

# Interreg Greece-Bulgaria Aqua-lity



European Regional Development Fund

## Deliverable 4.1.3

### “Project Evaluation”

Within the framework of  
“Application of innovative techniques for improving drinking water quality in urban  
areas” and the acronym “Aqua-lity”»  
INTERREG V-A “Greece – Bulgaria 2014-2020” Cross Border Cooperation Programme

*Municipality of Oraiokastros – LB*



<https://www.aqua-lity.eu/>

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*Municipality of Oraiokastros participates in the project "Application of innovative techniques for improving drinking water quality in urban areas" with the acronym "Aquality", which is implemented within the framework of the INTERREG V-A Greece-Bulgaria Territorial Cooperation Program 2014-2020 and co-funded by the European Union and National Funds of the participating countries*



December 2021

**Telephone survey to residents of Anthoupolis of the Municipality of Oraioikastro  
and online survey to bodies / partners of the Interreg Program (Aqua- lity)**

**Sampling duration: 1-10 December 2021**

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## 1. Introduction

Although in Greece water management processes have been adapted and enhanced by the use of innovative technologies, in some areas there are still issues that need to be resolved. The Municipality of Oraikastro, therefore, decided to improve its own capacity to deal with the problems of drinking water quality in the area and specifically in the area of the settlement of Anthoupolis, of the Community of Litis.

According to the Program analysis, the low levels of Ecological Good Criteria are due to various reasons, including industrial pollution, pollution from agricultural work and insufficient water management. Specifically, the concentration of hydrogen sulfide / H<sub>2</sub>S (> 0), iron / Fe (764.3 mg / l) and manganese / Mn (86.2 mg / l) in the water network of Anthoupolis, Oraikastro is higher than acceptable levels (H<sub>2</sub>S = 0, Fe <0.2mg / l and Mn <50mg / l) as defined in Greek legislation (Joint Ministerial Decision Y2 / 2600/2001).

In addition, most water networks are made of asbestos-cement pipes, leading to deteriorating water quality, while in remote areas with a small population where drinking water comes mainly from local boreholes, there are various problems with its quality, while many others have not been identified, as there is no efficient control of drinking water quality in these areas.

In addition, most water networks are made of asbestos-cement pipes, leading to deteriorating water quality, while in remote areas with a small population where drinking water comes mainly from local boreholes, there are various problems with its quality, while many others have not been identified, as there is no efficient control of drinking water quality in these areas.

This project has two main target populations: the first refers to the population of Litis Community of Oraikastro, which will enjoy safe and sterile drinking water and will be protected from the health risks arising from unsuitable, low quality water. The second target population refers to the partners (and their water investments that will

operate the systems after the project is completed) who will be equipped with innovative systems related to water sterilization.

The purpose of this study was to evaluate the project with respective objectives for the executives responsible for the supply of drinking water in the Greek area of the project, the citizens of the project area who are directly affected by the implementation of the project actions and finally the partners of the project.

The main questions raised were the extent to which the project contributed to the improvement of the quality and quantity of drinking water in the cross-border area, the measures to be taken by the partners to extend the benefits of the project, the level of satisfaction of those directly and indirectly involved in the project (partners, beneficiaries, etc.), as well as the results of the pilot operation within the project "AQUALITY".

The research included all the involved members of the bodies and partners of the project, as well as about 10% of the inhabitants of the area of Anthoupolis (population: 221 permanent residents according to the 2011 census).

## 2. Best practices

An important aspect of sustainable water management is to ensure water quality and protect it from pollution. Clean water is a prerequisite for human health and well-being, but it is also necessary for the protection and preservation of the environment. In this context, the intention is to protect, improve and ensure the good condition of all water resources, to protect the aquatic environment and public health from the negative effects of man-made pollution, to strengthen disaster resilience and to adapt to climate change. The EU has developed an integrated water policy, which has been gradually developed to address not only the health challenges but also the environmental impact of the main water-using sectors. As urban areas grow, so does the demand for such services. In addition, there is a growing need to make urban water systems more resilient to climate change.

All this leads to the realization that urban water management must be an integral part of urban planning in general. Land-use decisions affect the design and operation of the water supply and sewerage system, as well as the measures required to manage rainwater runoff. An operating system of urban infrastructure also requires energy which in turn usually requires water.

Home water use affects health, where its benefits from water supply are more manifested through improved access to water, and therefore more water, but also through improvements in water quality. A well-functioning water supply allows people to make their living with a degree of certainty about the water available for use, which provides a sense of stability. The presence of a water supply system can be an integral part of the development or even the existence of a community (Bjornlund, Henning & Robak, Anna. (2008). *Charting relationships between water supply and community livelihood and national economic welfare.*)

Water supply systems are built or upgraded to meet the needs of quality, quantity, accessibility and reliability of users. Water systems are also made or upgraded to improve operator safety, reduce resource and energy use, and reduce environmental pollution. The benefits of water supply upgrades are usually assessed

in economic terms, in terms of reduced maintenance and operation costs as well as reduced risks to system failure and public health.

### 3. Methodology

Regarding the research methodology, three (3) separate surveys were conducted. An online survey was conducted for the bodies and partners of the project, where the link was randomly distributed to those directly concerned. Respectively, regarding the inhabitants of the area, a telephone survey was carried out by random sampling with the CATI method.

For the purposes of the research, 3 different structured questionnaires were prepared for the respective targets (bodies, partners and residents of the area). The questionnaires were formulated based on the criteria of completeness, clarity, coherence, structure, brevity and appropriate appearance.

The CATI (Computer Assistant Telephone Interviewing) method was used for telephone research in the residents by random sampling of residents of Anthoupolis in the Municipality of Oreokastro. The researchers were properly trained to provide appropriate guidance to respondents on how to define different concepts or topics and how to complete their answers to each question.

For the online survey to bodies and partners, the questionnaire link was shared electronically to be completed appropriately by the participating members.

## 4. Result analysis

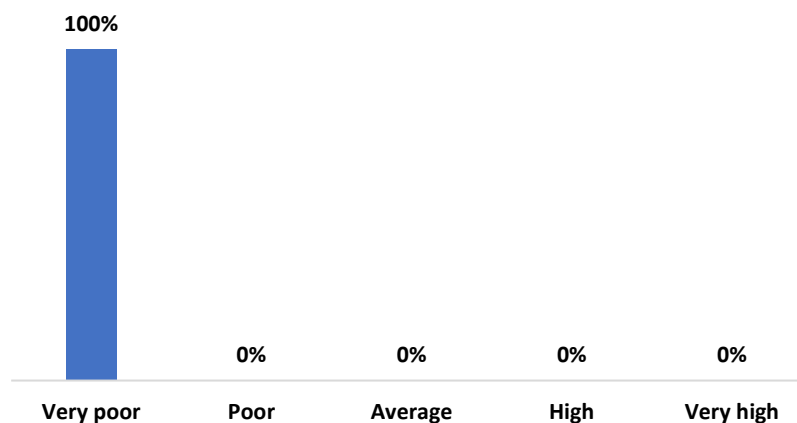
After data collection, the statistical analysis of the results was performed with the program SPSS v.23 IBM Statistics. The results are presented in detail for both the institutions / partners and the residents of the area.

### 4.1. Institutions / Partners

In total, all stakeholders and actors of the present project participated in the present study (employees and project managers).

The first question referred to how they evaluate the water quality of this particular area a year ago. With absolute unanimity, 100% of both institutions and partners considered the quality of drinking water in the area very low, as the concentration of hydrogen sulfide, iron and manganese in the water supply network of Anthoupolis, Oraiokastros was higher than acceptable levels, as they had been set.

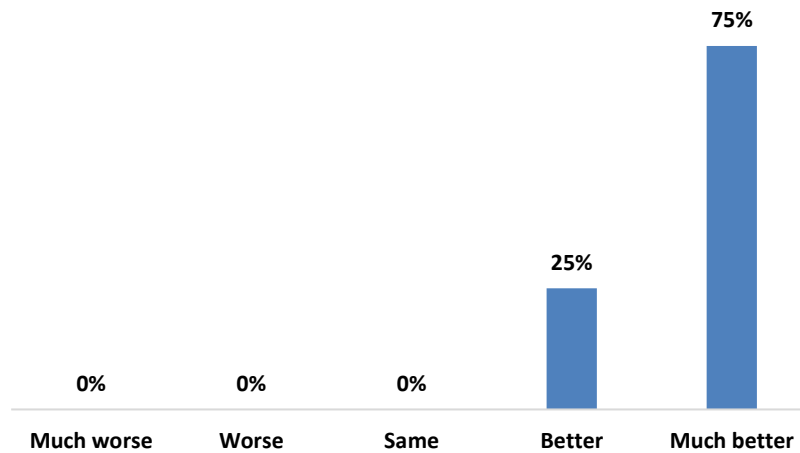
#### How do you evaluate the quality of drinking water in the area a year ago?



The next question was about how the participants evaluate the quality of drinking water in the area.



**Compared to a year ago, the current quality of drinking water in the area is ....:**

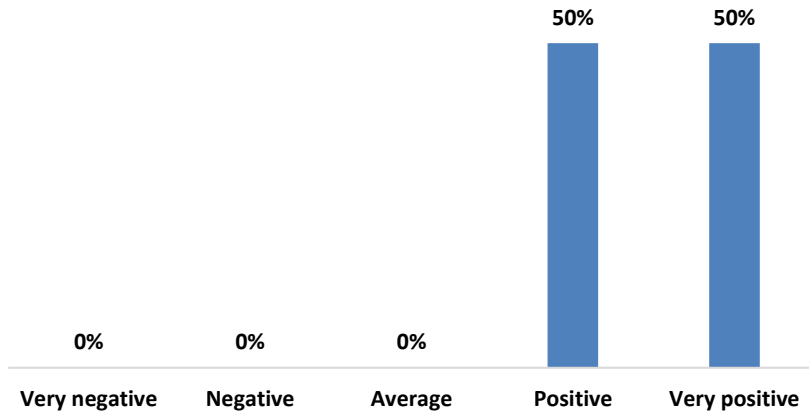


3 out of 4 institutions and partners now consider the quality of drinking water in the area of Anthoupolis much better while 1 out of 4 just better. Therefore, the view in general about the quality of drinking water after the end of the "Aqua - lity" project is positive.

Respondents were at that point asked to rate the area's drinking water in terms of pressure, purity, taste (if generally neutral) and continuous (no interruptions). Similar behavior was observed as shown in the diagrams below in all areas.

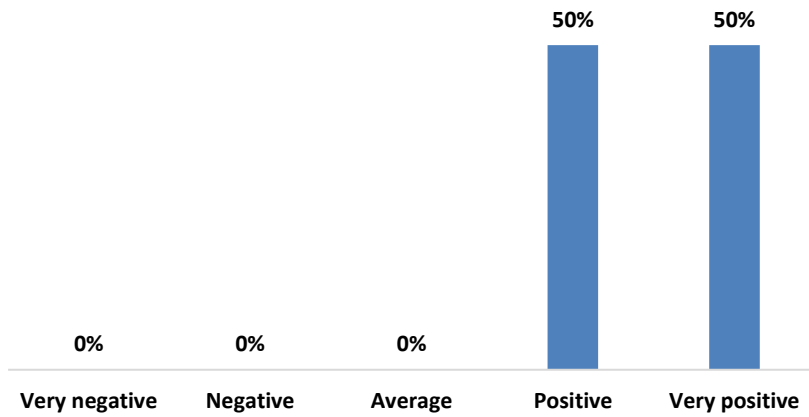
How would you rate the current drinking water in the area in relation with the following factors:

**1. PRESSURE**

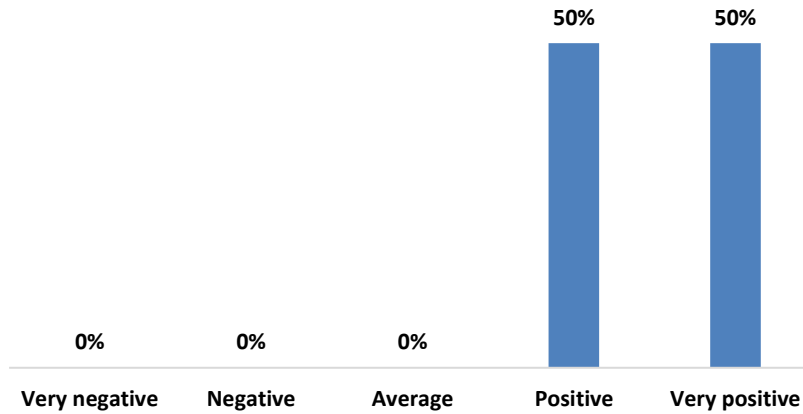


How would you rate the current drinking water in the area in relation with the following factors:

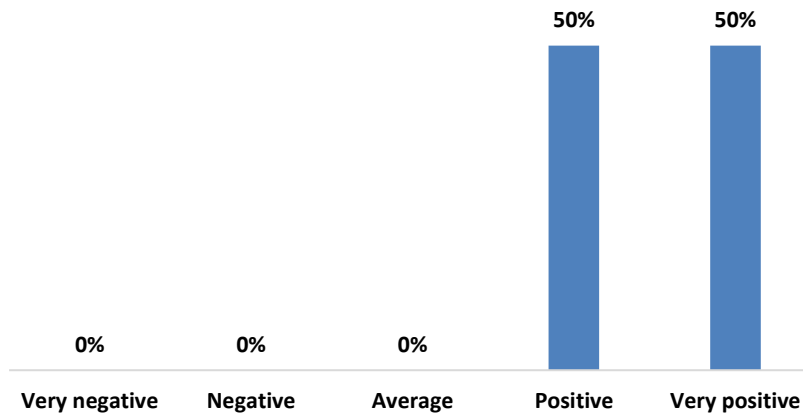
**2. CLARITY**



**How would you rate the current drinking water in the area in relation with the following factors:  
3. TASTE (being neutral)**

