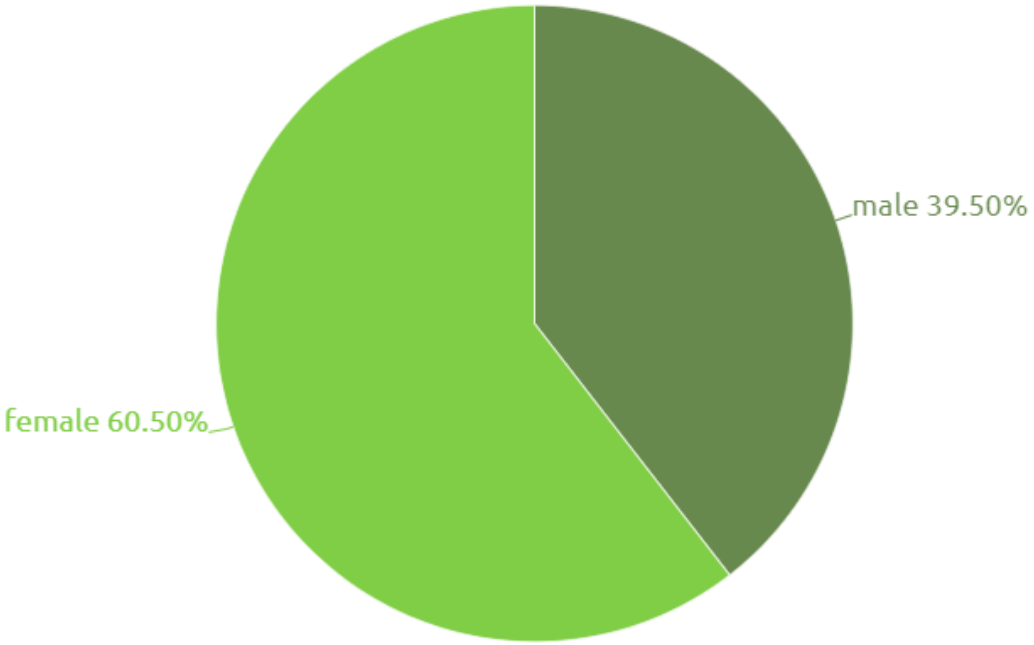
Results

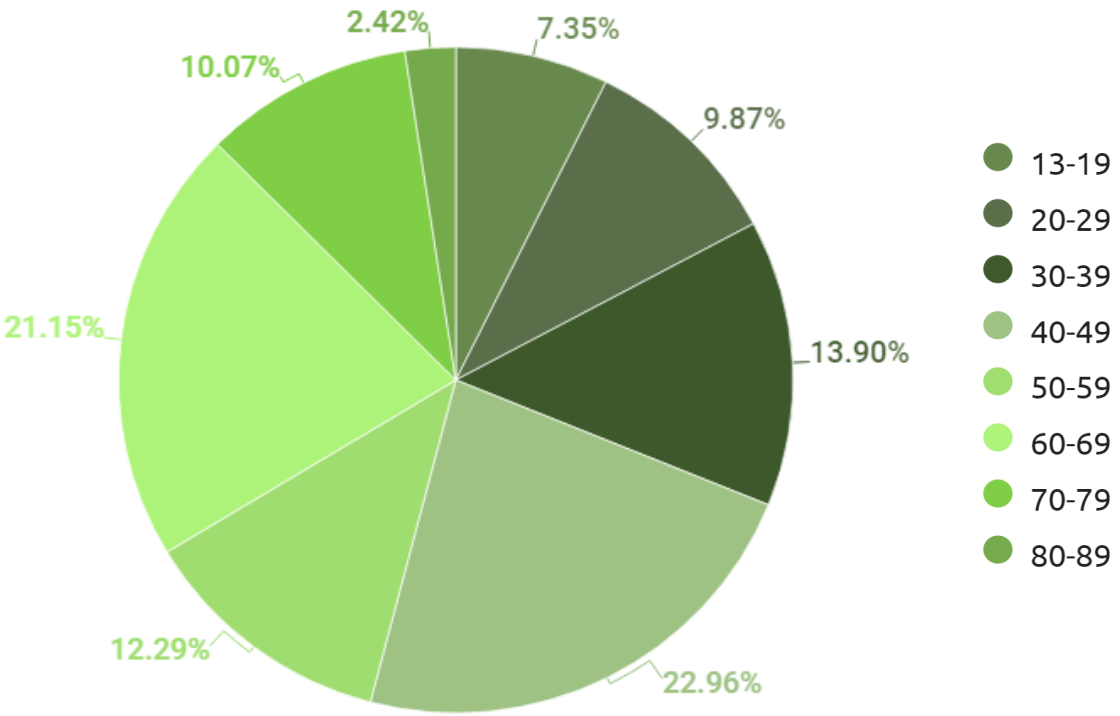
Basic information survey

Question 1: Gender results

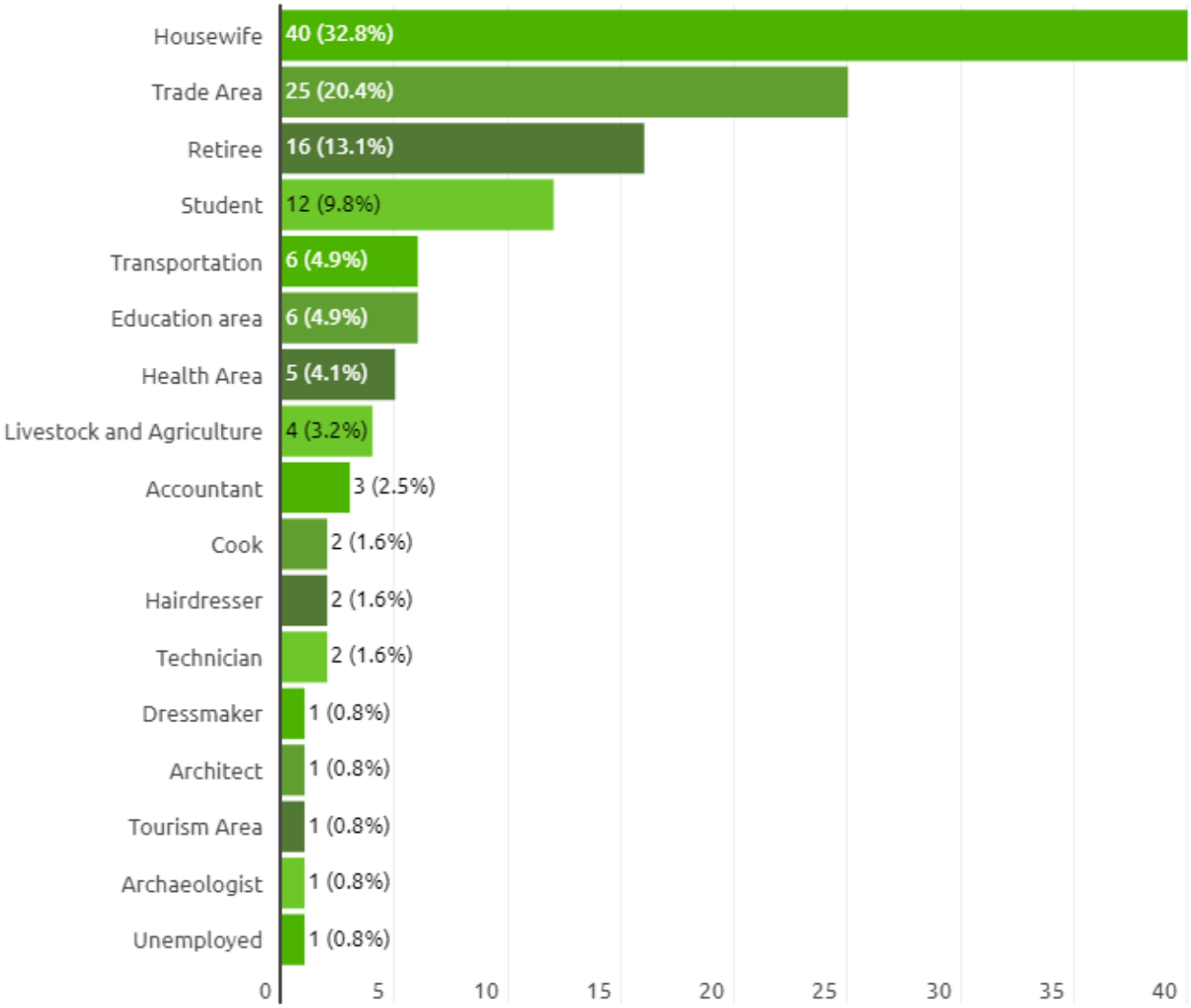


In the population survey, 60.50% were female. As we visited each household during working hours, it was mainly women at home who answered our questions. This shows that women have more knowledge about the water status and its problems, by doing housework and having constant contact with water.

