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Intellectual Output 4: *Develop digital tools to strengthen involvement in water issues by the general public especially the Roma population*

UNIVERSITAS GALATIENSIS

Norwegian University of Life Sciences

Study on access to water and water quality knowledge

Being part of the European Union, Romania has been required to implement tangible changes regarding the access of the population to basic utilities aligned to the current level of technology. Although, since its adherence to the European Union, Romania has definitely suffered a process of transformation to align its public policies with the European standards and requirements, there are still areas where both Romanian people and minorities deal with poverty and poor living conditions, including here the access to water. Of these, the worst situation is in the case of the Roma population. There are many projects and reports of Roma minorities inclusion, and they are mainly targeting the following objectives:

1. The institutionalization of the political objectives assumed by the Romanian government in the Roma issue and making the central and local public authorities responsible in the actual implementation of the measures destined to improve the situation of the Romanian citizens of Roma ethnicity.
2. Providing support in forming and promoting an intellectual and economic elite of Roma people able to function as facilitator of the modernization and integration policies.
3. Eliminating stereotypes, misconceptions, and the practices of some clerks in the central and local public institutions which encourage the discrimination of the Roma ethnics.
4. Positively changing the public opinion regrading in terms of the Roma population, based on principles of tolerance and social solidarity.
5. Stimulating the participation of the Roma ethnics to the economic, social, educational, cultural, and political life of the Romanian society, by attracting them through sectorial programs of assistance and community development.
6. Prevention of institutional and social discrimination of the Romanian citizens of Roma ethnicity in their accessing services provided by the society.
7. Ensuring conditions for equality of chances of Roma ethnics in order to achieve a decent standard of life. [1]

The last objective, through the syntagm ‘decent standard of life’, implies decent living conditions, that is housing and access to utilities. Thus, the action targeted in this direction would be, among others, the development of programs fully financed by the government or in partnership to ensure the minimum required living conditions in the Roma communities, that is electricity, potable water, sewerage system, gas and sanitation.

The right to decent housing and access to utilities should be a must for the Roma ethnic communities, but also for the poor Romanian communities. Unfortunately, in 2023, there are still headlines announcing that half of the people in Moldavia are not connected to the public water system. [2][1]

[1] The article follows a statistic done by the Romanian National Institute of Statistics in the year 2022. According to the survey, the population connected to the public water system is around 75%, with the lowest numbers registered in Moldavia, where only half of the population has access to the public water system. Statistically, Moldavia is the poorest region in the country.

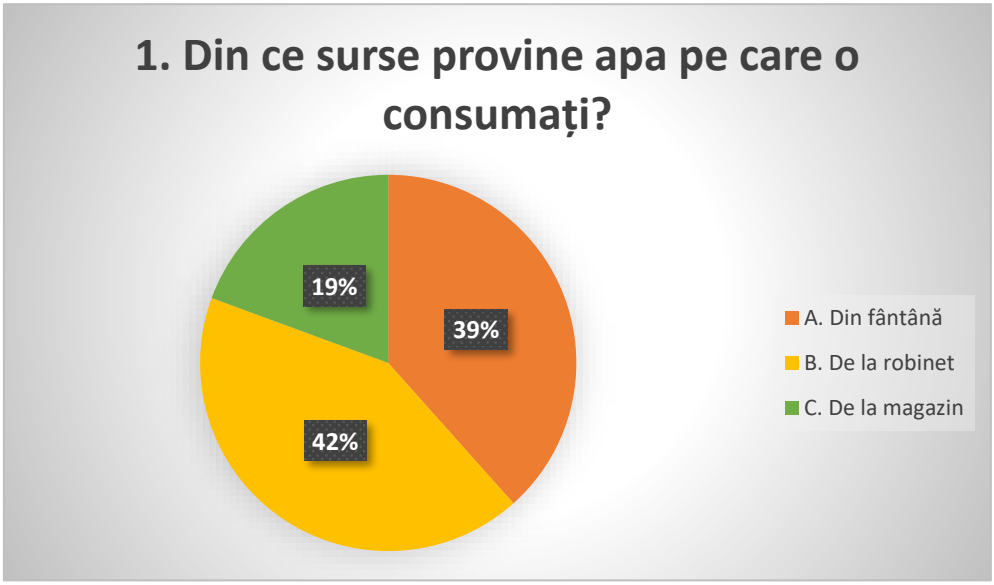
In this context, given the geographical position of the 'Dunarea de Jos' University of Galati, that is, in the south of the Moldovia region, the present questionnaire has been created so as to best reflect the reality of the access to water and water quality knowledge in areas known to be populated both by Roma ethnics and Romanians. Thus, three communes have been selected as follows: the commune Ivesti with the villages Ivesti and Bucesti, the commune Barcea with two villages Barcea and Podoleni and the commune Brahasesti with the villages Brahasesti, Corcioveni, Cositeni and Toflea.

The children in the 8th grade of the secondary schools in Toflea, Ivesti, Bucesti, Brahasesti, and Barcea (a number of eight schools in total) have provided answers to the questionnaire.

The villages Brahasesti and Toflea are part of the commune Brahasesti which, according to official data [3], has a population consisting mainly of Roma ethnics 58,77%. Of the two villages, Toflea has the highest ratio of Roma ethnics. Although, the results to the questionnaire are discussed generally, special attention is paid to the answers gathered from Toflea as they might illustrate the reality of a sensitive demographic in Romania. Thus, the children in the Toflea school responded that their main source of water is the well. Also, in terms of the priority according to which they consume the water, the majority of them prioritizes water around cooking and then drinking. Although their main source of water is the well, many of them responded that they have continuous access to tap water in the house, which means that they probably use automated hydrophores to extract the water from the wells. However, unfortunately, there have still been two answers mentioning that the access to water is outside of their household and the water has to be carried with the bucket or water can. Also, many of the respondents have admitted to the fact that there are no sewage systems and that they throw away the wastewater either in the yard or in front of the house or at the closest drain.

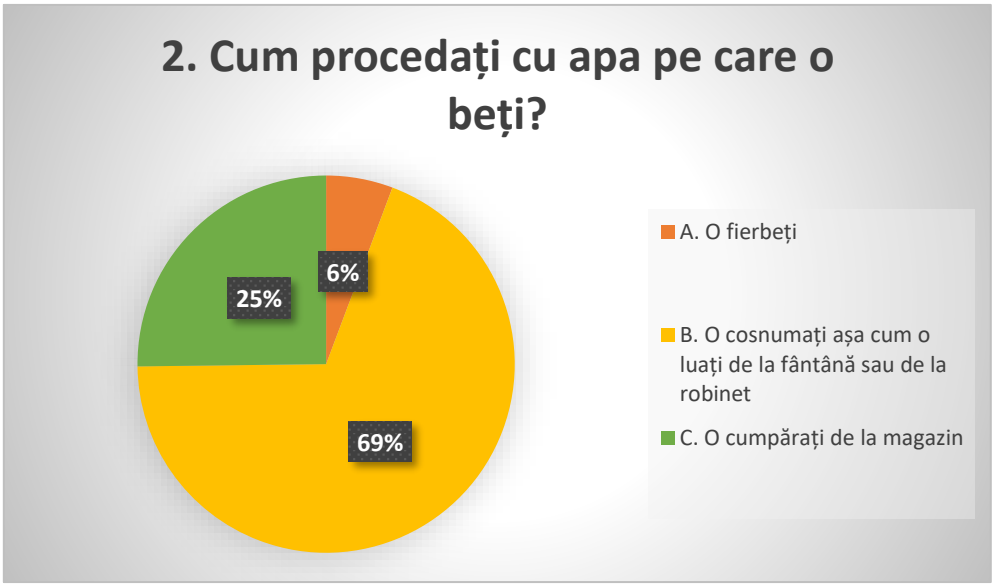
The villages Ivesti and Bucesti are part of the commune Ivesti which, according to official data [4], has a population consisting of Romanians (76.35%) and Roma ethnics (16.77%) and for the commune Barcea, with the villages Barcea and Podoleni, the percentages are Romanian (72.55%) and Roma ethnics (13.28%).