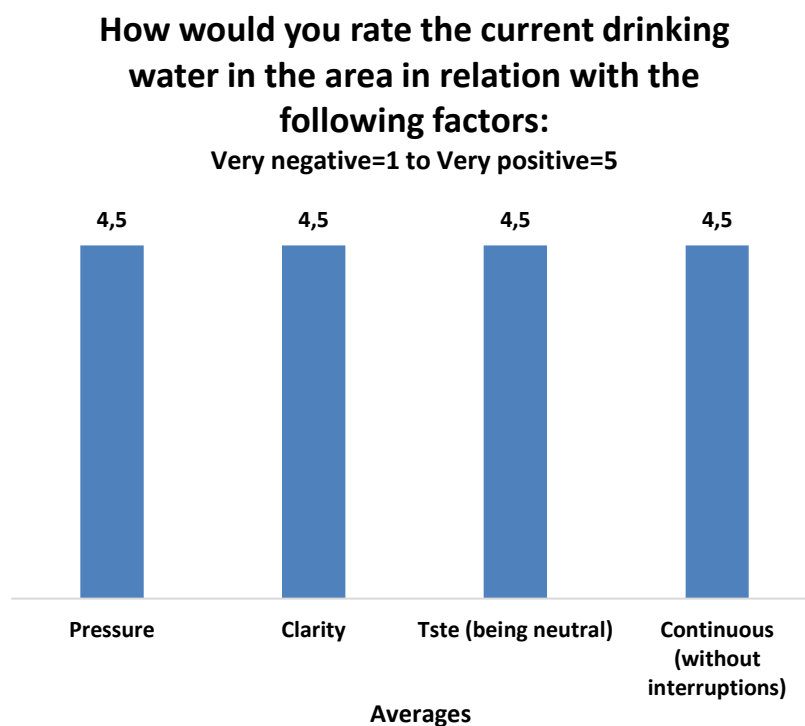


**How would you rate the current drinking water in the area in relation with the following factors:  
4. CONTINUOUS (Without interruptios)**



So in all four factors (pressure, purity, taste and continuous supply) 50% of the surveyed institutions and partners gave a positive sign with the remaining 50% evaluating them very positively.

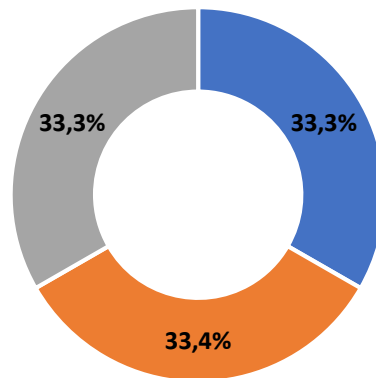
Studying on the other hand these four factors as averages (where the Very negative corresponds to 1 to the Very positive corresponds to 5), the following summary diagram emerges.



Therefore, with the new sanitation system, the quality and supply of drinking water in the area of Anthoupolis has been significantly improved, according to the opinion of organizations and partners of the project.

In the next part of the questionnaire, we wanted to explore what new actions are waiting as next steps to be taken around the issue of drinking water in the area.

**What new actions are you expecting to be taken concerning the drinking water in the area?**



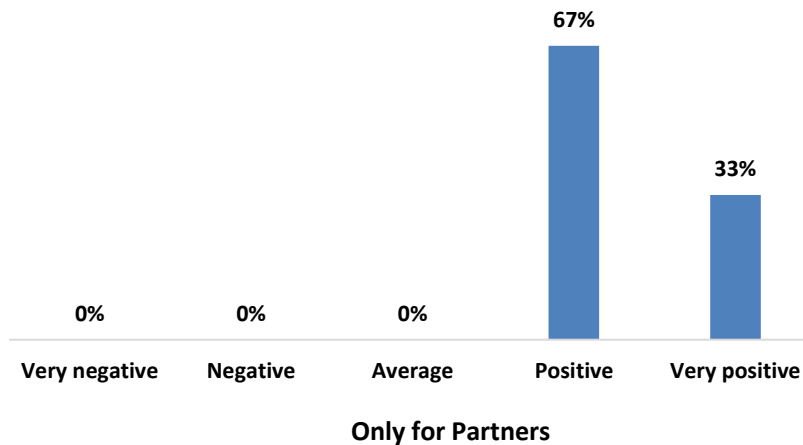
- Informing the residents and smooth operation of the project
- More quality checks
- Connection to Mygdonia's network

Three new actions were mentioned regarding the next steps that could follow the construction of the sanitation system in the area. With a corresponding representation, 33.4% proposed to conduct more quality controls in the drinking water of the tank, in order to have greater safety for the residents. It was also mentioned the connection of the existing network with the water supply network of Mygdonia, which will positively affect the area (33.3%) and finally to inform the residents of the area but also to ensure the smooth and uninterrupted operation of the project (33.3%).

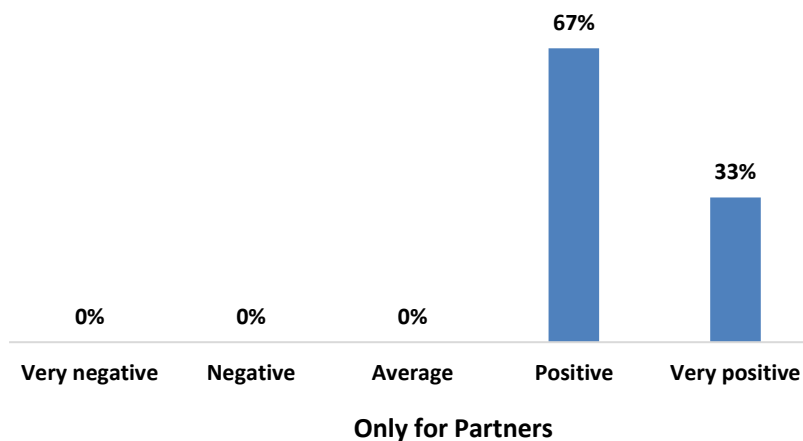
The next step was addressed only to the project partners in order for them to evaluate some factors related to the execution of the project, such as the division of work carried out, the observance of schedules in the execution of the project, the improvement of the daily life of the residents, the possibility of development in the area as well as cooperation between institutions and partners.

The evaluation of all five parameters moved along with 67% of the respondents in all cases evaluating them positively and the remaining 33% evaluating them with a very positive sign.

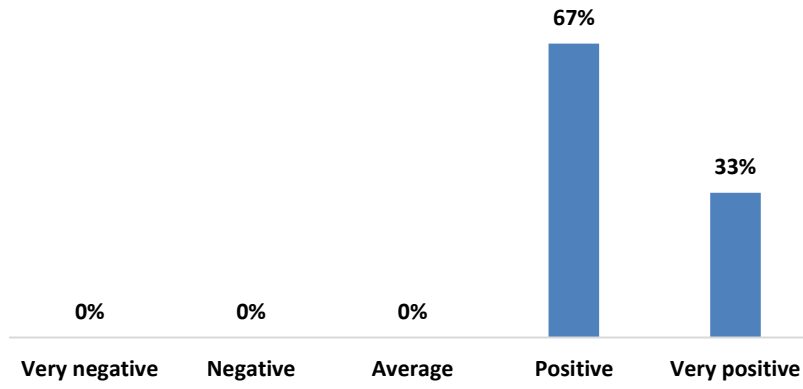
**How would you rate the overall project in relation with the following factors:  
1. DIVISION OF LABOURS**



**How would you rate the overall project in relation with the following factors:  
2. COMPLIANCE WITH TIMETABLE**

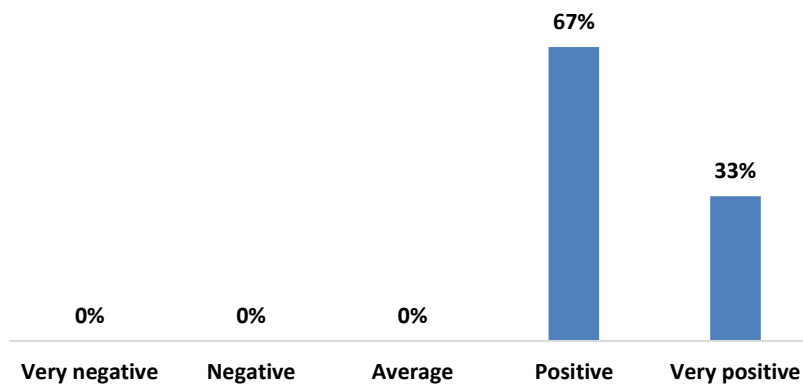


**How would you rate the overall project in relation with the following factors:  
3. IMPROVEMENT OF THE DAILY LIFE OF THE RESIDENTS**



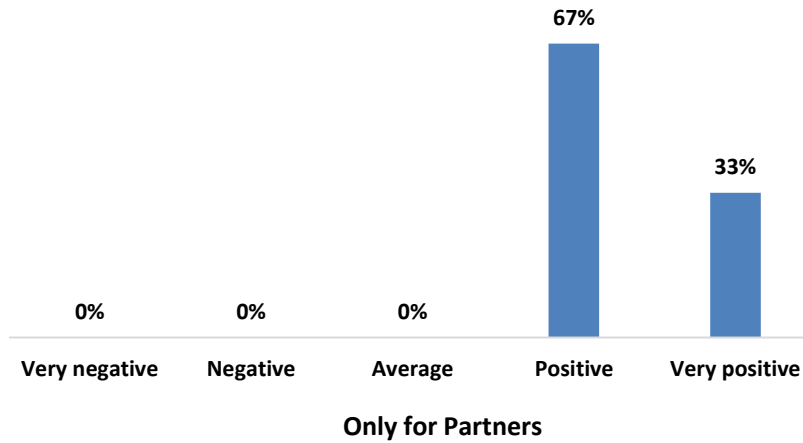
Only for Partners

**How would you rate the overall project in relation with the following factors:  
4. Potential development of the area**



Only for Partners

**How would you rate the overall project in relation with the following factors:  
5. COOPERATION BETWEEN INSTITUTIONS / PARTNERS**

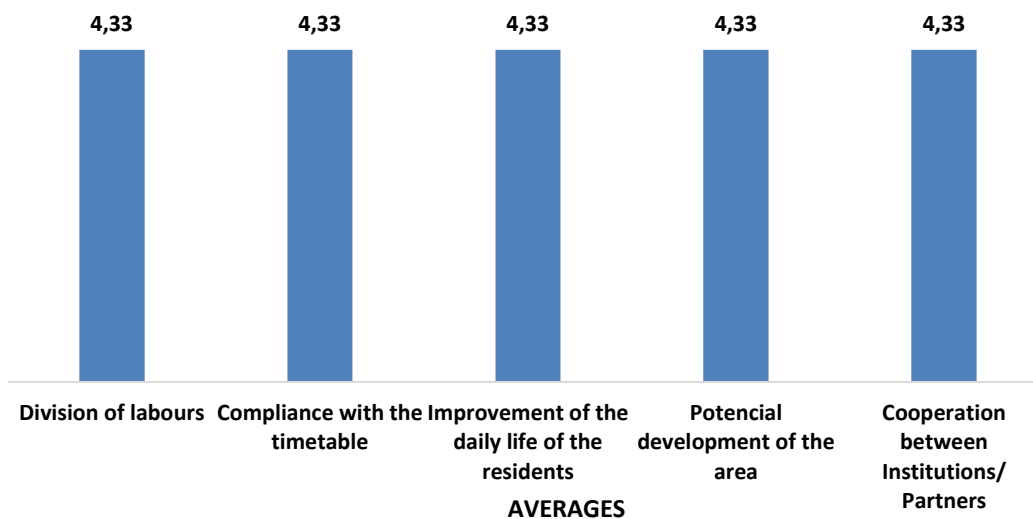


Therefore, regarding the execution of the project but also with the dynamics that it will give in the area of Anthoupolis, everything went smoothly. This is shown in the following diagram, where the respective averages are calculated (where the Very Negative corresponds to 1 to the Very Positive corresponding to 5) of the five evaluation criteria.

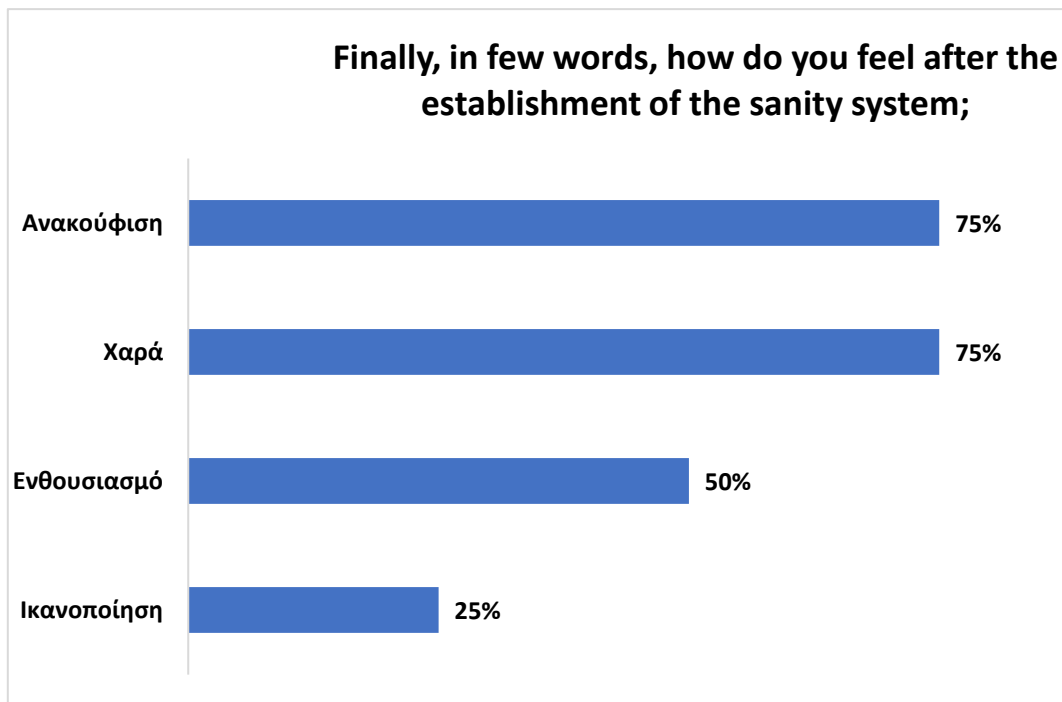


**How would you rate the overall project in relation with the following factors:**

Very negative=1 to Very positive=5



Closing with the part of the institutions and partners (where they both answered), the last question was about the emotions that were presented with the creation of the tank. Because the question was open, it was turned into multiple choice, as some respondents mentioned more than one choice.