Question 2: Age Survey

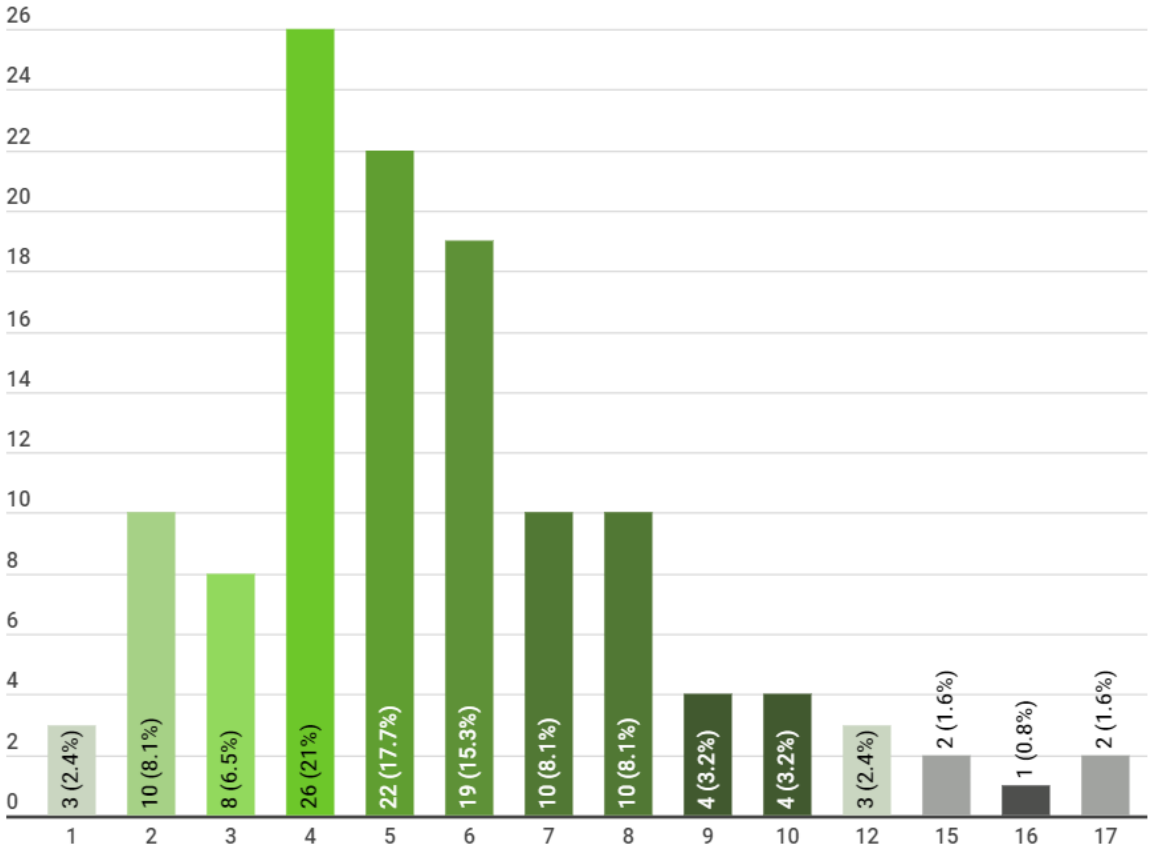


Question 3: Occupational Survey



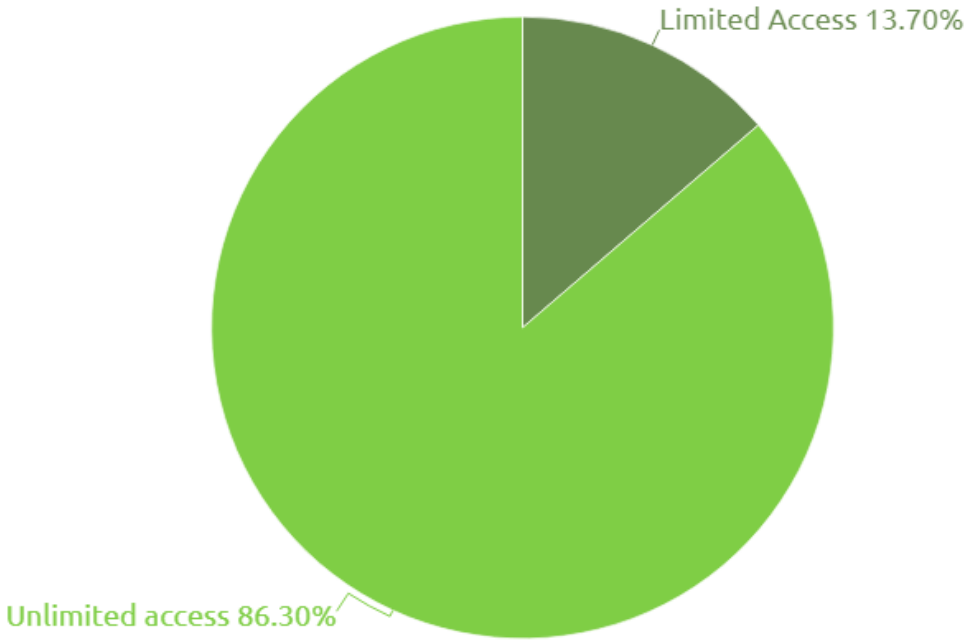
Question 4: Survey of inhabitants per household

As we can see, the population surveyed covers different ages, occupations and habitants per household. This makes the survey meaningful and reflects the effect of water on different people.