The following pie charts represent the global results to the answers provided to the questionnaire.



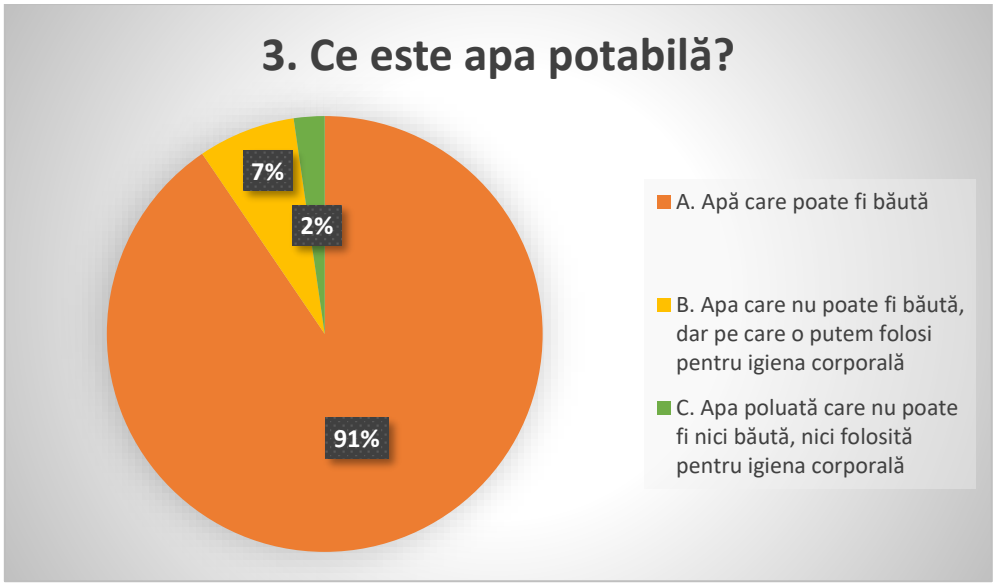
Q1: What is the source of the water you consume? **A.** The well; **B.** The tap; **C.** The store.

Although the highest percentage has registered for the choice B, this does not necessarily mean that we are dealing with a modern system for the distribution of water. Many of the households in the area targeted by the questionnaire have wells and systems such as hydrophores which allows them to have access to water inside their home.



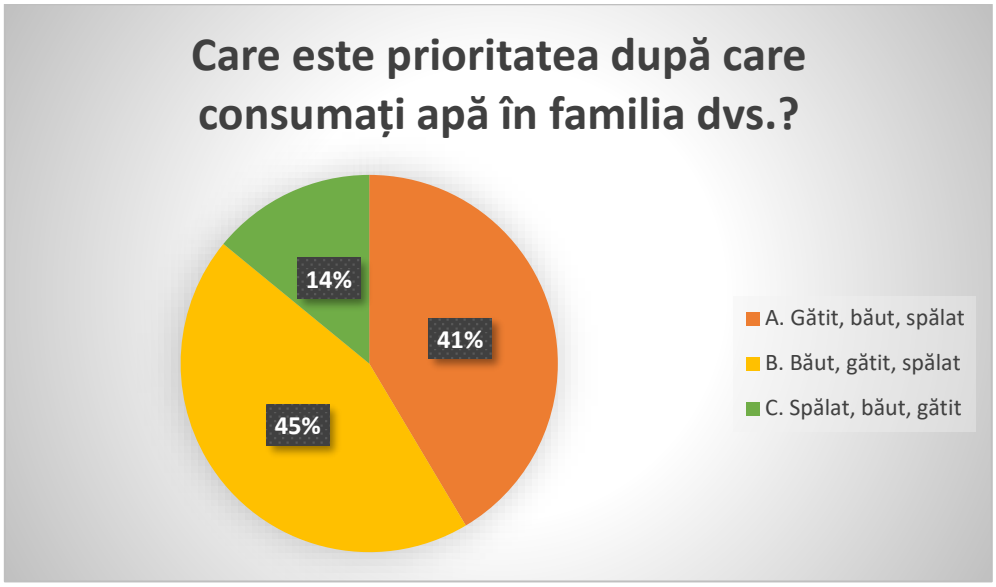
Q2: The water you drink is it: **A.** Boiled first; **B.** Consumed as it comes from the well or from the tap; **C.** Bought from the store.

The higher preference for answer B, the water being consumed as it comes from the well or from the tap, translates into a lack of education of the population regarding filtering systems and water quality.

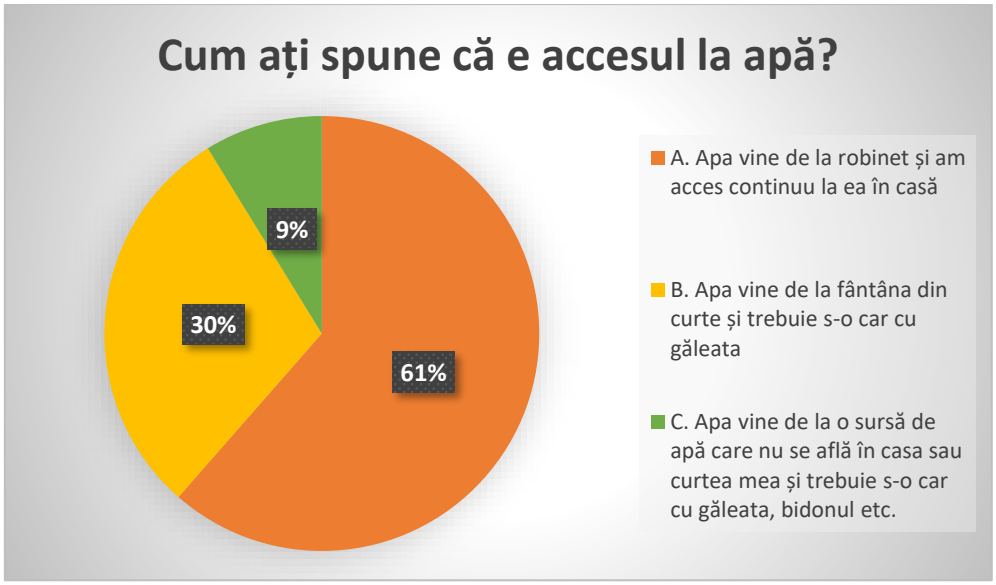


Q3: What is drinkable/potable water? **A.** Water that is safe for human consumption; **B.** Water that cannot be drank but can only be used for personal hygiene; **C.** Polluted water that is not safe for human consumption nor for personal hygiene.

