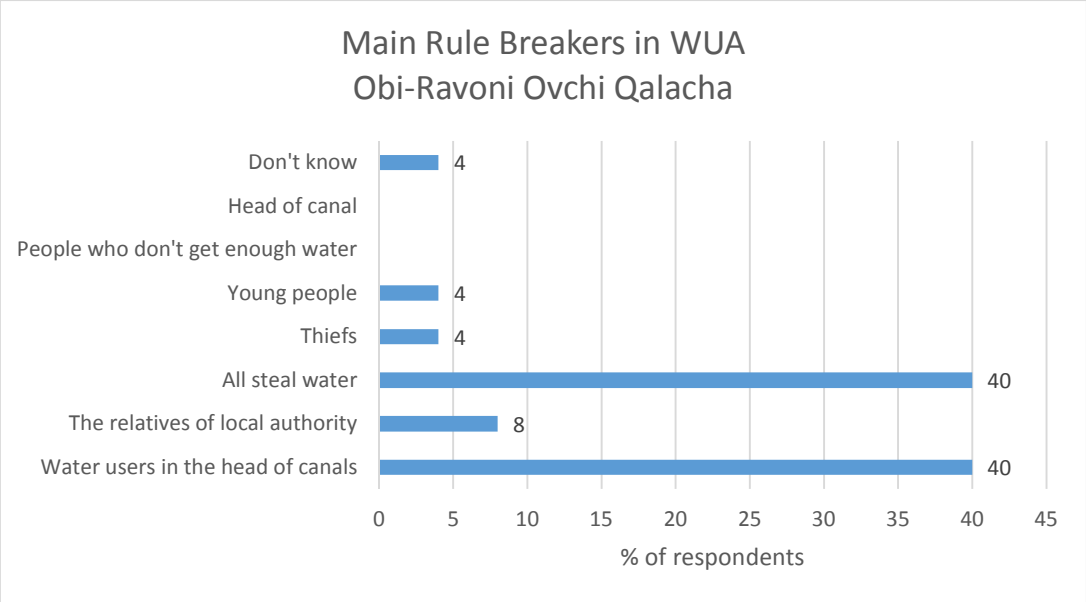

Figure 12. Main Rule-breakers within WUA Obi Ravoni Ovchi Qalacha

Water users indicated that there is mainly WUA Directorate responsible for punishment of rule-breakers. But this contradicts, there is high chance that water users will not respect the Directorates instructions because they see staff of WUA as executive staff. And also because, executive staff gets their salaries based upon contribution of deqkhan farmers. Therefore, it is very important that proper Governance of WUA is on place for effective water management. There is high probability that nobody will follow accepted rules and regulations due to combination of governance and management body by WUA Directorate, management. However, one aspect was clear that water users trust to Mirobs of WUA with regard to their eyes estimates in water measurement.

Below figure 13 shows that water users only approach WUA Directorate with the punishment of rule-breakers because they don't see any other entity except WUA Council and Local elder men council. But figure clearly shows that they go for WUA Directorate.

This type of approach jeopardize the work of WUA Directorate who should ideally responsible for operation and maintenance, i.e. day-to-day business of WUA. And not solving problems or issues of rule-breakers and punishing them. It is absolutely two different functions in WUA. This could be explained either the absence of WUA Governance body or it is local mentality which left from Soviet legacy to see in the one face governance or management functions of former Kholkhoz system.

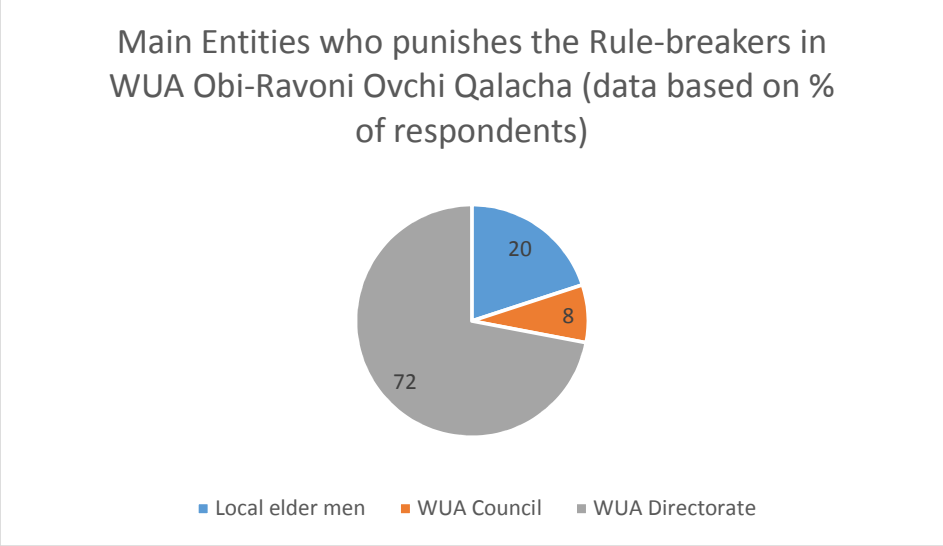

Figure 13. Main Entities who punishes the rule-breakers in WUA Obi Ravoni Ovchi Qalacha

This situation brings to the poor water governance, i.e. public participation and involvement in on-farm water management have led to farmers' dissatisfaction, lack of ownership of on-farm infrastructure, conflicts among water users (unsanctioned withdrawals of water by upstream or elite farmers) and between water users and WUAs, mistrust to the work of WUA (data transparency), reductions in crop yields and overall low rate of WUA irrigation service fee collection. Average ISF collection rate within WUA is 38-50% over last four years illustrated in figure 14. Need to mention that water users of WUA pay two different types of fees: 1st is the payment for State for 1 m3 = 1.77 Tajiki Somoni and second payment for WUA membership fee for 1 ha = 22 Tajik Somoni.

Table 7. Actual versus Planned payment of irrigation service fee to State

	2010	2011	2013	2014
Planned payment of irrigation service fee to State	23116.2	23050.71	22820.61	18599.16
Actual payment of irrigation service fee to State	10156.8	11434.7	9054.1	6980.5
% of payment Irrigation service fee to State	44	50	40	38

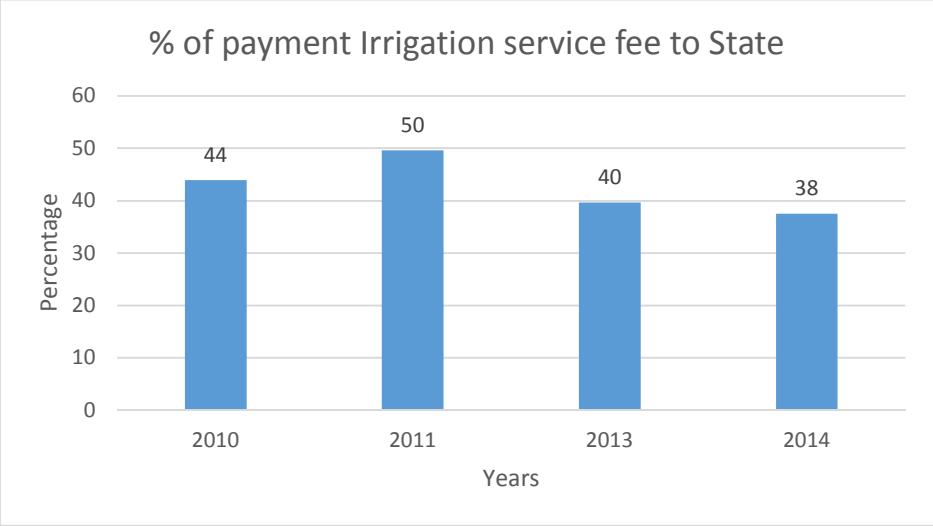

Figure 14. Irrigation Service fee collection rate in WUA Obi Ravoni Ovchi Qalacha

This brings to the question whether WUA has a system for punishment mechanisms for those who don't pay either WUA membership fee as well as Irrigation service fee to the State. Figure 15. Compares based upon collected data from WUA Obi Ravoni Ovchi Qalacha and WUA X. Olimov that there is basically absent punishment system with WUA Obi Ravoni Ovchi Qalacha or it exist but nobody respects and follows it. Majority respondents from WUA Obi Ravoni Ovchi Qalacha don't see any proper existence of penalty system in place.

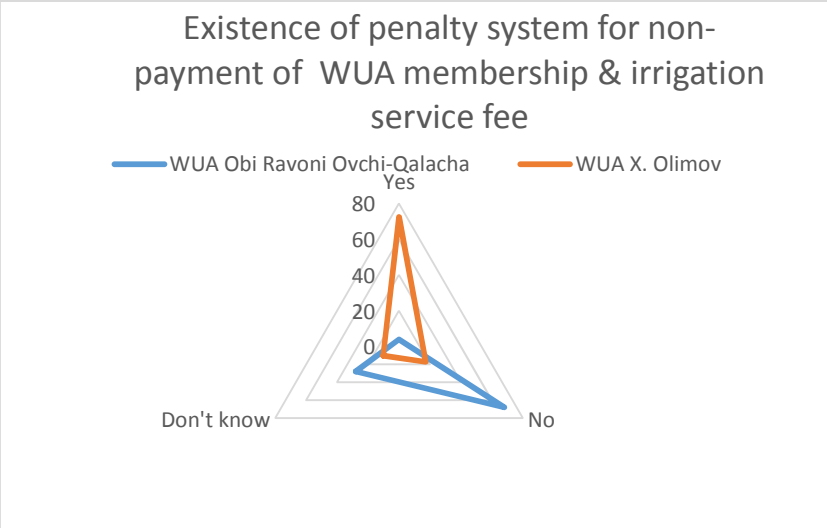

Figure 15. Existence of penaly system for no-payment of WUA membership and irrigation service fee

B. Case-study WUA X. Olimov, J. Rasulov district

This WUA is relatively young WUA which is successor of WUA Gulyakandoz. It was formed in February, 2014. Main founders of WUA are farmers who receive water from KhBC. WUA have two sources of irrigation water, one KhBC and second is river Isfana. WUA is based in the tail part of canal Khojabakirgan. Therefore, WUA uses water from river Isfana during the early spring when the ice melt in the mountains. Total irrigated area of the WUA is 1,886 ha, out of which 1,660 ha belongs to Deqkhan farmers, 180 ha for presidential land owners and 34 ha for kitchen-garden land owners. Up to end of 2014, WUA had 58 deqkhan farmers however starting from 2015 WUA is going to have 150 deqkhan farmers as part of dismantlement process in the country. The average total yearly water use plan is around 18,714.000 m3. The highest body of WUA is considered General Assembly. The Governance body of WUA is considered WUA Council which is comprised of 7 members. WUA Revision Commission is comprised of 3 people and Arbitrage commission comprised of 3 people. Executive body WUA Directorate is comprised of 10 staff. Water users of WUA pay as all water users of other WUAs for water 1 m3=1.77 diram as a State price and for the irrigation service of WUA 70 Tajik Somoni. Total population who lives in the territory is 15,000 people.

The annual average budget of WUA is 105,000 Tajik Somoni. Water Users in 2014 first General Assembly set WUA irrigation service fee as 70 somoni per ha. Separate payment for 1 m3 of water to the state in the amount of 1.77 diram for 1 m3 of water including taxes. The payment for the service of WUA amount of 70 Tajik somoni per hectare is considered a highest in the district.