Results about accessibility and water perception

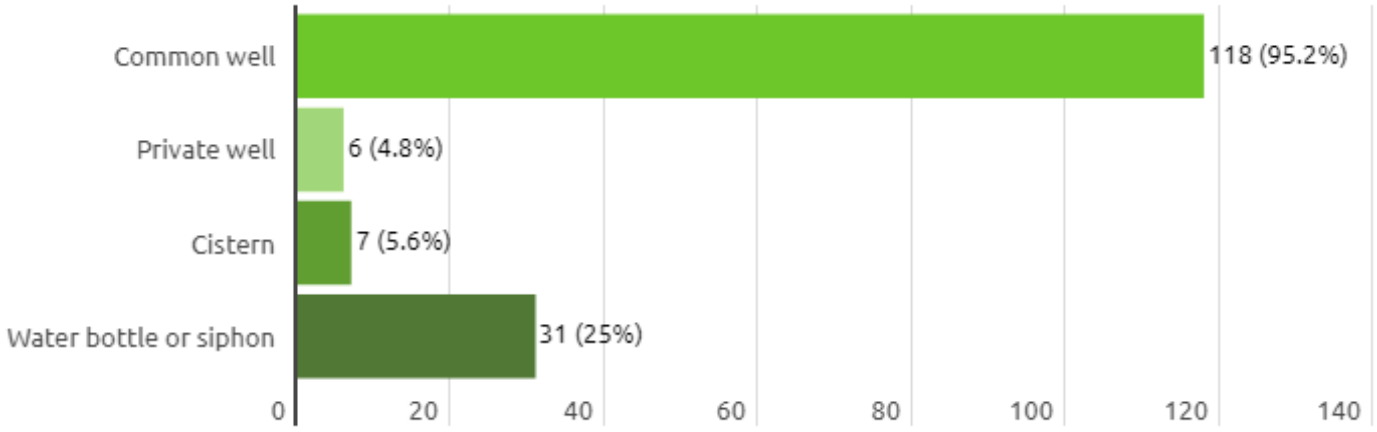
Question 5: About having water everyday



Analyzing this question, we can see that 86.30% of the respondents have water every day. However, some of them mentioned that hours were limited, for example, from 8 to 12 am

and from 4 to 6 pm. This shows a certain type of restriction to which people are used to but not really conscious (only 13.70%) about it because they lived in these conditions most of their lives.

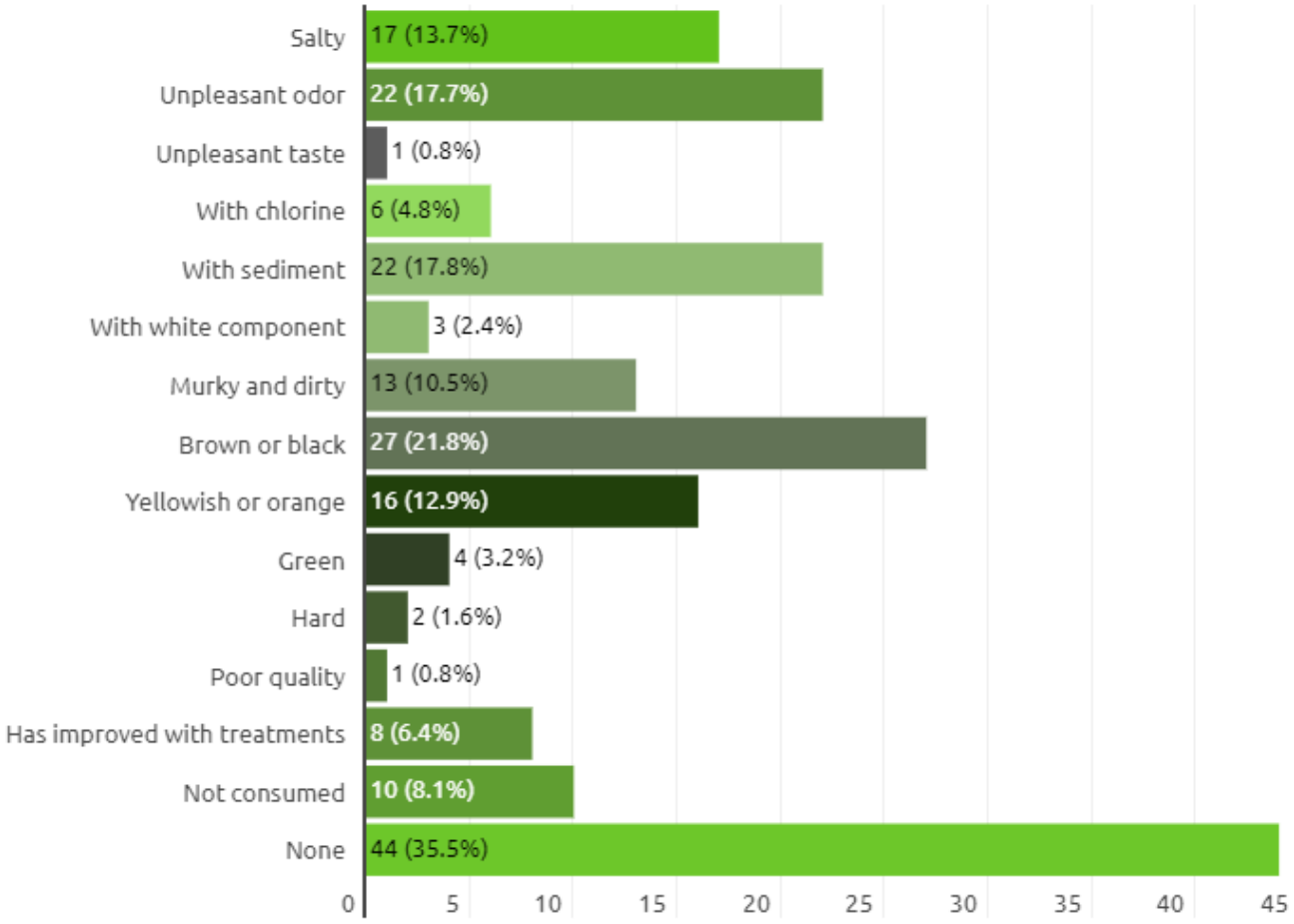
Question 6: Knowledge about where water comes from.



Every urban community has used a common well to store and distribute their drinking water, this is why more than 100 persons had access to these common well. However, many of them combined the use of this water with private wells, cistern, wagons or cyphons. This is because of the quality or quantity of water they receive from the well. Some commented that there isn't enough pressure for water to come out, others mentioned that the quality of water wasn't the best.