Even though most of the respondents are familiarized with the term potable water, there are still a number of people who still do not know what potable water is, which means that there is still a need for campaigns destined for educating people with regard to water consumption, water safety and access to water.

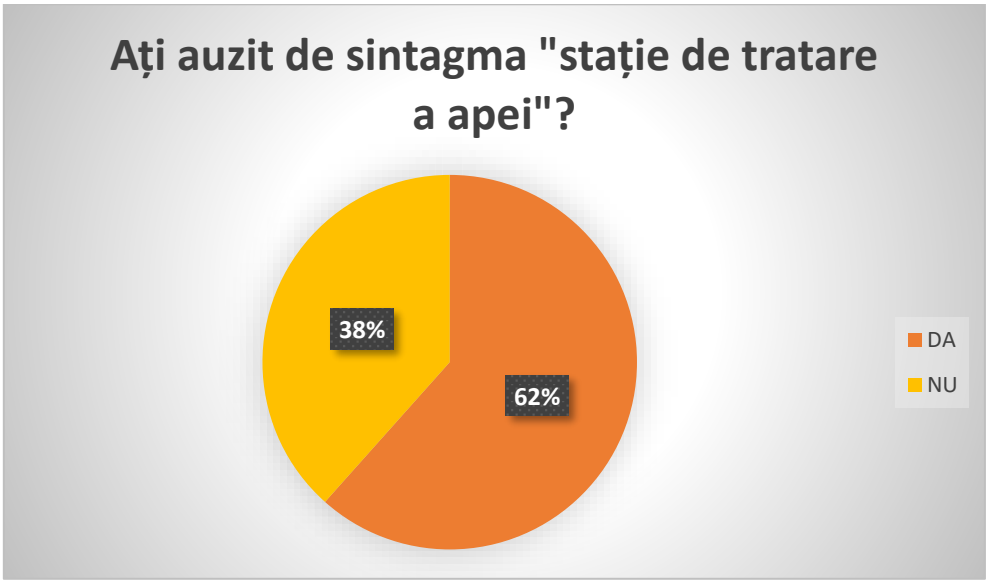


Q4: What is the priority of water consumption in your family? A. Cooking, drinking, washing; B. Drinking, cooking, washing; C. Washing, drinking, cooking.

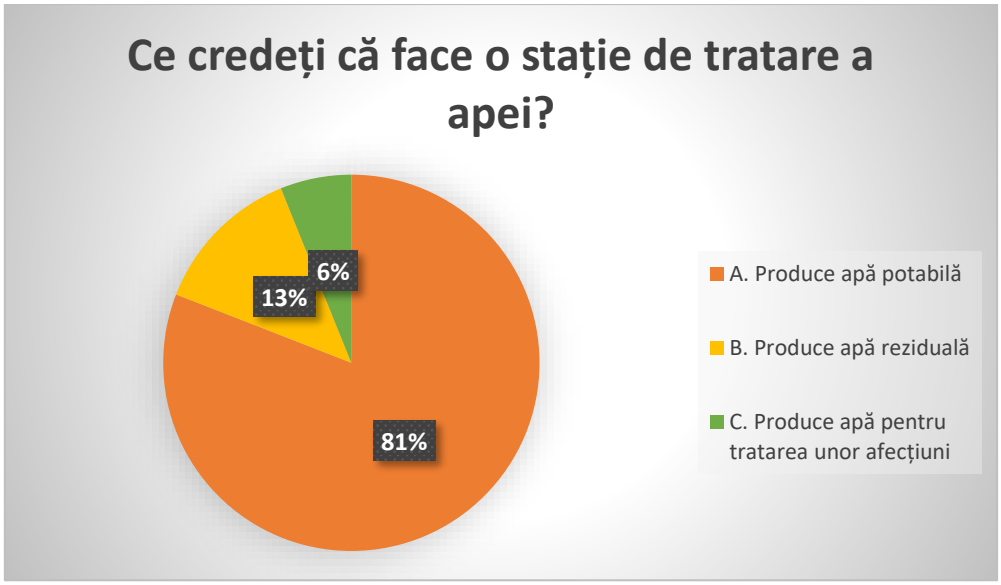


Q5: How would you define your access to water? A. I have continuous access to tap water inside the house; B. The water comes from the well in my yard, and I have to carry it with a bucket; C. The water comes from a water source that is not in my house, nor in my yard and I have to carry it with the bucket, the water can etc.

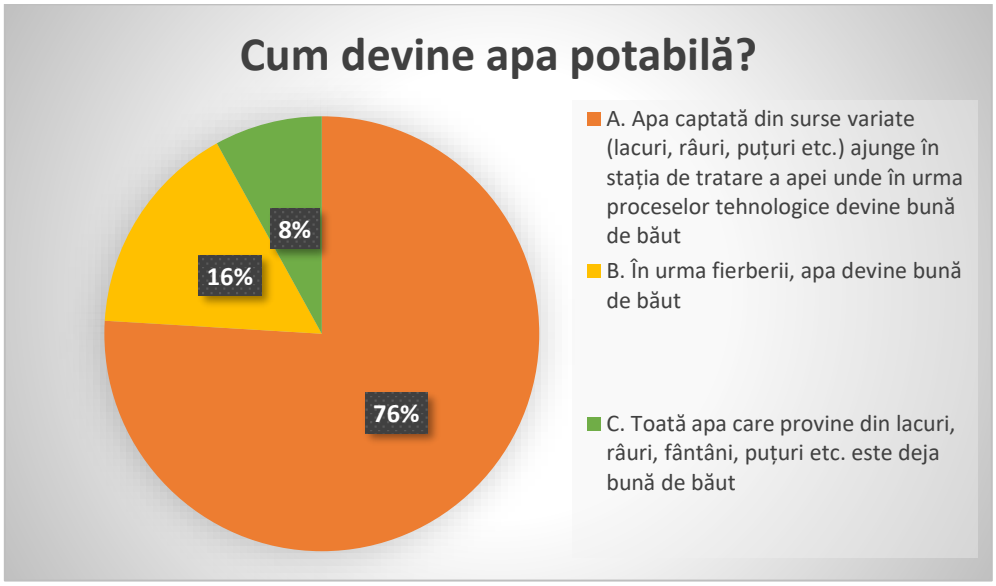
Despite the large number of people who answered that they have tap water and continuous access to water inside their house, their answers to subsequent questions come as a contradiction (see answers to question 11).