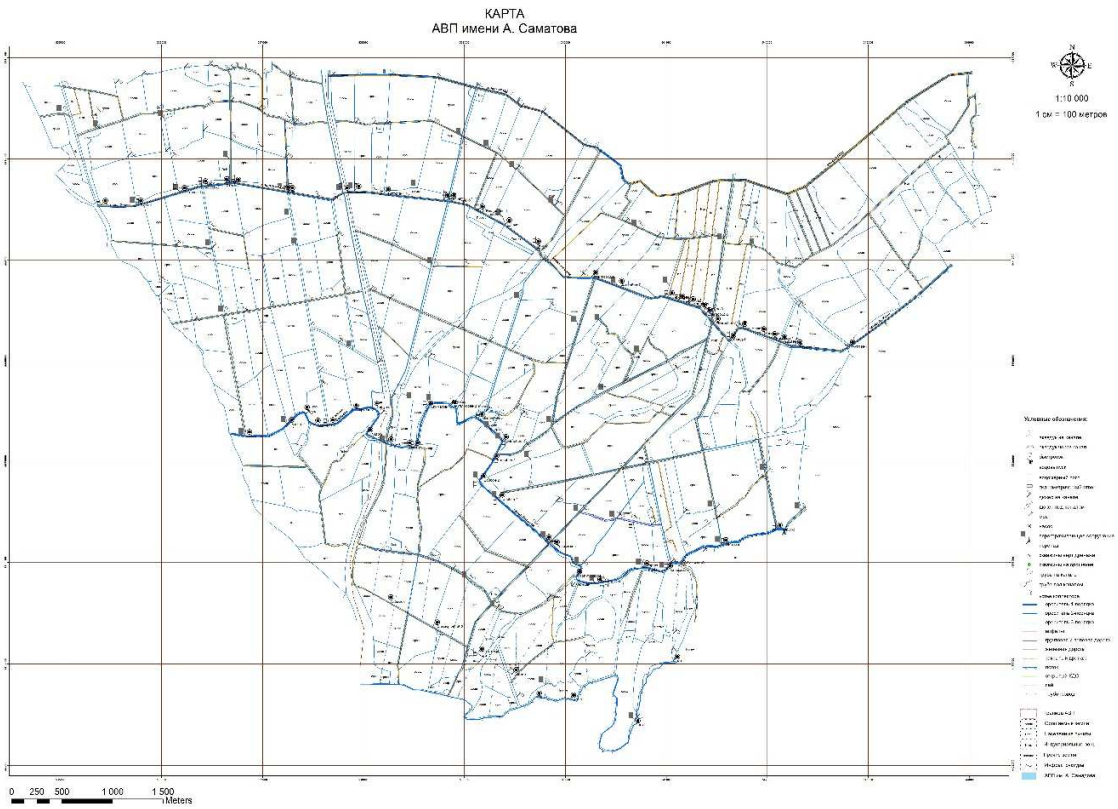

Figure 16. Map of WUA X. Olimov

There is also alternative source for use of water during the water scarce period of the year, it is pump station KhB-4 of J. Rasulov district water management organization. This pump station is basically pumps water from river SyrDarya.

Table 8. Main water users of WUA X. Olimov

#	Land users	Quantity, number, pcs	Area, ha
1	Deqkhan farmers	58[5]	1,600
2	Presidential land owners	150	180
3	Kitchen-gardens	300	34
4	Other water users		72
Total			**1,886**

WUA has in its balance two mechanisms: a) excavator, b) bulldozer. The total length of on-farm irrigation infrastructure is 60 km. There are 65 pcs of water measurement devices in the form of hydroposts SANIIRI. Below you can see the crop pattern in the WUA. The second crop which is used extensively after wheat is maize (corn) and mug bean.

Table 9. Crop pattern in WUA X. Olimov

#	Crop pattern	Area, ha
1	Cotton	815
2	Winter wheat	445
3	Summer wheat	162
4	Alfalfa	92
5	Orchards	106
6	Others	40
Total		**1,660**

B1. Results of field survey with water users of WUA X. Olimov:

As was stated above, approach to survey water users was based upon head and tail water users not only within one main canal Khojabakirgan but also to get views of water user from inside WUA. Research has chosen respondents also based on head and tail within WUAs. Totally has been interviewed 40 water users within WUA X. Olimov (table 10).

Table 10. Category of interviewed water users

#	Category of water users	Number of interviewed people	Location of water user in WUA		
			Head	Middle	Tail
1	Deqkhan farmers	29	10	9	10
2	Presidential land owners	9	3	3	3
3	Head of Makhalla Committee representing kitchen-garden plot owners	2			
Total		**40**			

Below analysis demonstrate water governance aspects of WUA X. Olimov and its strengths and weaknesses for effective water management at WUA level. Below analysis are based mainly on responses of deqkhan farmers who are basically owners of WUA X. Olimov, who are basically maintaining (funding) it and who are basically occupying the major land area within WUA.

[5] Need to mention that in Tajikistan the process of dismantlement of deqkhan farmers is still going on. WUA X. Olimov is expecting to have around 150 deqkhan farmers after accomplishment of the process of dismantlement.

Research has revealed (figure 17) that the main violations in WUA is stealage of water 44% of respondents responded that it happens often within WUA and non-payment for WUA membership as well as irrigation service fee.

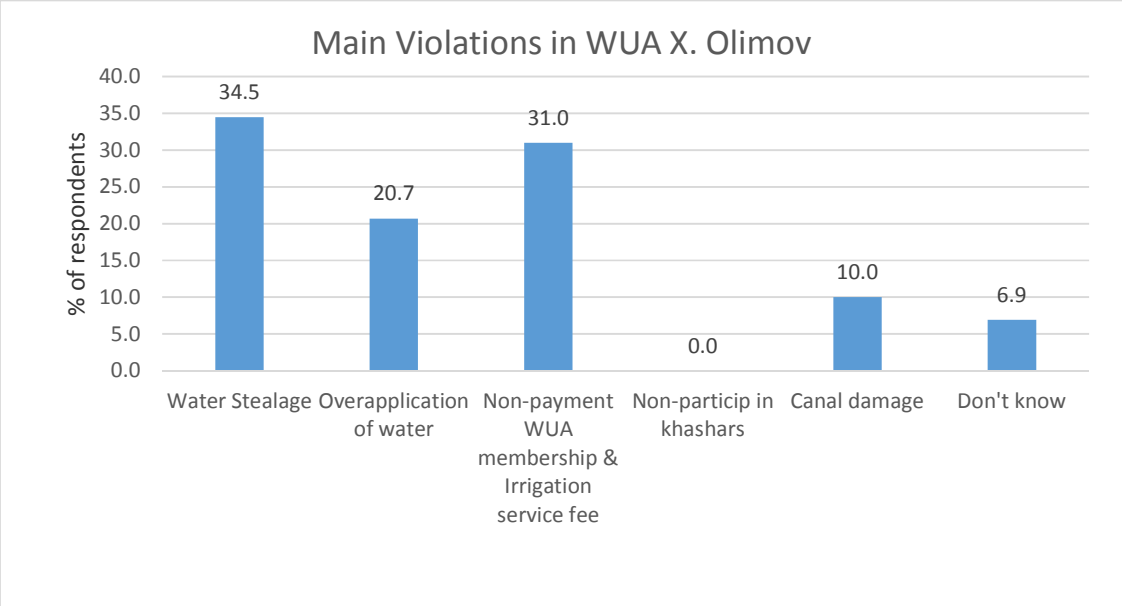

Figure 17. Main violations in WUA X. Olimov

From the figure 17, it is clear that water stealage also exists in WUA X. Olimov, it is not so high as in WUA Obi Ravoni Ovchi Qalacha however, figure shows all deqkhans participate in the khashars and it seems collective action is more present in this WUA.

Water users of WUA X. Olimov blame upper WUAs including WUA Obi-Ravoni Ovchi Qalacha as the stealer of the water and consider them as the main rule-breakers. But question was also directed internal procedures therefore they have also indicated that there is also persist problem of head and tail but it is not so widely disseminated. The interesting finding was that some of water users accuse head of main Khojabakirgan canal saying that he is the main person who brings to the rule-breaking inside the WUA. Need to mention that there is introduced warrabandi system of water allocation within the Khojabakirgan Canal Zone, i.e. rotation water distribution between two districts of serving canal.

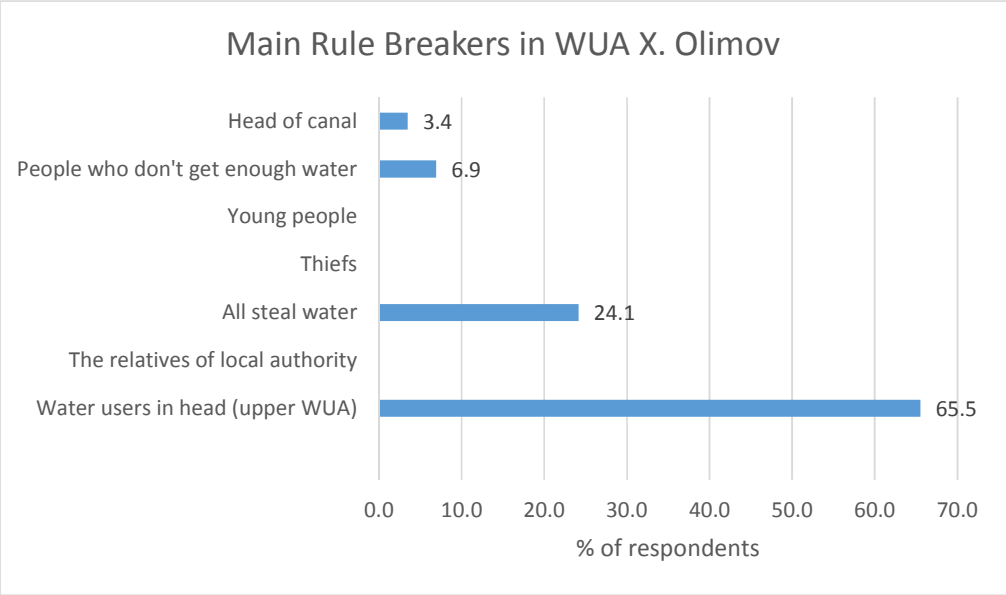

Figure 18. Main Rule Breakers in WUA X. Olimov

There is need to mention that in WUA X. Olimov nobody indicated that there is external forces which obliges WUA Directorate to serve differently some water users who have connections or relatives within local administration. In opposite, water users indicated that they would not allow happening such a process inside the WUA. Everybody understands that water is the scarce resource and taking by force somebody's turn to irrigate is not acceptable from the good neighborhood perspectives.

Table 11. Budget of WUA X. Olimov 2010-2014, thousand Tajik Somoni

	2010	2011	2012	2013
Planned	18,000	18,000	18,000	18,000
Actual	10,060	11,810	12,000	14,000

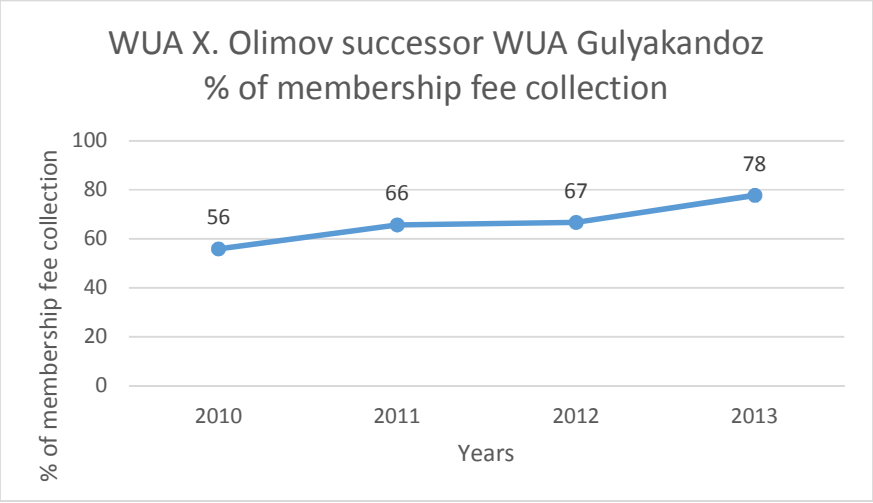

Figure 19. Percentage of WUA membership fee collection inside WUA X. Olimov

From above table 11 and figure 19, it is clear that WUA membership fee was increasing steadily over the last 4 years. This is due to fact that people started more rely on the work of WUA. Table 12 illustrates that there were discrepancies initially between actual versus planned water use however situation is much stabilized in 2013 and upcoming 2014 year due to the fact that leadership and governance of the WUA started to work properly. The improvement of the last year is linked with the setting WUA based upon its hydrographic boundaries.