Question 7: People's perception of their water.

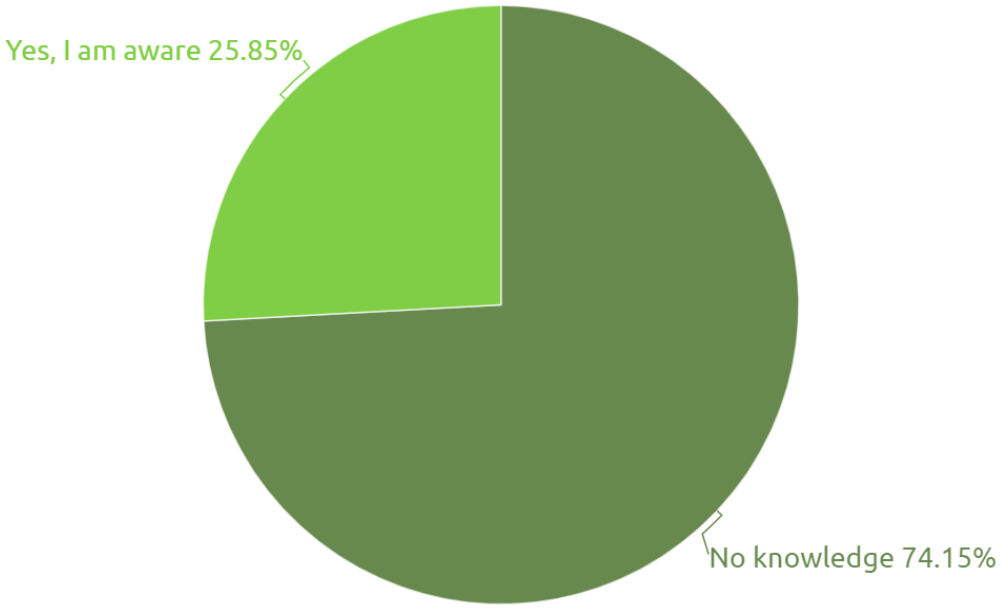
Every person had a different perception notwithstanding that their water came from the same well in each urban community. For example, although some people mentioned their water had improved, others were worried about either color, odor or flavor like sediment, yellow, green, brown or even black tones. Nauseating smells were even perceived. Other worst perceptions like water with algae, sludge, and tartar were mentioned. This shows that even though almost everyone has access to water, it is not potable and they consume it anyway.



Surprisingly, there was a percentage of people (over 40%) who didn't notice anything wrong with the water, even though we knew and saw the water status on their well, this is why we can conclude that people got used to this water.

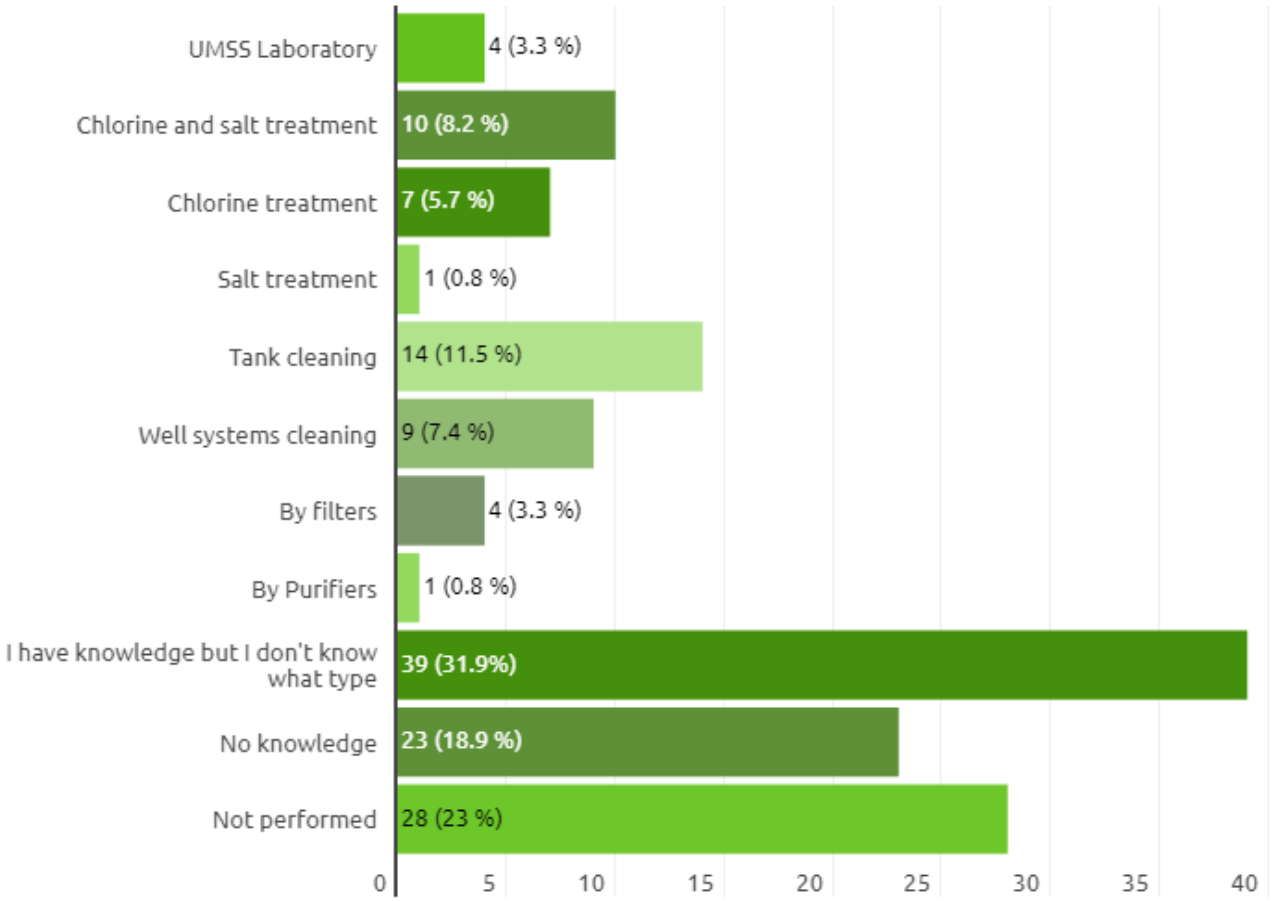
Public awareness of the current water pollution situation and its appropriate treatment

Question 8: Survey about knowledge of water quality by doing an analysis



74.15% of our sampling population didn't know their water status, just like they didn´t know that arsenic was present in their well, despite the fact that the presidents of the urban communities told us that they had the results of the sampling campaign done in 2018 and shared it with the neighbors. This shows us a perception that people are informed but they don't show much interest in it knowing that these results are also public on the Internet.

Question 9: Types of treatment in the water of the communities.



