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Baseline Study on Water Utilization in the Ararat Valley

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Acronyms

ADB	Asian Development Bank
AEF	Armenian Environmental Front
AFD	Agence Française de Développement
AMD	Armenian Dram
ASPIRED	Advanced Science & Partnerships for Integrated Resource Development
AWHHE	Armenian Women for Health and Healthy Environment NGO
BMO	Basin Management Organization
CWP	Country Water Partnership NGO
EBRD	European Bank for Reconstruction and Development
EDB	Eurasian Development Bank
EU	European Union
FGs	Focus Groups
GEF	Global Environment Facility
GOA	Government of Armenia
HH	Household
KfW	KfW Development Bank
LSG	Local Self-Governance body
MCC	Millennium Challenge Corporation
MEINR	Ministry of Energy Infrastructures and Natural Resources of RoA
MNP	Ministry of Nature Protection of RoA
MOA	Ministry of Agriculture of RoA
MOH	Ministry of Health of RoA
NGO	Non-governmental Organization
NPD	National Policy Dialogue
PSRC	Public Services Regulatory Commission
PURE	Participatory Utilization and Resource Efficiency
RoA	Republic of Armenia
SCADA	Supervisory Control and Data Acquisition (water monitoring system)
SCWE	State Committee of Water Economy of RoA MEINR
SEI	State Environmental Inspectorate of MNP
SGP	Small Grants Program
SHI	State Health Inspectorate of MOH
UFSD	Urban Foundation for Sustainable Development
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WB	The World Bank
WRM	Water Resources Management
WRMA	Water Resources Management Agency of MNP
WUA	Water User Association
WUP	Water Use Permit



Part 1. Results of Household Survey in Ararat Valley

1.1 Introduction

Within the Participatory Utilization and Resource Efficiency of Water activity (PURE-Water Activity) funded by the United States Agency for International Development (USAID), the Urban Foundation for Sustainable Development (UFSD) conducted a household survey on water utilization in the Ararat Valley. The goal of this survey was to assess awareness, attitudes and perceptions of citizens on water resources management, water quality, use, availability, and about responsibilities of relevant bodies.

Survey methodology: The survey was conducted in six towns (Artashat, Ararat, Armavir, Masis, Ejmiatsin, Vedi) and 16 villages randomly selected in the Ararat Valley (8 in Ararat marz, and 8 in Armavir marz, please see Table 1). The sampling of rural settlements was implemented based on stratified systematic random approach: a) all villages in each marz were grouped/stratified into relatively larger and smaller ones (i.e. having higher than the average number (694), and lower than the average number of households – calculated based on the average size of households estimated through other similar surveys), and b) four villages of each type (small/large) were selected in each marz based on systematic random selection.

A total of 385 households (HHs) were surveyed (104 urban and 281 rural) in order to have a representative sample (with 95% confidence level and a confidence interval of 5) for the population in Ararat Valley (Ararat and Armavir marzes, having about 527 thousand population in total).

The survey instrument - household questionnaire was developed by the lead social scientist (contracted by UFSD) in consultation with the relevant experts from the Country Water Partnership scientific, ecological NGO (CWP) and Environmental Law Research Center (ELRC) at Yerevan State University (YSU), as well as with the staff of UFSD and USAID ASPIRED project.

The structure of questionnaire included the following sections/questions:

1. Socioeconomic status and demographic profile of households (number of adult male/female and all household members, education, IT skills, and employment status of the respondent, current economic situation of households, estimated annual monetary income of households (HHs), as well as respondents' age and gender);
2. Availability, quality and access to drinking and irrigation water;
3. Awareness about issues related to drinking and irrigation water in the community; and
4. Civil activity, participation in decision making and monitoring activities related to water resources.

In total, about 80 questions were asked to the selected respondents (adult HH members who were informed about water related issues) during the interviews, and the average duration of an interview was 12 minutes. The interviews were conducted by four experienced interviewers, who were properly trained before the survey fieldwork. The questionnaire was pilot tested in one settlement in Ararat Marz (region) on May 28, 2017, after which minor adjustments were made into it, and the questionnaire was



finalized (approved by UFSD) on May 31st. The survey was conducted between May 31st and June 7th. The table below lists the names of settlements where the survey was conducted in each Marz, the types of settlements (urban/rural), the number of HHs interviewed in each settlement, the names of relevant water basin management territories, and information on the drinking water supplier organization in each settlement (Veolia or none).

Table 1. The number of interviewed HHs in each settlement

Marz (region)	Settlement name	Settlement type	Number of HHs interviewed	Basin management territory	Drinking water supplier
Ararat	Masis	urban	20	Hrazdan	Veolia
	Artashat	urban	17	Ararat	Veolia
	Ararat	urban	16	Ararat	Veolia
	Vedi	urban	17	Ararat	Veolia
	Shahumyan	rural	17	Ararat	Veolia
	Pokr Vedi	rural	16	Ararat	Veolia
	Nor Kyanq	rural	16	Ararat	Veolia
	Aralez	rural	16	Ararat	Veolia
	Noramarg	rural	19	Hrazdan	None
	Sis	rural	21	Hrazdan	None
	Jrahovit	rural	21	Hrazdan	Veolia
	Sipanik	rural	20	Hrazdan	None
Armavir	Ejmiatsin	urban	17	Hrazdan	Veolia
	Armavir	urban	17	Akhuryan	None
	Merdzavan	rural	17	Hrazdan	Veolia
	Norakert	rural	17	Hrazdan	Veolia
	Musaler	rural	17	Hrazdan	Veolia
	Lukashin	rural	17	Akhuryan	None
	Maisyan	rural	17	Akhuryan	Veolia
	Lenughi	rural	17	Akhuryan	None
	Artashar	rural	17	Akhuryan	None
	Ferik	rural	16	Akhuryan	Veolia

The territory of Armenia is divided into 10 administrative regions called “Marzes”, Yerevan (the capital city, which has 1/3 of country’s population) being the 11th Marz; and the country is divided into six water basin management territories: Northern, Sevan, Hrazdan, Ararat, Akhuryan, and Southern basins. Ararat Valley includes two marzes – Ararat and Armavir; and communities from three basin management territories (Hrazdan, Ararat, Akhuryan) are included in Ararat Valley.

As shown in the *Table 1*, the selected 16 rural and 6 urban settlements are from three water basin management territories covering Ararat Valley: Ararat, Hrazdan, and Akhuryan. In addition, 15 of 22 selected settlements are served by Veolia Djur company (a private drinking water supplier company) while the rest (7) are out of coverage of Veolia. While this report tries to make comparative analyses on water related issues between the two marzes (Ararat and Armavir), three basin management territories (Ararat, Hrazdan, and Akhuryan), and between the two types of communities with different drinking



water supply arrangements (i.e. those that are served by Veolia and others that are out of coverage by Veolia), however, it should be noted that the sampling design for this study has been made having a purpose to receive reliable data on the population representing the whole Ararat Valley, and any comparative analyses of data based on the further breakdown of results (i.e. between Marzes, basin management territories, or by Veolia coverage) is prone to having lower confidence levels due to relatively smaller sub-population sizes included in the survey.

1.2 Executive summary

Armenia is a country that has sufficient water resources (approximately 3,100 cubic meters per capita per year) to meet the needs of its population¹. The country has significant groundwater resources, and about 96 percent of the water used for drinking purposes and about 40 percent of water abstracted in the country comes from groundwater (World Bank, 2015). However, as this study revealed, there is a big share of population (particularly in Ararat Valley) that do not have access to quality drinking water or irrigation water to irrigate their land plots (especially in the summer, when the need for irrigation is higher). While this can be explained by seasonal and annual variability in river runoff and lack of adequate number/capacity of dams, the ineffective management of water resources by the state bodies is one of the main reasons for these issues. According to many experts interviewed within this study, there is a high corruption in this sphere and lack of political will to combat water related issues. Ineffective management and overuse of artesian water resources, especially by fisheries, has resulted in degradation, bog and salinization of the soil; the artesian water basin in Ararat Valley has been squeezed by three times, water resources in different artesian horizons have been mixed; some houses are cracked and seismic risks are increased in the area where positive pressure of groundwater has decreased. Due to lack of water, which is so necessary for having a productive agriculture (the main source of income for most rural residents in Ararat Valley), many local residents are obliged to sell their houses, land plots and emigrate from the country. Thus, in order to prevent the further damage to the country's water resources and the relevant socioeconomic consequences for the population (loss of income, emigration, etc.) it is necessary to implement relevant policies and programs aimed at increasing population awareness on mentioned ecological and socioeconomic issues, increase water productivity, promote economical use of water by the population, and promote civic activity for better oversight and involvement in solving water related issues.

1.3 Survey results

1.3.1 Drinking water

During the household survey conducted in the beginning of June 2017 among residents of the Ararat Valley, a number of questions were asked to the selected household members in order to determine availability, quality and access to drinking water. In response to the question “How do you mainly get drinking water for your household needs?” the following answers were received from the survey participants (please see Table 2 below):

¹ Yu, Winston; Cestti, Rita A.; Lee, Ju Young. 2015. *Toward Integrated Water Resources Management in Armenia. Directions in Development-Countries and Regions*. Washington, DC: World Bank. © World Bank.



Table 2. Sources of drinking water for households (number of respondents).

Marz	Community (Urban/rural)	I get it from drinking water tap (inside of house)	I get it from drinking water tap (in house yard)	We buy drinking water (in the shop or in other places)	We get water from neighbors/ street water tap/other	Total
Ararat	Aralez (R)	14	2			16
	Ararat (U)	15	1			16
	Artashat (U)	17				17
	Jrahovit (R)	8	2	2	9	21
	Masis (U)	12		5	3	20
	Nor Kyanq (R)	16				16
	Noramarg (R)	8	3	1	7	19
	Pogr Vedi (R)	12	4			16
	Shahumyan (R)	15	2			17
	Sipanik (R)	10	5		5	20
	Sis (R)	8	5	4	4	21
	Vedi (U)	15	2			17
	Total	150	26	12	28	216
Armavir	Armavir (U)	12		5		17
	Artashar (R)	9	7		1	17
	Ferik (R)	12	4			16
	Lenughi (R)	9	5	3		17
	Lukashin (R)	12	1	4		17
	Maisyan (R)	16	1			17
	Merdzvan (R)	16		1		17
	Musaler (R)	16	1			17
	Norakert (R)	16	1			17
	Ejmiatsin (U)	17				17
	Total	135	20	13	1	169

Thus, based on the analyses of data collected from 385 households randomly selected in Ararat Valley we can conclude (with $\pm 5\%$ marginal error) that 86 percent of population in Ararat Valley gets drinking water from the tap (inside of house or in house yard), 6.5% buys water, and 7.5% gets water from other sources (from neighbors, street water tap, etc.). In urban settlements 87.5 percent of population gets drinking water from the tap (inside of house or in house yard), 9.6% buys water, and 2.9% gets water from other sources (from neighbors, street water tap, etc.), while in rural settlements 85.4 percent gets



drinking water from the tap (inside of house or in house yard), 5.3% buys water, and 9.4% gets water from other sources (from neighbors, street water tap, etc.)

There is a big difference in access to water in communities that are served by Veolia versus those communities that are out of coverage of Veolia: the share of citizens that receive drinking water from the tap is 92.2% in Veolia served communities versus 73.4% in non-Veolia communities.

Those HHs that did not have access to water from the tap (14% of all) were asked to mention the reasons for not having water. 38 percent of those explained that it is due to lack of water pipes in the community, 51 percent mentioned that the water they get from the tap cannot be considered as “drinking water”, and the rest (11%) either did not know or mentioned other reasons.

Duration of water supply: 37 percent of HHs in Ararat Valley have permanent (24 hours/day) supply of drinking² water, while the rest get water with interruptions: 13% get water for 2-5 hours per day, 16% - 6-10 hours, 15% - 11-20 hours, and 6 percent get water irregularly, up to 24 hours per day (or once in two days). There is a big difference among communities that are served by Veolia versus those that are out of coverage by Veolia. Surprisingly, in communities where there is no Veolia service (Lukashin, Sipanik, Noramarg, Armavir, Sis, etc.) 59.4% have 24 hours/day access to drinking water, while in the communities served by Veolia only 26.5% have 24-hour supply of drinking water (exceptions are Ferik, Norakert, Musaler and Ejmiatsin where 59-100% of residents mentioned about having 24 hours/day water supply). Please see *Table 3* below for more details.

² Please note that many residents do not consider/use water received in their house tap as “drinking water” and they get drinking water from other places or buy it.



Table 3. Duration of drinking water supply in communities (% among communities).