Table 12. Actual versus planned water use within WUA X. Olimov

	2010	2011	2012	2013
Planned water supply, mln m3	69850	72730	56588	48063
Actual water supply, mln m3	50990	51980	38280	45524

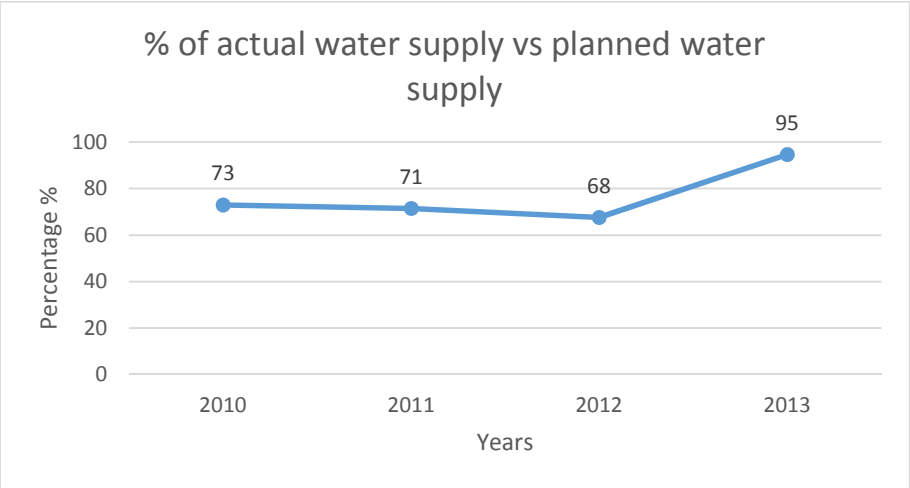

Figure 20. Illustration of actual versus planned water use at WUA X. Olimov

Furthermore, research revealed that tail end WUA X. Olimov has different mechanisms of its WUA governance. Especially, if there is a conflict with farmer and WUA, they approach either WUA Council first to solve it, if not they approach to so called Local elder men council, it is called court of Aqsakals Council. It is also one of the important body for punishing the rule-breakers inside the WUA. Figure 21 illustrates the answer of deqkhan farmers with approaching different entities to resolve local conflict.

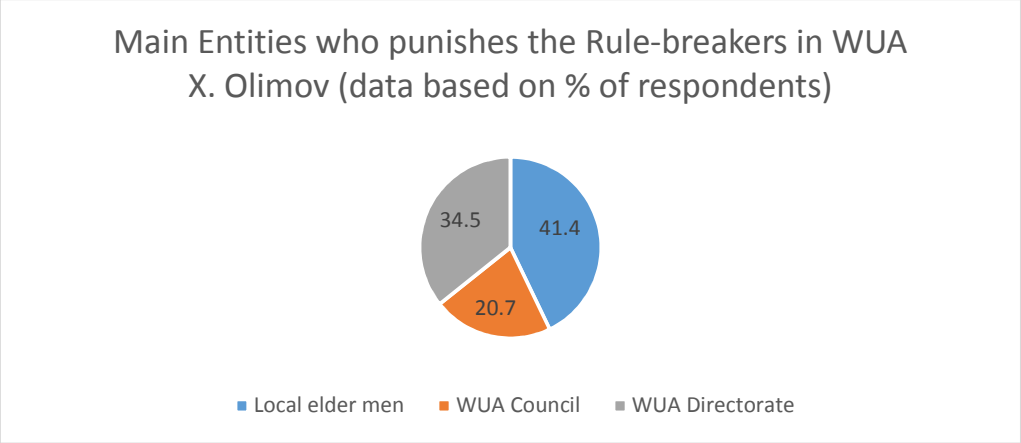

Figure 21. Main entities who punishes the rule breakers within WUA X. Olimov

Respondents replied that they would like to pay any price in order to make sure that there is water when it is needed in WUA. It was clear that starting from 2014, water users of WUA has increased their membership fee to WUA from 30 Tajik somoni per hectare up to 70 Tajik Somoni per hectare. Figure 22 illustrates the responses of survey that they are basically paying membership fees to WUA. WUA X. Olimov is planning to get 90% of ISF as well as WUA membership in 2014.

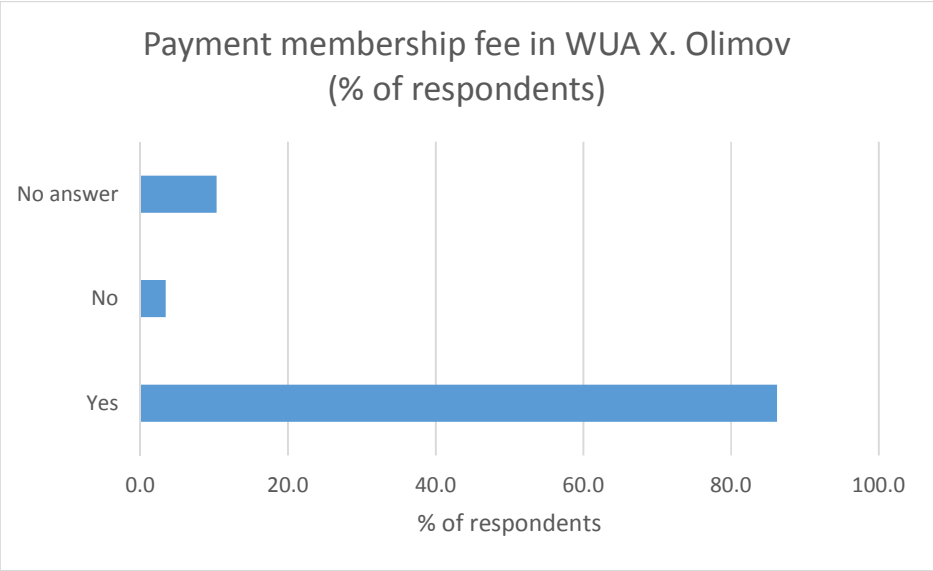

Figure 22. Payment of membership fee to WUA X. Olimov

And finally figure 23 shows that WUA X.Olimov has in place penalty system for those who don't follow accepted rules with WUA and in particularly, who don't pay irrigation service fee as well as membership fee to WUA. Almost 70% of respondents indicated that there is a system of penalty. The system works in the following way, if somebody breaks it, he or she will not get in his/her turn water and will be fully monitored by the system.

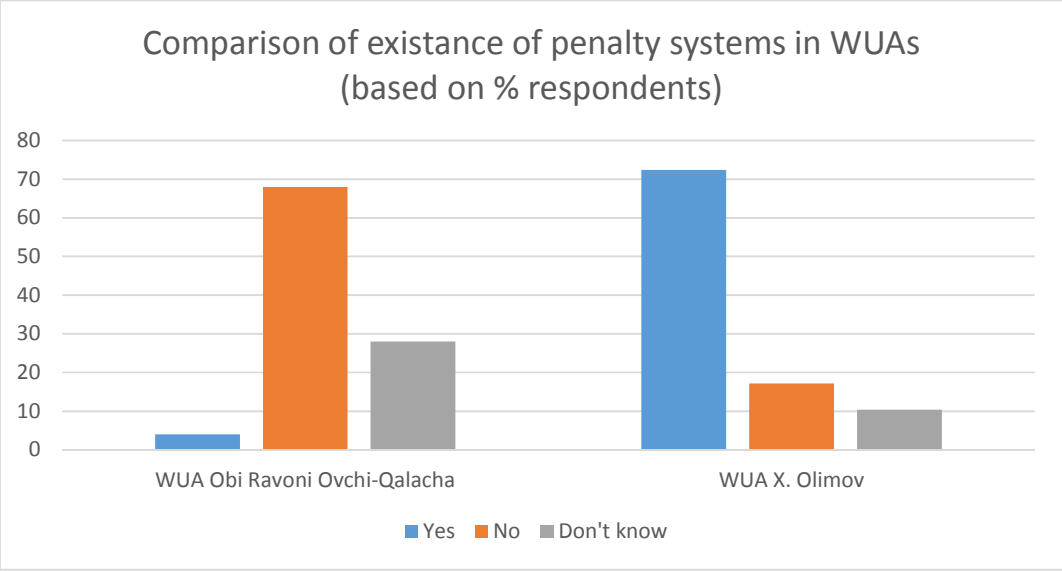

Figure 23. Comparison of existance penalty system in WUA X. Olimov vs WUA Obi Ravoni Ovchi Qalacha

Uzbekistan

There have been selected as case-study two WUAs along South Ferghana Main Canal (SFC) however additional information about general conditions/status of middle WUA has been also collected. One of the reason for selection of three WUAs because SFC is the long canal, totally with 114.9 km long length and irrigated area of more than 94,000 ha. So basically, there were selected one WUA in the head part, second in the middle part and third in the tail part of SFC. The head part WUA is called Tomchi-Kuli which is based in Markhamat district, Andijan Province, middle WUA is called Kodirjon A'zamjon based in Quva district, Ferghana Province and tail WUA is called Komiljon Umarov which is based in Toshloq District, Ferghana Province. In all WUAs, there have been interviewed key informants, collected background data using specifically developed data collection sheet as well as available local materials. In addition, there have been able to conduct survey among farmers of WUAs.

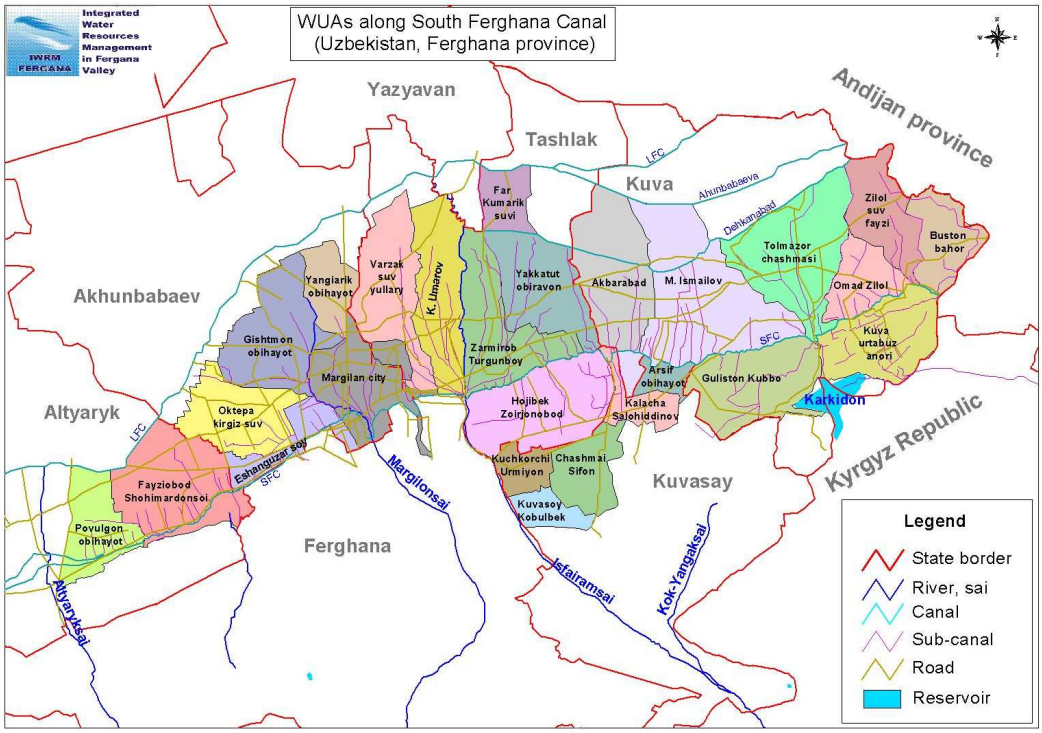

Figure 24. Water Consumer Associations (WCAs) along South Ferghana Canal

Survey has been conducted among 53 farmers as well as rural settlement chairs (makhalla) in Tomchi-Kuli WUA, among 31 individual farmers of WUA Kodirjon A'zamjon and among 30 individual farmers of WUA Kodirjon Umarov. Field methodology accomplished to collect intensive data collection in order to draft case-study of each WUA. There have been also explained in detail the research project objective and outcome to the WUAs leaderships. Local consultant in each WUA has been identified and hired for the conduction of extensive questionnaire. Jointly with WUA leadership and local consultants identified and selected different category of water users as well as their numbers to interview based upon research approach. Local consultants have been trained on each questions specific aims and approach how to ask each question of the questionnaire. There have been interviewed totally 114 water users in three WUAs using the questionnaire. The survey started in the mid of May, 2014 and accomplished in December, 2014.