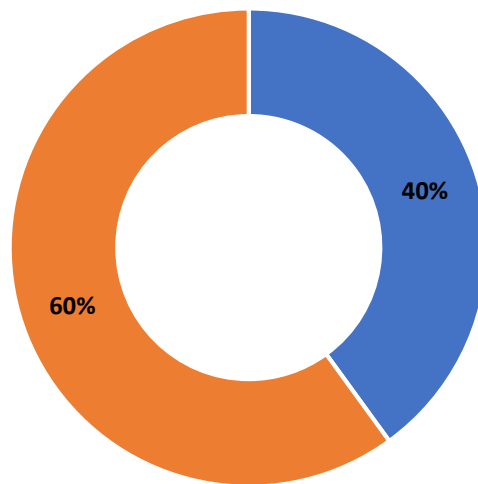


Therefore, 3 out of 4 respondents feel relief that this project was carried out as well as joy that this project was completed. Also 50% of the participants state that they feel enthusiastic about the creation of the tank and 1 in 4 is satisfied with the project.

## 4.2 Residents

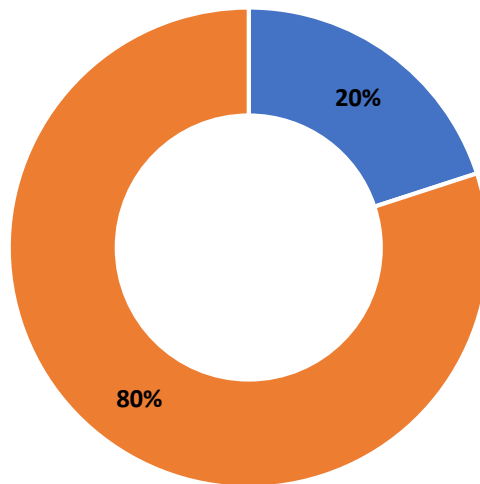
The sample of the survey in the residents of the area of Anthoupolis of the municipality of Oreokastro was about 10% of the population of the area. 40% were aged 36-45 years while 60% were aged 46-55 years, 20% men and 80% women and 40% consisted of 2 people in the household with the remaining 60% consisting of 3-5 people.

**In which of the following age groups are you in?**



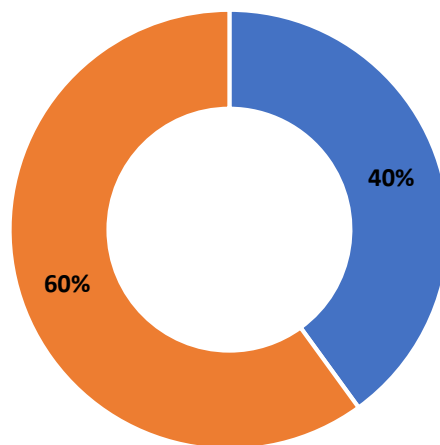
■ 36-45 years old ■ 46-55 years old

**Gender:**



■ Male ■ Female

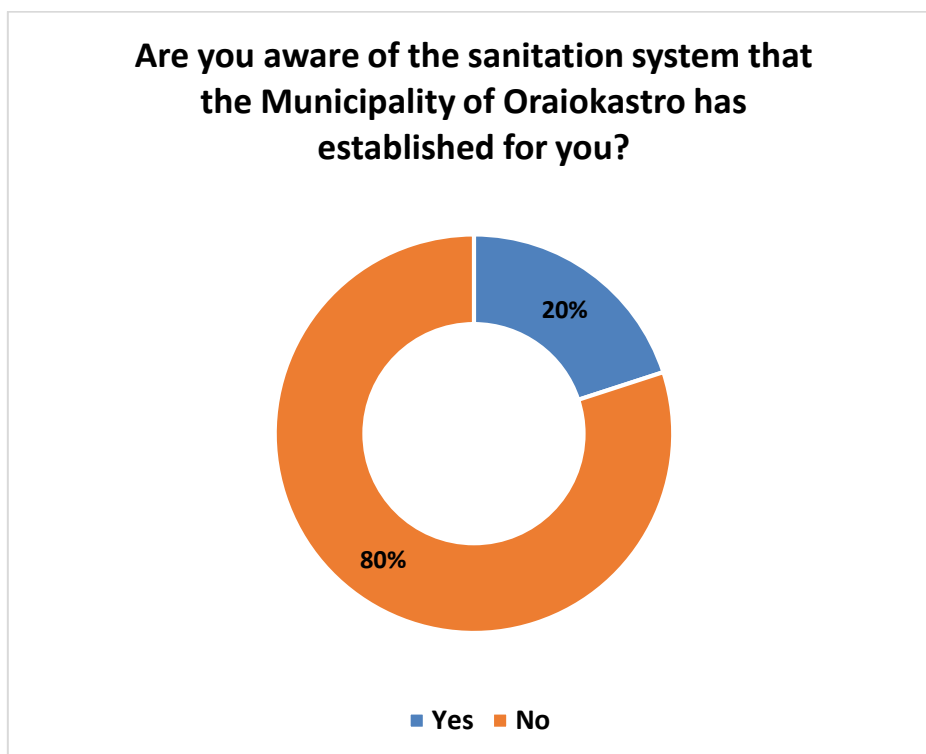
**How many people are included in this household (including yourself)?**



■ 2 ■ 3-5

An initial question in this specific issue was whether there had been aware of the construction of the sanitation system in the area by the Municipality of

Oraiokastro. In cases where the respondents did not have any knowledge about this project, the researchers had the power to brief them on the new tank).

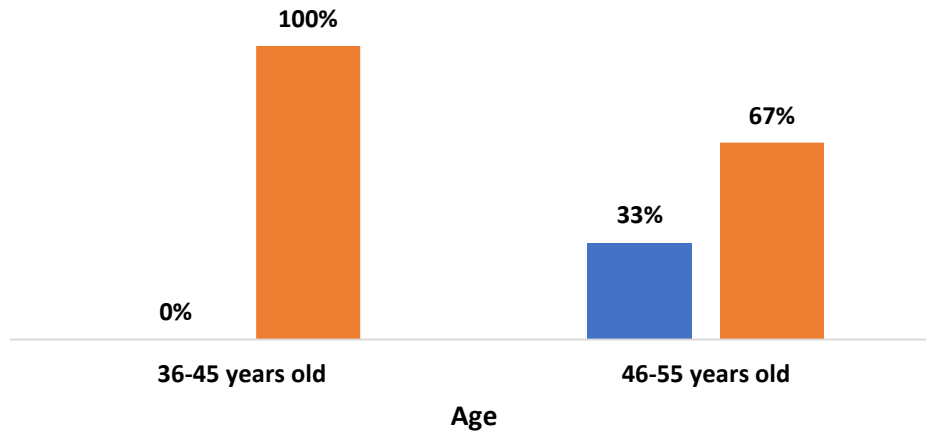


Only 1 in 5 surveyed residents knew about the new sanitation system in Anthoupolis, while 80% did not seem to know anything about the project.

A similar behavior is seen in the correlations of this question with the demographic data of the sample (age, gender and number of people in the household). 100% of the people aged 36-45, men and families with 2 people in the household did not seem to know the work of the new tank in the area.

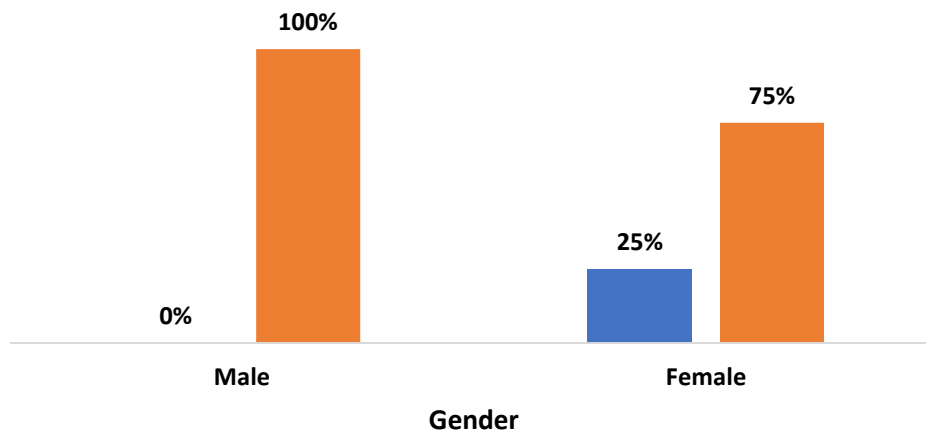
**Are you aware of the sanitation system that the Municipality of Oraioastro has established for you?**

■ Yes ■ No

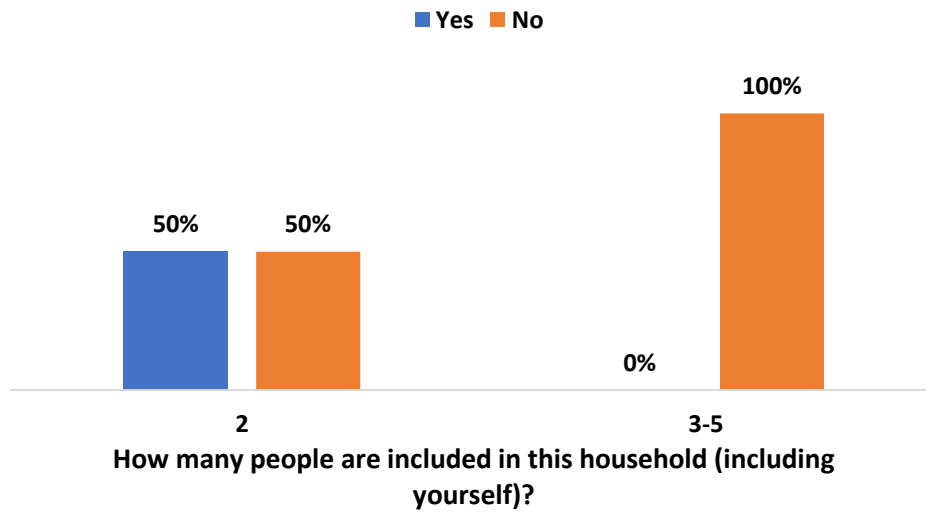


**Are you aware of the sanitation system that the Municipality of Oraioastro has established for you?**

■ Yes ■ No

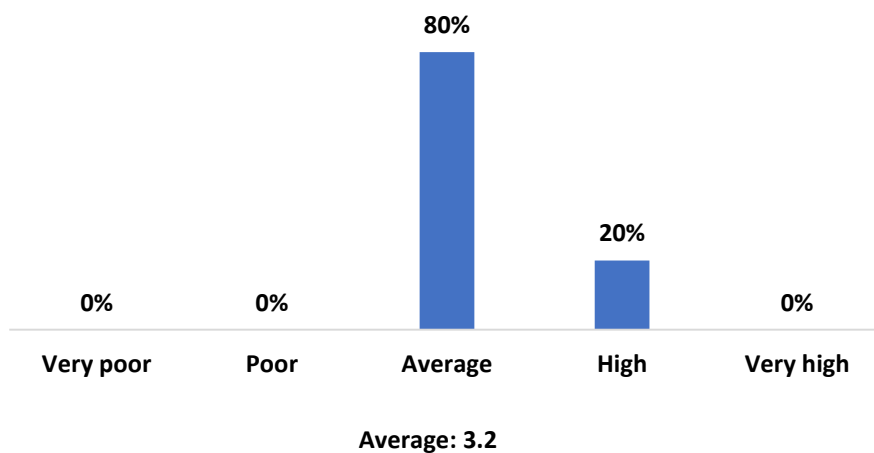


### Are you aware of the sanitation system that the Municipality of Oraiokastro has established for you?



Respectively, the next question dealt with the evaluation of the drinking water quality of the area a year ago, where the project "Aqua - lity" had not been carried out.

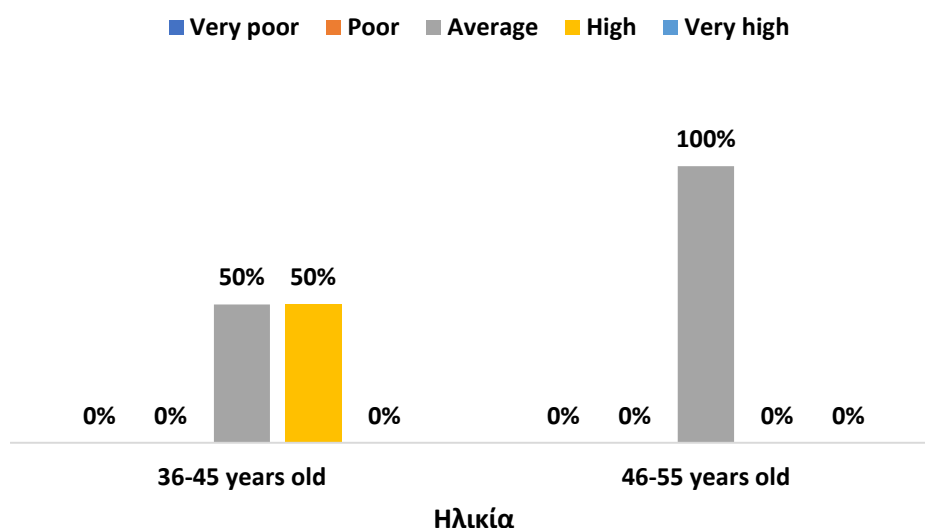
### How would you rate the quality of the drinking water in the area a year ago?



