

WATER AND SANITATION PROJECT FOR GLOBAL GRANT FUNDING – GG 201 003 79

Project: Safe drinking water for rural households in Gornja Stubica, Croatia.

1. COMMUNITY ASSESSMENT

City of Gornja Stubica stretches across an area of 50 square kilometres. It is located in the south of the Krapinsko-zagorska county. Its 20 settlements are inhabited by approximately 6000 people. Surface water sources are used as primary water source in this area. Local water supply systems are in poor technical condition with limited water quantity and poor quality. Surface waters collected for individual usage in households are of equally poor quality. Moreover, fecal/wastewater gets mixed with water for individual consumption leading to occasional intestinal infection.

Inhabitants of seven villages in Gornja Stubica, Krapina-Zagorje county (**Brezje, Gušakovec, Hum Stubički, Karivaroš, Sekirevo selo, Slani Potok, Šagudovec**) are going to benefit immensely from this Global Grant. The area covered by the project is extremely hilly and villages are typically located at the top of the hill. This requires considerable investment into pumps and higher attitude tanks. Given that there is no sewage system in the area, this creates additional risks of water pollution and infection. Currently, every village has a non-profit and non-governmental citizen association that manages the local water supply system; however, their financial capacity is insufficient for a sustainable improvement. The villages encompassed by the project have 2500 inhabitants in 820 households. Most households are families consisting of several generations living together. Poor water quality is one of the key reasons for some families leaving their homes and moving elsewhere.

Population in the project area live in poor conditions. Local water supply systems were built several decades ago. Unfortunately, they do not provide bacteriologically safe water for human usage. Public Health Association annually controls the quality of water in the local water supply systems. The results of microbiological tests are poor in most samples as there is no water treatment in place that would provide satisfactory water quality level according to Standards of testing methods and compliance of water for human usage (NN br. 125/17;https://narodne-novine.nn.hr/clanci/sluzbeni/2017_12_125_2848.html).

This project will enable clean and healthy water supply for day-to-day use by installing automatic water treatment system. As such, the project delivers several Rotarian goals:

1. Access to sanitary and healthy safe water for a sizeable local community;
2. Prevents intestinal and other infectious diseases especially in children;

3. Prevents depopulation of villages by securing normal living conditions which will motivate families to stay on their land and start engaging in farming or other economic activity leading to social and economic development of the area.

Community has a longstanding agricultural and craftsmanship tradition. Unfortunately, poor water quality is negatively affecting not only the health of local community but also further development of these skills. As previously stated, area is very poor. Improvement in water quality in the area of Gornja Stubica did not materialize due to:

- Insufficient city and community funds
- Limited access to alternative financing sources
- Low awareness of technical solutions which can improve water quality in current circumstances

Intent of the project is to improve local living conditions in a most effective way i.e. deliver safe water with minimum interventions which will improve health, reduce intestinal and other disease occurrence and stimulate economic activity in the area which will ultimately encourage people to stay or even return to their villages given they provide satisfactory living conditions. Due to inadequate financial capacity, local communities are increasingly reaching out to different organizations such as Rotary for help.

We used an integrated approach in order to offer sustainable long-lasting solution to the area that is connected with a lot of common points. We are not going to be able to cover all needs of the wider local community in Krapinsko-zagorska county. However, with step-by-step approach, we expect to be able to reach out to more communities in the future. In addition, we will develop a significant know-how in addressing the water quality issue which can be shared with other Rotary clubs and organizations willing to help in their communities.

Sanitarily correct and healthy safe water in the above-mentioned villages area can be secured by repairing water sources and water tanks followed by installation of automatic disinfection equipment, powered by solar cells. For disinfection of local water systems, we will apply chlorine solutions NaOCl (hypochlorite). Hypochlorite disinfection device will be installed in the latch chambers of the water tanks or will be connected directly to the pipeline of respective local water systems.