	Communities	Duration of drinking water supply (hours)					Don't know/ missing	Total (%)
		Irregular (0-24)	2-5	6-10	11-20	24		
No Veolia service	Armavir					64.7	35.3	100.0
	Artashar	5.9		23.5	17.6	47.1	5.9	100.0
	Lenughi		47.1	47.1			5.9	100.0
	Lukashin					94.1	5.9	100.0
	Noramarg					68.4	31.6	100.0
	Sipanik					75.0	25.0	100.0
	Sis					61.9	38.1	100.0
	Total	0.8	6.3	9.4	2.3	59.4	21.9	100.0
Veolia service	Aralez	56.3	6.3	31.3	6.3			100.0
	Ararat	6.3	37.5	37.5		6.3	12.5	100.0
	Artashat			11.8	76.5	11.8		100.0
	Ferik					100.0		100.0
	Jrahovit			4.8	52.4	4.8	38.1	100.0
	Maisyan			5.9	58.8	35.3		100.0
	Masis			15.0	35.0	5.0	45.0	100.0
	Merdzvan	5.9	41.2	17.6	23.5	5.9	5.9	100.0
	Musaler			5.9	29.4	64.7		100.0
	Nor Kyanq		31.3	62.5		6.3		100.0
	Norakert					100.0		100.0
	Poqr Vedi	43.8	31.3	25.0				100.0
	Shahumyan		35.3	35.3	23.5	5.9		100.0
	Ejmiatsin	5.9	17.6	11.8		58.8	5.9	100.0
	Vedi	17.6	41.2	35.3	5.9			100.0
	Total	8.6	15.6	19.5	21.8	26.5	8.2	100.0

Table 4 below illustrates the duration of water supply in communities served by Veolia versus non-Veolia communities, and also by urban/rural types of communities. In non-Veolia settlements 65% of urban residents have 24-hour access to drinking water while in urban areas served by Veolia only 16% have water 24-hours per day. In rural areas also 24-hour access to water is higher in non-Veolia areas than in settlements served by Veolia (59% vs. 32%). This is probably due to the fact that Veolia tries to save water for distribution to other communities.



Table 4. Duration of drinking water supply by settlement type (% among type of settlement).

		Duration of drinking water supply (hours)					DK/missing	Total (%)
		Irregular (0-24)	2-5	6-10	11-20	24		
No Veolia service	Urban					64.7	35.3	100.0
	Rural		7.2	10.8	2.7	58.6	20.7	100.0
	Total		6.3	9.4	2.3	59.4	22.7	100.0
Veolia Service	Urban	2.3	18.4	21.8	24.1	16.1	17.2	100.0
	Rural	1.8	14.1	18.2	20.6	31.8	13.5	100.0
	Total	1.9	15.6	19.5	21.8	26.5	14.8	100.0

As shown in the *Table 5* below, Ararat Marz residents have higher access to 24-hour drinking water in settlements not served by Veolia (Noramarg, Sis, Sipanik), while in Armavir Marz the settlements served by Veolia (Ferik, Norakert, Musaler, etc.) have much better access to 24-hour/day water as compared to Ararat Marz settlements served by Veolia.

Table 5. Duration of drinking water supply by Marzes (% among Marzes/Veolia service area).

		Duration of drinking water supply (hours)					DK/missing	Total (%)
		Irregular (0-24)	2-5	6-10	11-20	24		
No Veolia service	Ararat					68.3	31.7	100
	Armavir	1.5	11.8	17.6	4.4	51.5	13.2	100
	Total	0.8	6.3	9.4	2.3	59.4	21.9	100
Veolia Service	Ararat	12.9	19.2	27.6	23.7	4.5	12.2	100
	Armavir	2.0	9.9	6.9	18.8	60.4	2.0	100
	Total	8.5	15.6	19.5	21.8	26.5	8.2	100

Payments for water supply: The average amount of money that households pay for drinking water is about AMD 2000 per month (\$4.13) with the range of 0-7000 (7% of HHs mentioned that they did not pay for water at all). Only 7 percent reported about having debts for drinking water. It is worth to mention that 77 percents of residents reported about having a water meter for drinking water installed in their house. 36 percent of those who did not have a water meter mentioned that they pay a fixed amount of money to the village/city administration, 32 percent pay a fixed amount to the person who collects water payments in the community, and 21 percent of those who do not have a water meter (mostly in villages Sipanik and Noramarg in Ararat Marz – not covered by Veolia), reported that they did not pay at all. 77 percent of HHs pays water bills every month, 11 percent – once or several times a year, and 7 percent said that they do not pay at all. As for the non-payers, the distribution of those is the following: 85% (17/20) of respondents in village Sipanik (Ararat Marz), 26% (5/19) of respondents in village Noramarg (Ararat Marz), both in non-Veolia service area (where the same artesian water is used



for drinking and irrigation purposes, and where some citizens do not consider that they receive “drinking” water), as well as 15% (3/20) in Masis town, and 6% (1/16) in the city of Ararat.

Satisfaction with water pressure: In total, 64 percent of Ararat Valley residents seem to be satisfied with water pressure in the water supply system of HHs, while 35 percent – are not satisfied. In settlements served by Veolia, more residents are satisfied with water pressure than in non-Veolia settlements (69% vs. 55%).

Satisfaction with water supply duration: Although only 1/3 of HHs in the Ararat Valley has 24-hour access to drinking water, the majority (62%) of HHs mentioned that they were satisfied with water supply duration (37% - not satisfied). The dissatisfaction rate (on water supply duration) is higher (58%) in urban settlements served by Veolia, where only 16% have access to 24-hours/day water supply.

Quality of drinking water (taste, smell, color, clearness): Only 53 percent of Ararat Valley’s residents are satisfied with drinking water quality. In settlements served by Veolia, residents’ satisfaction on water quality (taste, smell, color, clearness) is higher than in settlements with no Veolia service (60% vs. 38%). In rural areas, perceived water quality is higher than in urban areas as (55% vs. 46%). This difference is even higher in Armavir Marz, where 62% of rural residents are satisfied with drinking water quality versus 32% in urban areas in Armavir.

1.3.2 Irrigation water

Land plots: 82 percent (314/385) of surveyed HHs in Ararat Valley mentioned that they have a backyard, the total area of which ranges from 30 (in urban settlements) to 12,000 square meters, with an average of 1300 sq. meters. In addition, 46 percent of all surveyed HHs (n=177) also mentioned having other land plots (in the same community) with the area of 500-50,000 square meters, with the average of 10,953 sq. meters or about 1.1 hectares (median=8000 sq.m).

Irrigation methods: As shown in the *Table 6* below, approximately 32.8 percent of HHs in the Ararat Valley irrigate their backyards using artesian water (extracted by own pump). Those are mainly the residents from the following communities: Ejmiatsin, Artashat, Shahumyan, Artashar, Jrahovit, Pokr Vedi, etc. 28.3% of HHs irrigate their backyards using community irrigation canals, 8% - community artesian water (mainly in villages Sis, Nor Kyanq), 7.3% - using the inter-community canals, 6.4% - using irrigation pipes, 6.1% - using drinking water (in Merdzavan, Armavir, Ararat, Musaler, etc.). 10.2 percent mentioned that they do not irrigate their backyards.

As for other land plots cultivated by citizens in Ararat Valley, 50.8% of HHs irrigate those land plots using the irrigation canals in the community, 6.2% - using inter-community canals, 4% - using irrigation pipes, 6.8% - through artesian water extracted by own pump (mostly in Ararat, Masis, Vedi, Nor Kyanq, Shahumyan, etc), and a big share (28%) mentioned that they do not irrigate their land plots at all. Those are the residents of Ararat, Masis, Noramarg, Artashat, Merdsavan, Ejmiatsin, etc. It is mainly associated with the fact that these residents do not cultivate those land plots due to various reasons.



Table 6. “How do you mainly irrigate your land plot(s)?”

Irrigation method	Backyard	Other land plot(s)
Inter-community canals	7.3%	6.2%
Irrigation canals in the community	28.3%	50.8%
Irrigation pipes	6.4%	4.0%
Artesian water (extracted by own pump)	32.8%	6.8%
Community artesian water	8.0%	4.0%
Drinking water supply system	6.1%	0%
Rain / snow waters	0.3%	0%
I do not irrigate/cultivate my land plot(s)	10.2%	27.7%

Access to irrigation water: 21 percent of all HHs that have land plots (including backyards) mentioned that they always have enough quantity of irrigation water, 36 percent mainly have water, 24 percent sometimes have irrigation water, sometimes – do not have, 13 percent do not have enough quantity of irrigation water most of time, 4 percent mentioned that they did not have access to irrigation water at all, and 2 percent did not know about it (due to the fact that some respondents, for instance young females, did not have information about irrigation related issues faced by their HH).

As for those HHs that have other (with larger than 1000 sq. meters of area) land plots, only 12.4% mentioned that they always have enough quantity of irrigation water, 39.8 percent mentioned that they mainly have water, 28.6 percent sometimes have irrigation water, sometimes – do not have, 13 percent do not have enough quantity of irrigation water most of time, 3.7% did not have irrigation water at all.

The communities that had relatively better access to irrigation water (i.e. where more than 60% of respondents mentioned that they always or mainly had irrigation water) include the following:

- Ararat Marz – Vedi, Jrahovit, Pokr Vedi, Shahumyan, Nor Kyanq;
- Armavir Marz - Merdzavan, Ferik, Lenughi.

Reasons for not having enough quantity of irrigation water: Those HHs that mentioned that they did not have enough quantity of irrigation water (41% of all HHs having land plots) were asked to explain the reasons for not having enough quantity of irrigation water. As shown in the *Table 7* below, 58 percent of those respondents explained the reasons for not having enough quantity of irrigation water by the following: a) the quantity of available irrigation water has decreased and b) the total area of irrigated land in the community has increased and water is not enough for the needs of community residents (water users). In addition, 11 percent mentioned about lack of proper irrigation system in the community, 7 percent mentioned that lack of water is due to the decrease of artesian groundwater level, 3 percent had debts for irrigation water, thus, they did not receive water; 2 percent associated this issue with ineffective functioning of Water User Associations, 10 percent brought other reasons, and 9 percent did not know why.



Table 7. “What is the reason that you do not have enough quantity of irrigation water?”

The quantity of irrigation water has decreased and it is not enough for the needs of community residents (water users).	32%
The total area of irrigated land in the community has increased and the quantity of water is not enough	26%
There is no irrigation water system in the community.	11%
Artesian groundwater level has decreased.	7%
I have debts for irrigation water, thus, they do not provide me with water.	3%
Because Water User Associations do not operate effectively	2%
Other	10%
Don't know (DK)	9%

Payments for irrigation water: As for the payments for irrigation water, 26-36 percent³ of those that have land plots reported that they do not pay for irrigation water, and 53% of those are HHs that irrigate their land plots through artesian water (extracted by own pump). This can be explained by the fact that a large share of HHs (28%) do not cultivate their land plots. 27 percent of HHs did not mention the size of payments for irrigation. Thus, only 152 HHs (or 48% of all that have land plots) mentioned that they make payments for irrigation water. The average annual payments for irrigation water make AMD 64,000, with the range of AMD 12,000-400,000 (median= AMD 20,000).

Only 30 HHs (10% of those who had land plots) reported about having debts for irrigation water, which ranged from AMD 5,700 to AMD 400,000, with the average of AMD 114,000.

As for the frequency of payments for irrigation water, the general practice is that the citizens pay for irrigation water within a few days after irrigating their land plots. The frequency of irrigation is associated with the types of crops cultured and other factors. For instance, grape fields are irrigated 3-5 times per year, while vegetables and other cultures require more frequent irrigation. In response to the question “How frequently do you pay for irrigation water?” 50 percent of respondents mentioned “Several times per year”, 30 percent – “Once per year”, 11 percent – “every month”, 5 percent – “Every time we water the land plot”, and the rest (4%) - irregularly. Although WUAs may require farmers to pay for irrigation more frequently, however, most of farmers mention that their income (from the sale of agricultural products) is received in the middle or at the end of year, thus, they cannot pay for water until they sell their produce. There have been cases when farmers have not been able (or willing to) pay for irrigation water for a period of year or longer, however, the WUA kept providing water to those farmers as they understood that those farmers were really in difficult socioeconomic conditions.

Quality of irrigation water: Since the ordinary residents are not able to judge on the quality (chemical composition) of irrigation water they receive, therefore, the residents were asked to assess the level of pollution of irrigation water among other issues related to irrigation water in their communities. Due to prevalence of more important issues related to water (such as availability/access, price, etc.), only 9 percent of residents (14% of Ararat and 2% of Armavir Marz residents) mentioned that pollution of irrigation water is among the three key irrigation water related issues in their community.

³ Depending on the formulation of questions, different answers were received on this; thus, the range is 26-36%.



Assessment of WUAs by the residents: The survey questionnaire included several questions about activities of water users' associations (WUAs). In response to the question about reasons for not having enough quantity of irrigation water, only 1.7 percent of residents blamed WUAs (3.3% in Armavir Marz and 0% in Ararat Marz). In response to the question about listing key issues related to irrigation water in the community, 3 percent of residents pointed out to the ineffective work of WUAs, and 8 percent (12% in Ararat and 3% in Armavir Marzes) mentioned that irrigation water is not fairly distributed among the residents, which can be also attributed to ineffective work of WUAs. Furthermore, 38 percent of local residents (32% in Ararat and 46% in Armavir Marzes) believe that Water User Associations are effective in terms of solving irrigation water related issues in the community. Thus, although WUAs do not have the trust of the majority of local residents, the residents of Armavir marz seem to be more satisfied with the WUAs than those in Ararat Marz.