Most of the surveyed residents of the area (80%) considered the quality of drinking water in the area as moderate, which indicates that specific problems had been identified among the residents in this area. 1 in 5 considered that the quality of drinking water was high. If we compare the Very low with 1 to the Very high with 5, the average that the quality of drinking water is evaluated a year before reaches 3.2 / 5.

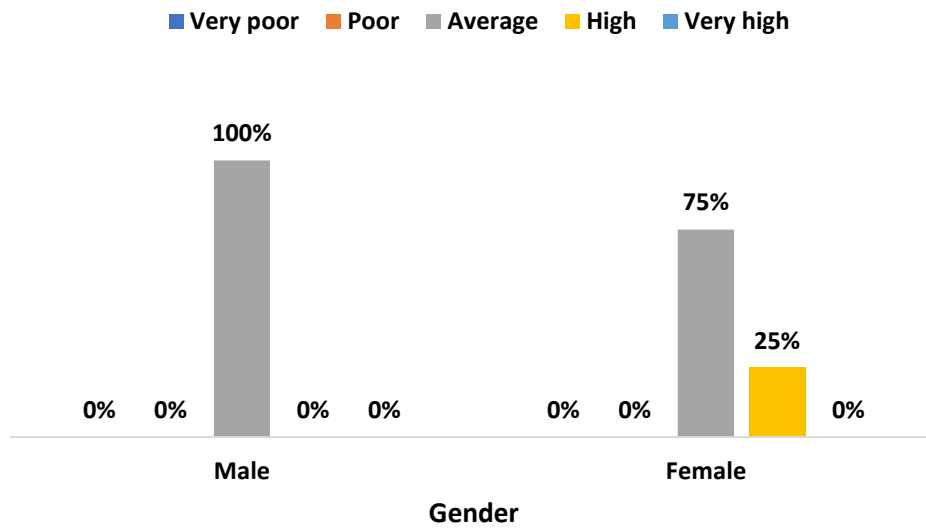
A similar behavior is observed with regard to the demographics of the sample, where at the ages of 36-45 there are divided opinions about the moderate and high quality of drinking water a year ago, men at 100% consider the quality of drinking water high a year ago as well as in households consisting of 2 people.

### How would you rate the quality of the drinking water in the area a year ago?

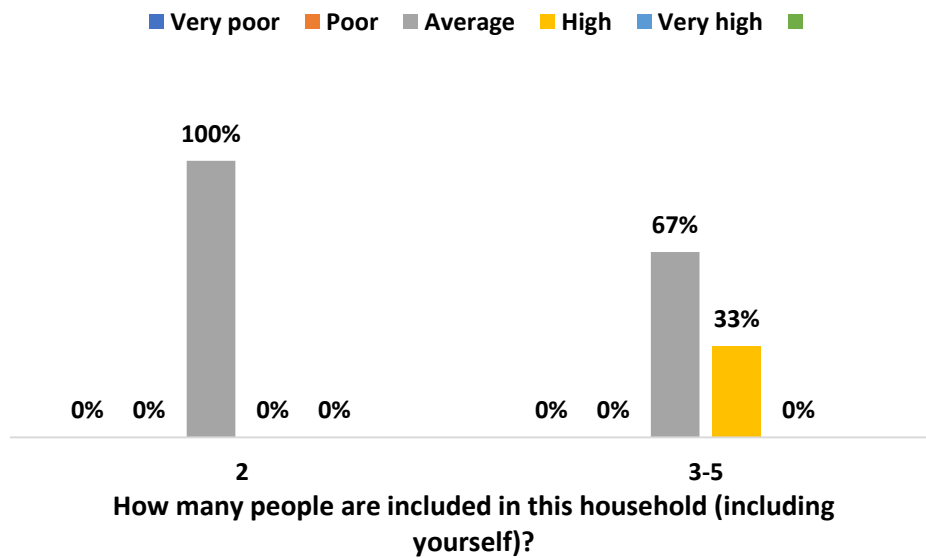




### How would you rate the quality of the drinking water in the area a year ago?

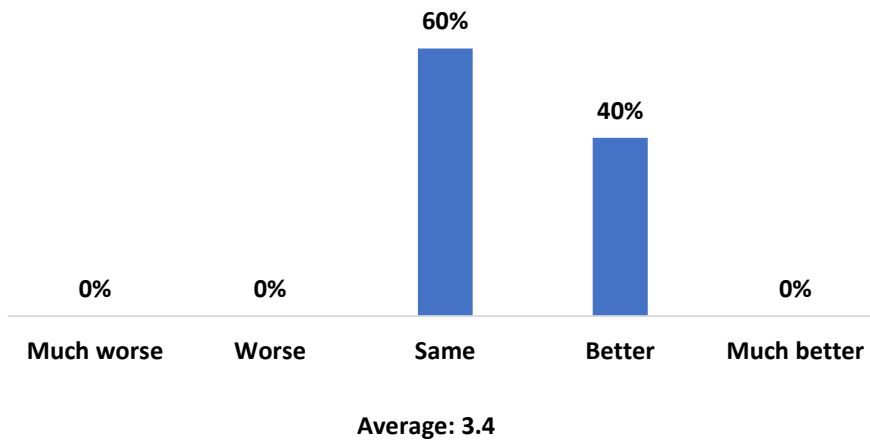


### How would you rate the quality of the drinking water in the area a year ago?



Then, the main question of the research concerned the evaluation of water quality at the moment compared to a year ago, when the creation of the sanitation system for drinking water in Anthoupolis was completed.

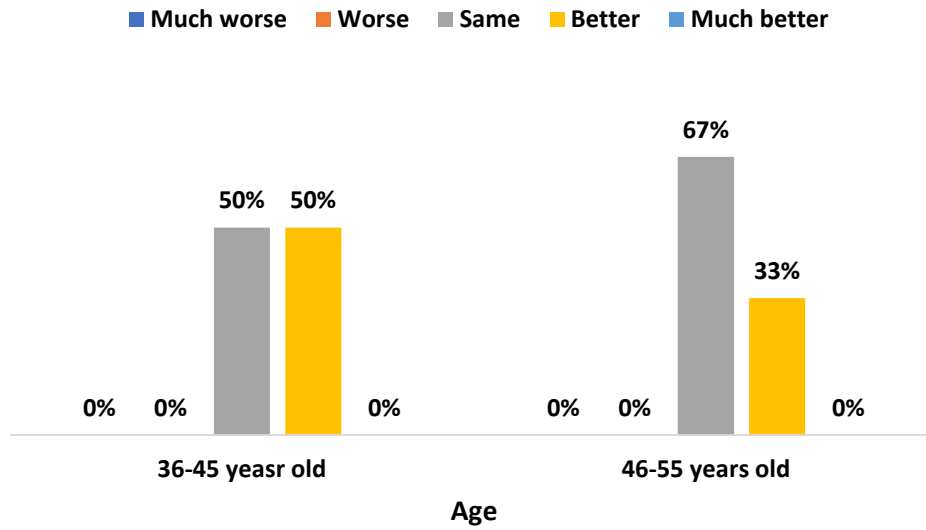
**In comparison with a year ago, the current quality of the drinking water in the area is..:**



6 out of 10 respondents do not seem to have noticed any significant difference in drinking water between the two time periods of a year ago and now, where the completion of the project has also taken place. 40% believe that now the quality of drinking water in the area of Anthoupolis is better than before.

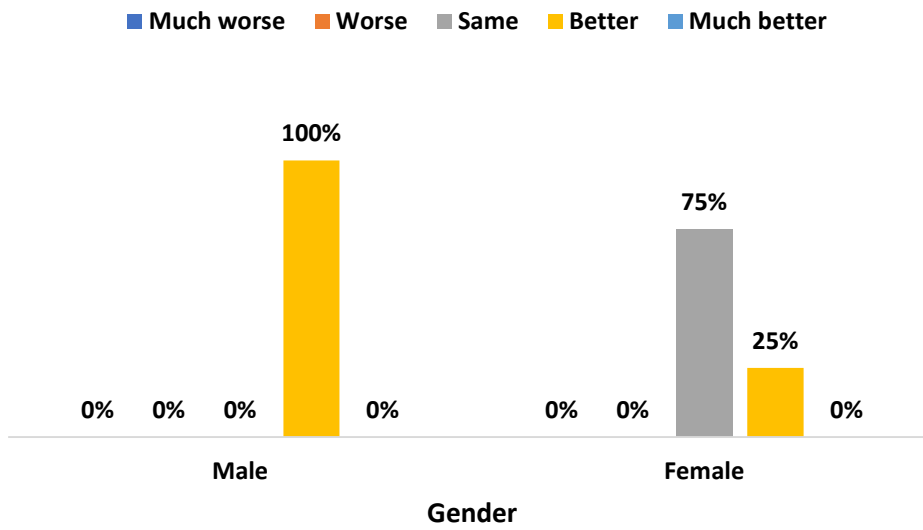
It is interesting to consider this question in relation to the evaluation of drinking water a year ago. The reason is, as shown in the diagram below, that those who considered the quality of drinking water high, 100% believe that it remained at the same levels. On the other hand, of the people who thought that a year ago the level of drinking water quality was mediocre, half of them (50%) now believe that a year later it has improved and its quality is high.

### In comparisson with a year ago, the current quality of the drinking water is..:

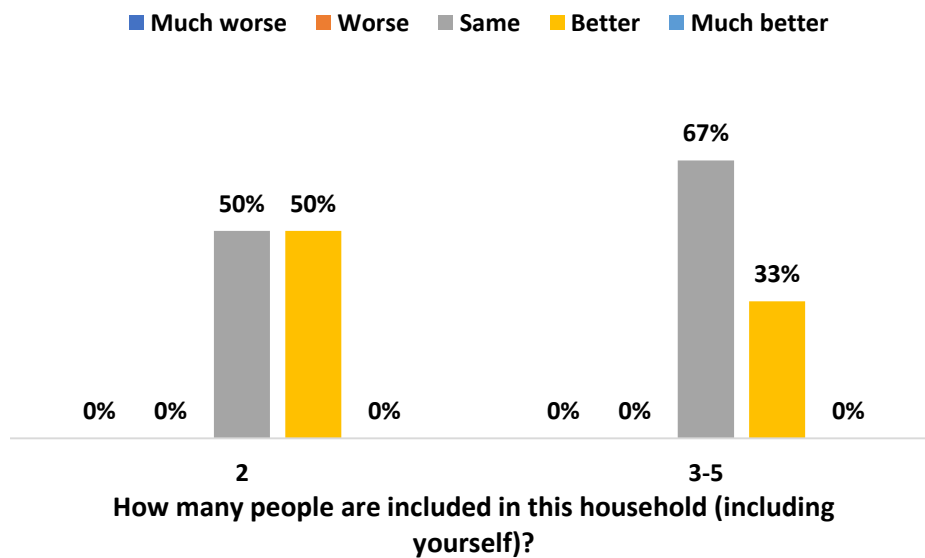


The following are the correlations of the network's drinking water current evaluation in relation with the demographics. Divided between the best and the remain at the same levels is the water quality in the participants aged 36-45 years, as well as in households with 2 people.

**In comparisson with a year ago, the current quality of the drinking water is..:**



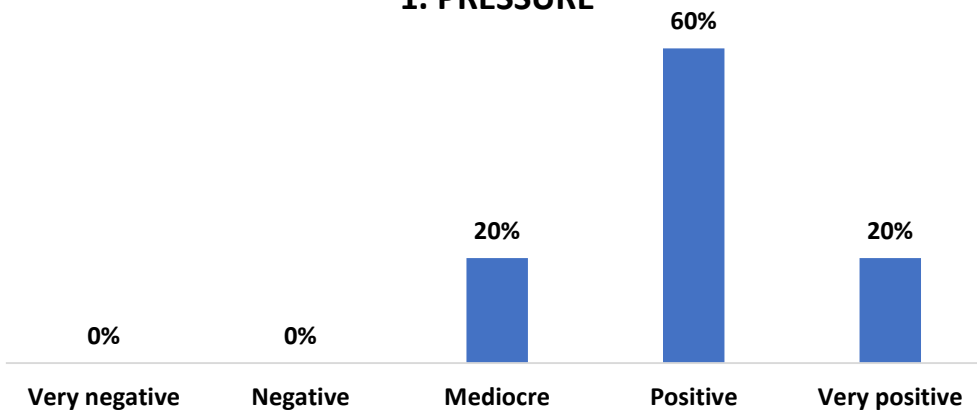
**In comparisson with a year ago, the current quality of the drinking water is..:**



This was followed by the evaluation of the four factors concerning the pressure, the purity, the taste (in terms of whether it is neutral) as well as whether the supply is continuous (without interruptions).