A. Case-study WUA Tomchi-Kuli, Markhamat District, Andijan Province:

WUA has been formed as non-governmental non-commercial organization on 07.02.2006 in Qora-Kurgon Rural Settlement, Markhamat district, Andijan Province. Total irrigated area of the WUA is 3,381.7 ha of land. WUA has totally 70 water users in the territory of WUA. The average size of farmer in the WUA is 45 ha. Total number of population who live in the WUA is 28,600 people. The annual planned water use within WUA is 30,3 mln m3. There are 10 people who work for WUA. WUA has differentiated irrigation service fee for different crops:

Table 13. Different rates of irrigation service fee in WUA

#	Crops	ISF per 1 ha, Uzbek Sum
1	Cotton	20,000
2	Wheat	20,000
3	Vegetables and melons	25,000
4	Fruits and orchards	50,000
5	Livestock	30,000
6	Makhalla/kitchen-garden per 0,01 ha	500

So from the above table 13, one can observe, that WUA has farmers who specialized in cotton/wheat, orchards, vegetables, livestock and others. There is need to mention that in comparison to Tajikistan in Uzbekistan there is no fee for the service of delivery from the State Water Management Organizations. Farmers or water users just pay for the service delivery to WUA in order to properly operate and maintain on-farm irrigation and drainage canals.

WUA has its Office. Total length of secondary on-farm canals is 35,6 km and tertiary canals length is 74,4 km. WUA has totally 31,12 km of drainage canals. WUA Tomchi-Kuli gets water from Sharqansoy irrigation system authority, Noryn-Qaradaryo Basin Water Management Authority, former Andijan Provincial Water Management Organization (OblVodKhoz). WUA has totally 7 on-farm secondary canals.

The highest body of the WUA is considered the General Assembly. Totally, there are 60 people who participate each year in General Assembly. WUA has also WUA Council where sit totally 7 people which was before 2014, however starting from 2014 and based upon the latest order #293 on re-registration of WUAs in the country, there is abolished the work of WUA Council. Director name is Urinov Abdurakhim.

B. Case-study WUA Kodirjon A'zamjon, Quva district, Ferghana Province:

WUA has been created in 2006 but officially passed registration in 09.12.2010. WUA serves territory of five villages. There are totally 16 makhallas where 19,500 people live there. WUAs total irrigated area is 3,405 ha. The total length of irrigated network is 29,5 km. There are 47 hydroposts in the territory of WUA. WUA has totally 9 people of staff (director, accountant, agronomist, two hydrotechnicians, technical person as well as three mirobs). There are no assets in the balance of WUA.

The established irrigation service fee (ISF) for 1 ha of cotton and wheat is 15,000 Sum; ISF for 1 ha orchards is 40,000 Sum; the population/kitchen-garden 0,01 ha = 200 Sum in 2014-2015.

Table 14. Different crops structure within WUA

Crops	Area, ha
Wheat-cotton	1,174
Orchards	250
Livestock	22

Others (mix)	215
Makhall	2,172
Total	**3,405**

WUA has in its territory 3 canals: Nayman, Quqon Kishloq and Bobomirza. According to the latest order #293 on re-registration of WUAs in the country, there is abolished the work of WUA Council. Director name is Jamol Akhmedov. His background is agroprocessing.

C. Case-study WUA Komiljon-Umarov, Tashloq District, Ferghana Province:

WUA has been founded in 2 February 2005 as non-governmental non-commercial organization. Total WUA area is 3,553 ha.

WUA has in its territory: 36 farmers specialized in cultivation of cotton and wheat, 12 farmers specialized in orchards, 5 farmers specialized in vegetables, 3 farmers specialized in livestock and 2 farmers specialized in fishing based on data from 2014. In addition, WUA provides water to 16 villages within 3 Rural Settlements. Totally, WUA has 97 water users within its territory. WUA provides water totally to 58,115 people who live in 3 rural settlements and 16 villages. The highest body of WUA is considered the General Assembly of WUA water users. The Governance body is considered WUA's Council which comprised of 6 people.

The irrigation service fee for 2014 has been following per 1 ha of land: cotton/wheat farmers should pay 26,900 Sum; farmers who use pumped water should pay 13,450 Sum; orchards as well as vegetable growing farmers should pay 30,000 Sum and orchards as well as vegetable growing farmers who use pumped/lifted water should pay 15,000 Sum. Kitchen-garden plot owners should pay per 0,01 ha 200 Sum.

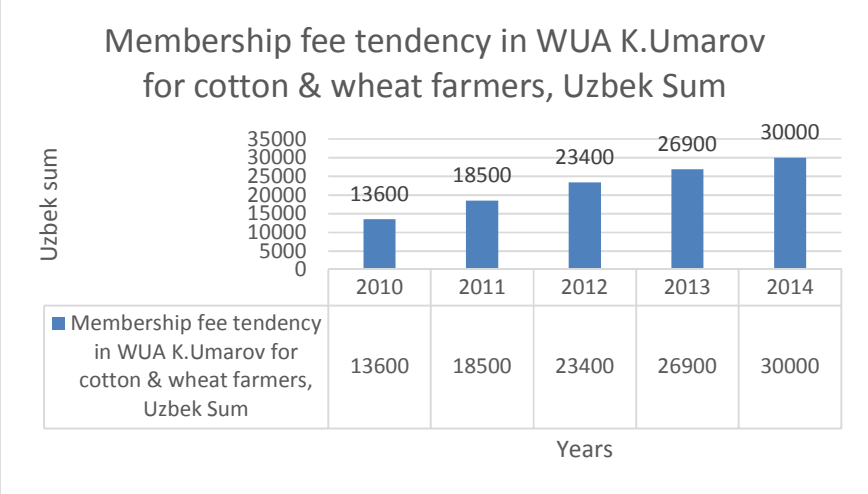

Figure 25. Membership fee tendency in WUA K. Umarov for cotton and wheat farmers

Director of the WUA is Adkhamjon Kurbonov. Director background is agronomist. There are 53 hydroposts available in the territory of WUA.

Table 15. Different crop structure within WUA

Agricultural Crop	Area, ha
Cotton	1,084.5
Wheat	1,052.2
Orchards	175
Vegetables	21

Others	125,5
Kitchen-garden	1,095
Total	**3,553.2**

WUA has only one source of water – South Ferghana Magistral Canal. WUA has a good system of water demand/request. WUA has totally 34 km length of on-farm canals. There are 5 secondary canals within the WUA, they are Akhshak, Besarang, Yangi-Soy, Varzak as well as Kapallik canals. K. Umarov WUA gets water from Isfayram-Shakhimardonsoy irrigation system authority.

Results of field survey in WUA Tomchi-Kuli and WUA Komiljon Umarov:

There is need to mention that below were processed data collection from two WUAs.

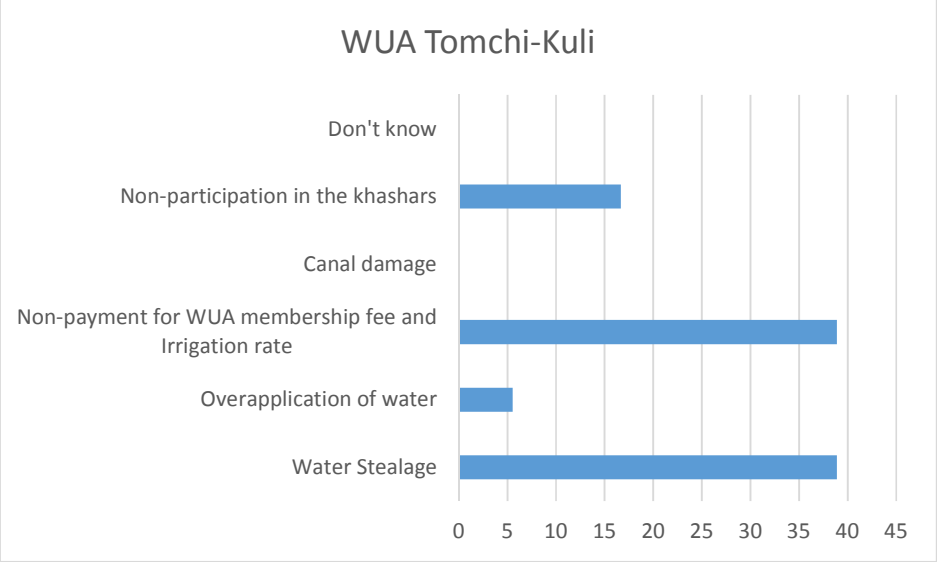

Figure 26. Main violations in WUA Tomchi-Kuli

As it seen in WUA Tomchi-Kuli, the main violations directed towards the water stealage, as well as not payment of WUA membership fee. WUA is located in the head part of South Ferghana Main Canal. It is negatively affects the water management inside the WUA and also inside WUA, the main violators are head tail water users. Water users stressed that in majority cases it depends on leadership of the WUA but more often there is high interferance to the work of WUA by external forces.

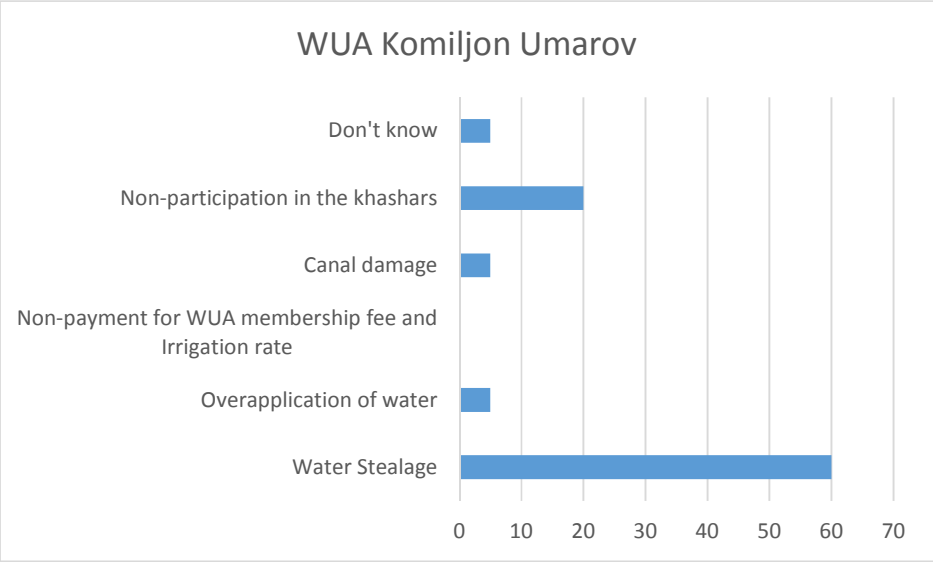

Figure 27. Main violations in WUA Komiljon Umarov

In contrary in WUA Komiljon Umarov there is no violation with regard to non-payment of WUA membership fee however still exist water stealage within WUA. So it means water stealage from head tail water users persist in two WUAs. However, non-payment of irrigation service fee is absent in WUA K. Umarov. The figure 28 shows the tendency of total planned budget of WUA K. Umarov. It is clear in comparison to WUA Tomchi-Kuli (figure 30), the budget of the K. Umarov is much higher especially over the last 3 years.