1.4 Awareness about issues related to drinking and irrigation water in the community

Awareness about water user's rights and responsibilities: 9.4 percent of surveyed HHs mentioned that they did not have an agreement for irrigation or drinking water use; 55 percent mentioned that they were not familiar with their rights and responsibilities as indicated in their agreement for irrigation/drinking water use; only 30 percent confirmed that they were familiar with their rights and responsibilities, and the rest did not respond to this question.

Awareness about water user's rights and responsibilities is slightly higher among males: 34% vs. 28% among females. Within age groups, the highest awareness was recorded among age group 56-65 years (45% were aware), followed by age group 36-45 (38%). Only 7 percent of youth aged 18-25 and 17% of those aged 26-35 were informed about water user's rights and responsibilities.

The respondents were also asked to mention up to three main issues in their community related to drinking water. Below is a breakdown of responses received from them⁴.

Table 8. Main issues in the community related to drinking water

The quality of water is low: it has unpleasant color/taste.	43%
Water supply is not available throughout the day.	31%
Water pressure in the system is low.	22%
We often have unplanned water supply cuts.	9%
The price of water is high.	7%
Water supply timetable is not followed.	6%
There are huge water losses associated with degraded system.	6%
We do not get drinking water in our house.	5%
Not all HHs have drinking water in the community.	3%
There are no issues.	30%

Thus, 43 percent of households in Ararat Valley are not satisfied of the quality of drinking water they get in their house tap. Another 31 percent mentioned that the water supply in their HH was not available throughout the day, 22 percent – that water pressure in the system was low, 9 percent – that they often had unplanned water supply cuts, etc. Only 30 percent of respondents mentioned that there were no issues with their drinking water supply.

As for the issues related to *irrigation water* in the community, the following answers were received⁵ (please see the *Table 9* below):

⁴ Please note that the sum of these responses exceeds 100% because respondents mentioned up to 3 issues.

⁵ Please note that the sum of these responses exceeds 100% because respondents mentioned up to 3 issues.



Table 9. Main issues in the community related to irrigation water

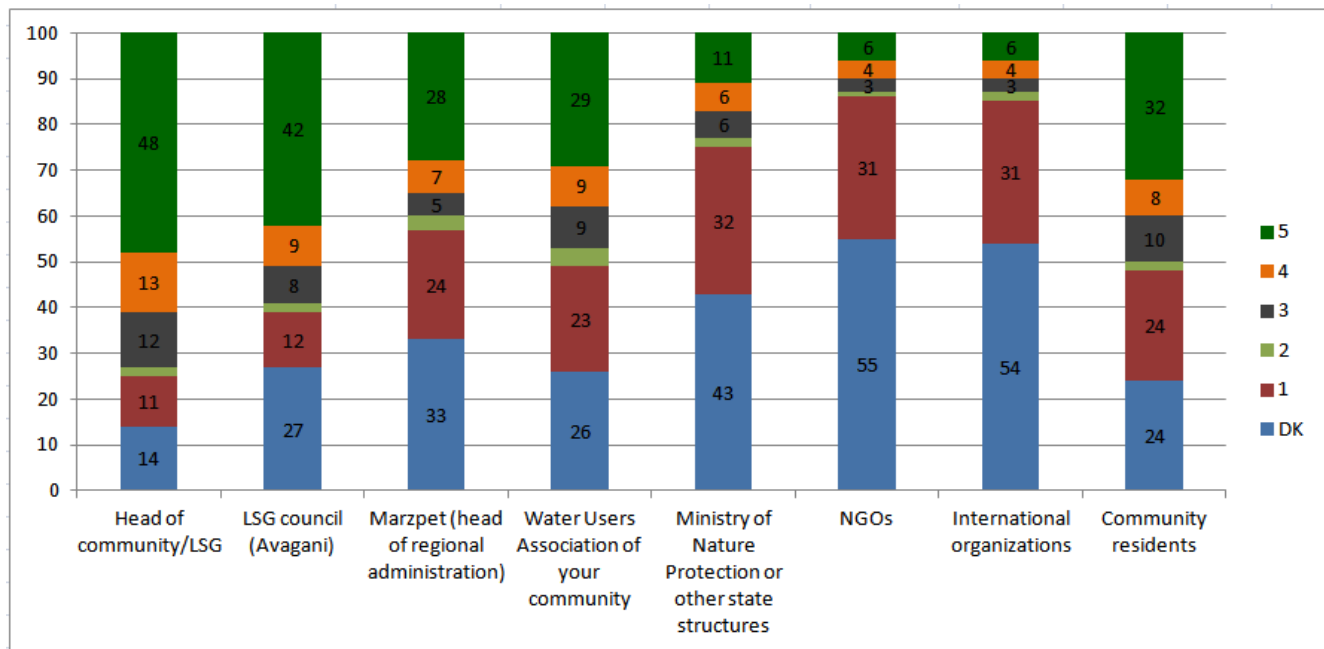
The quantity of available water is not enough for the needs of my HH or our community.	26%
The price of irrigation water is high.	16%
We do not get irrigation water.	13%
There is no adequate control over the irrigation water use.	10%
The quality of water is low; it is polluted.	9%
Irrigation water is not fairly distributed among farmers.	8%
The excessive use of artesian waters can end up with an ecological disaster.	6%
Water losses are high.	3%
Water User Associations do not operate effectively.	3%
Drip irrigation systems are not affordable for our HH.	1%
There is less water in summer which is not enough	1%
There are no issues.	29%

26 percent of HHs complained that the quantity of irrigation water was not enough for the needs of their HH or their community, 16 percent mentioned that the price they pay for water is high; 13 percent mentioned that they did not get irrigation water, 10 percent mentioned that there was no adequate control over the irrigation water use, etc. Only 29 percent of respondents mentioned that there were no issues with their irrigation water.

The respondents were also asked to assess (using the scale of 1 to 5, where '1' means 'Not effective at all' and '5' – 'Very effective') the effectiveness of various bodies/organizations in terms of solving the water related issues in their community. The chart below illustrates the responses received from HHs on those questions.



Chart 1. Effectiveness of various bodies/organizations in solving water related issues

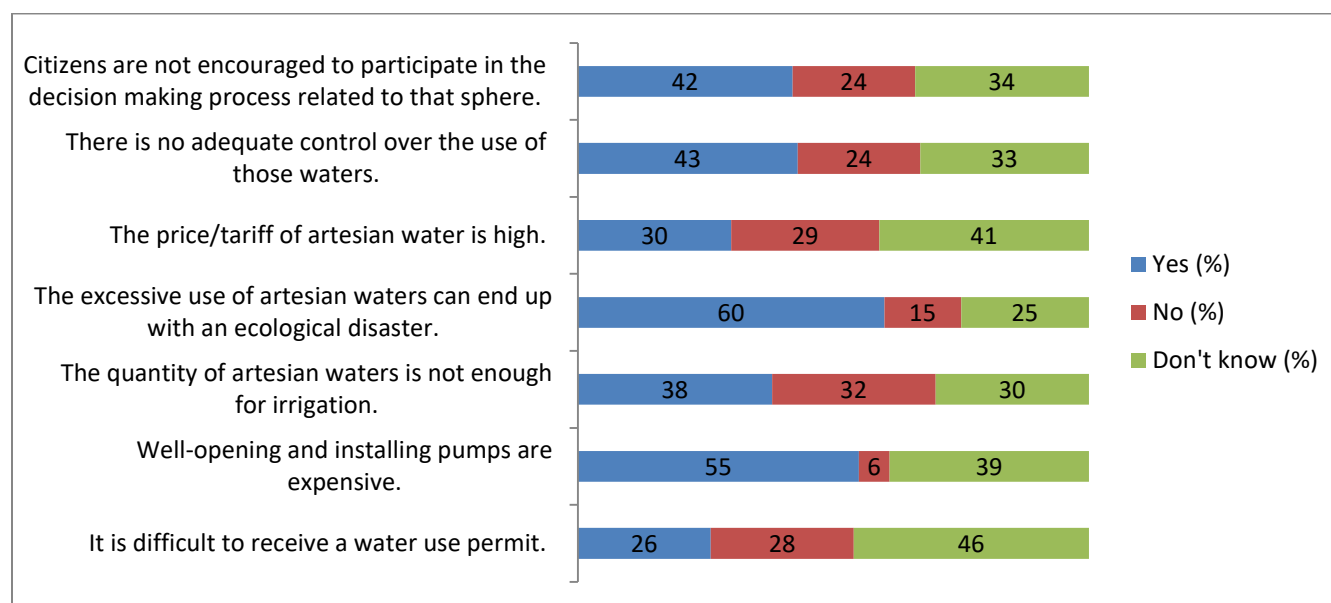


61 percent of respondents believe that the head of their community is capable of solving issues related to water supply (irrigation and drinking water) in their community. The Local Self-Governance (LSG) council (“Avagani”) is also believed to have adequate control over the water resources in the community (trusted by 51% of HHs). Community residents are believed to have the third place (40%) in terms of their ability to solve water related issues in the community. 38 percent of local residents believe that Water User Associations are effective in terms of solving water (irrigation) related issues in the community, followed by the head of regional/marz administration or Marzpet (35%). The community residents do not trust that the RoA Ministry of Nature Protection or other state structures, NGOs, or International organizations are able to (or effective in) solving water related issues in their community.

As shown in the *Chart 2* below, 42 percent of respondents believe that citizens are not encouraged to participate in the decision making process related to artesian water use in Ararat Valley. 43 percent of surveyed HHs mentioned that there was no adequate control over the use of those water resources; 30 percent believed that the tariff of artesian water is high (41 % - the contrary, low); only 60 percent of population understand that the excessive use of artesian waters can end up with an ecological disaster; 55 percent mentioned that the well-drilling and installing pumps are expensive (39% - the contrary, not expensive); and only 26 percent mentioned that it is difficult to receive a water use permit (46% mentioned – it is not difficult).

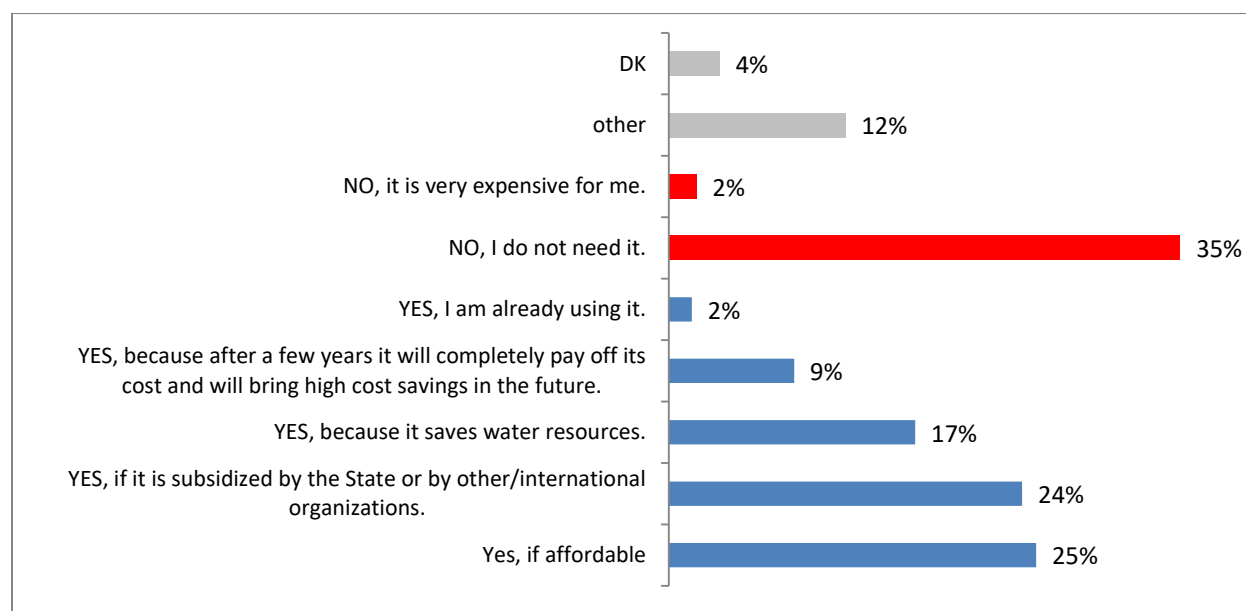


Chart 2. Perceived issues about artesian water use in Ararat Valley



As for using water saving technologies in agriculture, such as drip irrigation system, 37 percent of HHs mentioned that they did not need it (because it is expensive or they do not need it), 2 percent mentioned that they were using it; and the rest mentioned that they would use drip irrigation if it was affordable, because it saves water, and for other reasons (please see the *Chart 3* below).