**How would you rate the current quality of the drinking water in the area in relation with the following factors;**

**1. PRESSURE**

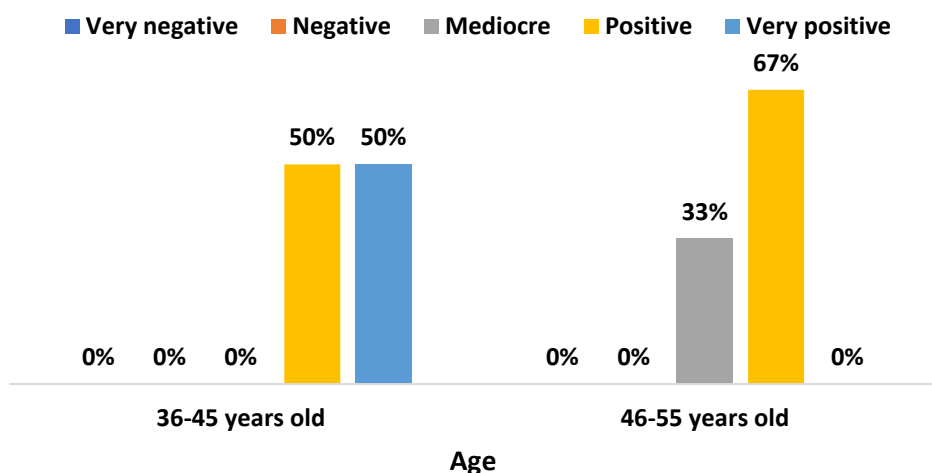


Average: 4

Initially, in terms of water pressure after the completion of the project, 6 out of 10 participants in the survey evaluate it with a positive grade and 20% with a very positive grade. 1 in 5 considers it to be at a moderate level. Regarding the correlation with the demographic data, the ages 36-45 look more positive, but also households consisting of 3-5 people.

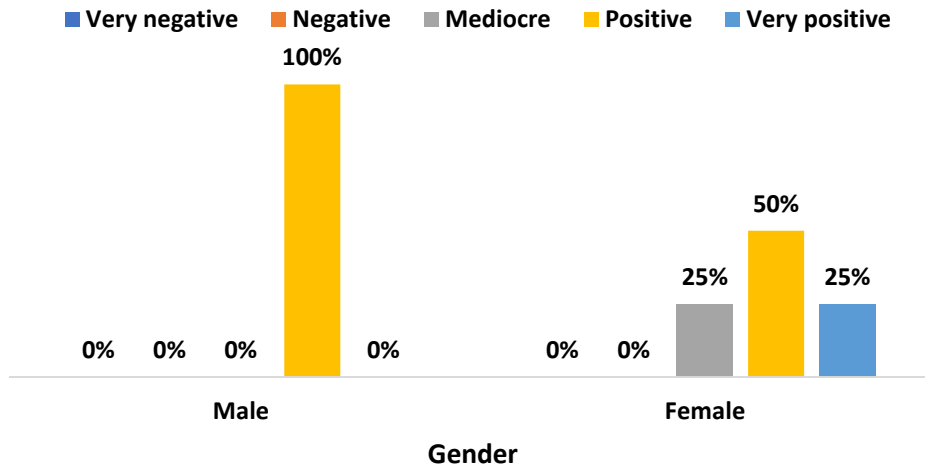
**How would you rate the current quality of the drinking water in the area in relation with the following factors?**

**1. PRESSURE**



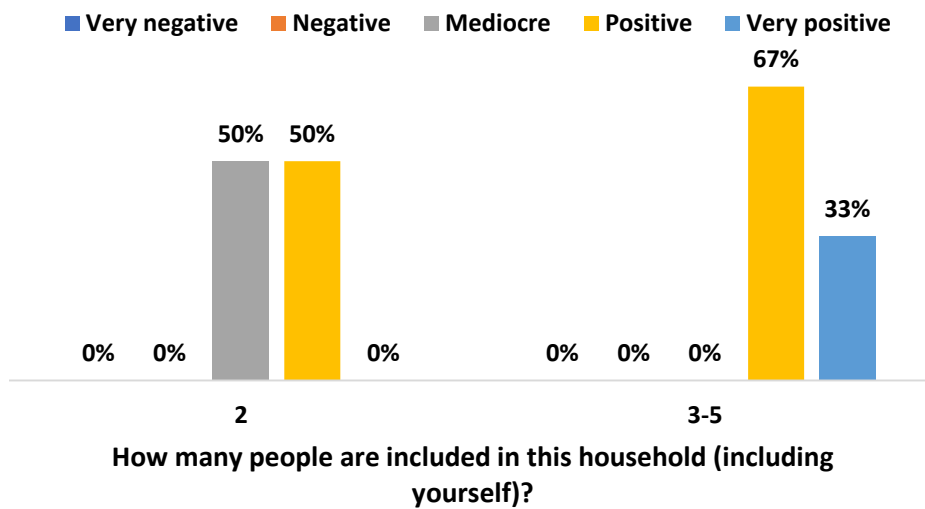
**How would you rate the current quality of drinking water in the area in relation with the following factors?**

**1. PRESSURE**



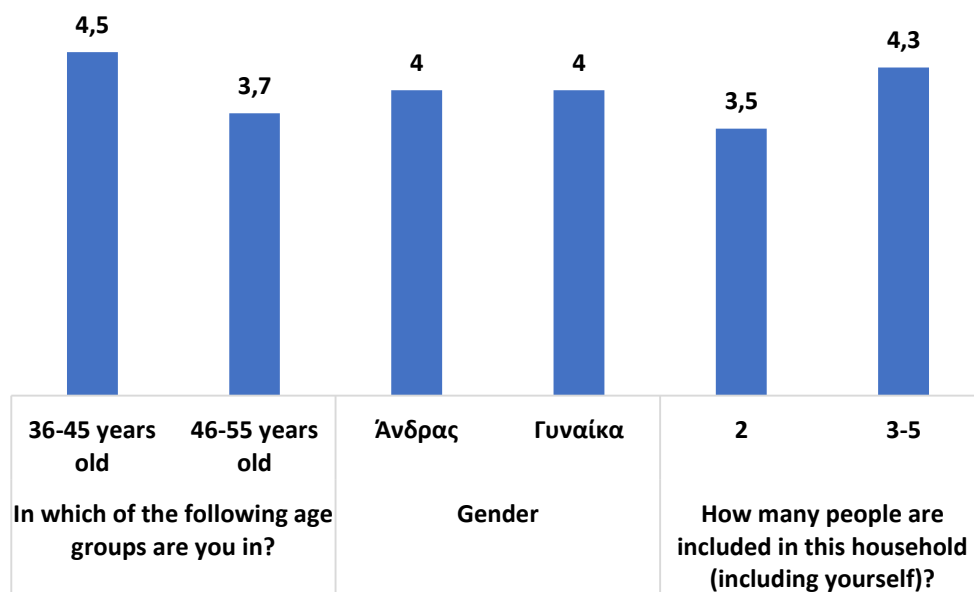
**How would you rate the current quality of the drinking water in the area in relation with the following factors?**

**1. PRESSURE**



The averages per category are mentioned accordingly so that the difference, where it exists, is more obvious (where the Very negative corresponds to 1 to the Very positive corresponds to 5).

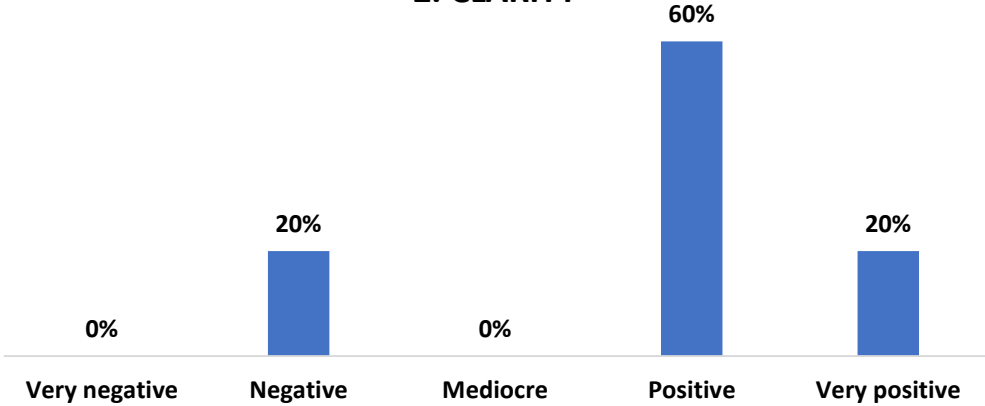
## PRESSURE



The next factor that was evaluated was the purity of the water. Again the largest part considers that the purity has now improved (as 60% evaluate it positively and 20% very positively). A smaller percentage (20%) considers that there is an issue regarding the purity of drinking water in the area and evaluates it negatively.

**How would you rate the current quality of the drinking water in the area in relation with the following factors?**

**2. CLARITY**



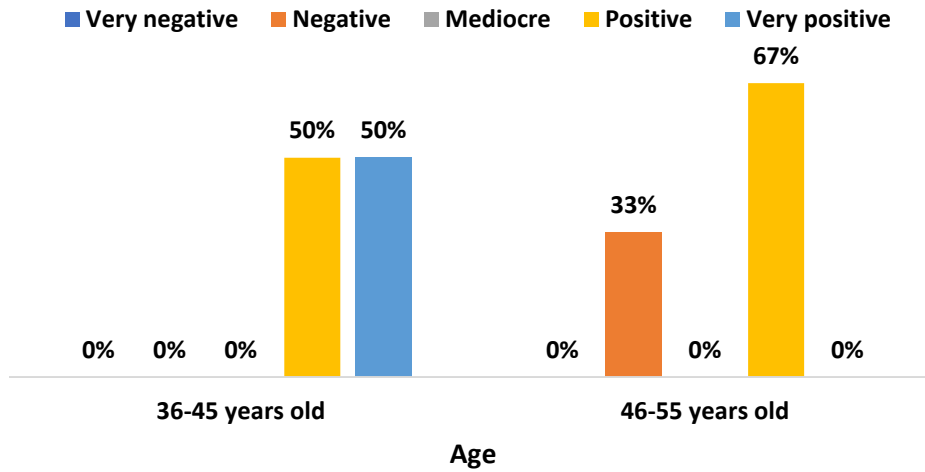
**Average: 3.8**

The following are the correlations with the demographics, where the purity is evaluated more positively by the ages of 36-45 years, the men of the sample as well as the households that consist of 2 people in total.



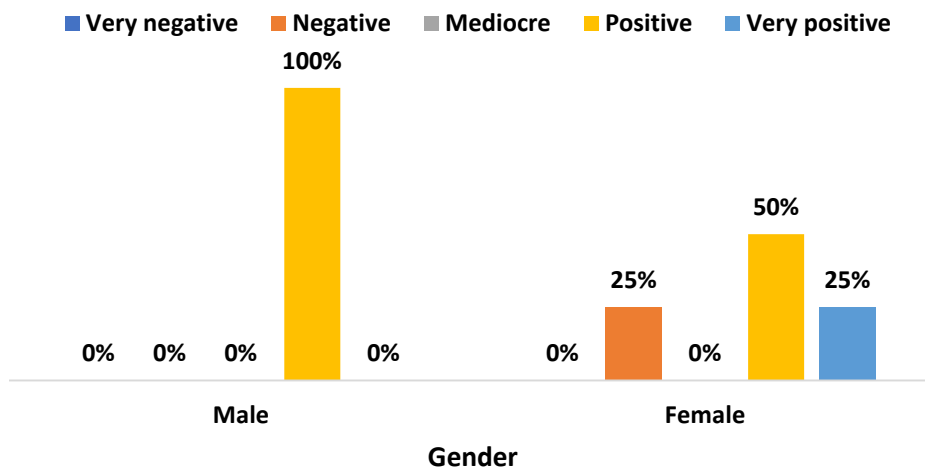
How would you rate the current quality of the drinking water in the area in relation with the following factors?

2. CLARITY



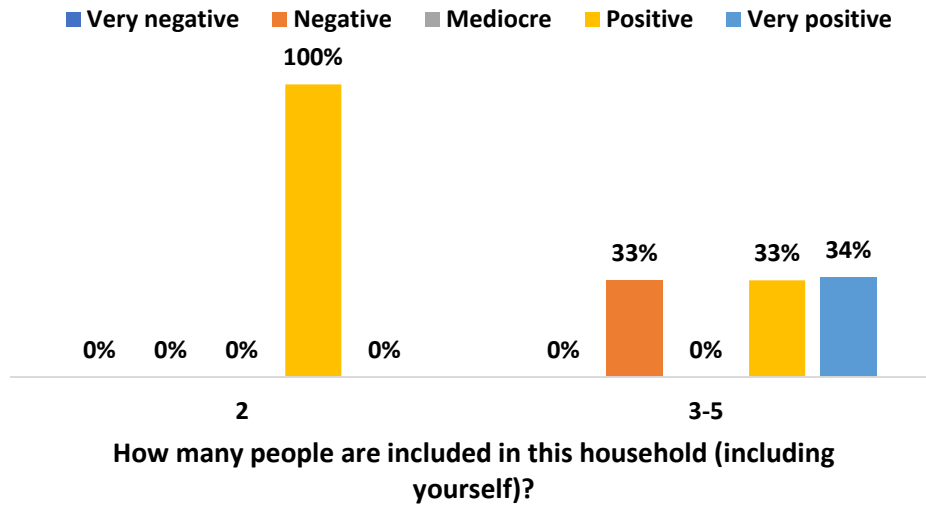
How would you rate the current quality of the drinking water in the area in relation with the following factors?