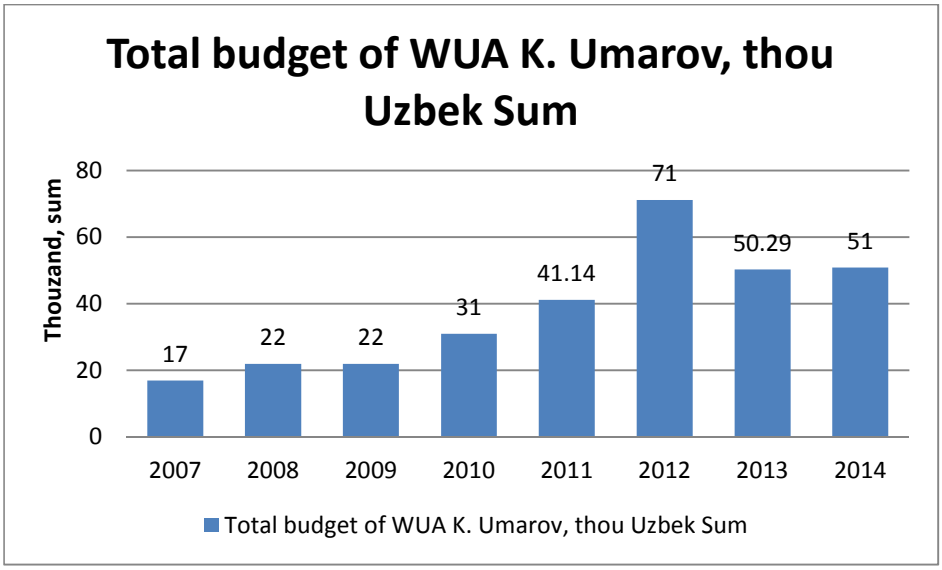

Figure 28. Tendency of total planned budget of WUA K. Umarov (2007-2014)

Another interesting moment which was revealed is that WUA Tomchi-Kuli has strong management as well as good relation with State Water Inspectorate see figure 29. It was clear, water users indicated that they approach WUA management to punish the rule breakers within WUA. But also people indicated that Republican WUA inspection play an important role. Need to mention that State Water Inspection unit was mentioned more in the response of water users of WUA Tomchi-Kuli.

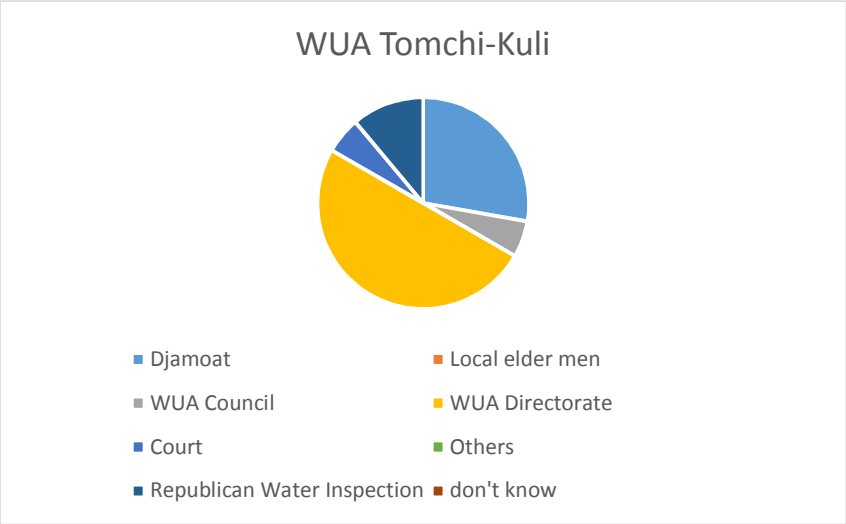

Figure 29. Main entities who punishes the rule breakers within WUA Tomchi Kuli

The role of State Water inspectorate has been also mentioned in survey results of WUA Komiljon Umarov. The role of WUA directorate has been less important by the answers of water users of WUA Komiljon Umarov in comparison to WUA Tomchi-Kuli. One might conclude that management of WUA Tomchi-Kuli is much organized in comparison to WUA K. Umarov. However, in both WUAs Water Inspection Unit has been mentioned.

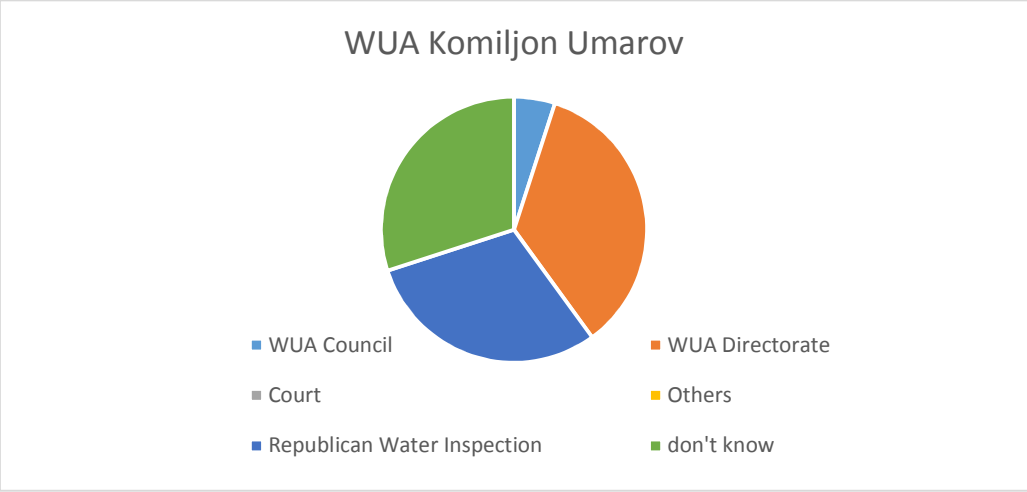

Figure 30. Main entities who punishes the rule breakers within WUA Komijon Umarov

In WUA Komiljon Umarov, it seems water users consider WUA directorate as governance and management body. The advantage of the WUA K. Umarov is its location in the premises of Rural Settlement Administration so called Qishlok Fuqarolar Yigilishi. It brings to good cooperation with the local authority which contributes to the viable operation of the WUA.

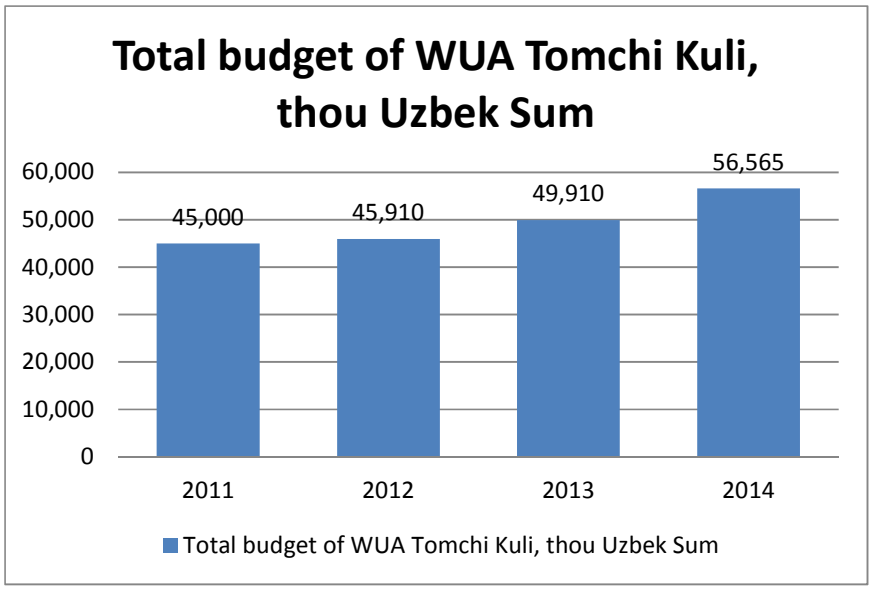

Figure 31. Total planned budget of WUA Tomchi-Kuli 2011-2014

In both case-study WUAs, it was clear that local authority as well as District Irrigation System Authorities actively participate in the General Assembly meetings of the WUA which makes the importance of the role of WUA in front of water users.

VII. RESULTS FROM THE FIELD STUDY

These results are based upon survey conducted among WUA directorate as well as WUA water users, first initial focus group discussion with key informants and observations. Key informants are water users such as deqkhan farmers, individual farmers, kitchen-garden plot owners represented by chairmen of local rural settlements, Canal Management Organization employees. Totally, there were surveyed 194 farmers in two countries. In Tajikistan itself, there have been interviewed 80 water users.

Tadjikistan:

- Important role is playing Djamoats, i.e. Rural Settlements in organizing collective action in the territory of WUA, such as social khashars (collective action to clean on-farm canals) in WUA X. Olimov, tail end WUA along Khojabakirgan Canal;
- Due to deqkhan farmers' dismantlement process, the process of collective action is becoming more difficult and complex. WUAs are facing challenge organize farmers into the governance body of WUA and sometimes dismantlement of farmers bring to sustainability of WUAs;
- More and more there is appearing the need to establish Water user groups in order to unite water users along tertiary canals for the collective action within WUAs;
- A question of on-farm irrigation and drainage network ownership is becoming more and more important, especially after dismantlement of Association of Deqkhan farmers who used to be owners of on-farm irrigation canals as well as constructed water measurement devices;
- The content of contract between WUA and water users as well as WUA and District Water management organization or Canal Management Organization (KhBC) is the same for the majority of WUAs although each WUA has its own conditionality;
- The water measurement and water accounting in the boundary of WUA with Canal Management Organizations and District Water Management Organization is conducted in outdated and almost non-functional water measurement devices. And usually it is done based upon last year water estimate or more precisely by the eye estimate of hydrometrician of District water management organization or KhBC;
- The main actors in main canal water allocation and use are followings: Management of Khojabakirgan Main Canal (CMO), WUAs, deqkhan farmers, lessees from deqkhan farmers, presidential land owners, kitchen-gardens and other water users, such as Djamoats/makhalas;
- The formal and in-formal structure of WUA governance is better organized in the tail WUA along KhBC. In majority of WUAs, the chairman of WUA Council is working on voluntary basis however in WUA X. Olimov (previous Gulyakandoz), water users decided to pay salary for Chairman of WUA Council work. They have realized and understood the importance of this body operation;
- However, there is need to mention that due to different ethnicity groups as well as nations live in the zone of Khojabakirgan, sometimes it is not easy to form a proper Water Governance body which respect all water users in the villages;
- Furthermore, there is systemic and organized work of WUA Council and its Board of Governors in WUA X. Olimov (former Gulyakandoz) with proper protocols, minutes of meetings. These aspects directly relate to the improved water management inside WUA incomparison to WUA Obi-Ravoni Ovchi Qalacha, head WUA.
- Farmers, i.e. deqkhan farmers in the tail WUA X. Olimov are more adhere to follow the accepted rules and regulations within WUA in comparison to head WUA. The leadership of WUA including its farmers strongly confident that they don't allow massive water stealage, violation the rules accepted in WUA and if it happens they could handle it within WUA;
- In contrast, there is high water stealage, break of rules and regulations in water allocation among farmers of WUA Obi Ravoni Ovchi Qalacha. The leadership of WUA couldn't handle the issue due

to absence of WUA mechanisms to punish, mainly due to absence of real WUA governance body who should help WUA Directorate. Plus because WUA doesn't own on-farm irrigation and drainage infrastructure. Today Water Director is representing Executive Body of WUA as well as Chairman of WUA Board, which contradicts IWRM principles. Low acceptance by water users that WUA it is their organizations, more and more there are deqkhan farmers who are willing to conclude contract directly with Canal Management Organization for the supply of water to the territory of farmer, basically ignoring WUAs main mission and task. This is partly because more than 10 outlets of the WUA getting directly water from KhBC. This was basically happened during the year 2013-2014. The leadership of WUA is responding that there was quick shift from former collective farm system to the individual farmer system with all farmer service providing organizations. WUAs have been created with zero assets, even on-farm irrigation systems have not been transferred to the balance of WUAs without mentioning any heavy mechanisms. This condition has created among farmers bad impression about WUA and its potentials. Shortly speaking, WUA Obi Ravoni Ovchi Qalacha doesn't have any assets in its balance;

- Collective action to clean irrigation and drainage canals is better organized in WUA X. Olimov in comparison to WUA Obi Ravoni Ovchi Qalacha;
- Canal Khojabakirgan still practice rotational (warrabandi) water distribution system between two districts which canal deliver water;
- When compare head versus tail WUA, it was also clear that tail WUA has much organized formal as well as informal bodies for tackling water governance issues;
- Another aspect was also clear that tail WUA water users are paying more than 2 times more fees for the WUA service or so called WUA membership fee separately from the fee which they pay for the State provision of water resources;
- The penalty system is much better organized in the tail WUA in comparison to head WUA which basically contributes to the non-existence of the massive violation of rules within WUA;
- In both WUAs there are exist external interferences in water allocation to the deqkhan farmers however, extend of interferences is hugely different in head WUA in comparison to tail WUA. More external interference to the work of WUA is occurring in WUA Obi Ravoni Ovchi Qalacha in comparison to WUA X. Olimov (former Gulyakandoz), mainly and due to presence of WUA governance in the tail WUA. The external interferences are basically followings: Local authorities such as Governors (Xokims), Prosecutor and other authority of District call and ask WUA management to provide water first to his/her relatives, friends or to his/her lands;
- In general, one can conclude that governance is better organized in WUA X. Olimov (tail ender) in comparison to WUA Obi Ravoni Ovchi Qalacha (head WUA). WUA X. Olimov has better collective action, existence of penalty system, governance structure such as court of Aqsakals (eldermens), all these contribute to the success of WUA governance;
- In both WUAs, Deqkhan farmers mentioned that there is need to revise the formal organizational structure of WUAs with its governance and management bodies. Both WUA deqkhan farmers agree that there is need to be WUA governance body but not in current organizational structure content. It should be more real and not just on the paper;
- There is low level of State support to the work of WUA especially with the tax situation for provision of water delivery services. Canal and some WUAs pay tax for their service delivery.