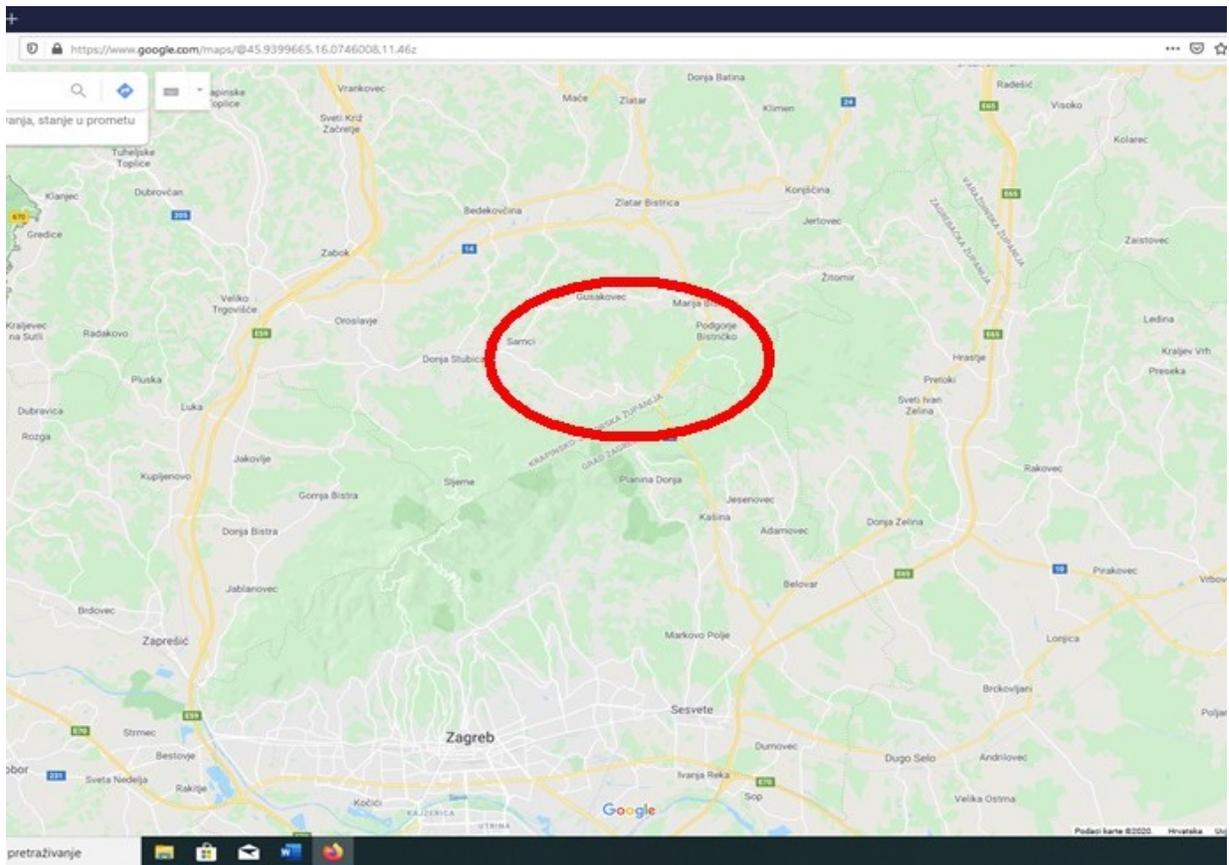
In order to have accurate, reliable, complete and relevant Community assessment, we engaged our **Rotary Community Corps Club Hrvatsko zagorje** which was established last year by our Rotary Club. One of the reasons for establishment of RCC and strong acceptance and engagement of the members under the Rotary umbrella is our intention to accomplish Rotary goals in the WASH area. Members of RCC Hrvatsko zagorje are well known and respected individuals from that area. They are in everyday contact with heads of local community whose representatives are also members of RCC Hrvatsko zagorje. As part of the Community assessment process, RCC Hrvatsko zagorje conducted in depth interviews with local community leaders, heads of the of local community associations, non-profit and non-governmental citizen associations who are operating local water systems, local experts and especially with directors of regional and state authorities responsible for management of public water supply system. Therefore, after debriefing sessions with members of RCC and consultations with local

community leaders, heads of state water management authorities, experts from academia, public health authorities and based on previous two extremely well organized and conducted similar projects that were supported by the District Grant, we decided to move forward. Our key partners will be local community representatives, our RCC club, other Rotary clubs from District 1913 and experts who expressed their willingness to become a part of this project. Several Rotary clubs from District 1913 such as RC Zagreb Sesvete, RC Dora, RC Krapina already expressed their commitment in financial and human resources as partners in the project. We will build on the experience gathered in the previous two projects supported by the District Grant and we now aspire to accomplish a more complex and demanding project with the support of a Global Grant.