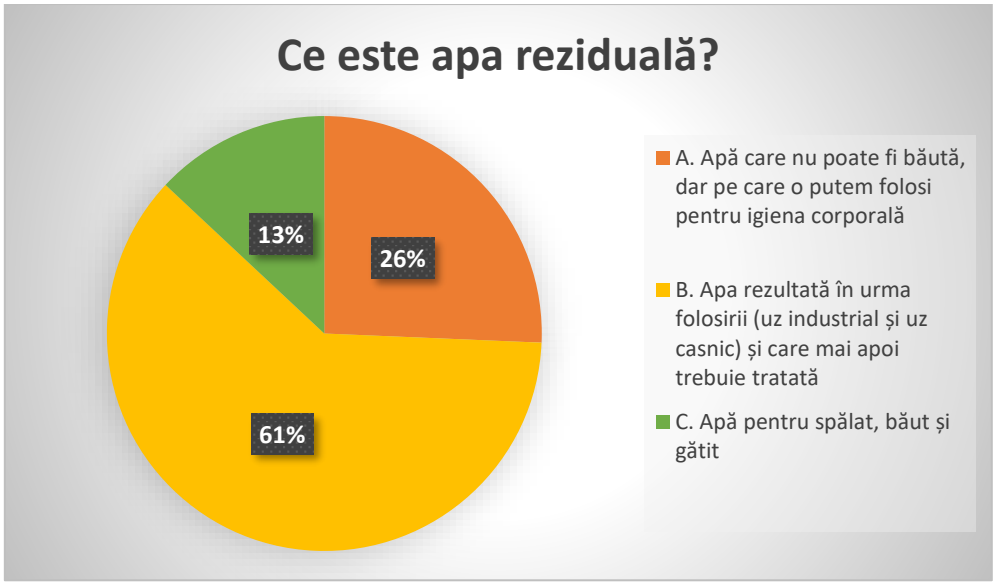
Q6: Have you ever heard about the syntagm ‘wastewater treatment plant’? □Yes □No



Q7: What do you think a wastewater treatment plant does? A. Produces potable water; B. produces wastewater; C. Produces water for the treatment of some ailments.

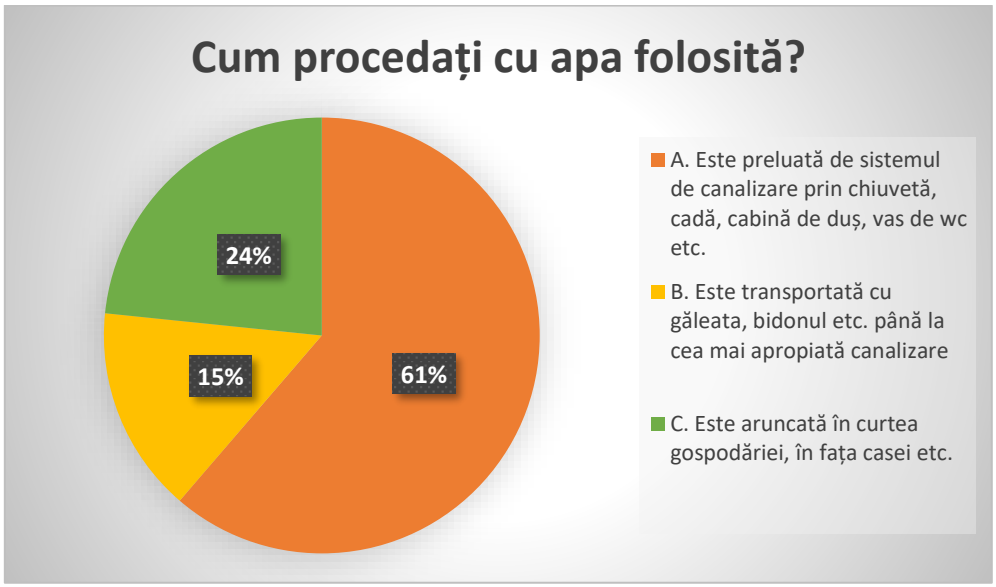


Q8: How does the water become potable? A. The water captured from various sources (lakes, rivers, wells etc.) reaches the wastewater treatment plant where after being subjected to various technological processes becomes potable; B. The water is potable after being boiled; C. The water that comes from lakes, rivers, wells etc. is already potable



Q9: What is wastewater? A. Water that is not safe for drinking, but can be used for personal hygiene; B. The water resulted both from industrial and domestic use and that later has to be treated; C. Water for washing, drinking and cooking.

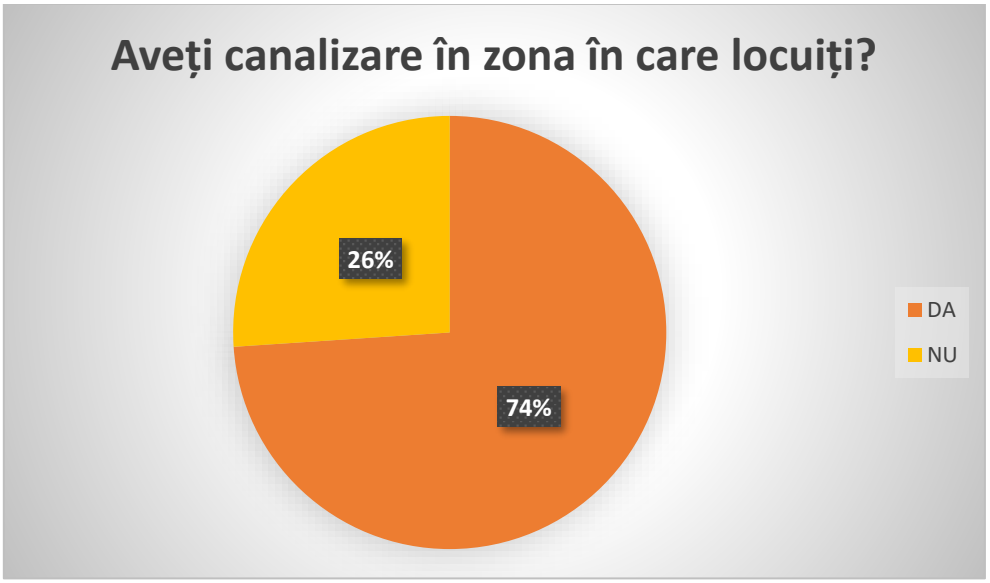
The answers to questions 6,7,8 and 9 are encouraging as they do reveal that a big part of the population know and understand processes that have to do with water processing and distribution.



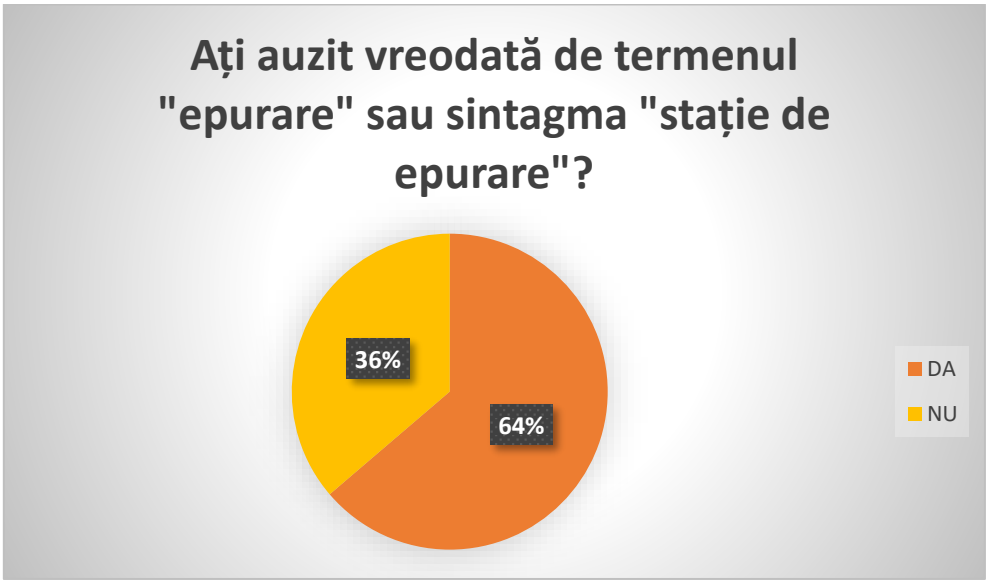
Q10: In your household, what is happening with the used water? A. It is taken over by the sewage system via sink, bathtub, toilet etc.; B. It is transported with the bucket, water can etc. to the closest drain; C. It is thrown away in the household yard, in front of the house etc.