Chart 3. “Would you consider installing a drip irrigation system in your land plot(s)?”⁶



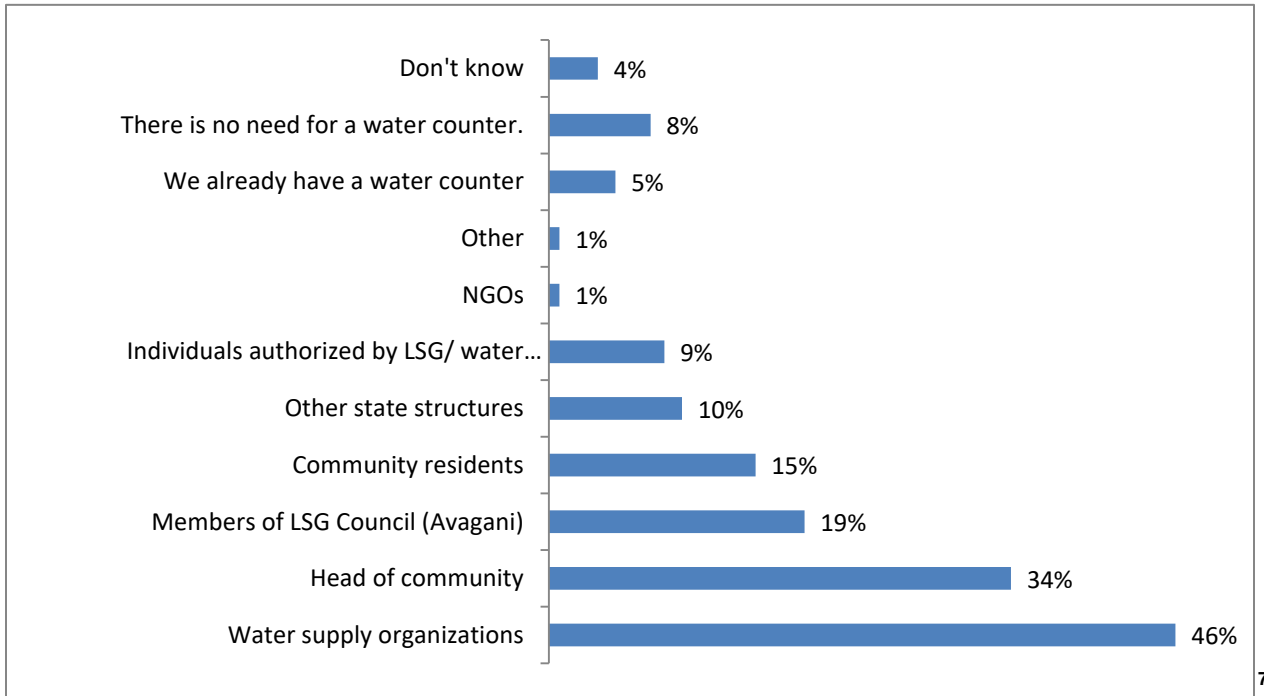
Water meters for drinking water: This survey revealed that 23 percent of residents did not have a water meter for drinking water installed in their house. In response to the question “Who should be

⁶ Please note that the sum of these responses exceeds 100% because respondents selected from 1 to 3 options.



interested and supervise that water meters are installed in the community?” the following answers were received (please see the *Chart 4* below).

Chart 4. “Who should be interested and supervise that water meters are installed in the community?”



Thus, almost half of residents believe that the water supply organization (“Veolia Djur”) should be responsible for installing water meters in HHs/communities where water meters are not installed (yet). It is worth mentioning that the qualitative survey (interviews among experts) revealed that more than half of Armenia’s communities (560 villages encompassing 1/3 of the country’s population) are not served by “Veolia Djur” water supply company, which means that water meters can be absent in many of those communities unless the LSGs take care of those. 34 percent of respondents believe that the Heads of communities should be responsible for installing water meters in their communities.

The respondents were also asked to mention up to three important measures that are necessary to undertake in order to save (effectively use) water resources. The table below illustrates the responses received from the survey participants.

Table 10. “What is necessary for more effective (economical) use of water resources?”

The state should implement control over all water users, regardless of their position/status	35%
Establish 24/7 supervision over the water use system using hot line and Internet portals.	21%
Enhance control and penalties over illegal water use.	21%
Change behavior of citizens related to water use so that they use water more	21%

⁷ Please note that the sum of these responses exceeds 100% because respondents mentioned from 1 to 3 options.



economically, without wasting it.	
Install water meters within fisheries and all other water users.	21%
Use more effective irrigation systems, such as drip irrigation, hydroponics or aquaponics	18%
Restrict extraction and use of ground waters for fisheries.	16%
Involve citizens and civil society in the control over the water use practices.	14%
Implement other water saving technologies in agriculture	7%
Build water reservoirs.	6%
Install water meters in irrigation systems.	5%
Install water meters in HHs.	4%
Increase the tariff for water used in fisheries.	4%
Restrict extraction and use of ground waters for irrigation purposes.	1%
Other	11%
Don't know (DK)	11%

The most frequent solutions that people gave on saving water resources include enhanced control over water users by the state, permanent supervision via hot line and Internet, increased penalties over illegal water use, installing water meters within fisheries and all other water users, changing behavior of citizens to use water more economically, etc.

65 percent of respondents think that the State should enhance control over fisheries in Ararat Valley in order to prevent illegal use and/or waste of artesian waters. However, much less people believe that HHs and other industrial users (other than fisheries, with about 10% of total water consumption as per National Statistical Service data) should be controlled for water use by the State.

Table 11. “Would you agree with the statement that the State should enhance control over the following water users in Ararat Valley in order to prevent waste of artesian waters that can end up with an ecological disaster?”

Water users	Yes	No	DK
Fisheries	65%	14%	21%
Industrial water users	40%	23%	37%
HHs (drinking and irrigation water use)	26%	48%	25%

1.5 Civil activity, participation in decision making and monitoring activities related to water resources

Ability of LSGs to solve water related issues: 24 percent of surveyed HHs (92/385) mentioned that they have had problems related to drinking or irrigation water in the past 12 months (mostly, cut of water supply). 37 percent of those (i.e. 34 of 92 HHs) mentioned that they did not raise those issues in front of their LSG, and 63 percent raised those issues (49 percent of all raised verbally, 5 percent raised in a written way, 7 percent - both verbally and in a written way, 1 percent – through LSG website, and another 1 percent – through mass media). Men tend to raise such issues more often than women (67% vs. 60%), and those in age group 26-45 tend to raise water related issues less often (44-52%) than others. This is particularly due to the fact that a large share of residents does not believe that

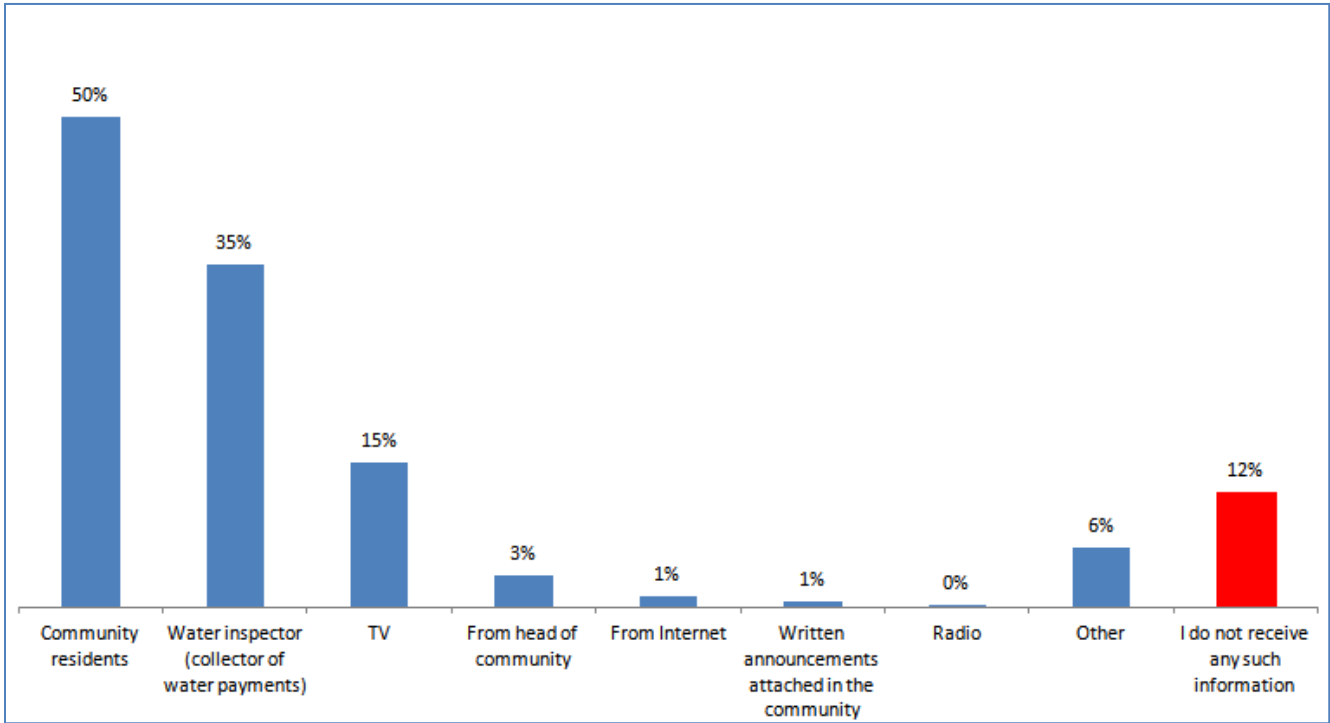


LSGs are able to solve water related issues in their community (which is true for those communities that are served by Veolia Djur).

Fifty percent of those who raised issues in front of their LSG (28/56) mentioned that their problem was not solved, 11 percent mentioned that the problem was still under the discussion, and only 39 percent mentioned that their water related problem was solved by the LSG.

Sources of information on the activities implemented in the water sector: As shown in the chart below⁸, 50 percent of residents receive information on the activities implemented in the water sector of their community and relevant issues from other residents of the community; 35 percent of residents receive such information from the community water inspector (collector of water payments), 15 percent – from TV, 3 percent – from the head of their community, 1 percent – from the internet, 1 percent – from written announcements attached in the community, 0.3 percent – from radio, 6 percent – from other sources, and 12 percent said that they do not receive such information at all.

Chart 5. Sources of information on water related activities implemented in the community.



This survey showed that most of local residents in Ararat Valley (96% and more) are not actively involved in water resource management processes, nor they have received such information/trainings. As shown in the *Table 12* below, only four percent of respondents (n=16) mentioned that they had ever participated in a training or discussion related to water resource management, water use, water quality/ access, or basin planning, and only 1.2 percent (n=5) has received information (through brochures, TV programs, media articles) about water resource management or effective use of water resources.

⁸ Please note that the sum of these responses exceeds 100% because respondents mentioned 1 -2 sources.



The level of participation in such trainings is slightly higher among men (5.6% vs. 3.1% among women), and among citizens in the upper and middle ages (7% among age group 46-55, and 11.5% among 66-75 age group, vs. 0% in 18-25, 1.6% in 36-45, and 4.2% in 26-35 age groups).

No one mentioned that they have ever participated in a regulatory action, decision making, or development of policies/strategies related to water resources, as well as in public hearings related to providing water use permits, or in a monitoring activity in the sphere of water resource management.

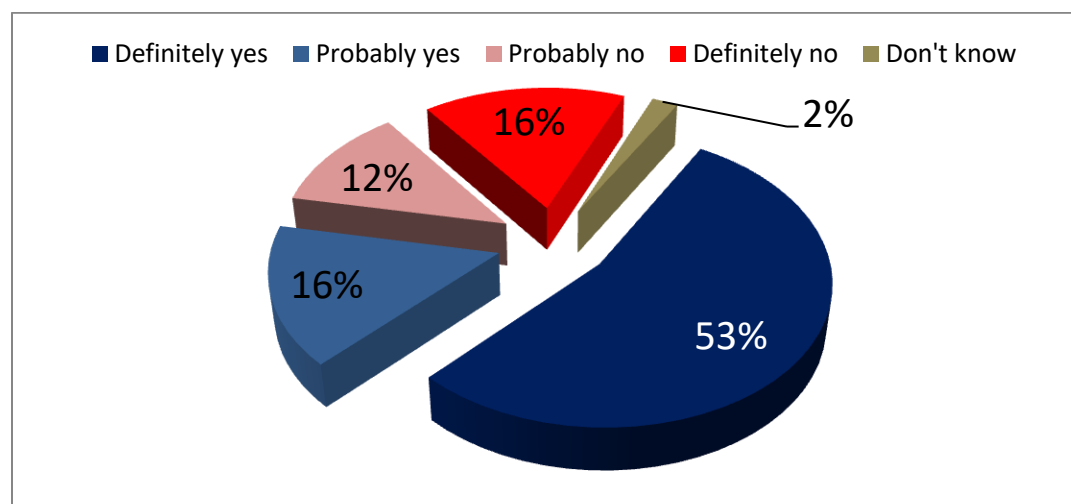
Table 12. Citizens' knowledge of and participation in water resource management, water use, water quality/ access, or basin planning.