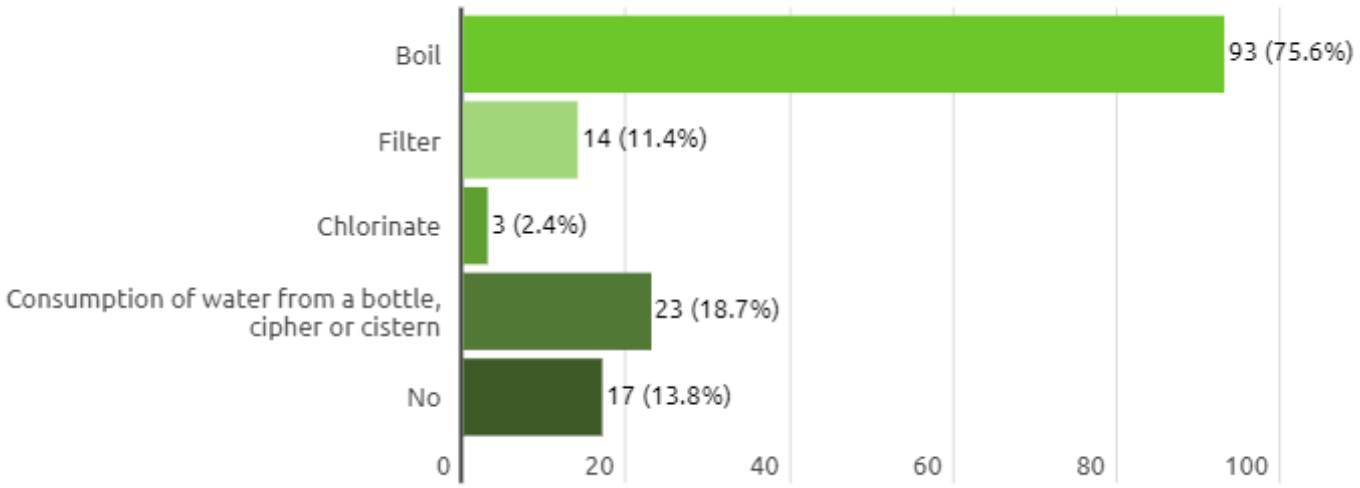
Talking about the work made by the universities, some people thought that they made some kind of treatment to their water reservoirs when in reality they only detected heavy metals. In the interviews we had with the presidents of each urban community, some told us that a treatment of chlorine and salt are made but only to remove manganese. The others told us that a kind of treatment was made but didn't know the name. Even if they knew that arsenic is present on their wells, in Bolivia there´s no validated treatment for it.

Almost all our sampling population knew that some kind of treatment is done on the urban community, but they didn't understand or simply they forgot it. Something that caught our attention was that some people confuse a real treatment with tank or pipe cleaning showing

us that even the presidents are mistaken. Finally other treatments mentioned by people were filters and purifiers. Although this can help to remove organic and inorganic solids, it doesn´t help in removing heavy metals such as arsenic and mercury.

Unfortunately, a big percentage of the respondents were unaware of, or affirmed that there isn't a water treatment at the urban community.

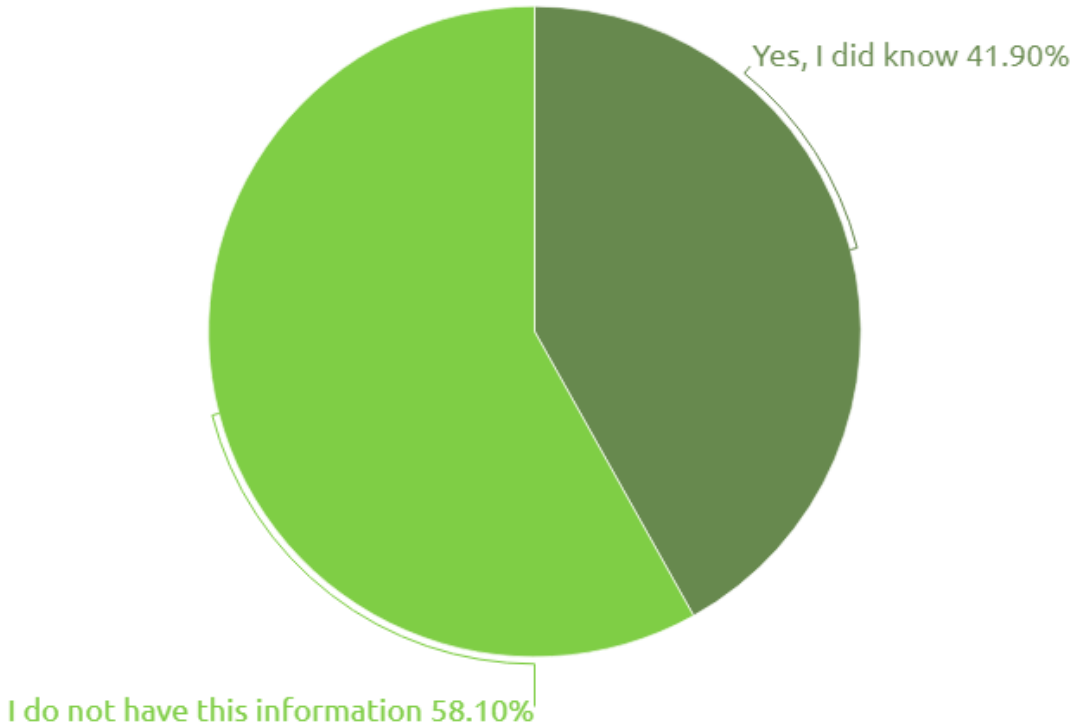
Question 10: Water consumption care before use



Clearly we can see that the majority of people boil their water thinking that this is enough to remove all types of contaminants as the impurities in the water remain adhered to the boiler walls. Besides, some people considered that this didn't solve the problem and prefered not to risk their health by consuming well´s water and bought either wagon, cyphon or cistern. On the other hand, we can see that there are people who think their water is of good quality and consume it straight from the tap.

Question 11: Knowledge about the sampling campaign.