Although there is a high percent of A answers which indicates a clear development of the areas, the numbers registered in the case of answers B and C are worrisome. There is still a high percentage of people who throw away the wastewater in the household yard or in front of the

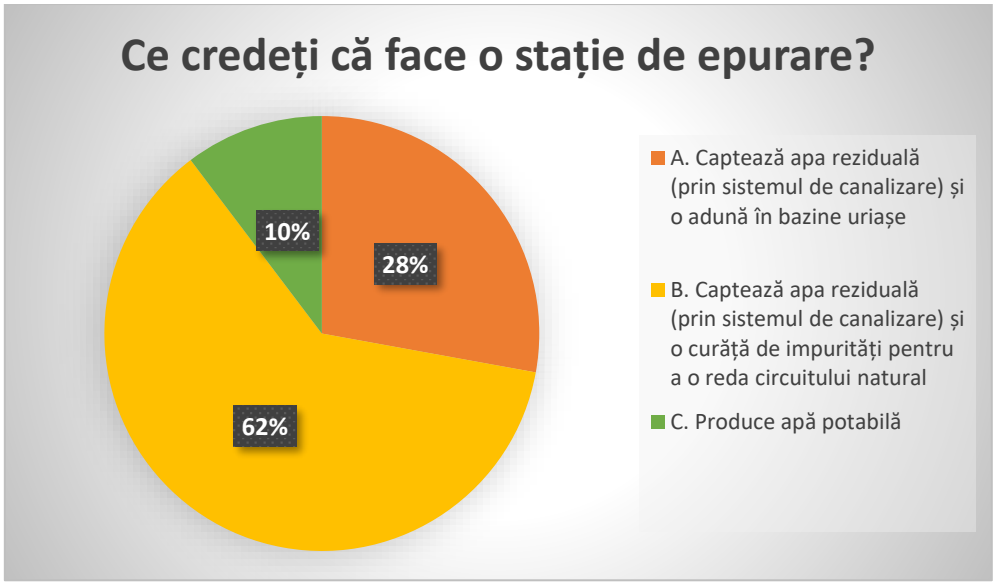
house. Nonetheless, the high percentage of A answers is in conflict with the high percentage of NO answers to the question “Do you have a sewage system in the area of your residence?”



Q11: Do you have a sewage system in the area of your residence? □Yes □No



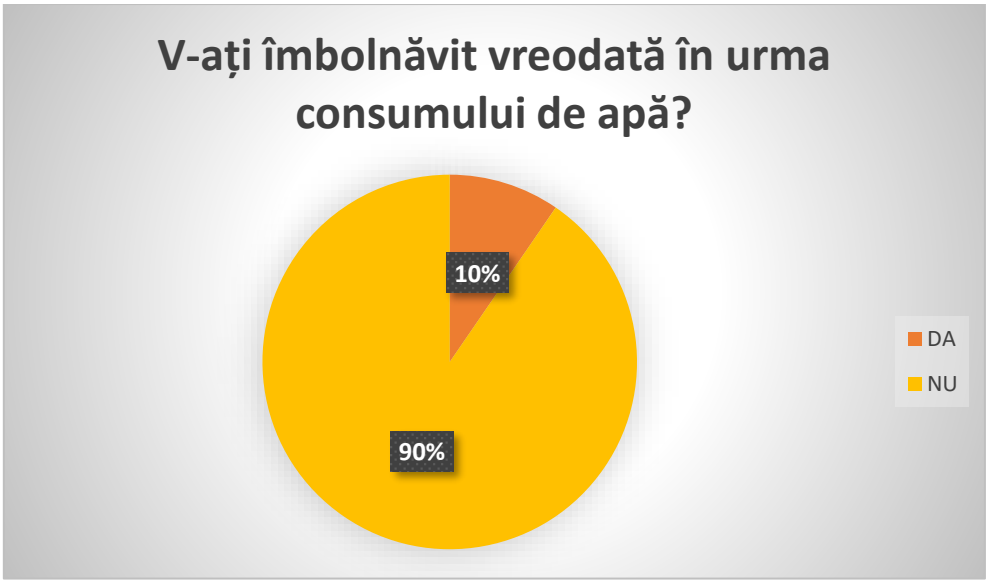
Q12: Have you ever heard about the term ‘treatment’ or about the syntagm ‘wastewater treatment plant’? □Yes □No



Q13: What do you think a wastewater treatment plant does? A. It captures the wastewater through the sewage system, and it gathers it in huge basins; B. It captures the wastewater through the sewage system, and it cleans it in order to return it to the natural cycle; C. Produces potable water.

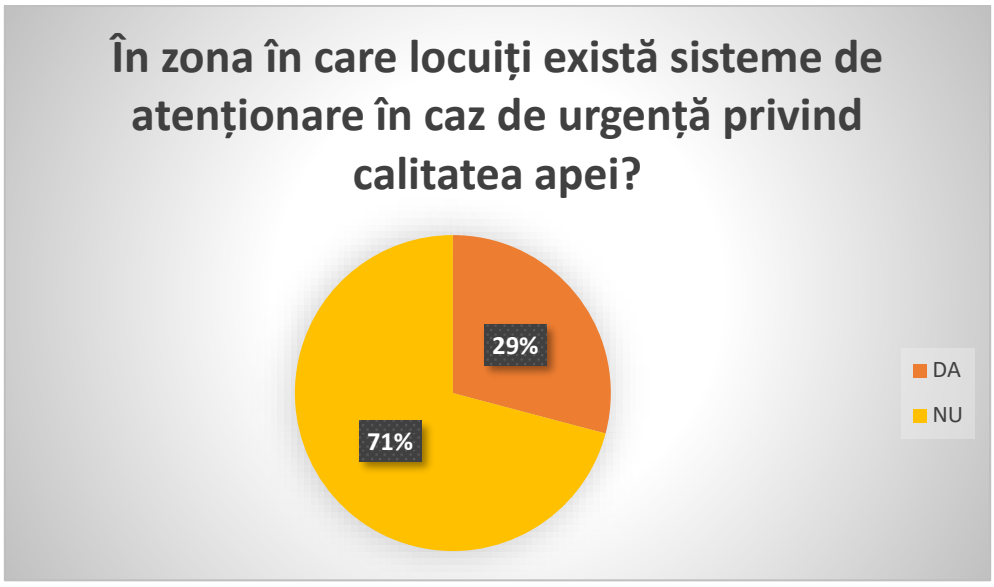
Most of the answers to question 13 reveal that there is solid knowledge regarding what a wastewater treatment plant does.