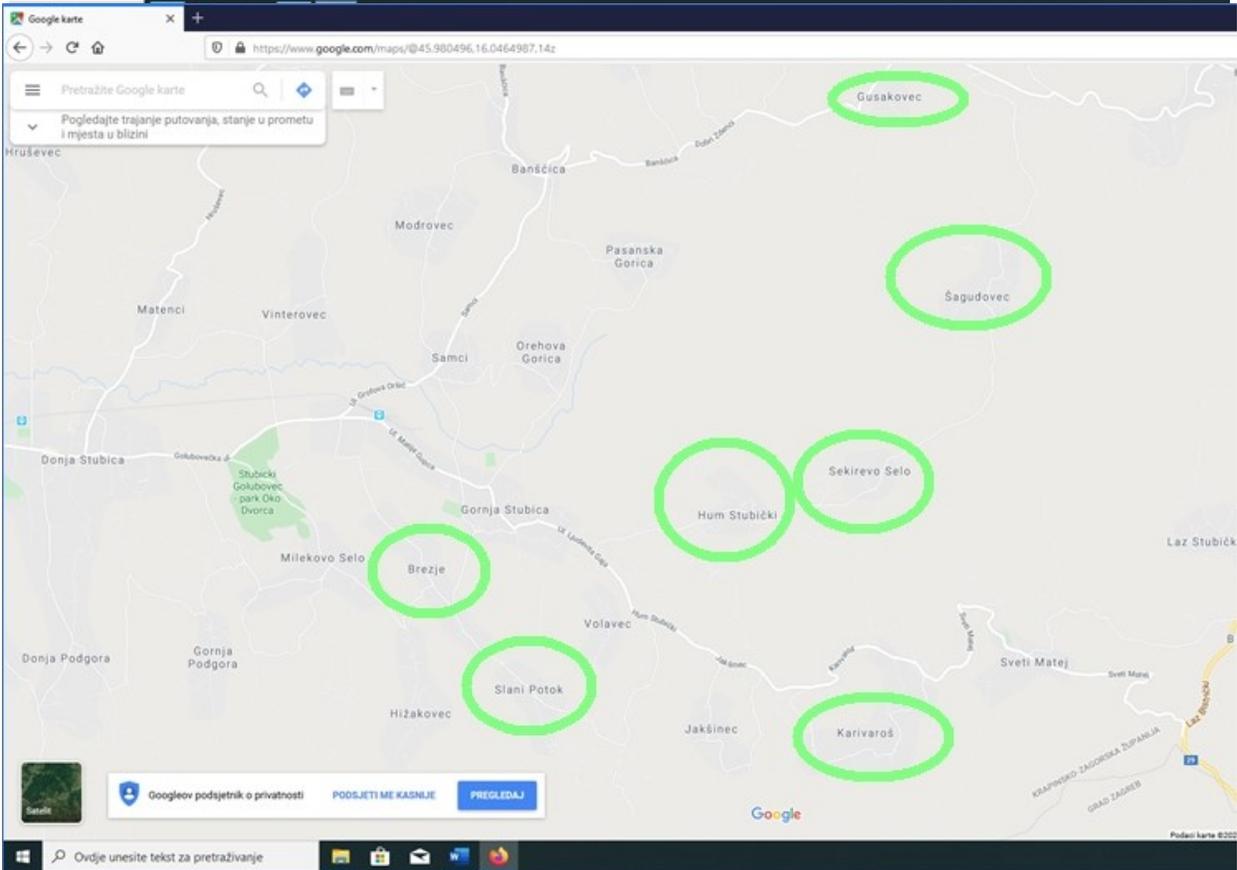
Through the RCC club, local community will support this project with physical labour where necessary, machines, equipment and other activities that will be needed during the project and can be activated locally. We expect that this will be a long-lasting project that will provide enormous help for local community. We are going to organise trainings and education for several members of the local community - in each village at least two people - who will be responsible for monitoring and maintenance of the system functionality. Ownership and responsibility for the newly installed system will be passed to the local community upon installation. Nevertheless, we will continue to monitor system functionality by regular contact with local authorities in those villages and with the local Public Health authority that will continue to monitor the quality of water in those local systems.