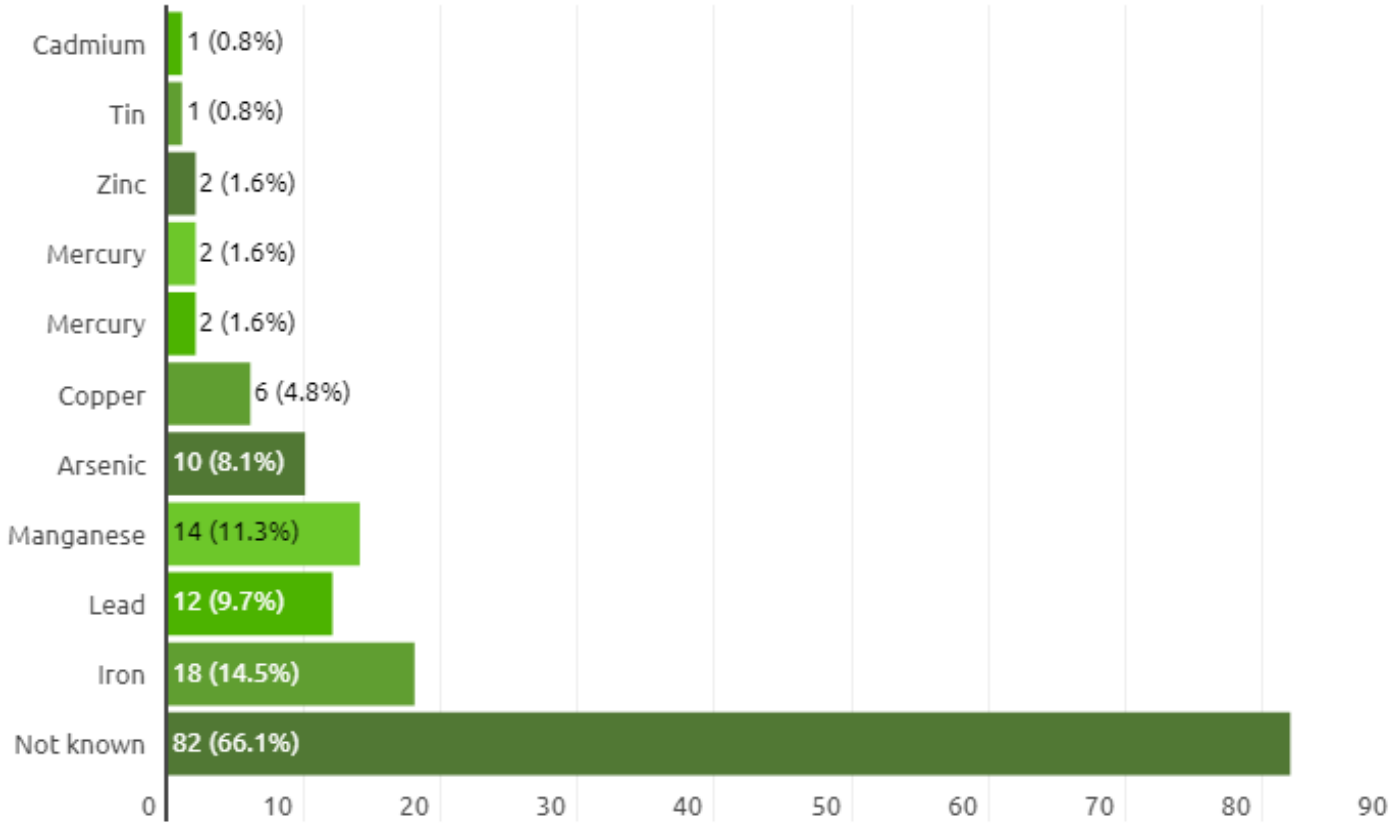
58.10% of the people didn't know that a sampling campaign was carried out, showing us that there wasn't a good communication of information or they didn't give it the proper importance. Although there were people that lived 50 years on the urban community, nobody informed them or were not aware of this, making us understand that they weren't considerate or informed in the right way. Something we can highlight is that from this percentage, most of them are women which is alarming because, as we mentioned before, women are the ones who have more contact with water in their households.



In contrast, there is this 41.90% that does know about the sampling campaign but the biggest problem we could notice was that the results given by the laboratory were not comprensible or easy to understand.

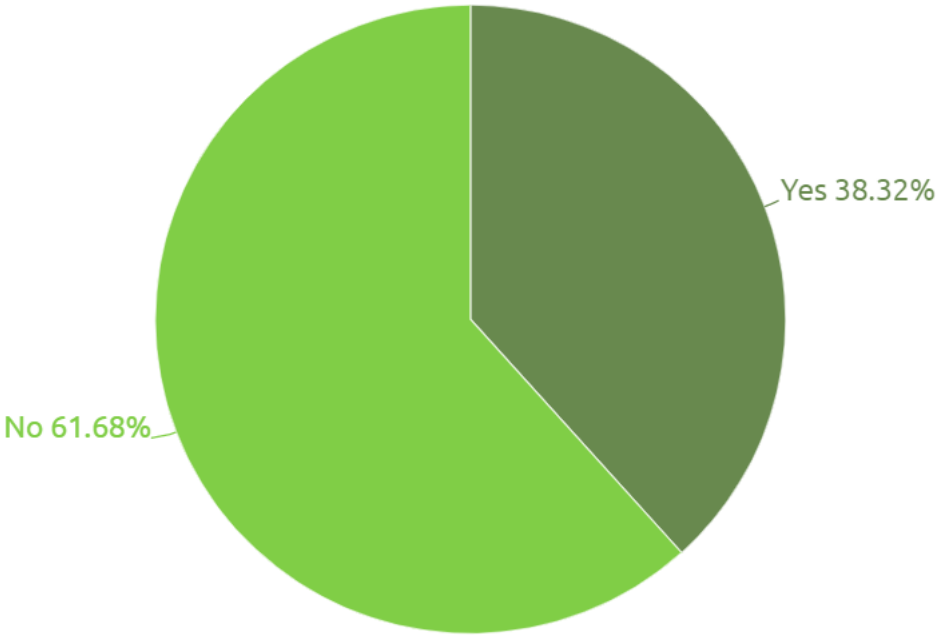
Question 12: Knowledge about presence of heavy metals in water

With this result we can notice that almost all the people surveyed didn't know what a heavy metal was and that this could contaminate water whether in the capture, storage and distribution of
water. This shows us their perspective about the lack of importance they give to heavy metals, giving more emphasis to this type of contamination that can be perceived by the senses.



Raising public awareness of the current situation of contaminated well water

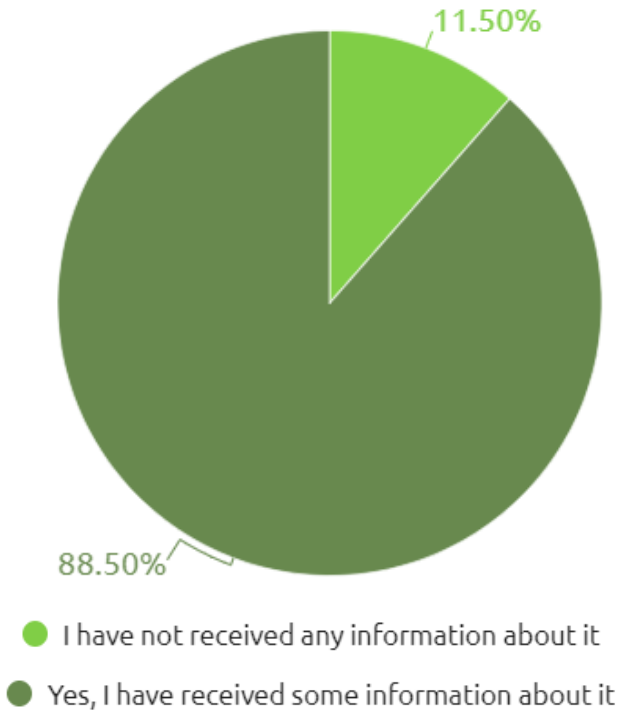
Question 13: Education about health and water



More than 60% of the respondents did not receive education about water and health during their higher education. This is alarming because even though they were taught at school that everyone needs water to live, not knowing that water could have contaminants and

cause terrible diseases is not correct. These people would have continued thinking that, no matter what type of water, everyone needs it.