	Yes	No	DK
1. Have you ever participated in a training or discussion related to water resource management, water use, water quality/ access, or basin planning?	16	367	2
2. Have you ever participated in a regulatory action, decision making, or development of policies/strategies related to water resources?	0	384	1
3. Have you ever participated in a monitoring activity in the sphere of water resource management?	0	383	2
4. Have you ever participated in public hearings related to providing water use permits?	0	383	2
5. Have you received any information (through brochures, TV programs, media articles) about water resource management or effective use of water resources?	5	378	2

The vast majority of residents (69%) mentioned that they would participate in discussions in their community related to drinking or irrigation water if such discussions are held by the bodies responsible for water sector. Men are more active in this (due to cultural norms): 80% of men answered positively to this question versus 61% result among women. And, similar to the previous question, people of middle and upper ages are more willing to participate in such meetings than those aged 45 and younger (72-77% vs. 60-68%).



Chart 6. Question “Will you participate in water related discussions?”



Thus, given the big ecological and social issues related to water in Ararat Valley, it is obvious that there is a need for implementing public education sessions to increase awareness of residents on water resource management, effective use of water resources, water quality/ access, and basin planning. The citizens should be encouraged and empowered (through relevant laws/regulations) to actively participate in public hearings related to providing water use permits, in monitoring activities in the sphere of water resource management, and in regulatory actions, decision making, and in development of policies/strategies related to water resources.

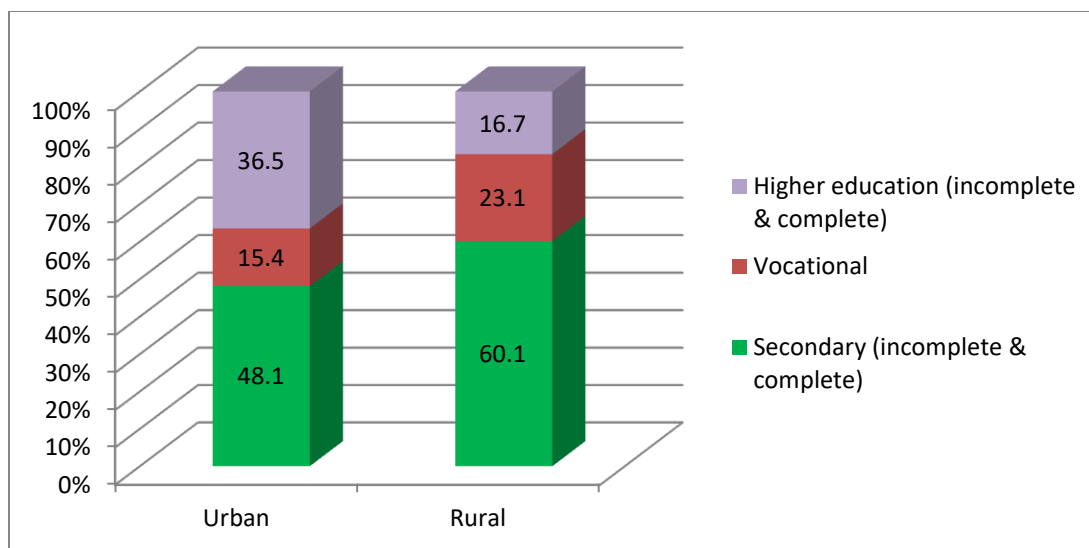
1.6 Socioeconomic status and demographic profile of households

Household size: The average number of persons living in surveyed households ranged from 1 to 12 people, with the average of 4.6 persons per HH (4.7 in rural and 4.2 in urban settlements). The average number of adult males in households was 1.6; and the average number of adult females –1.8.

Education and IT skills: As shown in the *Chart 7* below, 57 percent of surveyed adult respondents had complete or incomplete secondary education (60% in rural and 48% in urban settings), 21 percent had received vocational training (23% in rural and 15% in urban settings), and only 22 percent had complete or incomplete higher education (16.7% in rural and 36.5% in urban settlements).

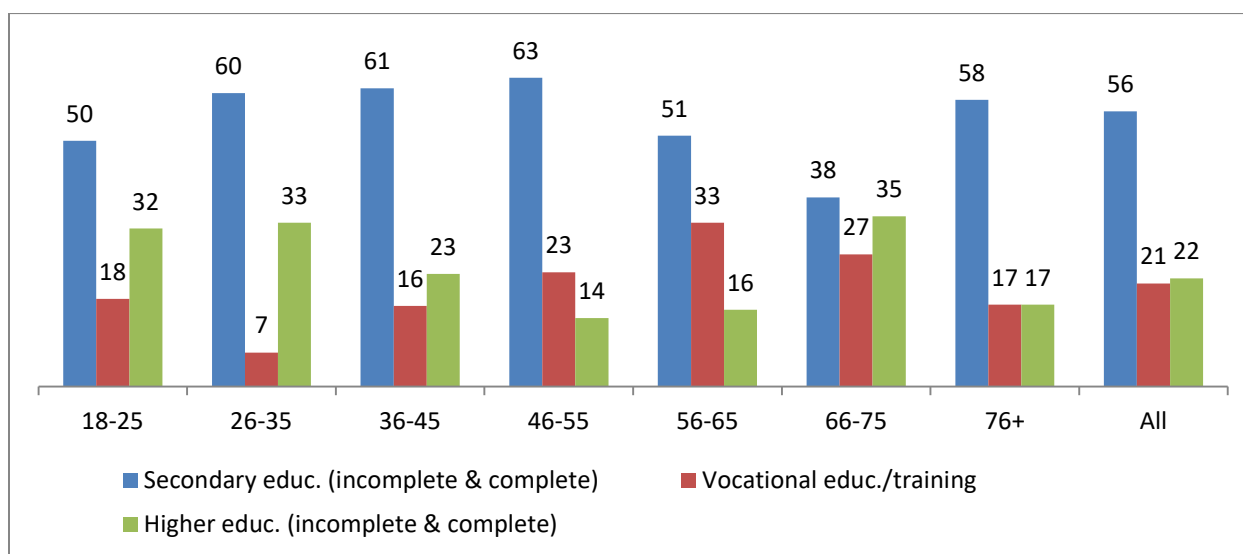
Chart 7. Respondents' education (% of all)





As shown in the *Chart 8* below, 32% of youth aged 18-25, 33% of people aged 26-35, and 35% of people aged 66-75 have higher education while in other age groups these rates are lower (the lowest share is among the age group 46-55, which is 14%). On the other hand, more people of middle ages have received vocational training. This is the generation of people that received such a training to work within the economy in the Soviet system. From the gender perspective, there are no major differences between males and females related to the educational level.

Chart 8. Respondents' education (% within age groups)



IT skills of respondents in the Ararat Valley also have a similar picture: 67 percent of adults in rural settlements and 49 percent of adults in urban settings have absolutely no (zero) skills **to write an email**. Youth aged 18-25 have 4-5 times higher rate of IT literacy than middle and upper age groups. While 100% of those aged 76 and above, 92% of people aged 66-75, 76% of people aged 56-65, 78% of people aged 46-55 have no skills to write an email, this share is only 18% among youth aged 18-25 and 35% in age group 26-35 (thus, the higher the age, the higher the IT illiteracy).

Residents' ability **to explore the Internet**, including the ability to search for some information also correlates with the type of settlement and age: 49 percent of adults in rural settlements and 37 percent of adults in urban settings have absolutely no (zero) skills to explore the Internet, including the ability to search for some information. Internet illiteracy among youth aged 18-25 is 10 times lower than among elderly people: 7% in 18-25, 17% in 26-35, 23% in 36-45, 59% in 46-55, 66% in 56-65, and 77% in 66-75 age groups, and 100% among elderly people aged 76+.

Residents' ability **to use smart phone applications** is also correlated with the type of settlement and age (no correlation with gender though): 59 percent of adults in rural settlements and 51 percent of adults in urban settings have no (zero) skills to use smart phone applications. While only 21% of youth aged 18-25 and 22% of those aged 26-35 are not familiar with various smart phone applications, these rates drastically increase with age: 36% of those in age 36-45, 73% in 46-55, 79% in 56-65, and 92% in age group 66-75 have no (0) skills to use smart phone applications.

No major differences in these skills were observed from the gender perspective.

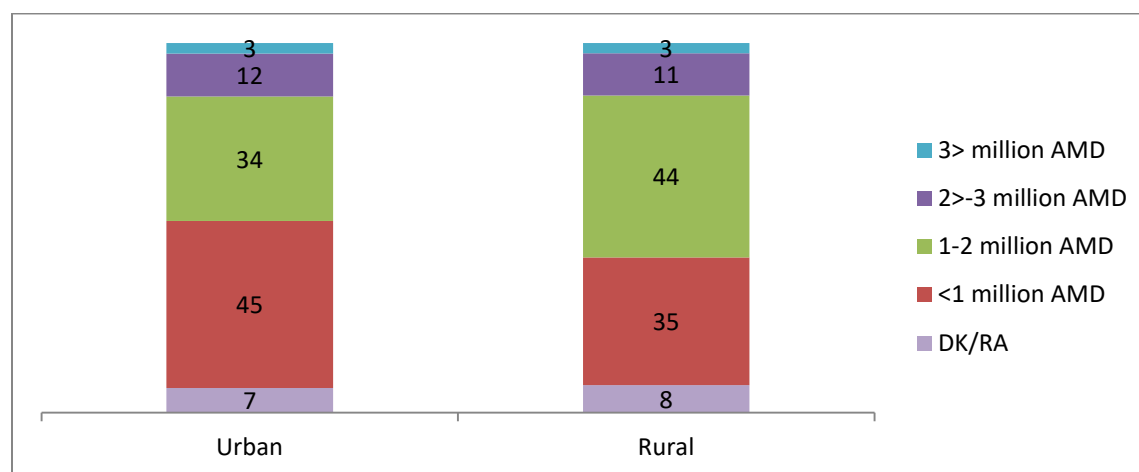
Employment status: In response to the question "Which of the following better describes your employment status?" 44 percent of surveyed adults in urban settlements mentioned that they did not work, 29 percent mentioned that they work, 12 percent mentioned that they were self-employed, 14 percent were family members working with no pay, and 1 percent were members of a production/consumer co-operative. In rural settlements, 27 percent mentioned that they did not work, 42 percent were self-employed in agriculture and 5 percent in other spheres, 6.5 percent were family members working with no pay, 1 percent were employers (owner of a business who permanently hire staff), and only 18 percent mentioned that they work.

Economic situation of households: 49 percent of urban and 42 percent of rural residents mentioned that their income was enough for buying food and clothes, but it is not enough for buying expensive durables like a refrigerator or a washing machine (most of them take loans to buy such HH items). 21 percent of urban and 31 percent of rural HHs mentioned that they could only afford to buy food, and 11 percent of urban and 14 percent of rural HHs mentioned that they did not have money even to buy enough food for their households.

In surveyed rural settings 35 percent of HHs reported that their annual household income was less than AMD 1 million (i.e. <\$2070/year) and 44 percent – AMD 1-2 million, while in urban settlements these figures are 45 percent and 34 percent respectively, which shows that urban residents in Ararat Valley live in worse economic conditions than those in rural settings, who make for living through agriculture. This can be attributed to lack of jobs in the region, or low income in agriculture. We should also note that such questions (about income or economic well being of HHs) are sensitive, and many HHs tend to deliberately under-report relevant figures.



Chart 9. Annual income of HHs (% of all)



It is also worth noting that there is a positive correlation between HH income and access to irrigation water: 51% of HHs with the reported annual income of below AMD 1 million, 60% of HHs with the annual income of AMD 1-2 million, and 76% of HHs with the annual income of higher than AMD 2 million have mentioned that they always or mainly have enough quantity of irrigation water. Thus, the better the access to irrigation water is, the higher income HHs get.