In both WUAs, Deqkhan farmers indicated that they use other different water governance mechanisms in contrast to accepted one in order to find solutions for the different problems related to water allocation, such as work closely with Djamoat leadership and Association of Deqkhan Farmers leadership. It is highly recommended to revise proposed WUA governance structure taking into consideration local context and indigenous knowledge. There is potentially reconsider current

governance structures in WUAs taking into consideration important informal institutions. It is also expected to provide more in-depth findings and recommendations for WUA governance improvement.

Uzbekistan:

Officially WUAs in Uzbekistan are called as Water Consumer Associations (WCA), it was introduced in 2009 after the revision of Law on Water of Republic of Uzbekistan.

- All water users consider that it is important to have WCA Governance and its meetings. Specifically, during the General Assembly of farmers there are discussed the water use situation, the contractual relationships between WCA and water users, the irrigation service fee collection rates, preparedness of irrigation and drainage networks for the upcoming vegetation season as well as get reporting of executive as well as governance body such as WCA Directorate as well as WCA Council accordingly;
- Need to mention that there is high influence to the work of WCA especially in Tomchi Kuli from the External players and forces which negatively affects the efficient use of water resources;
- Although payment for the irrigation service fee to the WCAs is differentiate widely between head and tail WCAs, water stealage from the water users located in the head part of canals remains a common problem for two comparative WCAs;
- There is need to mention that in all WCAs there is symbolic payment for the use of water by kitchen-garden plot owners. Individual farmers basically compensate the cost of provision of irrigation water to kitchen-garden plot owners;
- There is agreement within WCA that water first delivered to the fields of farmers starting from 06:00 – 21:00 and later from 21:00 – 06:00 water is provided for kitchen-gardens;
- The important role plays as well the leadership of WCA. Water users stressed that it is important to have a good leader who could adhere the order as well as discipline in the WCA;
- Interesting finding in WCAs of Uzbekistan, especially in WCA Kodirjon A'zamjon starting from 2013 based upon Governmental order 293, WCAs have passed re-registration. According to this order, especially WCA Kodirjon A'zamjon basically abolished WCA Council. Everything is now concentrated in the executive body, i.e WCA Directorate under one person. This process is bringing more or less back former collective farm organizational structure;
- There are also situations where external forces affecting to the process of water allocation within WCA, some farmers who are the relatives of some people in the governmental bodies do not oblige to the rules and regulations which have been accepted within WCA;
- One of the most spread methods of getting irrigation service fee paid by WCA, is the closure of the outlets and not provision of water by WCA directorate;
- One of the issues in Uzbekistan WCAs is the typical form of agreement/contract which is disseminated in all WCAs to make a contract between WCA and farmers. The issue is that it is not changed but replicated to each WCA in the same form;
- There is also high interference to the work of WCA by State water management organizations, specifically for allocation and distribution of water within WCA. Local District Water Authorities influence in allocation of water while the State Water Inspectorate looks to the allocated water limit use and conditions of off-farm and on-farm water measurement devices;
- Majority of farmers within WCAs are cotton and wheat producers. These two crops are considered State quota crops, therefore State purchases cotton and wheat from the farmers. This process sometimes takes long time therefore, there is delay to payment for irrigation service to WUAs;
- Because people live within one society, they would like to solve conflicts and disputes within their societies internally;

- Need to mention that although WCA Tomchi-Kuli is based in head of Canal and ideally WCA management shouldn't be active but in WCA Tomchi-Kuli management is better organized due to its leadership skills and experience;
- In each case-study WCA, it was clear that WCA administration reports to a General Assembly that consists of farmers and WCA staff, but the General Assembly is also attended by officials of the Administrative Irrigation Systems (ISA) as well as local heads of Rural Settlements as well as respective mahalla leaders;
- Survey has revealed that leadership plays important role in governing and managing water resources inside WCA. According to survey, WCA Tomchi-Kuli is better organized in comparison to WCA K. Umarov. Water users are would like to approach more directorate of WCA Tomchi-Kuli to resolve the conflicts at least;
- Uzbekistan has strong approach in development of water use planning and scheduling at level of WCAs. In comparison to other countries in the region, Uzbekistan revises several times water use planning and scheduling based on availability of water resources in the sources;
- In both WCAs, farmers indicated that there is interference of State Water Inspection especially with regard to on-farm infrastructure maintenance, water measurement and water allocation based on limit;
- However, in both WCAs there is need to revise the governance structure taking into consideration local indigenous knowledge and informal institutions.

The specifics of Uzbekistan WCAs is that user payments for irrigation water are generally not linked to the actual amount of water used. Almost in all WCAs, irrigation fees are lowest for the crop that used the most irrigation water – cotton, the main state-mandated crop. In majority cases, WCAs who serve orchards and vegetable crop farmers the irrigation service fee is much better in comparison to WCAs who supply water to cotton and wheat.

After discussion with water users, it is clear that WCAs are still demanded organization which should exist and almost a single agricultural organization that operates by farmers themselves. Farmers gradually understand that it is their organization and that they need to support. However, State interference is high to the work of WCA, starting from making sure that WCAs have in place all documentations (contract with farmers; demand, supply and limit documentations; day-to-day water allocation schedule, water use planning as well as water scheduling), control the proper operation and maintenance of irrigation and drainage infrastructure within WCAs and others. There is basically less problem with regard to difference between head and tail WCA. There is similarities of State interference in all case-study WCA and revision of current Governance structure. If there will be disappear Governance body, WCAs could not operate in the viable conditions.

VIII. Recommendations based upon comparison of case-study WUAs

From the comparison of WUAs of Uzbekistan and Tajikistan, one can conclude that there are mutual interesting points that needs to be learned.
Specifically for Tajikistan WUAs:

a) There is need to learn the process of reorganization of WUAs from administrative-territorial approach to hydrographic principles of water management. It can be easily learned from Uzbekistan who shifted already in 2002 to the basin water management approach and it affected as well the creation of hydrographic WUAs;
b) It is important to transfer on-farm irrigation and drainage infrastructure to the balance of WUAs. Today's picture shows that majority of WUAs don't have under the account balance any assets of on-farm irrigation and drainage;
c) Tajikistan has created WUA Support Units however, it will be rational to strengthen the work of Water Inspection Agency or Unit with regard to break or violating agreed water measurement and accounting procedures. Uzbekistan experience can be replicated with regard to Inspectorate;
d) Tajikistan WUAs will only win with the strong cooperation with the local authorities and inviting Rayvodkhozes or Canal Management representatives into General Assembly meetings of the WUA;
e) Government should support to abolish value added tax which is charged to Canal Management as well as to WUAs for the delivery of water to the water users;
f) Last but not least, it is important to reconsider the optimum size of the WUAs from the perspective of economic and financial viable operation.

Recommendations for Uzbekistan WCAs;

a) Because size of average farmer in the WCA is around 50-60 ha, it is important to make sure that WUAs themselves prepare water use planning and not request Administrative Irrigation System (AIS) to prepare for WUA;
b) Today in the Republic of Uzbekistan, there are more than 1,500 Water Consumer Associations (WCAs). It is important to create so called WCA Support Units who will support WCA activities. Because WCA Support Units will play important role of bridge between Government and Non-Governmental Organizations such as WCAs;
c) Furthermore, externally there is need to create a separate Law on WCA;
d) Government supports WCA operation via allocating funds through quota system to cotton and wheat producer farmers, however, time and sequence of transfer of funds so long which makes WCAs financially vulnerable;
e) There is need to revise current internal institutional structures of WCAs in the Republic. There are more and more practicing informal institutions who helps to operate WCAs. It is important to legalize these informal institutions or agreements, such as role of Rural Settlements.

In all three countries of Ferghana Valley there is indigenous knowledge as well as informal institutions that are more active and helpful versus official formal ones. Among such structures in Kyrgyzstan is Court of Aqsakals, in Tajikistan Djamoats, in Uzbekistan Qishloq Fuqaroral Yigini. It is clear that there are institutional aspects which could be exchanged and learned between WUAs in the region such as collective action of Kyrgyz WUAs, State support and state positive interference of Uzbek WUAs and from Tajik WUAs setting the irrigation service fee. In all countries, there is required to improve water accounting on the boundaries of Rayvodkhozes, Canals and WUAs.

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Annex 1. Questionnaire for questioning of the WUA's leadership

[*For questioning of the WUA's leadership*] *№ of the questionnaire*

Questioning date: ___/___/ 2013

Respondent's name: _____

Name of WUA: _____

1. **Respondent's post in the WUA**: _____

2. **Sex**: Male(*1*) Female(*2*) 2.1. **Age**: _____ years old

2.2. **Education:**

Higher *(1)* Incomplete higher *(2)* Specialized secondary *(3)*

Secondary *(4)* Primary *(5)* No education *(6)*

3. **How many farms form the WUA**: _____ farms

4. **How many farms are there on the territory served by the WUA**: _____ farms

CROPS AND YIELDS IN 2013

5. **Total area of the WUA's irrigated lands:** _____ ha

6. **Total area of the irrigated lands of the WUA's members:** _____ ha

VEGETATION PERIOD 2013

7. **WUA's crops in 2013:**

Name of the crop	Area, ha	Crop productivity, centner/ha	% for sale	Receipts, ths. sums
1.				
2.				
3.				
4.				
5.				