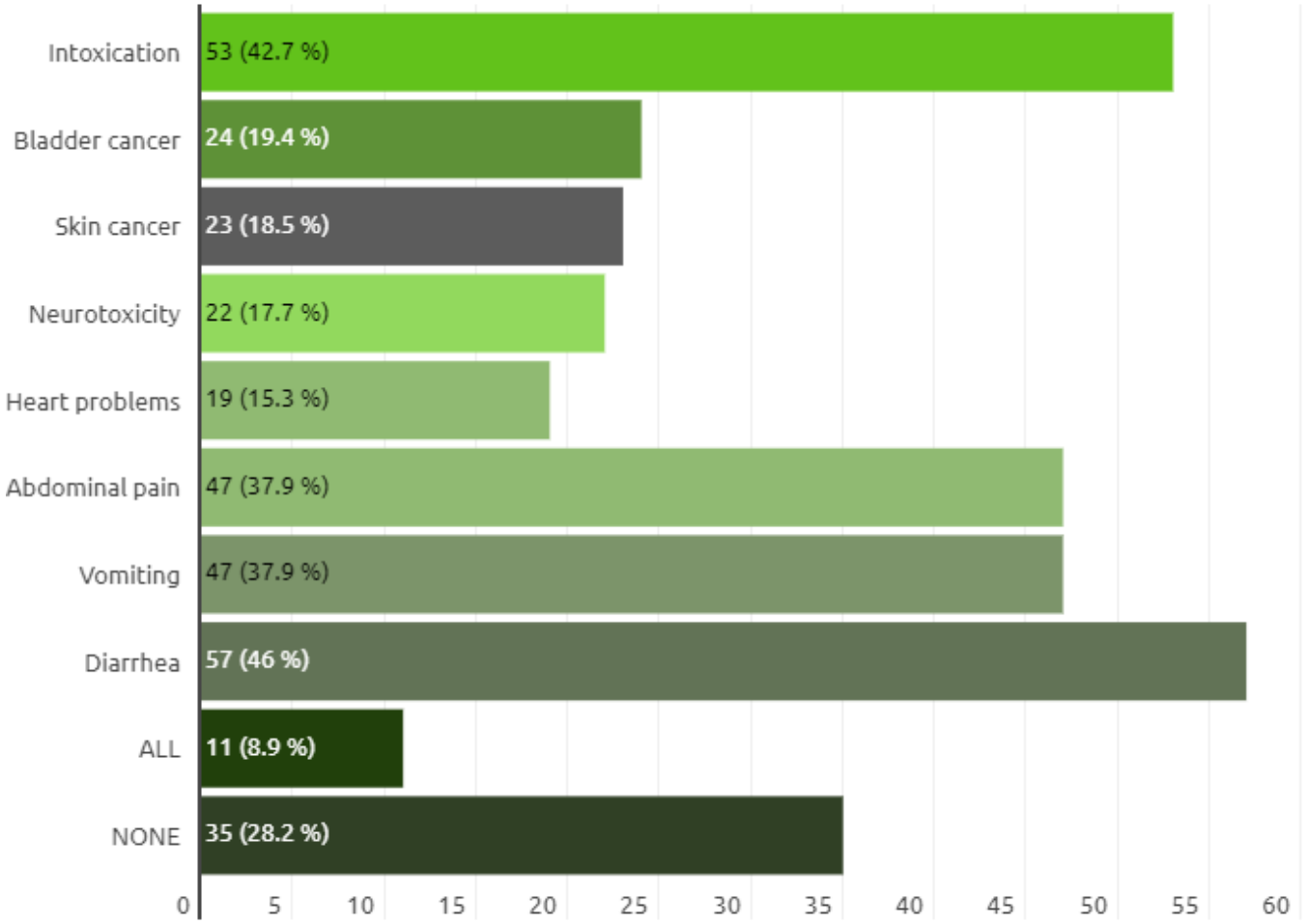
Question 14: Knowledge about arsenic and their health effects.



Despite the fact that more than 60% of the respondents did not receive any type of education about water and health (question 13), only 11.5% of people didn't know that contaminated water can bring negative effects to health as well. The remaining percentage and the rest of the respondents that did receive education about water and health knew about the risks of consuming contaminated water, either by simple logic or because they learned it somewhere.

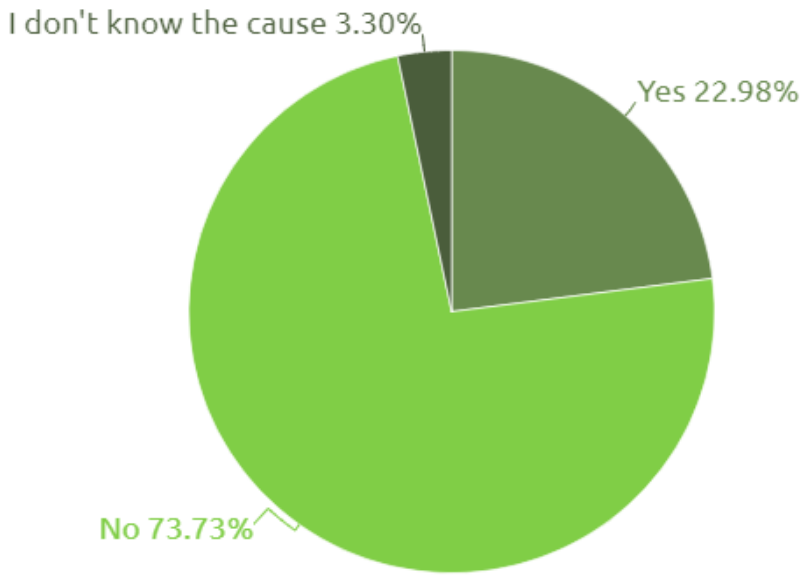
Question 15: Knowledge about types of sickness because of contaminated water

According to the survey results, most people knew about diarrea, nausea, abdominal pain and intoxication because it's something common and easy to relate with water. But unconsciously they related these diseases without really knowing that it is arsenic. Likewise, the percentage that didn't think that these carry harmful effects is alarming.