2. CLARITY



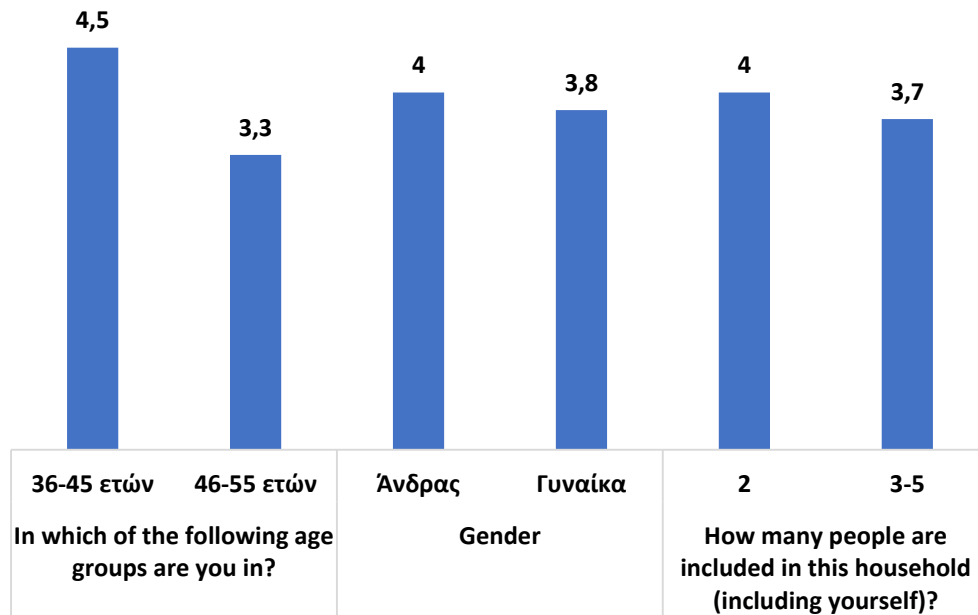
**How would you rate the current quality of the drinking water in the area in relation with the following factors?**

**2. CLARITY**



The averages per demographic category are mentioned accordingly so that any difference is more visible (where the Very negative corresponds to 1 to the Very positive corresponds to 5).

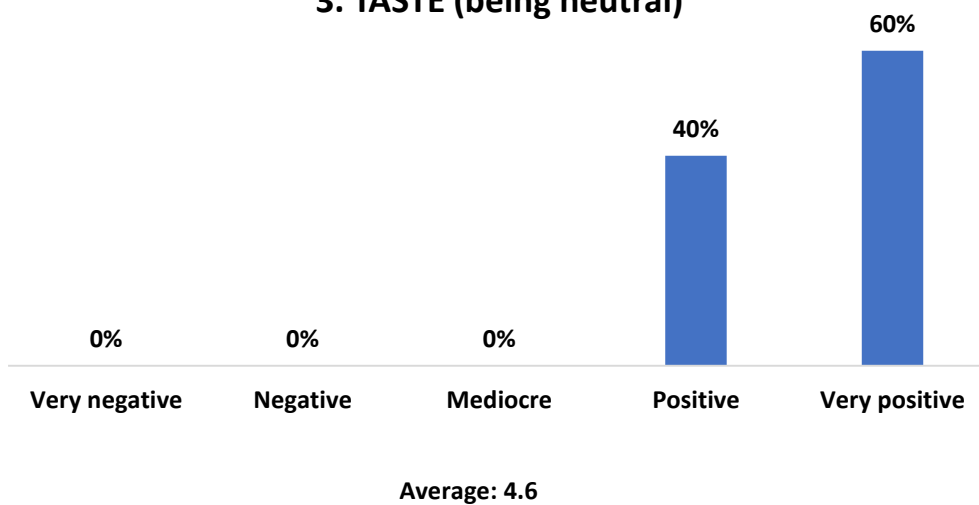
## 2. CLARITY



The third factor that was evaluated was the taste of the water (ie whether it is neutral in taste). All survey participants rated the taste of drinking water positively (40%) or very positively (60%).

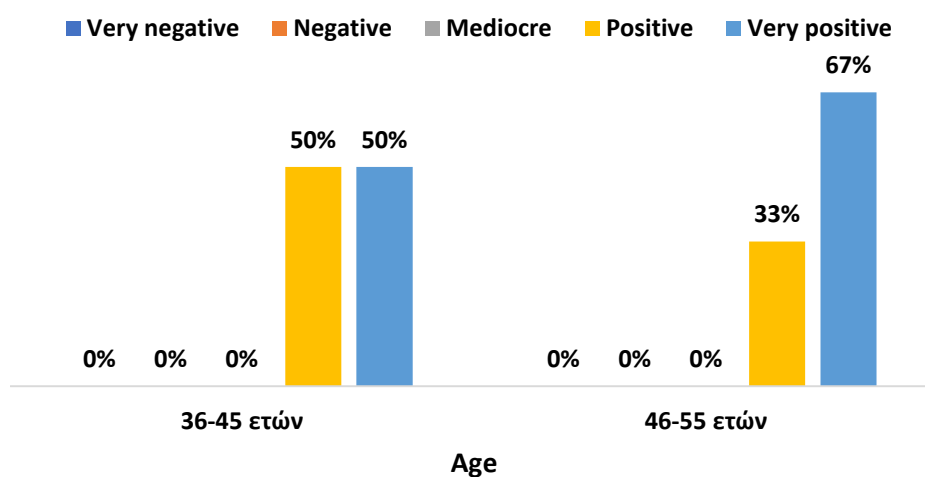
**How would you rate the current quality of the drinking water in the area in relation with the following factors?**

### 3. TASTE (being neutral)

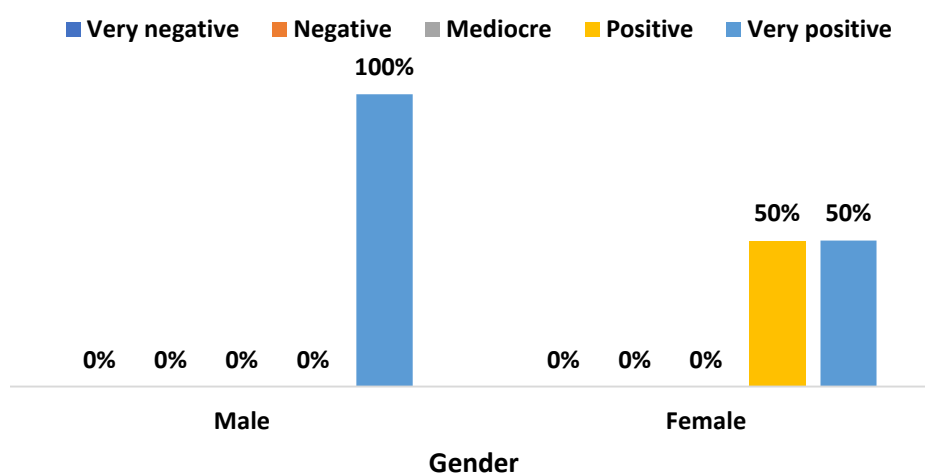


The following are the correlations with the demographics, where more positively evaluate the taste of drinking water aged 46-54 years, the men of the sample as well as households consisting of 3-5 people in total.

**How would you rate the current quality of the drinking water in the area in relation with the following factors?  
3. TASTE (being neutral)**

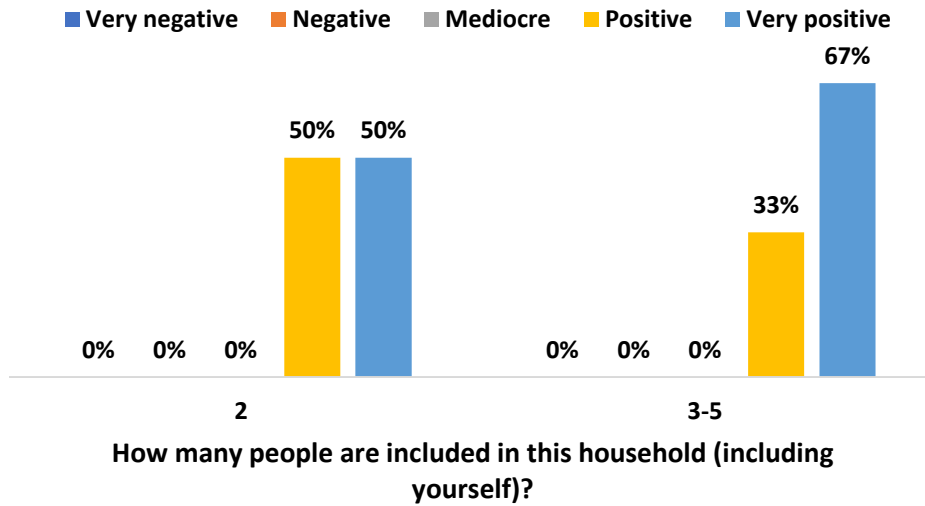


**How would you rate the current quality of the drinking water in the area in relation with the following factors?  
3. TASTE (being neutral)**



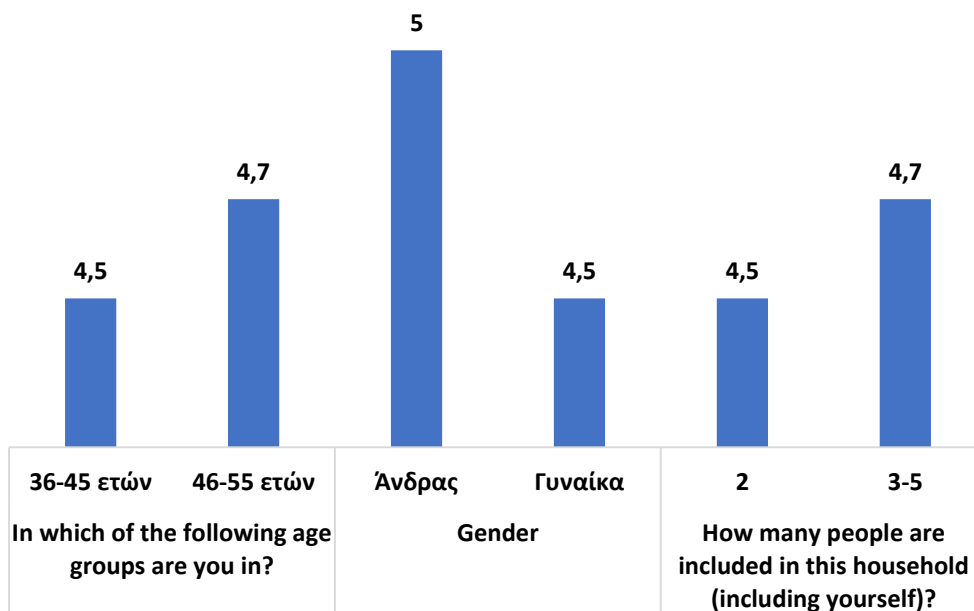
**How would you rate the current quality of the drinking water in the area in relation with the following factors?**

**3. TASTE (being neutral)**



The averages per demographic category are mentioned accordingly so that any difference is more visible (where the Very negative corresponds to 1 to the Very positive corresponds to 5).

**3. TASTE**

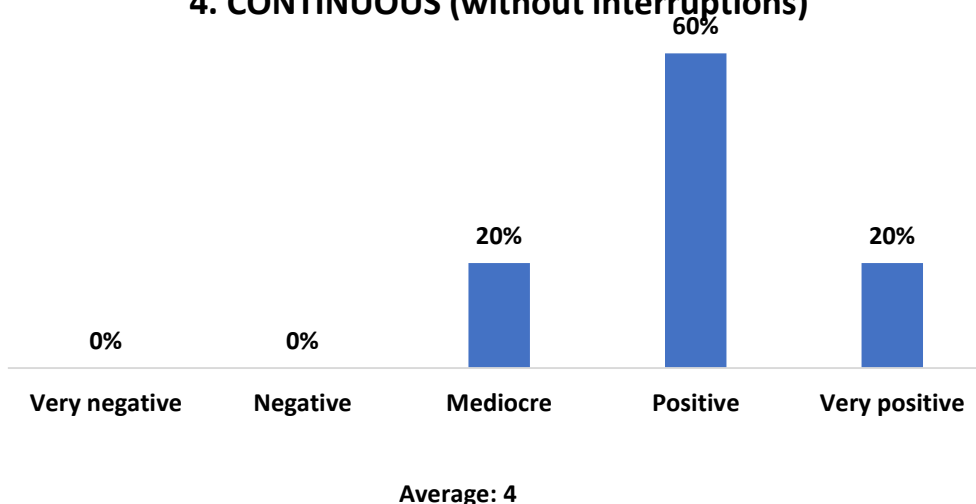


The averages per demographic category are mentioned accordingly so that any difference is more visible (where the Very negative corresponds to 1 to the Very positive corresponds to 5).

The last factor that was evaluated was the continuous supply of drinking water (ie whether there are interruptions in the water supply network). In this area as well, the evaluation is considered positive, as 60% evaluate the supply positively and 20% very positively. About 1 in 5 respondents rate it moderately.

**How would you rate the current quality of the drinking water in the area in relation with the following factors?**

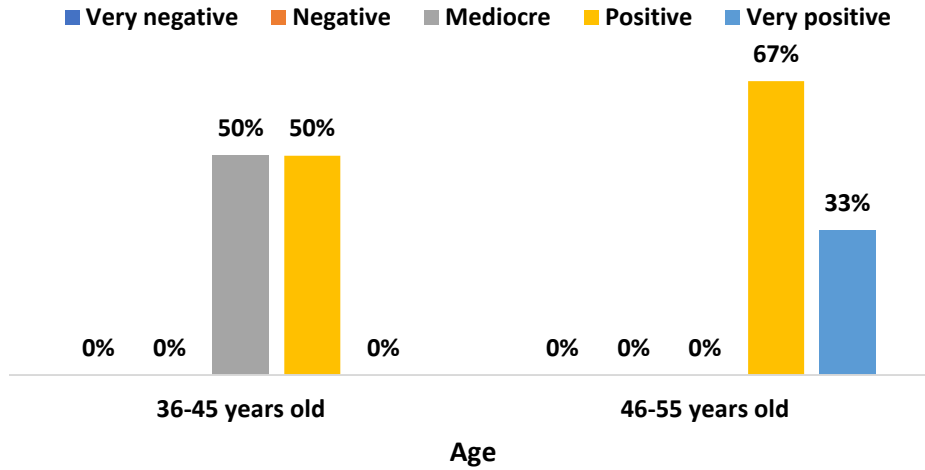
**4. CONTINUOUS (without interruptions)**



Regarding the correlation with the demographic questions, it is observed more positively to evaluate the continuous benefit of the persons aged 46-55 years, while in terms of gender or the number of persons in the household there is no difference in the evaluation.