WATER SUPPLY

8. **How many water sources have WUA and please indicate the names:** _____
_____

9. **Who and which organization deliver water from each source to WUA**
_____
_____

10. **Volume of water supplied to the WUA in 2013 during the vegetation period:** _____ m^3

11. **Total volume of water demand by the water users for 2013:** _____ m^3

12. **Total volume of water obtained by the water users during the vegetation period 2013:** _____ m^3

13. **Number of the water demands from water users for the vegetation period 2013:** _____

14. **Number of the water demands executed on-time:** _____

15. **Number of the days of water supply in the tail ends of the canals (30% canal length):** _____ days

16. **Number of days of the sufficient water supply (according to the demands) in the tail ends of the canals:** _____ days

17. **What tariffing does the WUA use for the water supply payments?**

	Payment	Tariff
	for a cubic meter of water supplied	diram/m^3
	for a hectare of the irrigated area	somoni/ha

18. **What part of the fees do the farmers pay in kind?** _____%

19. **What kind of measure is taken in WUA if farmer does not pay irrigation service fee? Plz, indicate**: _____

20. **Do farmers sanctioned who don't pay for irrigation service fee?** Yes(1) No(2)

21. **If YES then how are they sanctioned?**

_____

22. **Which extra sources of water do the farmers use in WUA?**

	Water sources	Volume, m^3
	ground waters	
	collector-drainage waters	
	discharge waters	
	rainwater	

OPERATION AND MAINTENANCE OF THE CANALS

23. **Total canals length in the WUA:** _____ km

24. **Total length of the canals in bad condition:** _____ km

25. **Total number of the hydraulic/water measurement units installed on the canals:** _____ units

26. **Total number of the hydraulic/water measurement units in bad condition:** _____ units

27. **Number of the hydraulic installations renewed in 2013:** _____ units

28. **Number of the farms equipped with water measuring installations:** _____ units

29. **How many times was the monitoring of the condition of the canals and hydraulic installations held in 2013?** _____

30. **How often was the training on the use of the water measuring facilities held in 2013?** _____

31. **How often was the training on the water saving cost-effective irrigation methods held in 2013?**
_____

WUA'S ORGANIZATIONAL STRUCTURE

32. **Full name of WUA and when it passed official registration**_____

33. **WUA's legal status:**

Commercial *(1)* Non-governmental, non-commercial *(2)*

Governmental (3) Non-governmental (4)

34. **How many people work in the WUA?** _____ persons

35. **How many employees have diplomas in their field of work?** _____ persons

36. **Which body in WUA is considered the highest governance body?**

General Assembly of Water users *(1)* WUA Council *(2)*

Board of Governors (3) Directorate (4)

37. **Was the Annual General Assembly Meeting of all the WUA's members held in 2013?**

Yes (1) No (2)

38. **If YES then how many WUA members took part in the AGM?** _____ persons

39. **Does there exist WUA Council, if yes, please indicate how many members are sitting there:**

		Quantity of WUA Council members
	Yes, WUA Council exists	
	No, WUA Council doesn't exist	
	Exists another form	

40. **If WUA Council exist, please, indicate who are the members of WUA Council, which category of professionals**_____
_____
_____

41. **How many WUA Council meetings were held in 2013?** _____ meetings

42. **Does WUA have Board of Governors, if yes, please indicate how many members are sitting there:**

		Quantity of WUA Council members
	Yes, BoGs exists	
	No, BoG doesn't exist	
	Exists another form	

43. **If WUA BoG exists, please, indicate who are the members of WUA Board of Governors**_____
_____
_____

44. **How many WUA BoG meetings were held in 2013?** _____ meetings

45. **Was the BoG election held in 2012-2013?** Yes(1) No(2)

46. **How many women are in the WUA Board of Governors? _____**

47. **Could you plz, indicate shortly what kind of questions are addressed in the meetings of WUA Council and in the meetings of WUA Board of Governors, in addition indicate what kind of functions they have:**

Questions addressed in WUA Council meetings	Questions addressed in WUA Board of Governors meetings

48. **Could you, please, indicate in shortly why there is need to have WUA Governance bodies (WUA General Assembly, Meetings of WUA Council and Board of Governors meeting if such exists)?**

_____
_____

49. **Does the WUA settle disputes between the water users?**

	Never(1)
	Sometimes (2)
	Always(3)

50. **Which body of WUA or entity usually settles the disputes?**

_____

51. **Do the farmers know about the water supply schedule and in what turn and in what amount the WUA's water users get the water?**

	No one knows (1)
	A part knows (2) (how many persons?_____)
	Everyone knows (3)

52. **If farmers know about the water delivery schedule, is there an applied sanction against farmers who break or violate the irrigation schedule?**

Yes No

If yes, could you indicate what kind of sanctions are applied_____
_____

53. **Is the WUA as a nonprofit organization released from debts?** Yes(1) No(2)

54. **With how many water users has the WUA a contract for the irrigation services?** _____

55. **Are all the contracts executed?**

	No one executed(1)
	Partially executed(2)
	All executed(3)

55.1. **If not all of the contracts are executed what is the reason?**

_____

56. **Is there applied any sanctions in relation to farmers who broke the contractual obligations according to contract? yes no**

If yes, indicate what kind of sanctions_____

57. **Could you please, indicate why water users break the rules, norms and regulations which are accepted and agreed inside WUA? Could you, plz, indicate the reasons?**

_____

_____
_____

COMMON PROBLEMS

58. **Which problems related to the water in the WUA must be solved in the short run (please assess their importance from 1 till 3, 3 – the most important):**

___ lack of the water for land irrigation
___ lack of the potable water and water for daily living needs
___ quality of the water for land irrigation
___ quality of the potable water and water for daily living needs
___ high waters and waterlogging
___sinking of the ground water table
___raising of the ground water table
___soil degradation (salinization of soil etc.)
___OTHER: _____

59. **Are the fees collected from the water users always transmitted in time into the WUA's bank account?** Yes(1) No(2)

59.1. **If NO what is the reason?** _____

_____

60. **The ISF rates in 2013 (versus 2012):**

60.1. **If there were changes in the ISF rates what is the reason?**

	Increased(1)
	Remained the same(2)
	Decreased(3)

_____
_____

61. **How do you think, which problems in the WUA influence most its efficiency (please assess their importance from 1 till 3, 3 – the most important)**

62. **How do you think, what is the strength of the WUA's activity? (Please assess their efficiency from 1 till 3, 3 – the most efficient)**

	Problems with the even water supply to the water users	
	Problems with the technical equipment and rehabilitation of the canals	
	Financial problems	
	Low irrigation service fees collection rate	
	Social problems and disputes between the water users	
	Organizational problems within the WUA, WUA Governance	
	Low competence of the WUA's employees	
	Low awareness of the famers about water saving technologies	
	Low participation of the water users in the WUA's direction	
	OTHER:_____	

	Even water supply to the water users	

	Good technical equipment and timely rehabilitation of the canals	
	Financial welfare	
	High irrigation service fees collection rate	
	Social interaction and absence of the disputes between the water users	
	Successful organization of the WUA's work	
	High competence of the WUA's employees	
	Awareness of the water users about water saving technologies	
	Active participation of the water users in the WUA's work	
	OTHER:_____	

63. **What do you think, need to be taken in order to make sure that all water users in WUA adhere to the accepted and agreed rules, norms and regulations within WUA?**
(Please assess their efficiency from 1 till 3, 3 – the most efficient)

	Increase the sanctions on violation of rules, norms and regulations
	Equip WUAs with water measurement devices
	Revisit, restructure the WUA organizational structure
	Reconsider the work of WUA Council
	Reconsider the work of WUA Arbitrage Commission
	Reconsider the work of WUA Revision Commission
	Stimulate, provide incentives for water users to use water rationally
	Others:_____

Annex 2. Questionnaire for interview different types of water users

[*for interview different types of water users*] *№* ___

Date of survey: ___/___/ 2014 ***Name of the surveyor:*** _____

Rural Settlement where respondent lives: _____
Village where respondent lives: _____
Location of respondent land in the territory of WUA: head, middle or tail end.

1. THE BASIC INFORMATION

1. The main status of the respondent (head of the family) _____
2. Gender: Male (*1*) Female (*2*)
2.1. **Age**:_____
2.2. **Education:**
Higher *(1)* Non accomplished higher *(2)* Secondary specialized *(3)*
Secondary *(4)* Primary *(5)* without education *(6)*

3. Type of farming: Farmer *(1)* Deqkhan *(2)* Kitchen-garden *(3)* Peasant *(4)*
Other (5) _____

4. Specialization of the farming:
Grain crops *(1)* Cotton *(2)* Orchards *(3)* Livestock (4)
Others (5) _____

4.1. **How many totally people work in your farming**: _____ people

5. Are you member of WUA? A) Yes ___, I am full member of WUA and have right to participate in the work of WUA.
B) No ___, I am not member of WUA, just receive water from WUA. Don't have any right to participate in the work of WUA.

6. How long do you live in the village? _____

7. How many years and why are you involved in irrigation (deqkhan, farming)? (Plz, explain).
_____
_____

8. Household composition (HHC): Main data and occupation of the current members of the household

1. Head HHC; 2.Wife; 3. Parent; 4.Son/daughter; 5.Grandson/Granddaughter; 6. Brother/Sister; 7. Daughter-in-Law; 8. Others	Male (M) Female (F)	Age	1. Married 2. Divorced 3. Widow 4. Single	1. Without education; 2. Primary; 3. Secondary; 4. Secondary Special; 5. Not completed higher; 6. Higher; 7.Others	1. Kindergarten; 2. Pupil; 3. Student; 4. Unemployed; 5 Housekeeper; 6. Farmer; 7. Service in the army; 8. Hired worker; 9. Entrepreneur (trade); 10. State employee; 11. Working for NGO; 12. Pensioner; 13. Working abroad; 14. Other	
Relationship to the head of HHC	Gender	Age	Marital Status	Level of education	Main activity	Additional activity

2. LIVELIHOODS

9. What are the main sources of your family income? (Plz, indicate based upon the level of importance): a. State service/Army; b. Remittances from abroad; c. Agriculture/farming; d. Trade; e. Hired worker (for example. Construction and etc); f. Non-governmental organization; g. Pension. h. Other sources, plz, indicate:

_____

_____

10. Could you approximate indicate, how much funds in the total income of your household comes directly from agriculture (sale of grains, vegetables, fruits, livestock and etc) just circulate the answer**?:**

a) ≤ 10% b) 10% - 30% c) 30% - 50% 4) ≥ 50%

11. How do you think, over the last ten years, your non-agricultural income *increased, decreased or remained unchanged*? (Could you underline your answer and explain below)

_____

_____

_____

3. LAND AND FARMING (AGRICULTURE)

12. Total irrigated area in your farming: _____ ha

13. Name of the canal secondary or tertiary order from which respondent is getting water (if respondent knows it):

_____

14. Location of the respondent along secondary or tertiary level of canal, i.e. where is respondent land is based:

Head Middle Tail

15. Please indicate the quantity of harvest obtained the 3 most major crops of those crops, vegetables, fruits, food, etc. grown in the last year?

Crops		Aim of growing 1 Earn means. 2.For the household consumption. 3. Fodder for livestock; 4. Others (indicate)	Cultivation area (ha)	Yield (hundreds kilograms per hecta)	Yield (*Plenteous; Average; Bad*)	Revenues, thousand somoni per ha
Commercial crops: Cotton, wheat	1.					
	2.					
	3.					
Vegetables: Potato, onion, carrot, tomato, cucumber, pepper, cabbage, etc.	1.					
	2.					
	3.					

Fruits: apple, pear, apricot, peach, mulberry, cherry, nuts and etc.	1.					
	2.					
	3.					
Fodder/forage: alfalfa, grass, etc.	1.					
	2.					
	3.					
Others						

16. Is there changes in the types of cultivated crops over the last ten years (indicate)
Yes_____ No____(*if yes*) (*Plz, explain*)_____
_____

17. **Indicate the caucuses which are mainly impede or prevent you to get maximum yields in your irrigated area and evaluate based upon the importance from 1 to 3 (1 is the most important one):**

__ scarcity of water for irrigation
__ big losses in the canals, late delivery of water resources
__ weather conditions
__ fertilizers: __ scarcity __ bad quality
__ agrochemicals: __ scarcity __ bad quality
__ shortage of necessary agricultural equipment and mechanisms
__ shortage of funds for purchase of necessary resources and equipment
__ bad land ameliorative conditions (*for example, salinity*)
__ lack of agronomic knowledge
__ lack of knowledge with regard when to irrigation and how long irrigate agricultural crop
__ absence of incentives (*for example, low prices, absence of market and etc)*
__ Others: _____

4. INSTITUTIONS

18. Are you member of any committee/association in the village (mark) Yes___ No____

Name of committee/association	Conditions of participation: *a) living in the community; b) membership fee; c) others (write what is the conditions of participation)*
1.	
2.	
3.	
4.	