Q14: Do you think there is a close relationship between a good state of health and water? □Yes □No



Q15: Have you ever had health problems related to the water consumption? □Yes □No

Given the answers provided for question 2, water being consumed as it comes from the well or the tap, and the extremely low percentage of answers declaring that people have never had problems from consuming water, it can be concluded that there is a lack of awareness regarding the safety of the water that is being consumed.



Q16: Are there emergency alert systems regarding the quality of water in the area of your residence? □Yes □No

Most of the respondents have reported that there are no emergency systems regarding the quality of water in the area of their residence. However, there is the national system RO-ALERT, which alerts the population in cases of life and health threating situations. Such a message has been sent in Campina, when the population had been warned that the tap water was not potable [6].

The public health authority in Romania surveys the quality of water in the case of big and small water suppliers as well as in the case of the public wells. In the case of personal wells, placed in households, it is the owner's responsibility to check the water quality. Thus, the last report issued by DSP regarding water quality reported a total number of 1250 public wells of which only 65 have been monitored and sampled at least once during the course of the year 2022. For the year, 2022, DSP reported a number of 430 public wells with interdiction for human consumption. For these areas, and these particular cases, the city hall has the obligation to provide bottled water to the families affected and also, the local general medicine clinics are required to have a clear situation of the pregnancies and of the children aged 0-1 [7].

The answers to the questionnaire are somewhat satisfactory in terms of the knowledge regarding the safety of water and the treatment processes of wastewater. However, they do reveal that there is still a need for a through education of the public regarding the consumption of water, the safety of water, water treatment processes and last but not least, ecology and protection of water sources. Although, generally, people know what a wastewater treatment plant is, they are not yet conscious about the effects of the water pollution. To this end, the water companies in Romania have started various campaigns of raising awareness. An example is the initiative of the Apa Nova Bucuresti company, Manualul Apei (water manual), which is designed to be an interactive educational instrument, where in four episodes children discover the major role of water in our lives as well as the itinerary it has to follow for all of us to be able to consume it safely [8].

Locally, to raise awareness, the Apa Canal company organizes open doors campaigns usually held on the International Day of Water (March 22nd). This year, almost 3000 students of all ages have visited the wastewater treatments plants [9].

Considering the technological and digitalized society we live in, there are timid attempts towards raising awareness to ecology, environment and water quality via apps and games. Such an attempt is represented by the game developed by UGAL students that are still in their early stages and that are oriented towards raising awareness on the connection between ecologic behavior and water quality [10]. Two examples of print-screens are given bellow. As it can be seen this game can be easily used by children, given them at the same time useful information about the water. The full set of questions for this trivia game is given in the Appendix.

To conclude, as it is expected, the access to water is slowly improving even in sensible areas as a result of Romania being a part of the EU and being required to comply with the European norms and campaigns [11]. This process could be speed up by implementing partnerships and encouraging the close collaboration of the water companies with universities, thus being able to connect the field reality with recent research and innovation in terms of digital and digitalization. Open doors campaigns are not efficient and sufficient in a time of extreme changes governed, as recent years have showed us, by digital revolutions and

pandemic outbursts. Thus, the efforts must be oriented towards online and digital campaigns, games and apps oriented towards public and mass education.

Furthermore, within the frames of the European water directive, Romania is specifically oriented towards attaining the following objectives:

1. Protecting the health of the population by ensuring a high microbiologic and physico-chemical quality of the water destined to human consumption;
2. Regulating the proper legislative frame so as to be able to provide a good monitoring of the quality parameters of potable water via updated standards and methods as a result of the new emerging scientific data;
3. Implementing a surveillance and monitoring system for the control of the potable water quality throughout the entire distribution chain, starting with the water source and ending with the tap water;
4. Assuming the obligation to correctly, regularly and promptly inform the consumers in the case of particular or general situations of poor water quality or quantity or with potential health impact;
5. Lastly, but not the least, providing access to all citizens to potable water.

As a result, the benefits of the European water directive translate into governmental regulations that aim public safety and access to potable water for all citizens including marginalized and vulnerable populations [12].

Digital tools for the management of the water sector

As for the measures that can be adopted to strengthen the involvement in water issues by the public, certain digital tools must be considered. Water management methods that are based on digital tools, can increase the efficiency of communication with local communities. Through smart management, the rural areas can be helped to build and support the social capital and social innovation through collaboration between the local community and the local government [13]. Digital tools should be part of a sustainable development implemented at various levels of local management. Smart management of the water sector assume using advanced digital tools and technologies (such as fast broadband connections, and the Internet of things) to increase the efficiency of administration of the existing infrastructure and implementation of sustainable management solutions and, consequently, improve the quality of local community life. The implementation of this kind of tools is essential in the context of water resource management, manly in the context of climate changes that lead to permanent water deficiency and hydrological drought.

A concept that is developed more and more is e-government which is the use of ITC devices (e.g., computers and Internet) to offer public services the citizens in a country/region. With the development of the Internet, the governments invested more in ITC equipment and the e-government concept developed in the last two decades aiming increased quality of the public services with a lower cost. E-government projects have the potential to give a more direct access to citizens to government. The concept is however wider than this, targeting the interconnections between citizens, government, government agencies, employees, and businesses at all levels (i.e. city, region, country and international). Effective digital public services, or eGovernment, can furnish a wide variety of benefits. These include more efficiency and savings for governments and businesses, increased transparency, and greater participation of citizens in political life. There are being implemented numerous governmental initiatives that aim to enhance the efficiency and effectiveness of the public services and increase the democratic processes of government.

For example, in Romania the public administration has the National Electronic System (ro. SEN) which is managed by the Authority for the Digitalization of Romania [14]. The service is continuously developing and could integrate in the future more initiatives for specific regions and ethnicities. The water sector could be greatly benefit on this platform to help the vulnerable groups get access to water and be better informed.

The European Commission, on the other hand, developed an Action Plan that aims to modernize digital public services and make the EU a better place to work, live and invest [15]. Among the goals of the eGovernment Action Plan (and implicitly of SEN) is to set up a Digital Single Gateway that enables users to obtain all information, assistance and problem-solving services needed to operate efficiently across borders. Among the 20 actions identified to reach its objectives, the following has priority: facilitating digital interaction between administrations and citizens or businesses for high-quality public services.

The e-government concept aims to rethink the interactions between citizens and businesses in terms of information, communications, and transactions [16]. The electronic administration consists of five steps [17]:

1. dissemination of information,
2. communication with citizens,
3. online transactions,
4. integration of government agencies,
5. participation of citizens.

Figure 17 displays the concept of using digital tools in the management of water and wastewater sector. The digital tools that serve the above-mentioned functions of the electronic administration reflects the concept of sustainable development of green economy (which combines economic development activities with environmental responsibility, while improving human well-being and social justice).