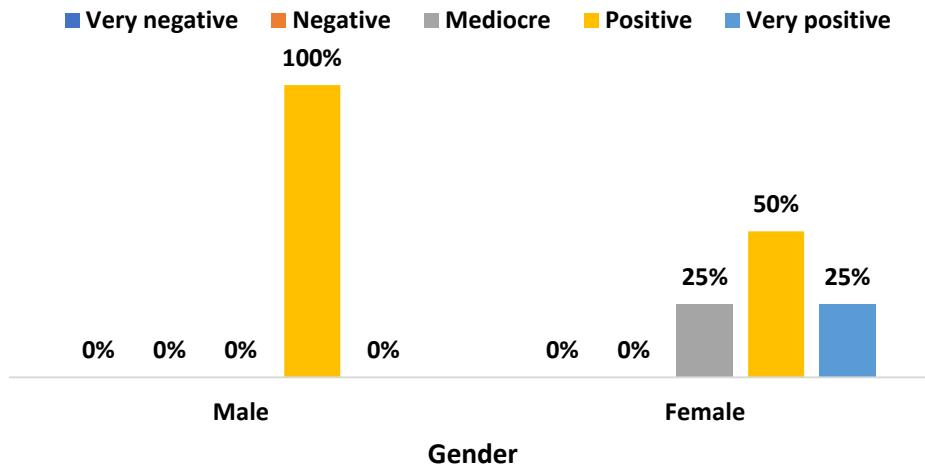
How would you rate the current quality of the drinking water in the area in relation with the following factors?

4. CONTINUOUS (without interruptions)



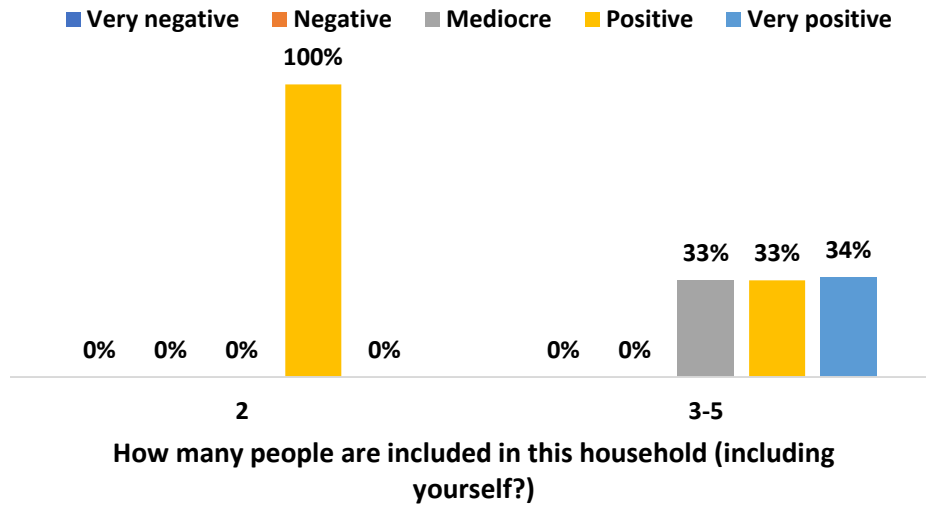
How would you rate the current quality of the drinking water in the area in relation with the following factors?

4. CONTINUOUS (without interruptions)



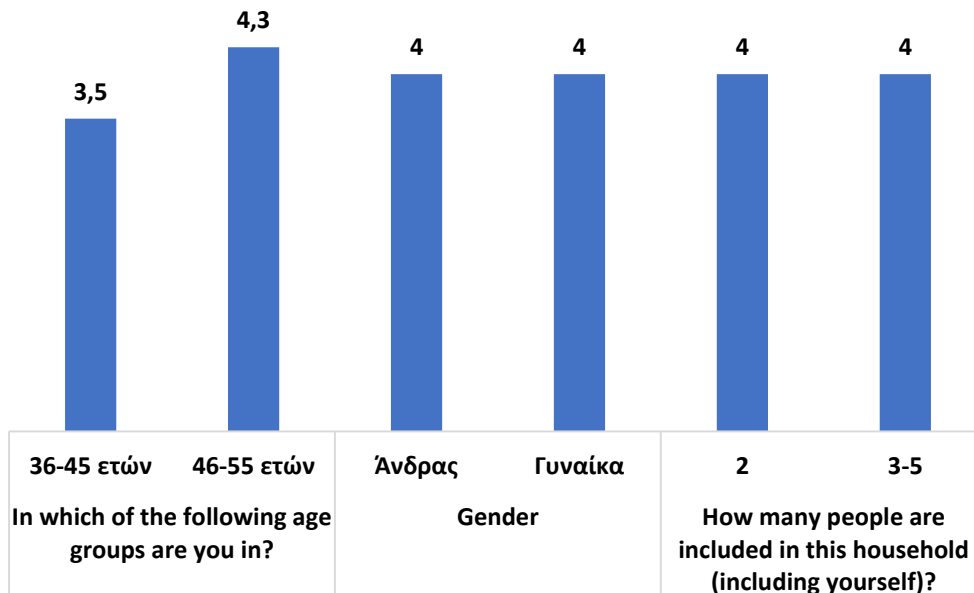
**How would you rate the current quality of the drinking water in the area in relation with the following factors?**

**4. CONTINUOUS (without interruptions)**



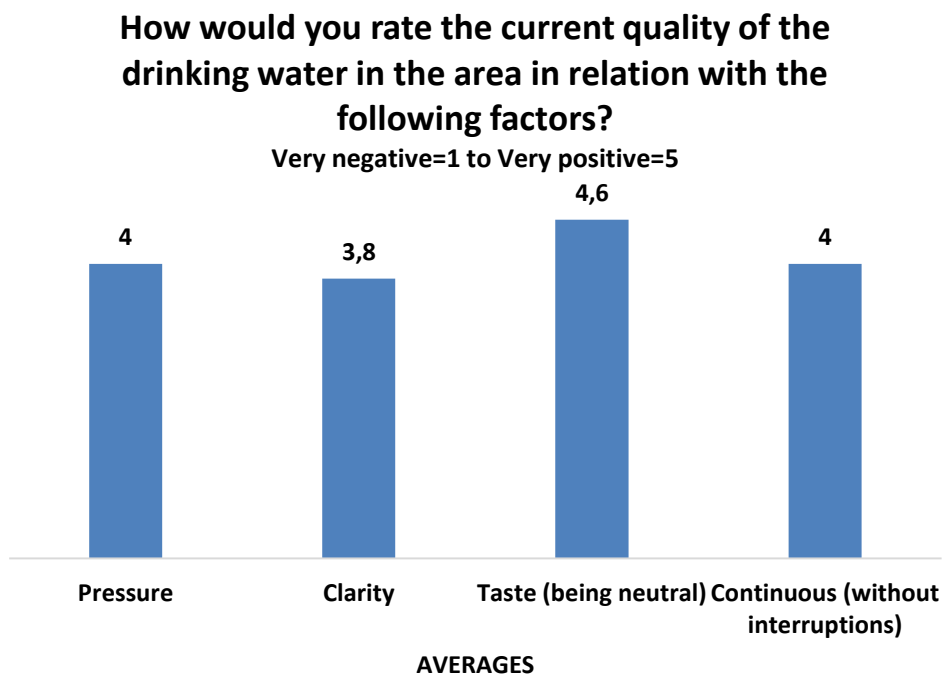
The averages per demographic category are mentioned accordingly so that any difference is more visible (where the Very negative corresponds to 1 to the Very positive corresponds to 5).

**4. CONTINUOUS**

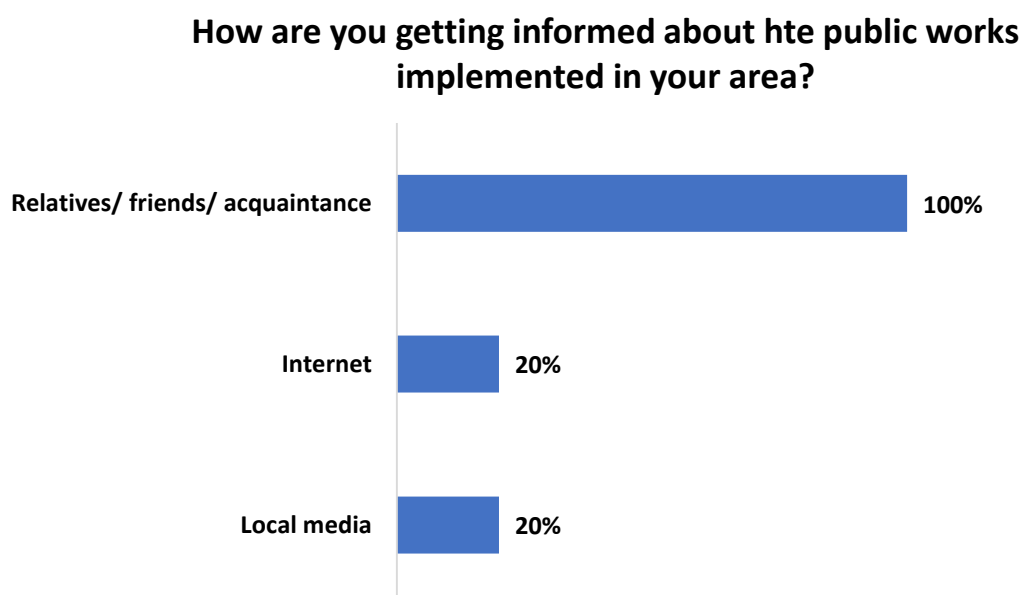




In summary, for all four factors evaluated, their respective averages are reported in the chart below (where Very Negative corresponds to 1 to Very Positive corresponds to 5).



The next question was about informing the residents about the public works that are happening in the area.



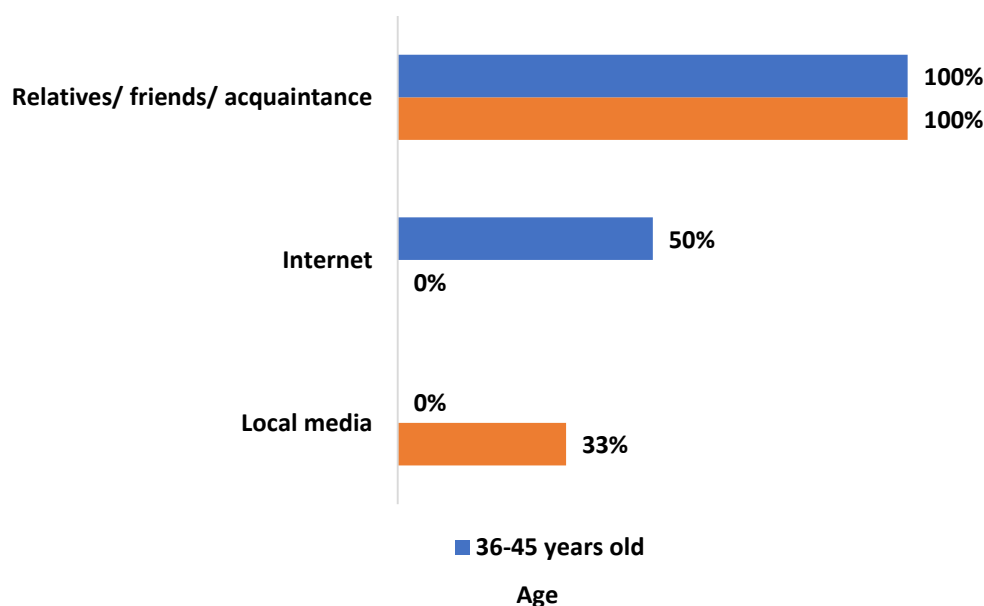
All participants (100%) as a channel of information about public works issues have their immediate environment (relatives, friends and acquaintances). 1 in 5 chooses to be informed from the internet as well as from the local media in the area.

Regarding the correlation with the demographic questions, in all cases the first choice (100%) is the relative / friendly environment which is used for the information about the public works of the area. Younger people (36-45 years old) use the internet to a greater extent (50%).