1.7 Summary of main findings

The current survey among urban and rural residents in Ararat Valley revealed the following:

- ✓ Although 88 percent of urban and 85 percent of rural HHs get drinking water from the house tap, almost half of them are not satisfied of the quality of drinking water they receive in their HH.
- ✓ In addition to unacceptable quality of drinking water, most of settlements in Ararat Valley do not have permanent (24 hours per day) supply of drinking water. There are many settlements that receive water supply once in two days, or a few hours per day. Although many HHs seem to be satisfied of interrupted supply of drinking water, it is worth to mention that the interruptions of water supply increase the risks for water contamination due to negative pressure in the decayed pipes.
- ✓ While there are seasonal and geographic variations, on average, 41 ($\pm 5\%$) percent of farmers in the Ararat Valley often face problems with getting water for irrigation in time (especially in the summer). Residents mostly explain the water access issues with the scarcity of water in the region.
- ✓ There is no proper management and control of water use (both for drinking water and for irrigation water or artesian water used by fisheries) in Ararat Valley:
 - A large portion of HHs in the Ararat Valley (about 23%) do not have drinking water meters;
 - Payment for irrigation water are handed to WUAs and are not closely supervised by state or other bodies, creating high risks for corruption and unfair distribution of water resources to local residents. WUAs are often not able to provide water to farmers when they need it, especially in summer. And the cost of irrigation water is very expensive for



- many farmers. Thus, 59 percent expressed dissatisfaction with WUAs' activities in their community;
- 35 percent of HHs believe that the state should implement control over all water users, regardless of their position/status;
 - 21 percent believe that there must be enhanced control and penalties over illegal water use; and
 - 65 percent believe that the State should enhance control over the fisheries;
- ✓ 70 percent of HHs are either not familiar with water users' rights and responsibilities, or they do not have such an agreement for water supply.
 - ✓ Only 38 percent of population understand that the quantity of artesian waters is not enough for irrigation and only 60 percent understand that the excessive use of artesian waters can end up with an ecological disaster;
 - ✓ Only 2 percent of HHs are using water saving technologies such as drip irrigation. 37 percent do not want to have it, and the rest would have it if affordable/subsidized/etc.
 - ✓ The survey showed that television, radio and internet have a much smaller share as sources of information on water related problems as compared to the information received from community residents or water inspector;
 - ✓ This survey also showed that most of local residents in Ararat Valley are not actively involved in water resource management processes, nor do they have received such information/trainings.

1.8 Recommendations

1. Considering the broad (40-45% of HHs) dissatisfaction of the population related to the quality of drinking water in Ararat Valley, it is suggested that the State Committee of Water Economy (SCWE) of the Ministry of Energy Infrastructures and Natural Resources of RoA consider providing alternative sources of drinking water to the population living in the areas of Ararat Valley where the quality of artesian water has decreased. On 14.06.2017, during the interview with the survey's Lead Social Scientist, the Deputy director of SCWE mentioned that there is a possibility for providing high quality drinking water (about 1000 liters/sec) to the population in Ararat Valley from Gyumri (Ghazanchi source); however, its construction will cost about 35-40 million USD, for which funding sources are not identified yet.
2. The State Health Inspectorate of the Ministry of Health of RoA should implement regular (monthly) checkups of the quality of drinking water provided to the population in all settlements of the country.
3. Water losses in the drinking water supply system are extremely high in Armenia (70-80%). While part of it is considered as "technical losses", many people who do not have water meters and/or do not pay for water, use it illegally, and even water their land plots using drinking water. The fishing industry is the number one consumer of artesian water in the Ararat Valley and the state authorities have not been able yet to fully control water use levels and assure their compliance with Water Use Permit (WUP) conditions. Considering the fact that many of those large illegal water users are high ranking officials/oligarchs, it is extremely important to empower the Ministry of Nature Protection (creating task forces with the Police) to implement mandatory checkups among all major water users to identify possible absence of or incompliance with WUPs.



4. The institute of WUAs should be reviewed: a) their directors' elections should be more transparent and competitive, b) cash payments for irrigation water should be totally excluded to avoid misuse of funds by WUAs, c) there must be a smart and transparent system for distributing water to farmers – online systems should be explored and used to make a more effective distribution of water to residents – based on their electronic requests, d) the water tariffs for irrigation water and the principles for estimation of the volume of water used by individual farmers should be revised; water meters should be used to calculate (not estimate) the volume of water provided during each irrigation, and the tariffs should be revised to be more affordable, thus, lowering the cost of agricultural production and increasing the competitiveness of Armenian fruits and vegetables in the international market;
5. Awareness of residents on the rights and responsibilities of water users should be increased so they can protect their rights when dealing with WUAs, water supply agencies like Veolia, and the LSGs;
6. The State should promote capital investments in building systems for secondary use of water (from fisheries to agriculture), as piloted by UNDP GEF SGP and USAID ASPIRED in the village of Hayanist;
7. Water saving technologies such as drip irrigation, aquaponics, and hydroponics should be subsidized (by the State or donor organizations) and made available for farmers. Farmers should receive corresponding trainings and instructions, as well as technical assistance in building such systems, and finally
8. Considering the low awareness of the population on water related issues and low level of their participation in decision making processes, it is important that the local residents get trained, promoted and empowered to participate in decision making processes related to water resources management.

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1. Toward integrated water resources management in Armenia, World Bank, 2015
2. Assessment study of groundwater resources of the Ararat Valley, USAID Clean Energy and Water Program, Final Report, 2014

Part 2. Results of In-Depth Interviews Conducted Among Stakeholders and Experts in the Water Sector

To complement the results of the quantitative study (household survey) and to receive deeper information on the questions asked in the baseline survey relating to water usage practices and resource management policies, a number of in-depth interviews were conducted among experts and stakeholders in the water sector (representing the Government of Armenia, international/bilateral donor organizations, civil society, media, research/consulting firms, and the private sector). The full list of



interviewees is presented in Annex 1. The interviews were conducted between June 12th and June 22nd, 2017.

The interviewees were selected based on the recommendations of various experts representing the Country Water Partnership scientific, ecological NGO (CWP), the Environmental Law Research Center (ELRC) at Yerevan State University (YSU), the USAID ASPIRED project staff, and other experts. The in-depth interview guide was drafted by the Lead Social Scientist, and was finalized based on the review and discussions with the experts mentioned above. The guide contained questions on water utilization, quality and availability of drinking and irrigation water resources, water resources management and relevant policies, as well as information on the projects/activities implemented by the relevant organizations and the level of their influence on water related policies. The guide also contained instructions for the interviewer and question probes. Although the interviewees were informed about confidentiality of responses provided by them, however, half of them refused using an audio recorder during the interviews, and the interviewer had to take only written notes on their responses. It is also worth noting that not all questions were applicable to all interviewees, and not all interviewees were comfortable/informed to answer to all the questions, thus, the number of answers to some questions (i.e. number of bullet points below) is relatively lower.

2.1 Executive summary

Almost all interviewed experts and stakeholders in the water sector (even State officials) agreed that water resources management in Armenia (particularly in the Ararat Valley) is not effectively implemented. While the overuse of the country's water resources is explained by the economic crisis (water is over-used to produce electricity when the country faces energy crisis, as Armenia does not have adequate number of power stations that use alternative energy sources), seasonal rain/snow water scarcities, and by the need to boost the economy (through production and export of fish, and creation of relevant jobs), it is worth noting that both the water resources of Lake Sevan and of the Ararat Valley artesian basin should not be overused (more than the actual recovery capacities are) as the damage caused to the nature can be unrecoverable (while the volume of water can be recovered after several years, its chemical composition cannot recover in the same/short period). Within this study, the issues related to the Ararat Valley's artesian water basin were explored not from the scientific perspective, but as perceived by the experts, key stakeholders, and the population of the region. The experts and most of stakeholders agreed that there has been an overuse of Ararat Valley artesian water basin in the past 15-20 years, and that the level of artesian water and water pressure provided to the population in Ararat Valley (from groundwater sources) has significantly decreased in many locations, the soil quality has also decreased, affecting the agriculture and the income of population in Ararat and Armavir marzes. While the experts and stakeholders understand that the overuse of the Ararat Valley's artesian water resources is mainly a result of improper control by the State authorities (Ministry of Nature Protection), ordinary citizens and other structures (international/bilateral, private, civil society, etc.) have not been active in or able to fight against those issues, with the exception of some media (Hetq.am) and civil society organizations ("Armenian Environmental Front" civil initiative, Ecolur NGO, etc.). While the latter are active in raising those issues to the public and to the State authorities, their voices are not always/adequately heard, and often economic interests of the country (or of some/private interest groups, mostly associated with the State authorities) seem to prevail over the ecology.



The measures that are necessary to implement in order to prevent further damage to the country's water resources (including those of Ararat Valley artesian basin) include the following:

- Strengthening the control by the State over all major water users, including fisheries, mandating them to install online water meters (SCADA) in order to make sure that they extract water as per WUP norms;
- Involving civil society into the mentioned oversight/monitoring activities – to ensure more transparent and effective control in this sphere;
- Studying the reasons for significant losses (both in drinking water supply and in irrigation systems) by impartial (third party) organizations, such as the UN or bilateral/donor organizations, and putting measures (including involvement of civil society) to identify and significantly reduce those losses;
- Verifying the physical state and capacities of all wells against corresponding WUPs, and conserving the illegal ones – with the involvement of state and civil society organizations;
- Renovating the irrigation canals and the drainage system close to fisheries in the Ararat Valley;
- Establishing a more effective system for providing irrigation water to farmers – a system that works online, transparently, and where tariffs for water are established with the principle that the payments received from farmers cover the cost of maintenance of this system, and which does not provide profit to WUAs or relevant individuals;
- Constructing dams and shifting to gravity irrigation system to save rainfall/snowfall water and energy costs;
- Promoting and subsidizing the use of water saving technologies in agriculture and in fishing industry;
- The donor agencies should introduce covenants into their loan agreements for the country to implement the required legislative reforms and establish better control mechanisms over the water use before being eligible to receive those loans;
- International best practice in water resource management should be studied and replicated in the country to the extent possible.

The next chapter contains the list of key responses provided by interviewees to the questions asked during the interviews.

2.2 Summary of responses provided to the interview questions

- a. ***Question: How would you assess the effectiveness of water resources management in Ararat Valley, and in Armenia in general?***

Answers provided by interviewees:

- ✓ Less than effective, with excessive water abstraction, very badly affecting the water table and salinization of the soil.
- ✓ The legislation/laws are well developed, but their implementation is poor – sub-legislative acts are not adequate.
- ✓ Supervision/control mechanisms are not functioning properly. Water inspections have not been conducted by WRMA since 2015.
- ✓ There is lack of political will to implement effective management of water resources.



- ✓ There is high staff turnover and lack of skilled staff within Water Resources Management Agency due to low staff salaries.
- ✓ Water resources management is highly centralized. Although Basin Management Organizations (BMOs) were created by the Ministry of Nature Protection (MNP), the BMOs were not authorized/ supported to act independently. BMOs were supposed to provide water use permits (WUPs) in the regions/ marzes, but they are just collecting and transporting relevant documents to Yerevan. It is due to their weak professional capacities, and willingness of MNP WRMA to centralize WUP issuance processes.
- ✓ There is a big shadow economy within the fishing industry in Ararat Valley. It is in the hands of influential political figures (financial oligarchy).
- ✓ Although many fisheries are closing now, but the groundwater continues to outflow from the open wells as many wells have not been conserved.
- ✓ In terms of social and ecological impact, water resources are poorly managed in Armenia. The GoA does not involve all relevant bodies in decision making processes related to WRM.
- ✓ Public hearings are not always held (especially when decisions are made related to the status of land plots); voices of communities are not considered;
- ✓ There are contradictions in legislature related to water;
- ✓ WUAs are problematic and they function within high corruption risks;
- ✓ The conclusion of ecological expertise is not accepted as an administrative act by the court;
- ✓ The water supply company “Veolia Djur” functions within anti-competitive settings: it does not properly implement drainage which affects the sanitary situation in many communities. Pollution of land and water resources is becoming a broad issue. There are 30,000 sq. meters of saline soils due to bad drainage system;
- ✓ Water resources are very poorly managed: while Garni village has huge water resources which are transported to many parts of the country, the residents of Garni get drinking water only for two hours per day.
- ✓ “Hetq” daily has discovered that a high ranking central government official had been watering his huge land plots (about 100 ha) using drinking water main pipeline that transports water from Garni to Yerevan.
- ✓ Water resources management in Ararat Valley is not implemented properly, however, the activities that are currently implemented (as per current government’s water strategy) will result in improvement of it, in economical use of water, proper counting of water use; banning of new well openings, and restriction of water use permits provision;
- ✓ A state/national mentality should prevail while making decisions on water resources. The government should better collaborate with donor agencies, make co-payments when/where necessary, and follow its promises.
- ✓ Natural resources are exploited in Armenia for the sake of enrichment of some people. There is no proper management of natural, including water, resources. The relevant laws are not followed. I am familiar with water basin management plans, but I don’t think that those can be implemented. The donors should re-consider what they are funding and why. The funding approaches should be revised to become targeted and result oriented.
- ✓ Water resources are effectively managed in our region (Ararat). We have individual water distributors (мелиоратор) who are making a schedule of irrigation water requests, and providing water to residents within three days of receiving requests. The payments are



exceptionally done through post offices, several times per year. There are residents who have debts for several years; however, we (WUA) continue providing water to them as well. I think 90 percent of our residents are satisfied of irrigation water in the region we serve.