Thus, the function of the digital tools in water and wastewater management is the dissemination of the information, communication, and promotion. These can be done at two levels official and social. At official level the governance institution has offices that can directly inform the citizens. However, this would reach a low number of people. The second level has the potential to reach most citizens in a community through websites and social media. This level is mostly associated with local communities and involve information exchange and dialogue on the opinions concerning the operation of (waste)water company and emergency situations. The dialog also targets constructing relations in the local communities on the water sector domain. Websites/portals are a must these days but, as the physical offices, they reach in certain cases a low number of citizens, social media, on the other hand, ease two-way interaction with many people, businesses and their customers having a direct connection. Mobile technologies make possible the dissemination of text, images and videos and analyze the interactions of the citizens with the posts. Governments, agencies, businesses use social media (e.g., Facebook, Instagram, LinkedIn) to build communities for interacting with the disseminated information.

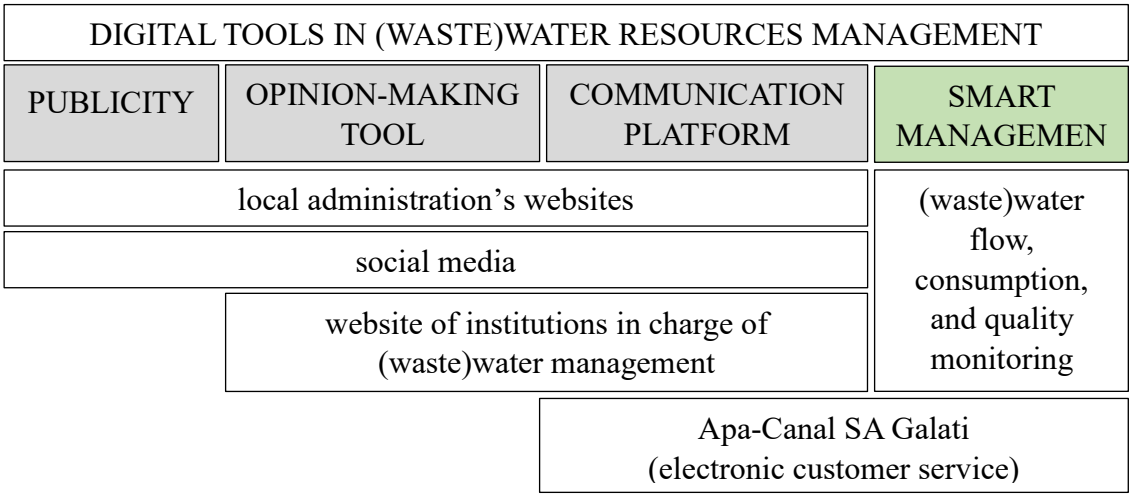


Fig. 17. The functions of the digital tools used by the local governments in water resources management [13]. The Institution in charge of the water and wastewater management in Galati County is Apa-Canal SA.

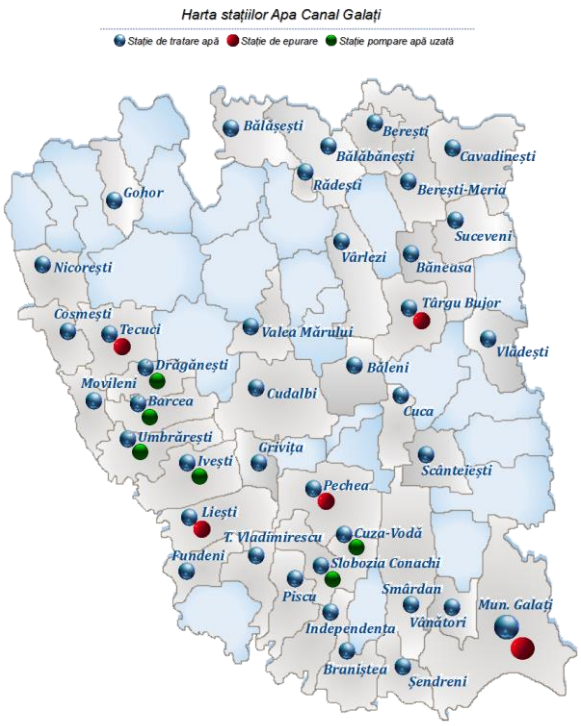


Fig. 18. The map of water and wastewater plants in Galati County covered by Apa-Canal SA [18]

The communities have the responsibility to make sure that their facilities for water supply can furnish the requirements in terms of volume and pressure and their wastewater treatment plant is capable to receive the sewage water and the discharged volume have a good quality. The government authority is the decisive element that determines the quality of collaboration between the main players, costumers, and water/wastewater management company.

Figure 18 shows the maps of water and wastewater plants in Galati County, including the communities where the children in the 8th grade of the secondary schools in Toflea, Ivesti, Bucesti, Brahasesti, and Barcea (a number of eight schools in total) have provided answers to the questionnaire. The map shows only the plants of Apa-Canal SA Galati, the rest of the territory being covered by other water companies. It can be observed that the region in which the school children answered the questionnaire is provided with infrastructure for clean water. This comes with an entire set of chemical and bacteriological analyses that are performed daily. However, this does not mean that every house is connected to the network, many of them having individual wells. The studied region does not have any wastewater treatment plant which could put some problems in the future when the communities will grow.

The expansion of mobile connectivity in the region created opportunity for digital innovation. Even though the water management company has a very informative site that presents the infrastructure, water quality measurements, investment projects, news, public acquisition, master plan etc., behind this is a capable network with connected SCADA systems that can communicate with a central. This requires very clear procedures and a cybersecurity policy.

With de development of technology and connectivity, new digital tool could serve the water sector. Many devices now come prepared for IoT that can work with the water industry by giving utilities and customers new information on water use. The Alliance Water Resources

[19] considers that the IoT can work with the water industry by giving utilities and costumers new information on water use. Using sensor technology, IoT can deliver data about water consumption, quality, points of loss or leakage, distribution, and wastewater. In many cases the information already exists, but the dissemination to the consumer is slow and require many approvals.

The future of water is envisioned with integrated IoT devices into the water management process, operators being alerted sooner of possible process issues, detect leaks, and improve the distribution. Almost 50% of the world's population will come under water-stressed regions by 2050 [20]. IoT can play a vital role in the in the present and future of the water industry and can lead to an effective water management from the source to the costumer. IoT is becoming less expensive and bring a higher level of connectivity. Smart water meters work like traditional meters, but they can furnish the consumers actionable data in addition. These devices need to be connected to a network and will give instant data, allowing the residents and businesses to see how much water they use compared to the region average. The customers could become more responsible in this way and save water and money.

IoT comes, of course, with some challenges such as security, privacy, and cost. When data is transferred back and forth from sensors to businesses there is always a risk of hacking, thus cybersecurity education and practices should be a continuous concern. Privacy is another worry when working with smart meters, the companies being in the position to know too much on the customer. Even though the IoT is becoming cheaper they their cost is still prohibitive for smaller communities.