19. Do you or your relatives/neighbours help each other in such works like construction, food provision or funds?

Help the majority part of time seldom help Never help, write the reasons

_____

_____

20. What do you think, the mutual help to each other *increased, decreased or remained in the same level* for the last ten years? (Plz, underline and explain)

_____

_____

_____

21. In general, do you think you could trust to the majority inhabitants of this village?
Yes ___No____ (*PLz, explain*)

_____

_____

_____

22. Could you, plz, indicate the name of WUA whom you are member?

_____

23. Do you have any position or responsibility on irrigation in the village? (for example, collect funds, mobilize people for the maintenance of canals, monitoring and etc) (plz, indicate)?
Yes ___ No ___ (if yes) (plz, explain)

_____

_____

_____

24. Do you participate in the General Assembly of WUA? *(indicate)***?** Yes___ No___ (*if yes*)
How often over the last three years _____? (*if not)* _Why not?_____

_____

25. If Yes, do you make a proposal for improvement the work of WUA? Yes(*1*)
No(*2*)

26. If Yes, are your proposals incorporated in the work of WUA? Yes(*1*) No (2)

27. Plz, indicate, what kind of service (work) you should contribute into the work of WUA as the member of it?

	Mainly, you spend more time in the participation of WUA meetings
	Annually participate in the Khashars
	Just pay irrigation service fee
	Annually, provide information about the agricultural crop structure
	Others, indicate:

28. Plz, indicate why there is need to conduct WUA General Assembly?

	None of the WUA members are aware about it
	This is the way the things are done

	In order to accept strategic decisions in WUA
	For the annual reporting
	Other, plz, indicate:

29. Do you participate in the meetings of the village which is organized by Djamoat (Rural Settlement)? (indicate): Yes___ No__ (if yes, how often)_____? (if not, why)?_____

30. How the group decisions are taken during the meeting of WUA? (mark only one)

100% agreement By majority One-man

31. How are the group decisions taken during the meeting of the village? (mark only one)

100% agreement By majority One-man

32. Do you participate in the decision making process of WUA? (mark it)
Yes___ (*if yes*), in which way (i.e., you are the member of WUA Council or other?). Indicate who is also member of WUA Council? Who is making the decisions? (Plz, explain),_____
_____

No ___(if not), plz, tell who is participating in the decision making process in WUA? Who is the mainly participating in the decision making process? Who is making the decisions? (Plz, explain)_____
_____

33. Do you participate in the decision making process in the village level? (mark it)
Yes___ No ____(*if yes*), In which way? Who is making the decisions?
(Plz, explain)_____
_____
_____

34. How and from whom you get to know about the accepted decisions at WUA? (for example, is there any written notices, protocols, the decisions of the General Assembly or the board of announcement, newspaper, bulletins and etc) (plz, explain)_____
_____
_____

35. Are there conducted the election of WUA Chairman? Yes No

36. Could you, plz, tell what is the strength of the WUA Chairman which was the criteria for his or her election? (for example, experience to work with community, knowledge of the sector, education and etc):_____
_____

37. Have there been conducted election of WUA Director or he/her was appointed by the WUA Council or other body? Plz, indicate:_____

38. Could you, plz, tell what is the strength of the WUA Director? (for example, experience to work with community, knowledge of the sector, education and etc)::_____

39. How do you think, the decisions which are taken at the WUA level, are also accepted, agreed and respected by the leadership of the village, Rural Settlement and District authority? Yes No, plz, indicate why_____

_____

5. WATER MANAGEMENT AND ALLOCATION

40. Do you know all water users in your WUA? (*mark*)

Yes___No___(*Plz,explain*)_____

_____

41. In what way, the water is allocated in your village? (*Mark, everything is applicable*)

After particular interval of time
In the limited volume
In accordance with established procedure (in turn)
Other_____
Based on crop types
On Household level
Based on land size
Other_____

42. Do you think current rules of the water allocation and water use in WUA is fair and corresponds to the local conditions? (mark it) Yes _____ No _____ (if yes), explain how? (if not), why not? (Plz, explain)_____

_____

_____

43. Irrigation types and water availability?

Infrastructure type 1. Channel from the valley 2. Spring 3. Private pump (a. pumps spring water; b. pumps from river) 4. Common pump (a. spring water; b. river) 5. from water pipe 6. Other	Local name of the canal (or other indication)	Location of the land from the canal (1.Head; 2.Middle; 3.Tail)	Water Sufficiency 1. More than half of necessary amount (<50%) 2. About the half of requested (≈50%) 3. Sufficient (100%)

44. How often are you irrigating your crops during the following seasons? (mark it)

Spring Once a week Two times a week Once in two weeks
Once in three weeks Once in month
Other_____

Summer ☐ Once a week ☐ Two times a week ☐ Once in two weeks
☐ Once in three weeks ☐ Once in a month
☐ Other_____

Autumn ☐ Once a week ☐ Two times a week ☐ Once in two weeks
☐ Once in three weeks ☐ Once in a month
☐ Other_____

45. What kind of obstacles exist to get sufficient amount of water?
(check all that apply) (What is the significance of the three most important from 1 to 3, the most important and 1-least 3)

☐ Location of the village (head, middle, tail)
☐ Location of land (head, middle and tail)
☐ Not fair water distribution schedule
☐ Uncontrolled water use
☐ Just, scarcity of water in the sources, because of climate *(spring, summer and autumn)*
☐ Absence of the adherence to the rules
☐ Conflicts with other farmers
☐ Absence of the punishment for the break of rules
☐ Absence of the information about the land sizes
☐ Non equal input of the labour force into the maintenance of canals
☐ Non-sufficient carrying capacity of canals
☐ Water losses due to leaking and break of canals
☐ Use of water by other users (use of water mainly for construction and etc.)
☐ Other _____

46. Do you submit application to get water in the beginning of 2013 into WUA, indicating how much water you would require during the vegetation season? ☐ Yes ☐ No

47. If Yes, how do you calculated the necessary amount of water you need? Plz, indicate
_____
_____

48. Have you participated in the development of the schedule of the water allocation in WUA? ☐ Yes ☐ No

6. OPERATION AND MAINTENANCE OF THE IRRIGATION SYSTEM

49. Do you participate in the khashars for maintenance of the irrigation canals (*cleaning, construction*) (*mark*)? Yes___ No ___(If yes), Do you participate in the voluntary basis or compulsory (forced) way? (plz, mark)

50. (*If yes*) in which basis there is distributed the work? (*mark it*):
☐ Based on size of the land ☐ Based on households ☐ Others (indicate): _____

51. (*If yes*), approximately, how many days you work for khashars? _____

52. Is there any system of punishment or compensation for non-participation in khashar? (*mark it)* Yes___ No ____(*If, yes*), In what type? _____ How much? _____
_____
_____

53. Have you participated in the discussion of the setting the rate of the WUA irrigation service fee, i.e. membership fee for 2014?
Yes No, plz, indicate why not_____

54. Do you pay the annual membership fee? (*Mark it*) Yes___ No ____(*If yes*), How much?_____Do you pay as well separately for water? Yes___ No ____(*If yes*), How much?_____

55. In your opinion, in general, what was the level of WUA irrigation service fee rate in 2013?
(Mark your response)
Very high High Normal Low Very low

56. Have you paid for the water and WUA irrigation service fee, i.e. membership fee in 2013? *(Mark you response ☑)*
Yes Partly No
56.1. If «No» **or** «Partly»**, plz, indicate why? _____**
_____
_____

57. Is there a penalty for non-payment? Yes___ No ____(*If yes*), How much?_____

58. Do you think that all the efforts that you make on the issue of water use (eg, payment water charges and participation in khashar) return you benefits from it?
Yes___ No ____ *(Plz, explain*)_____
_____
_____

7. <u>MONITORING, PUNISHMENT AND CONFLICT RESOLUTION</u>

59. Do you participate in the observations/monitoring of the water resources inside the WUA? *(If yes, mark all which are applicable in your participation)*
Water allocation Water use Conditions of water infrastructure
Others_____
(*If yes*) Individually in Groups (*Plz, explain*)_____
_____
_____
_____
(*if not*) Why not? (*Plz, explain*)_____
_____
_____

60. **Could you indicate what kind of rules and regulations which are accepted inside WUA you are aware of? (for example,** например, rotational water use, participation in khashars, don't break irrigation infrastructure, advance payment for the irrigation service fee and etc**).**

_____
_____

61. What violations mostly occur in WUA? (*mark all which are applicable*)

Overuse of water Theft (stealage) of water Non-participation in khashars

Channel damage Water pollution with livestocks Non-payment for WUA service

Others, indicate _____

62. Please specify who and what type of water users group are the major breakers of rules within WUA?

Water users who are based in the head part of canal, outlet

Water users who are the relatives of people who are the decision-makers or influencing to decision makers inside the WUA, plz, also indicate where their lans are located along canals

_____

Other category of water users, plz, indicate _____

63. Is there any sanctions/punishments for the breakers of rules and regulations accepted inside the WUA or village? (Mark it)

Yes___ No ____(*If yes*) What kind of? (*Plz, explain*) __ _____
_____

64. **(*If yes*) Who punishes the rules breakers?** (*mark everything which is applicable*)

Djamoat Traditional leaders (Aqsakals) WUA Council (including Arbitrage and Revision Commissions)

WUA (Director, Mirob) Court Other, indicate_____

65. *(If not)* What should be done in order to stop the break/violations of rules? (*Plz, explain and give your proposal*)

_____
_____

66. How often do you confront with the water conflicts inside the WUA over the last 3 years? *(mark only one option)*

Never Only once Twice Three times More than three times Many, difficult to count

67. What are the main reasons of water conflicts in your village? (*mark, everything which is applicable*)

Inequitable distribution of water Untimely delivery of water

Violation watering queue (theft) Bad cleaning or maintenance of canals
Bad performance of WUA Absence of water accounting
Use of water by outsiders (*for other purposes*) Others _____

68. Whose role is the main in the resolution of disputes and conflicts in your village? (*Plz, mark all which is applicable in the scale from 1 up to 3;*
1- most important, 3- less important)
Djamoat (Rural settlement) Traditional Leaders (Aqsakals) WUA Council (Arbitrage and Revision Commission) WUA (Director, Mirob) Court Others (Indicate)_____

69. How quickly resolved disputes, punishment inside the WUA?
Very quick inside the WUA (in each outlet) among water users
Quickly Mirob and WUA Director act on it and solve it
Long time via WUA Council, then it is given to Court and etc
Others, indicate_____

8. RESULTS AND OUTCOMES

70. Can you list the types and frequency of natural disaster occurrence over the last ten years? *(mark it)*

Drought	Never	Once	Twice	Three times	More than three times
	Many times, difficult to count				
Floods	Never	Once	Twice	Three times	More than three times
	Many times, difficult to count				
Others___	Never	Once	Twice	Three times	More than three times
	Many times, difficult to count				

71. What are the major socio - economic and environmental problems associated with the use of water in your village? (*mark what is applicable*)
□ Conflicts among local residents □ Loss of the traditional relations
□ Poor life □ Problems with the food
□ Bad conditions of health □ Degradation of land resources
□ Bad quality of water and its amount
□ Others _____

9. FARMERS AWARENESS

72. Do you know about the existence of WUA water supply schedule? Yes No

73. Do you know always:	Yes	No	Not sure
- how many times there is need to irrigated your crops in order to get good yields?			
- when there is need to irrigation your crops in order to get good yields?			

- do you know how much m3 of water you get during the vegetation period			

74. Do you want to know actually how much m3 of water you are getting to your field during the vegetation period? Yes ( ) or No ( )

75. If yes, why you need to know it, plz, write it down

_____

10. QENDER EQUALITY

76. From the total number of registered workers how many men and how many females in your farm?

77. How many people in average work in your deqkhan farm during the peak of agricultural works? Out of them which are percentage of women?

78. What kind of agricultural workers/employees work in your fields?

(you may chose several options)	What kind of work they accomplish?
1. ☐ family = 2. ☐ share holder = 3. ☐ hired workers = 4. ☐ tenant = 5. ☐ mirab =	

79. How much in average the salary of the agricultural workers

Women	**Men**
☐ shareholder = ☐ hired workers = ☐ tenant = ☐ mirab of the deqkhan farm = ☐ mirab of the household =	☐ shareholder = ☐ hired workers = ☐ tenant = ☐ mirab of the deqkhan farm = ☐ mirab of the household =