- ✓ Effective management of water resources can be possible if all water users use relevant equipment to measure/report the water quantities used by them.
- ✓ Water resource management has not been effective in Armenia. In 2014 the MNP cancelled many WUPs and it sealed many illegal wells, however, instead of saving water, the level of groundwater use increased by 20 percent. This was due to involvement of local BMOs who authorized fish producers to re-open the sealed wells (against bribes). In addition, in 2014 the Government allowed illegal water users to get water use permits (i.e. to get legalized) by May 2014, and those who did not get those permits, were mandated to be liquidated or conserved. The BMOs profited also in that period, by issuing/selling water permits putting earlier dates on those WUPs. Third, the Government attempted to install mechanical water meters in fisheries in 2012 (produced locally), however, these water meters soon got out of order due to absence of water filters and maintenance/renovation of those. As a result, many fisheries restarted to use/extract water with no water meters. Currently, automated (online) water meters are installed in 20 fisheries within a pilot project (provided free of charge), however, the rest of fisheries will be obliged to buy such water meters. 2) All fisheries have been also mandated to install and use semi-circulated water use technologies with a deadline of 1 year and 8 months from now. 3) There is a decision to increase water tariffs from 0.5 AMD to 1 AMD per cubic meter of water. All of these will increase the financial burden on fisheries, mandating many of those to be closed or consolidated.
- ✓ Water resources management is poor in Ararat Valley, and poor-to-moderate in the rest of Armenia.
- ✓ Efficiency of water resources (surface, underground) management in Ararat Valley is low, though in recent years international projects are implemented and the government makes relevant efforts. As a result of inefficient water resource management, a number of serious issues have emerged in Ararat Valley, which can be classified as follows:
 - Inadequate organization and control of water use, as a result of which a number of communities do not have enough drinking and irrigation water. Moreover, in some communities there is no water supply at all, and in some places there are unused self-propelled wells;
 - There are 40-70% water losses in the country's irrigation system and 70-80% - in drinking water system. This is due to poor conditions of pipelines and water logging. It should also be noted that a number of large water users do not pay for water, which increases financial burden on the small/community water users (the amount generated from water expenditure is divided and attributed to smaller water users), and these are considered as large amounts of water discharges/losses.
 - Lack of proper drainage systems as a result of which community sewage, retreating waters from fisheries, and other types of wastewater do not remain in the pool (even in dirty condition), and it flows into the neighboring Turkey. As a result, the water balance of Ararat Valley water basin is affected.
 - There is a lack of water quality control and pollution control, as well as relevant preventive measures, as a result of which the quality of Ararat Valley water significantly



reduces. Surface waters are polluted by sewage dumps or solid waste, and, as a result of decreasing Ararat Valley artesian basin level, some drinking water sources have changed their quality and become unusable for drinking purposes.

- There are high tariffs for drinking and irrigation water, and different water payment systems are used in different communities.
- There is incorrect servicing/maintenance of the existing drainage systems;
- Improper water management also affects the other sectors such as agriculture, hydropower, etc.

b. Question: *How is it possible to have a more effective management of water resources (groundwater and surface) in the Ararat Valley artesian basin which would satisfy the needs of all water users without endangering water ecosystems?*

Answers provided by interviewees:

- ✓ We (ADB) are developing a water project that is aiming at closing as many wells as possible in the Ararat and Armavir marzes, by switching the sources of water from the well fields to sources in the Kotayk and Aragatsotn marzes. This will reduce energy consumption and increase the water table level, also a SCADA system linked to the water well, will allow for a better management of existing wells;
- ✓ Management functions should be differentiated/specified among various state administration bodies;
- ✓ The tariffs for groundwater should be increased to reduce groundwater extraction;
- ✓ Many wells should be liquidated/conserved;
- ✓ Armenia is not and should not become a fish producing/exporting country as we do not have adequate water resources. Thus, we should not allow growth of fishing industry and relevant exports. If we start selling our drinking water to Iran, we can make much higher profits.
- ✓ Armenia can make much bigger profits by selling drinking water abroad.
- ✓ The monitoring function of the state water resources management bodies should be strengthened.
- ✓ The policy makers should be concerned about sustainable development;
- ✓ Sub-legislative acts on water issues should be implemented and imposed;
- ✓ State bodies should take higher responsibilities for their actions: they often function without bearing responsibility over their actions/decisions; and nobody brings them to responsibility or sues them;
- ✓ Water circulation system should be assured in Ararat Valley – water extracted for fisheries is wasted (it goes to Turkey);
- ✓ Provision of WUPs (for extraction of artesian water) should be restricted and better regulated;
- ✓ WUAs should develop and follow a certain schedule to provide irrigation water to users;
- ✓ There must be a transparent (online) system where irrigation water users (farmers) could submit written requests to WUAs to get water;



- ✓ WUAs should be prohibited to take cash for providing water to residents (such payments should be done only via bank transfers) – to avoid corruption. SCWE representatives informed that there is a decision that irrigation payments should be done to WUAs only through bank transfers, however, some people still continue paying cash to WUAs.
- ✓ There must be a hotline service to raise concerns about WUAs in front of the Water committee, and the work of WUAs should be monitored and assessed by relevant agencies;
- ✓ There must be a correct, scientific approach to water issues;
- ✓ Economical use of water is important;
- ✓ Water supply companies (Veolia, etc.) should take higher responsibilities for providing quality services to the population;
- ✓ Citizens should know their rights and responsibilities regarding water use and they should demand WUAs and water supply companies to get quality services;
- ✓ A proper culture should be in place for water use. Effective policies need to be implemented in this sphere; effective management; the rights and responsibilities of water users should be protected; and there must be a state mentality (versus narrow interests).
- ✓ There is an inter-agency working group on water as per RoA Government decree No 42a; as well as an action plan No 413;
- ✓ Honestly, I don't believe that it is possible to restore the water system in Armenia, including the Sevan lake.
- ✓ The Government is responsible for the effective management of water resources (groundwater and surface) in Ararat Valley artesian basin. In 2015 the verifications by the SEI among fisheries were prohibited as per Government decree No 839a (dated July 30, 2015) in order to allow the businesses to develop. However, in early 2017 the MNP restarted verifications as problems emerged related to nature protection and effective use of water resources.
- ✓ In our organization we recommend: 1) using advanced technologies to save water, for instance, re-using discharge waters from fish farms for irrigation in Ararat Valley. A pilot project has been implemented by GEF in Hayanist community in collaboration with USAID ASPIRED and Coca Cola Armenia. This can be replicated in the country if financial resources are available. 2) Drainage systems should be rehabilitated. 3) Water management policies should be revised; 4) feasibility studies should be conducted to assess the baseline situation and plan relevant activities; 5) the banking sector should support (by providing credit/loans) to fisheries to install such systems.
- ✓ As a first step, there is an urgent need to prepare a Water Master Plan to prioritize the competitive water needs from various sectors. And then probably all of the above (mentioned bullet points in the questionnaire).
- ✓ Very often, the water resources management system does not clarify the activities carried out by different bodies, often resulting in disputes and disagreements. It is necessary to clarify the functions of each governing body and to revise the existing water legislation. Without strict oversight of the legislative framework and the clarification of functions and the application of sanctions, I think it will complicate the current situation and make the current water resources management system more confusing. It is



necessary to develop a sequence of steps that will flow from one to another. All the measures listed in this form will result in improved water efficiency, but it is necessary to develop a clear sequence of their performance, otherwise the current management system will become worse, or less effective.

c. **Question: What are the main problems associated with the access to and quality of drinking and irrigation water in Ararat Valley?**

Answers provided by interviewees:

- ✓ Hardness of the water, this will be solved by switching sources.
- ✓ The quality of drinking water cannot be considered as bad/unacceptable just based on its taste. The groundwater in Ararat Valley has been tested and found as acceptable to be used for drinking purposes. However, its taste is much inferior to the quality of mountain water (Garni, etc.) and it is not cool (about +18 degrees Celsius). The quality of drinking artesian water is now worse as the level of artesian water has decreased in Ararat Valley;
- ✓ We do not have proper infrastructure for water supply: the pipes are mostly old, water meters are not broadly available; losses are high (70-80%);
- ✓ There is lack of control over the water resources. There must be oversight by the public at large;
- ✓ There is injustice and inequalities in distribution of irrigation water to the water users. Due to lack of irrigation water, citizens often block main roads in Armavir so that their voices can be heard;
- ✓ Water users are mandated to pay for irrigation water even when they do not get water when they need it;
- ✓ Although the government provides large amounts of subsidies to WUAs, WUAs are not functioning fairly and transparently. They provide water to users based on their political affiliation or power/connections, and they are often engaged in criminal activities. WUAs are making money by selling water to users. Their executive director is elected by water users of a community(-ies). WUAs are managed by an inter-agency council headed by the director of SCWE, however, there are no mechanisms or legal bases to oversee or monitor their activities in a certain area.
- ✓ In Armavir the quality of drinking water is not good; its hardness is high; there are communities (Taronik) that do not have drinking water for 25 years already;
- ✓ Water drainage system is very poor in Armenia;
- ✓ Although many farmers complain about the quality of artesian water used for irrigation, there are no quality standards/norms for irrigation water in Armenia. In many areas wastewater of households (and possibly of industries) is dumped into the irrigation water stream.
- ✓ Very high (80%) losses in drinking water system – due to theft, not paying by some people (especially high ranking officials). Within 10 years of functioning Veolia company has not been able to significantly reduce water losses (it reduced those from 89% to 76% only; it plans to further reduce water losses by 30% by 2032, or by 2% per year), and they are compensating those losses by increasing the tariffs for water paid by ordinary citizens.



- ✓ Groundwater resources in Ararat Valley have decreased due to uncontrolled extraction (without water meters and/or without permits). This creates water scarcity for irrigation, and many farmers are obliged to sell their land plots and leave the country.
- ✓ The RoA Ministry of Nature Protection has been providing water use permits to water users starting from 2002, however, there are many wells that were opened before 2002 for which there are no such permits;
- ✓ The quality of drinking water supply is not consistently monitored. There are many cases when population has been poisoned (through Arzni-Yerevan water pipeline, the case in Nubarashen, etc.) due to the fact that wastewaters of industries are sometimes flown into the drinking water supply system;
- ✓ There is unequal natural distribution of water resources (in various parts of the country) which causes problems with access to water. Second, lack of state funding also contributes to inequalities in water supply to various parts of the country. Currently, there are only company that implements drinking water supply as per 15-year agreement signed with the Government of Armenia in 2017. In the coverage area the official sources estimate 20-23 hours/day of water supply, while in the rest of country water supply duration is unstable, with frequent interruptions, and the quality of water is not controlled and it is often far from the norms;
- ✓ Local communities and LSGs are often against having service of Veolia as the relevant community leaders are making money by selling water to local citizens. On the other hand, Veolia, as a business oriented company, is not interested in expanding the coverage to the rest of the country as there are many small villages spread over the country where per person investment costs (for installing new water pipelines) by several time exceed such costs in highly populated areas, and they estimate much smaller profits if they start providing water to those areas.
- ✓ Fountain artesian territory of Ararat Valley has been squeezed by three times (from 32800 ha to 10700 ha) due to uncontrolled use of artesian water (mostly by fisheries). The groundwater level has decreased by 3-15 meters. As a result, buildings are cracked, people do not get irrigation water, soil quality is affected, and farmers cannot run a productive agriculture. The MNP does not report actual/correct data on the amount of artesian water extracted as many wells belong to influential politicians and oligarchs. The government is not concerned about nature protection; they just think about doing business. They are not implementing monitoring among fisheries; illegal fisheries are not reported or sued. State officials are not honest; many of them own large land plots and fisheries; and they report false data. Locks and water meters are not installed in many wells.
- ✓ In places where there is no 24-hour supply of drinking water, there is a high risk of water contamination: bacteria from sewage or from other contaminated areas may infiltrate into the water supply system (through the decayed pipes) when the water goes away, as there is negative pressure in the system.
- ✓ During the past 10-15 years water resources have been predatorily exploited in Armenia. The Government has committed an ecological crime by selling huge number of WUPs: a much higher volume of artesian water was permitted to be extracted (mostly by fisheries) than the actual capacity of artesian basin in Ararat Valley is. I find that fishing industry should be prohibited in Ararat Valley. The miserable taxes paid by the fishing companies are not comparable with the losses of the nature. It has resulted in degradation, bog and salinization



of the soil; the artesian water basin in Ararat Valley has been squeezed by three times, water resources in different artesian horizons have been mixed, houses are cracked and seismic risks are increased in that area. Many local residents are obliged to sell their houses, land plots and emigrate from the country. We have reported of these crimes 1.5 years ago; the legal authorities have sent this suit to Ararat marz court; however, there is no feedback yet. The relevant officials who were responsible for these crimes have not been judged yet, and they continue managing these spheres. They even dare to participate in meetings with agencies like the USAID to discuss water issues. The issue of Ararat Valley artesian water basin was brought to the government's agenda only when they found that there is not enough water for cooling the reactors of Metsmator Atomic Energy Plant as it has been also using groundwater.