Bizz4Intellia IoT Bussines Solution [20] which provides customizable IoT solutions identified 7 benefits of the IoT-powered Smart Water Management Systems in the water sector:

1. Real-time Analysis of Water Consumption. It can be done through quality sensor devices that is able to acquire accurate data and to transfer it to the user's dashboard in real-time.
2. Reduced Maintenance Costs. the technology-based functionality helps reduce maintenance costs with automated techniques and scheduled monitoring.
3. Better Communication among stakeholders. IoT devices generate a link between industrial assets and the user for quick responses.
4. Predicting Potential Failures. The implemented algorithms are empowering the understanding and command over each aspect of the water sector.
5. Remote Monitoring. Through interconnected systems which are well-structured will the help of the IoT technology the water authorities are enabled to remote monitoring avoiding thus shortage of stuff.
6. End-to-End Services. Upon installing the IoT-based solution, the authorities can leverage the advantages of automated processing, user-friendly interactions, accurate results, and better productivity.
7. Interactive Reports. The authorities can easily count upon the data shared by the advanced sensors as it gets converted into a user-friendly format. The reports generated are shareable and interactive, illustrating all the details about the industry.

Smart water management provides thus a better insight on the water system including flaw detection, preservation, and water management [21]. Smart water grids are able to save costs by conserving water and energy while improving the quality of service to consumers.

Conclusions

The access to water is slowly improving even for vulnerable communities because of Romania being part of EU and being required to comply with the European norms and campaigns. By developing partnerships and encouraging the dialogue between businesses, universities and citizens, the process could be speed up. This would connect reality with the latest research and innovation and lead to digitalization. Direct interaction of citizens with authorities' offices is not efficient and/or sufficient and reach a low number of participants. Thus, the efforts must be oriented towards online and digital campaigns, games and apps oriented towards public and mass education.

The digital tools used by water companies for informing the customers such as websites and social media, complemented with games, presentations, images, and videos are known to reach a bigger number of people. They can build audience for local communities and, with the help of the local authorities, can also reach the vulnerable communities.

Behind the infrastructure of a water management company lies numerous projects for developing the infrastructure and many times connected devices able to communicate. Many new devices come prepared for IoT and are suitable for developing management strategies in the the water industry by giving utilities and customers new information on water use. Using sensor technology, IoT can deliver data about water consumption, quality, points of loss or leakage, distribution, and wastewater. In many cases the information is constantly acquired, but it is not disseminated with the consumers for a number of reasons. However, the future of water is envisioned with integrated IoT devices for the smart management of the entire process, from the source to the costumer.

Nevertheless, even though the vulnerable communities are connected through internet (at least through their mobile phones) there is still the need to have campaigns of information in schools to help the children (and future adults) to know where to go for information and dialogue. Short videos and e-learning platforms are known to give better results than linear text materials.

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Appendix: Water Trivia Questions

1. What temperature does water boil?
   1. At 0 degrees Celsius
   2. At 150 degrees Celsius
   3. **At 100 degrees Celsius**
   4. At 100 degrees Fahrenheit

2. How much water does the human body contain?
   1. **About 70 %**
   2. About 10 %
   3. Almost 100%
   4. About 15 %

3. Of all the water that exists on Earth, how much water is in the seas and oceans?
   1. 20 %
   2. **97 %**
   3. 50 %
   4. 37 %

4. Of all the water on Earth, how much water is drinkable?
   1. **1 %**
   2. 5 %
   3. 90 %
   4. 50 %

5. What elements does water contain?
   1. Carbon and oxygen
   2. Carbon and hydrogen
   3. Nitrogen and oxygen
   4. **Hydrogen and oxygen**

6. How long is it good to change the toothbrush
   1. **At 3 – 4 months**
   2. Every year
   3. It does not need to be changed because it is washed very often
   4. When it breaks and can no longer be used

7. What does a wastewater treatment plant do?
   1. It is a pumping station that takes water from sewage and discharges it into the river
   2. It is a pumping station that takes water from the river and sends it to taps
   3. It is a station that deals with the analysis of water flows in rivers
   4. **It captures wastewater through the sewage system and cleans it of impurities**

8. What is drinking water?
   1. Water that cannot be drunk but can be used for irrigation
   2. Water that is polluted
   3. **Water that can be drunk**
   4. Water that cannot be drunk but with which we can wash ourselves

9. Is the water in the well safe to drink?
   1. Yes, it is much safer than tap water
   2. It is only good to drink if it tastes good
   3. **It is safe to drink only after it has been analyzed in the laboratory**
   4. It is not good to drink, but it is good for watering plants

10. How much water does it take for a short 5-minute shower?
   1. Between 5 and 10 liters
   2. **Between 50 and 100 liters**
   3. Between 200 and 300 liters
   4. Over 500 liters

11. What is the most common substance on Earth?
   1. **Water – H2O**
   2. Kitchen salt – NaCl
   3. Oxygen – O2
   4. Nitrogen – N2

12. At what temperature does water freeze?
   1. At 100 degrees Celsius
   2. **At 0 degrees Celsius**
   3. At 0 degrees Fahrenheit
   4. At 37 degrees Celsius

13. How much does it cost to operate the water system across the country?
   1. It doesn't cost anything, water from rivers is free
   2. **Over one billion lei every year**
   3. About one million lei each year
   4. Less than one million lei per year

14. How much water does a cow need to produce a liter of milk
   1. 1 liter of water
   2. Does not need water
   3. 50 liters of water
   4. **4 liters of water**

15. How many liters of water does one cubic meter of water have?
   1. 100 liters of water
   2. **1000 liters of water**
   3. 10 liters of water
   4. Water cannot be measured in cubic meters

16. In what form is water most accessible to life?
    1. In solid form (ice)
    2. In the form of water vapor
    3. Water has no form
    4. **In liquid form**

17. What can we do if the water in the well contains nitrates?
    1. We boil it before drinking it
    2. We can drink it if we filter it with a filter cup
    3. **We don't drink it because we can get sick**
    4. Nitrates do not harm health, they are also found in food

18. Can water be a source of energy?
    1. **Yes, if it goes through a hydroelectric power plant**
    2. Yes, if it goes through a wind turbine
    3. Yes, if it goes through a photovoltaic panel
    4. No, water is not a source of energy

19. How much water do we consume to wash dishes by hand
    1. Between 3 and 5 liters
    2. **Between 30 and 80 liters**
    3. Between 300 and 400 liters
    4. Over 500 liters

20. What does a water treatment plant do?
    1. It takes water from the river and sends it to taps
    2. It takes water from the sewer network and sends it to the river
    3. He takes water from the spring, treats it and bottles it in cans
    4. **It takes water from the river, separates impurities, treats it and sends it to taps**

21. What is high hardness water?
    1. Water with high content, very hard impurities
    2. Water with high hydrogen content
    3. **Water with a high content of calcium and magnesium salts**
    4. Water with a high content of organic substances

22. Why is chlorine put in tap water?
    1. To protect water pipes
    2. **To kill microbes in water**
    3. So that the water does not smell bad
    4. To neutralize harmful substances

23. Is it recommended to drink water directly from the river?
    1. **No, because it can be polluted**
    2. Yes, because it is the safest water
    3. Yes, because animals also drink water from the river
    4. No, because it tastes unpleasant

24. How many times a day do we have to wash our hands?
    1. Twice daily
    2. Before each meal
    3. After we go to the toilet
    4. **Whenever needed (before meals, after toilets, when we return home, etc.)**

25. How often are samples taken for microbiological analysis in a water treatment plant?
    1. Once a week
    2. **Every day**
    3. Once a year
    4. Never because microbiological tests are done at the hospital