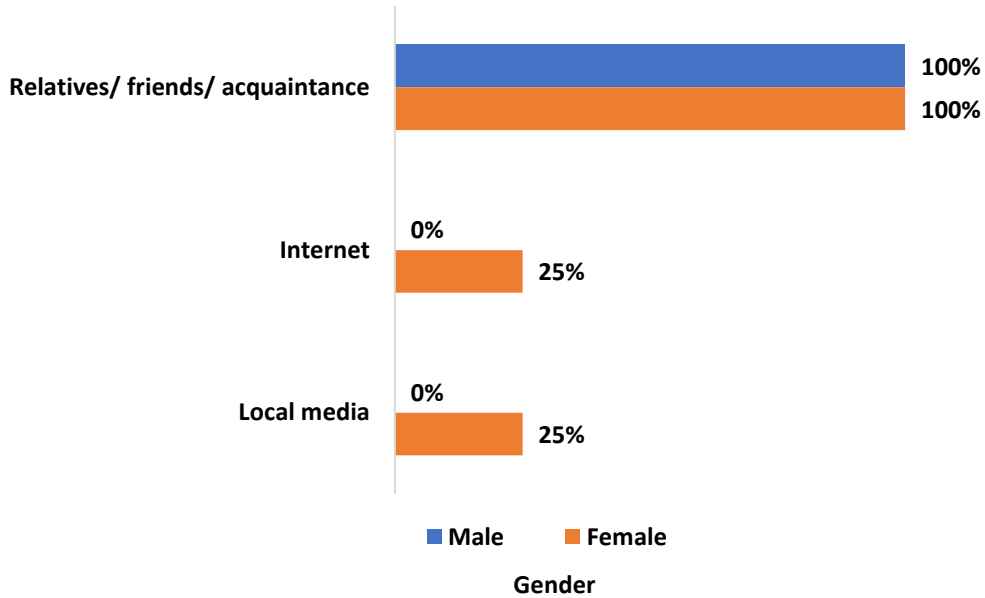
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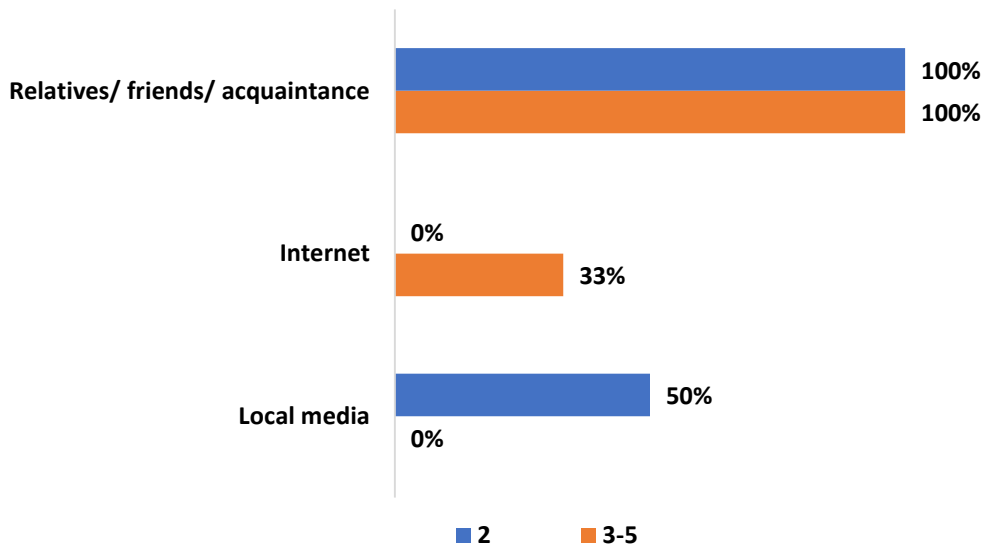
### How are you getting informed about hte public works implemented in your area?



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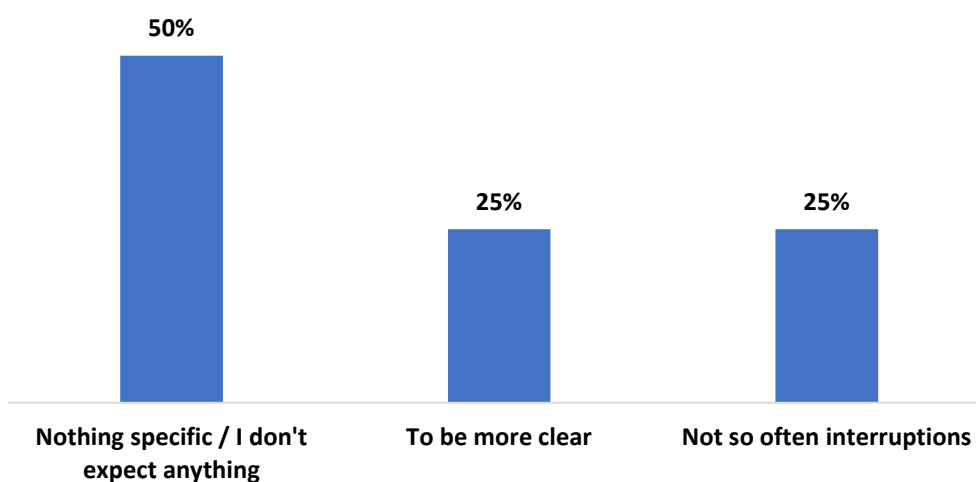
### How are you getting informed about the public works implemented in your area?



How many people are included in this household (including yourself)?

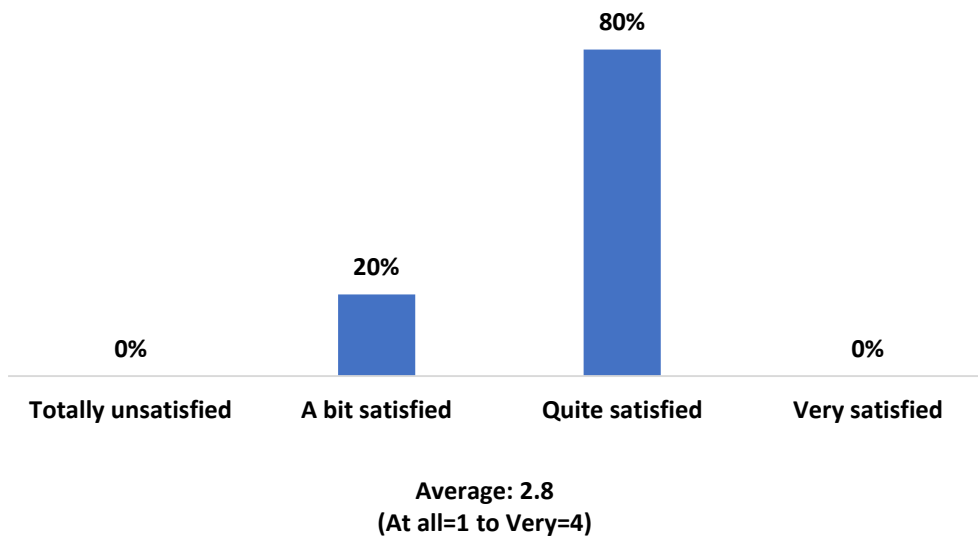
This was followed by the question about the new actions that the residents are waiting for to be carried out by the competent bodies regarding the issue of drinking water. The largest part (50%) did not have something specific in mind as further actions in this sector. 1 in 4, however, would like actions to be taken to be cleaner and also 25% would like a better supply so that there is no interruption.

**Which new actions do you expect to be taken by the competent bodies regarding the quality of the drinking water in your area?**



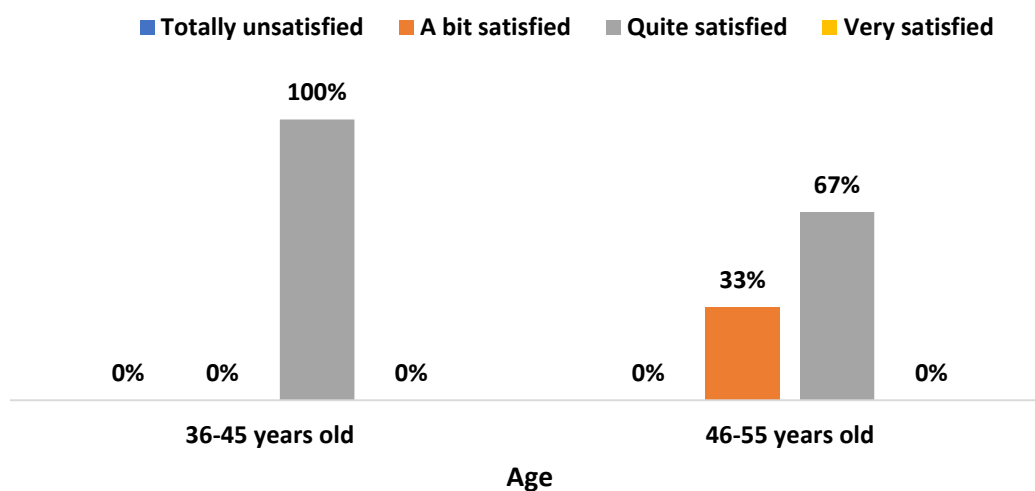
Next was the question regarding whether the residents are satisfied with what they saw / heard / learned about the "Aqua - lity" project in the area. Where, as shown in the diagram below, most of the residents of the area (80%) are quite satisfied with the project "Aqua - lity". There is of course a 20% who are less satisfied, probably from some issues in the water supply network that remain.

**Considering everything you have seen/ known/ heard about Aquality project, you would say that in general you are:**

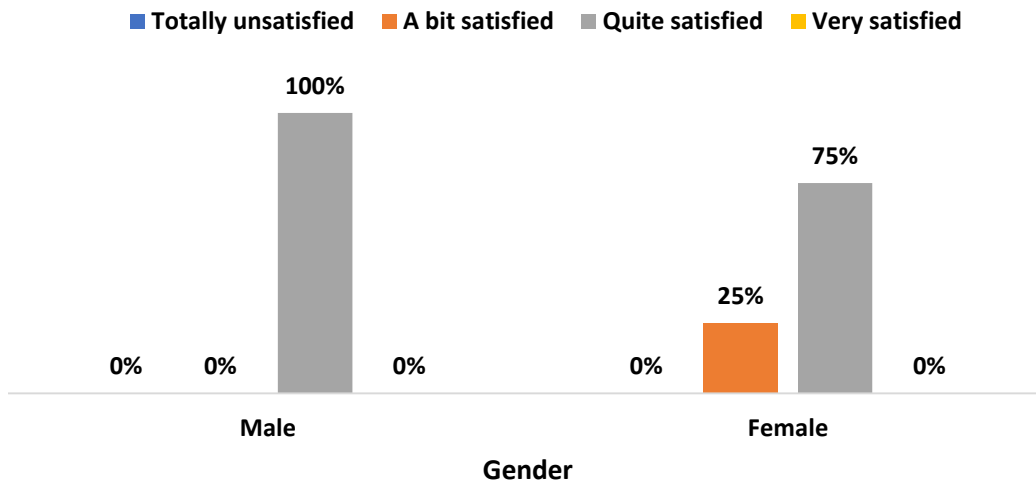


In the correlations with the demographic data of the research, there is no particular difference in terms of age, gender and the number of people in the household.

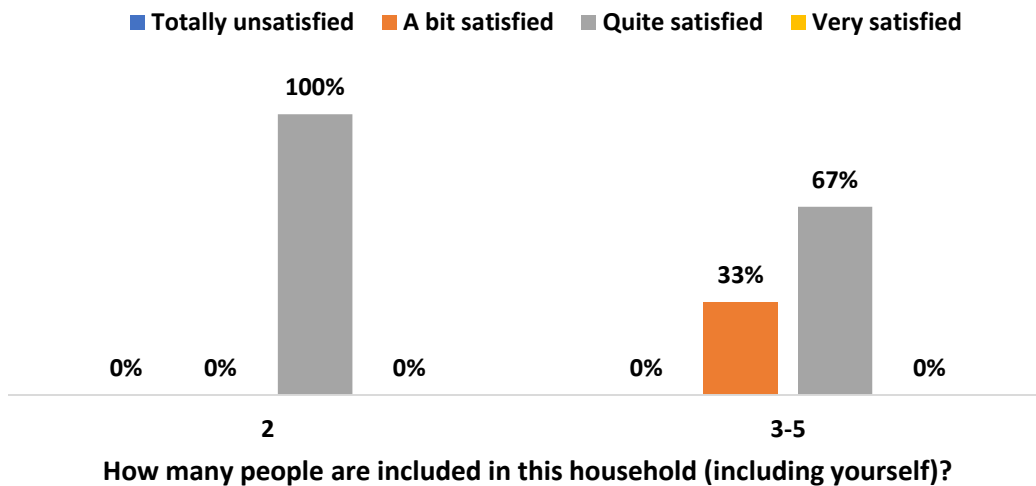
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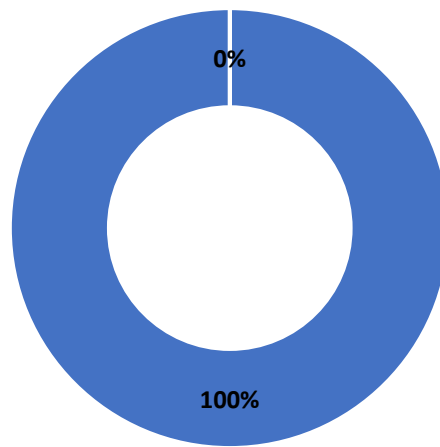


**Considering everything you have seen/ known/ heard about AQUALITY project, you would say that in general you are:**



The last question in the questionnaire of the residents concerned whether they would support the effort of the Municipality of Oraikastro to improve other factors of their daily lives. 100% of the surveyed residents are in favor of such practices and would support the Municipality of Oraikastro in new actions.

**Would you support the effort of the Municipality of Oraikastro to improve other aspects of daily life?**



■ Yes ■ No

## 5. Conclusions

In conclusion, in terms of the institutions and partners of the present project, there is a significant difference (Improvement) in the evaluation of drinking water in the area a year ago compared to the current situation. The evaluation of all the factors that are important in the quality of drinking water in the area of Anthoupolis Oraiokastro was positive, as well as all the procedures for achieving this goal. New actions regarding the extension of the network connectivity but also the proper maintenance of the existing project are reported by institutions and partners.

On the part of the residents, there is also a significant difference (improvement) regarding the evaluation of drinking water in the area a year ago and now. However, it is very important to note that most of the respondents were not aware of this project. In combination with the fact that the main channel for informing them about public works is mainly in the immediate environment (relatives, friends and acquaintances), it is considered imperative that the competent bodies communicate the information about the new tank and the benefits that will arise.

The evaluation of both the key factors for the quality of drinking water and for the general satisfaction from this project is observed to have a positive sign. Finally, it is worth mentioning that the society of Anthoupolis is on the side of the Municipality of Oraiokastro in its effort to improve other factors of the daily life of the citizens of the area.



## 6. Epilogue

In conclusion, water supply projects that improve the quality of drinking water, have an improving effect on the quality of life of the residents of the areas of influence. This is confirmed both theoretically (from respective studies) and practically (from the evaluation of the residents of the area of Anthoupolis). The continuation of such improvement actions regarding the daily life of the citizens of the Municipality of Oraiokastros will be supported by the citizens of the area.