- ✓ In our region (Ararat) the existing irrigation water system is decayed or absent. Through the grant of MCC, 5 km long concrete semi-trench dams were constructed, however, the actual needs are much higher. We have border communities (Paruyr Sevak, Yeraskh) where there is a need to provide 8-10 km long concrete semi-trench dams, which can increase the area of irrigated land by 350-400 hectares.
- ✓ The situation with the ground water is critical; it used to be the main source for drinking water for the population in Ararat Valley;
- ✓ The main problems with the access to drinking and irrigation water include inadequate water supply and huge water losses. These two issues are interconnected and stem from one another. If a proper distribution of available water resources and efficient water management is implemented, perhaps the existing water levels would fully meet the needs of communities in Ararat Valley. As regards the quality of water, the absence of the environmental mentality of the population is among the main problems. Residents do not realize that they should not pollute the natural waters. Another problem is lack of drainage systems, inadequate waste management, disruption of water-chemical regimes of water resources resulting from climate change and human impact.

d. **Question: *How do you think those problems can be solved? Who should be involved in solving the mentioned issues and how?***

Answers provided by interviewees:

- ✓ Fighting corruption is the most important activity that should be implemented to solve water related issues in the country. International organizations should support with this. There must be penalties and strict measures against those who are involved in corruption.
- ✓ To build proper infrastructure for water supply: install new (plastic) pipes and water meters, reduce water losses;
- ✓ In communities where water operators (such as Veolia) are not present, LSGs should be responsible for renovating water supply systems in the community, finding financial resources, installing new pipes and water meters, charging for and controlling water use in their communities;
- ✓ Irrigation water: citizens should know and protect their rights and they should require the representatives of water user associations to provide them with irrigation water fairly, as per established schedule (shared among residents of community);



- ✓ Awareness of citizens on water issues should be increased to preserve water. This can be done by NGOs and civic activists;
- ✓ Proper policies need to be implemented;
- ✓ Investments, such as installation of drip irrigation systems (with the support of international organizations, as the state government does not have enough funds for that);
- ✓ State support for businesses;
- ✓ Strengthen monitoring and control mechanisms, involve NGOs and citizens in this;
- ✓ Decentralization of water resources management;
- ✓ There must be political will to solve water problems;
- ✓ There must be transparency in water sector to solve water problems;
- ✓ Increase professionalism and accountability of state officials;
- ✓ Promote investments in water supply, involving local businesses (such as Grand Candy, Vivacell MTS) and international/bilateral organizations (USAID, World Bank, IFAD, etc.);
- ✓ There must be effective management of water resources to solve relevant problems;
- ✓ State-private partnerships (with Grand Candy, Vivacell MTS, etc.) and involvement of donors/charitable organizations in renovation of water supply system in areas that are out of Veolia coverage could alleviate the financial burden of the government and solve the problems with population access to quality drinking water;
- ✓ SCWE has a potential to transport high quality drinking water from Gyumri (Ghazanchi source) to Ararat Valley; the construction of this water pipeline (with the capacity of 1000 liters/sec) will cost about 35-40 million USD, but funding sources are not identified yet for this project;
- ✓ Automated remote control system should be installed among all water users, so that the MNP could push buttons to control water extraction and monitor water use/extraction level;
- ✓ The MNP should be empowered to implement proper control/monitoring over water use and extraction of artesian water. The size of penalties for illegal water use should be significantly increased in comparison with the size of relevant damage caused to country's water resources;
- ✓ The Government of Armenia plans engaging an additional operator (private water supply company) to cover settlements that are currently out of coverage by Veolia company;
- ✓ Fisheries should shift to semi-closed system of water use, i.e. when they extract only 30% of water they need, while they put the rest (70%) of needed water into circulation;
- ✓ Farmers need to receive relevant trainings and consulting on economical and more effective use of water. For instance, instead of frequent watering of crops, which reduces harvest quality, they may consider to bark the soil thus, saving water;
- ✓ Due to high electricity costs, extraction of deep groundwater is not cheap, thus, we should consider using alternative energy sources (such as sun energy) to operate pump stations.
- ✓ Sanitary/ecological emissions of groundwater resources should be reduced. The relevant law of year 2011 is anti-ecological. It has been issued to expand the network of Hydroelectric Power Plants, which are owned by influential individuals. Over-exploitation of Hydroelectric Power Plants endangers river water basins. While those contribute to renewable energy production, the relevant water use permits have not been issued by the MNP based on correct calculations of water flows (as per AEF estimations, 80% of those plants are using/reporting incorrect water data). We should also fight against injustice related to



payment for water. There are big land owners who do not pay for irrigation water. I know places where the residents were provided with irrigation water with a big delay, on June 6th. As for drinking water supply, I don't think that it is necessary to expand the coverage of Veolia company which installs water meters and sells water (for about AMD 200 per cubic meter of drinking water) to residents. I think LSGs can also organize installation/renovation of water supply systems in their communities and they should charge people minimal fees for water system maintenance/renovation works only. The residents should require LSGs to report on the income and relevant expenditures related to water in the community to avoid misuse of relevant funds by LSGs. We need more professional and hearty managers in water sector. Radical changes are needed in this sphere to have more effective management. If there is a small (5-6 individuals) group of professional, hearty people involved in supervision in this sphere, they can help to identify and solve many relevant issues.

- ✓ We need financial support of international/bilateral donors to renovate and construct new irrigation water canals (concrete semi-trench dams). Constructing 8-10 km long concrete semi-trench dams in border communities can increase the area of irrigated land by 350-400 hectares.
- ✓ For irrigation, introduction of modern irrigation techniques such as drip irrigation, land consolidation, construction of small reservoirs up to 1M cubic meters, conversion from pumping to gravity where possible – are required to improve access to irrigation services. As for the quality, a modern water treatment plant should be in place. The international and local organizations, state, private sectors, the civil society, NGOs, civil activists – all of them need to be involved in solving the mentioned issues.
- ✓ Solutions can vary widely depending on the types of problems. One of the solutions is to organize effective water management, environmental events, population awareness raising, environmental mentality development, etc. The international and local organizations, the state and private sectors, the civil society, NGOs, and civil activists – all of them should be jointly involved in solving these issues.
- ✓ We (ADB) are developing a water project that is aiming at closing as many wells as possible in the Ararat and Armavir Valleys, by switching the sources of water from the well fields to sources in the Kotayk and Aragatsotn regions. This will reduce energy consumption and increase the water table level, also a SCADA system linked to the water well, will allow for a better management of existing wells.
- ✓ All stakeholders, from international financial institutions to SCWE, to donors, should be involved in solving issues in the water sector. A quarterly coordination meeting on this issue chaired by the SCWE should be sufficient.

e. **Question: How is it possible to introduce reforms/revisions in the legislation and policies related to water resources management in Armenia?**

Answers provided by interviewees:

- ✓ There must be political will and desire to implement reforms;
- ✓ It is necessary to implement correct assessments and monitoring (for all aspects), and develop management modules;
- ✓ A system approach must be used for solution of water issues;



- ✓ State bodies should take higher responsibilities over their actions;
- ✓ Professionals should be involved in water RM; and they should get decent salaries;
- ✓ The laws/legislation should be developed to protect people's rights, and not the interests of narrow groups of individuals;
- ✓ There must be funding to implement reforms;
- ✓ Real reforms in water resources management in Armenia can be implemented only when there is another/better political system. Otherwise, in the current state of affairs, it is not possible to introduce any significant changes.
- ✓ The State Committee of Water Economy is responsible for this;
- ✓ Discussions, study of best international experience, analyses of water issues in the communities;
- ✓ We (ADB) normally introduce them as a covenant to a Loan requested for the water sector.

2.3 Conclusions and recommendations

The qualitative study (in-depth interviews conducted among experts and stakeholders in the water sector) confirmed that water resources management in Ararat Valley, and in Armenia in general, is not and has not been effectively implemented in the past 10-15 years which has resulted in sharp decline of Ararat Valley artesian basin level, soil degradation, and in relevant socioeconomic impact on the population. This has been mostly associated with the ineffective use of artesian water resources by fisheries, and lack of proper control by the state authorities. According to local experts, the institutions responsible for providing water use permits and controlling the compliance of water users with those WUP conditions has been functioning with flaws/ineffective which contributed to the flourishing of illegal businesses (fisheries) most of which being owned by high ranking officials and oligarchs. Due to conflict of interest, relevant authorities have not been able to fully control and ban operation of those illegal businesses. Nor the civil society has been properly informed, able, or empowered to fight against those ecological issues associated with the illegal/ineffective use of groundwater resources in Ararat Valley. While water resources of the country are mostly sufficient for the needs of agriculture, the irrigation system is mostly inefficient, with 40-70 percent of losses due to decayed network and large portion of illegal/unpaid uses of water. This creates unequal distribution of water resources leaving many communities with no access to irrigation water. The same can be said also about drinking water. The largest water supply company – “Veolia Djur” is supposed to cover the drinking water needs of the whole country's population. Even in the communities that are served by “Veolia Djur” the share of losses are extremely high (76-78%, according to SCWE), there is no 24-hours/day supply of water; the quality of water is unsuitable for drinking purposes in many communities, and control of water quality is not regularly implemented.

Thus, based on the interviews with experts and stakeholders in the water sector, the following recommendations can be made for improving the management of water resources (groundwater and surface) in Ararat Valley artesian basin:



- a) Management functions should be differentiated/specified among various state administration bodies;
- b) The fishing industry should be strictly controlled. State authorities should ensure that all major water users, including fisheries in Ararat Valley have corresponding WUPs and that they follow the terms and conditions of those WUPs;
- c) The system of irrigation water distribution via WUAs to the residents should be revised. The WUAs should be prohibited from taking cash as payments for water; and measures should be in place (such as online platforms for water request and payments) to guarantee transparent and fair functioning of WUAs. In addition, there must be online and hotline services for the citizens to raise concerns about activities of WUAs;
- d) The WUAs and the civil society should have an opportunity to monitor and, if necessary, have access to list of irrigation requests to ensure that influential individuals/farmers are not receiving water in disproportionally higher quantities as compared to the ordinary residents/farmers;
- e) State or international/private/research institutions should be tasked to study the reasons for high losses in the irrigation and drinking water systems and make corresponding recommendations to reduce those losses;
- f) The State should promote using water saving technologies, such as drip irrigation, semi-closed system of water use in fisheries, and re-using discharge waters from fish farms for irrigation, and provide subsidies to the most socially vulnerable residents to install such systems. Lower tariffs for promoting and installing water saving technologies can be implemented at the legislative and institutional level;
- g) The State should rehabilitate the water drainage system in the Ararat Valley, especially in areas where fisheries are located;
- h) International/bilateral organizations, civil society, media, private sector, research institutions and all other parties should be involved in the management, decision making processes, and in oversight of water resources' use in the country, and in the Ararat Valley in particular.



Annex 1. List of in-depth interview participants

	Organization	Name	Position	Date of interview
1.	USAID ASPIRED Project	Magda Avetisyan	Chief of Party	12.06.2017
2.	“EcoLur” NGO	Inga Zarafyan	Director	12.06.2017
3.	“Hetq” (online) daily	Sara Petrosyan	Journalist	13.06.2017
4.	“JINJ” Engineering-Consulting Company	Eduard Mesropyan	Director	13.06.2017
5.	State Committee of Water Economy (SCWE) of RA MEINR	Hovhannes Harutyunyan	Deputy Chairman	14.06.2017
6.	State Committee of Water Economy (SCWE) of RA MEINR	Valodya Narimanyan	Deputy Chairman	14.06.2017
7.	Water Resources Management Agency (WRMA) of RA MNP	Artyom Mkhitarian	Deputy Chairman	14.06.2017
8.	NGO “Armenian Women for Health and Healthy Environment” (AWHHE)	Elena Manvelyan	Director	15.06.2017
9.	ArmWaterProject Institute	Yuri Javadyan	Director, Chairman of the Presidential Advisory Committee on Sevan Issues	15.06.2017
10.	“Armenian Environmental Front” civil initiative	Levon Galstyan	Member of coordinating council	16.06.2017
11.	Ararat WUA	Vanya Tartikyan	Director	16.06.2017
12.	Ministry of Nature Protection of RA, State Environmental Inspectorate (SEI)	Hakob Galstyan	Head	19.06.2017
13.	NGO “Union of Fish Producers & Exporters of Armenia”	Artur Atoyan	Director	19.06.2017
14.	UNDP GEF Small Grants Programme	Hovhannes Ghazaryan	National Coordinator	20.06.2017
15.	World Bank Armenia office	Arusyak Alaverdyan	Senior Agriculture Specialist	20.06.2017
16.	NGO “Country Water Partnership” (CWP)	Liana Margaryan	National Expert	21.06.2017
17.	Eurasian Development Bank	Armen Poghosyan	EDB representative	22.06.2017
18.	Asian Development Bank	Cesar Llorens	Deputy Country Director, Urban Development and Water Division (CWUW)	03.07.2017