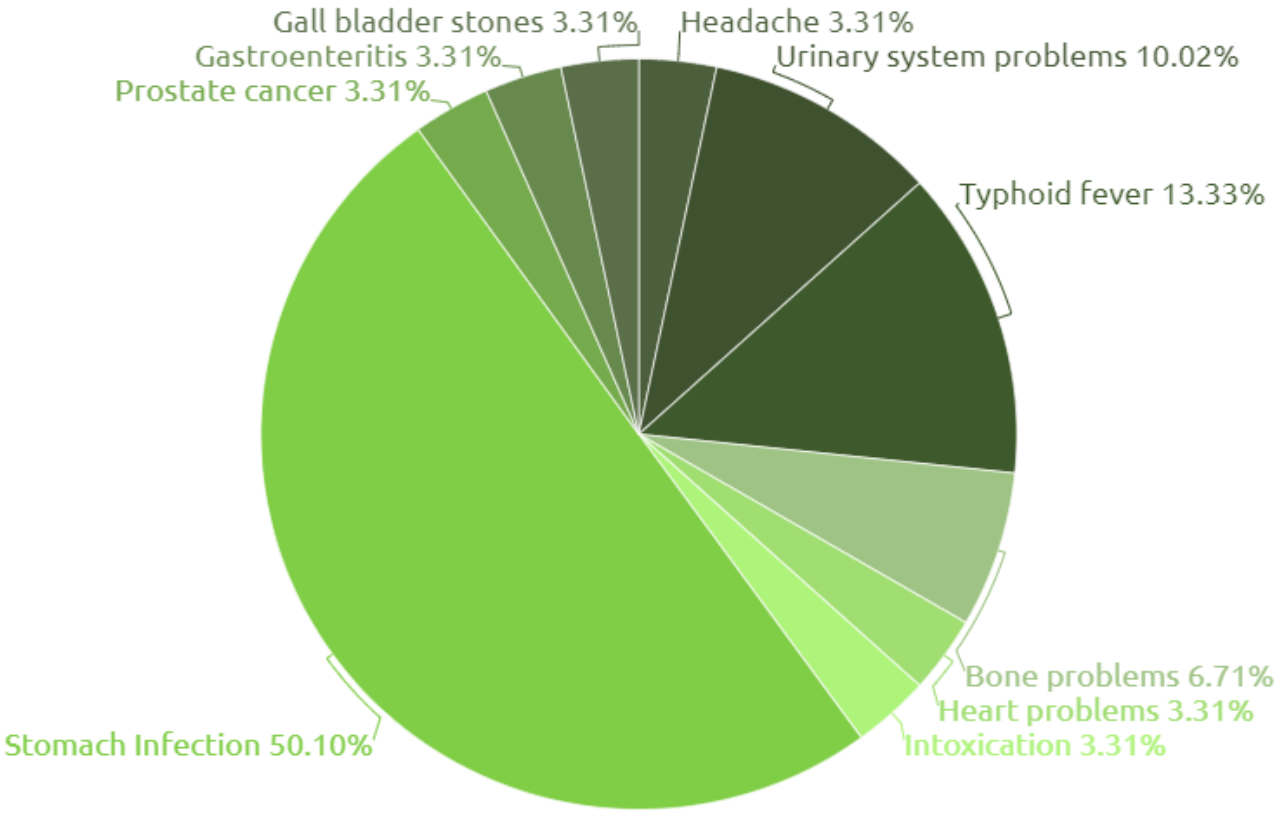
Effects of contaminated water on public health

Question 16: Medical care. Have you ever visited a doctor for any of these reasons?



Fortunately, 73.73% of the respondents answered that they didn't have to go to see a doctor because of any of the diseases mentioned before. Nonetheless, there was this 22.98% of the respondents that needed a kind of treatment or medicine. It should be noted that many of the respondents commented that they prefered to stay at home and cure themselves with traditional medicine such as mates, medicinal plants, etc. The worrisome side of this high percentage of people who didn't attend a treatment with a doctor or hospital, is that aside from herbs or other natural remedies, they tend to misuse antibiotics.

Question 17: Disease and its origin

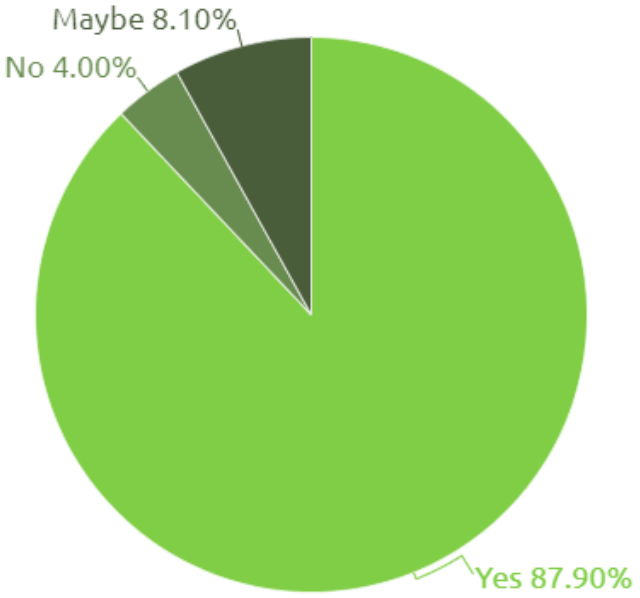


Specifically, the fourth part of the population sampling answered that they went to a medical consultation and this is why they know the origin from their disease, for example, the most common diseases such as stomacal infection or typhoid fever are caused by the consumption of contaminated water. As they know the origin of their "problem", they decide to stop consuming the well´s water and buying a wagon, cistern or cyphon or changing their habits like boiling water. It should be noted that these answers are not only of one person but of the entire family living at the house, where the average is six habitants per household.

In contrast, less than half of the three fourths remaining appealed to traditional medicine. This reveals that this part of the sampling population doesn't know certainly or with medical support the real origin of the disease they could have suffered and this is why they didn't make any change to improve their health and continue in the same situation of having their water contaminated, making their problem worse.

Project interest and understanding

Question 18: Would you be willing that an arsenic detection system could be implemented?



After people responded to the survey, 87.90% were more conscious about the problems that heavy metals can bring by consuming contaminated water and this is why they were interested in implementing a system that could detect arsenic through an easy and not expensive system.

8.10% of the respondents thought that heavy metals were not an influential or significant problem on their water rather than having water contaminated by sediments and organic or inorganic solids. The other 4% wasn't willing to accept a detection of arsenic on the urban community well because of their good perception of its water.

Question 19: Do you know what synthetic biology is, do you know what a biosensor is?

Only 1.60% (2 persons) did have knowledge about what synthetic biology is. Clearly, in Bolivia synthetic biology is not well known, noticing that these 2 persons weakly know what synthetic biology is. With this we can notice that science communication is so important to us and it encourages us to continue spreading information about synthetic biology with even more effort and commitment.

3.20% of the respondents (4 respondents) did know what synthetic biology and a biosensor is and the 8.9% knew what a biosensor is. Contrasting the people who know what either of both were related to the people who didn't know, we can notice that the percentage is scarce.

86.30% of the respondents didn´t have any knowledge about what synthetic biology or a biosensor is. As they didn´t know we explained to them more about biotechnology, synthetic biology and our project and they ended up really interested about all the technology we used, which made us realize that we could achieve an important goal.