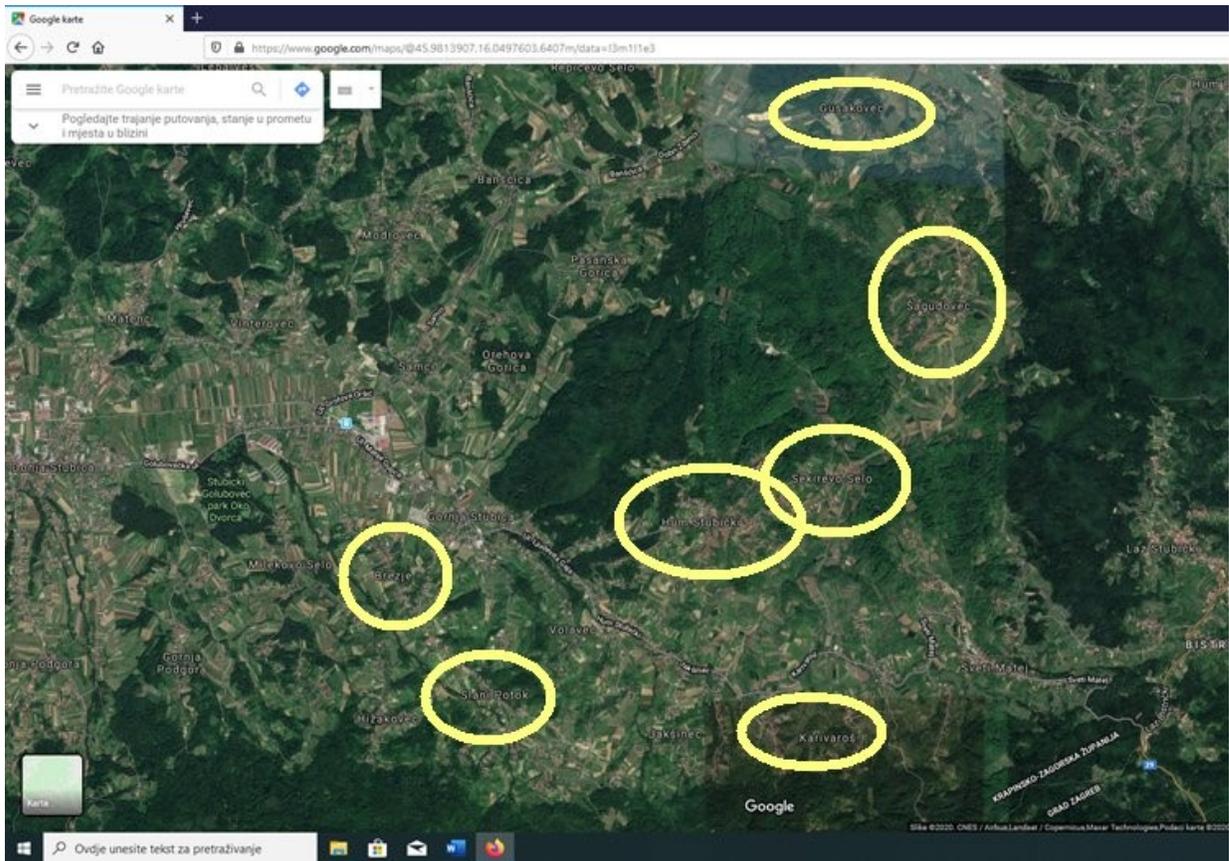
We expect that this activity, as has already started, will attract intensive public and media interest because it is going to be one of the best examples of how we can help individuals, families, and communities that need our help.

This document is a result of comprehensive approach to this challenge from academics and practitioners in the area of water systems from RC Zagreb Medvedgrad, RC Zagreb Sesvete, RCC Hrvatsko zagorje, experts from local and state institutions responsible for water management and public health safety, our Rotarian scholar mr. Saša Petričić who received a grant from Rotary Scholarship for Water and Sanitation Professionals (TRF and IHE Delft Institute for Water Education) few years ago (sponsoring club was our club RC Zagreb Medvedgrad) and experts from media who will provide public visibility and support for this project.



4





2. MATERIALS AND TECHNOLOGY

In the Krapina-Zagorje county there are 49 local water supply systems that provide water to 21.875 residents. The local water supply systems are managed by local citizen associations or municipalities. Water quality in local systems is poor and the financial capacity of local associations is insufficient to provide a sustainable solution. In addition, settlements in the project area are dispersed and houses are usually positioned in hilly areas where connection to regional water supply system is not envisaged in the near future.

The sanitary and safe water for villages in the project area can be secured by two tasks:

Task 1: Repairing of water sources and water tanks.

Task 2: Installation of water disinfection system.

Repairing of water sources and water tanks (Task 1) will be done to provide reliable water quantities. Local water supply systems were built several decades ago and may require repair or some adaptation for system installation. Based on initial screening in the field, we expect investment in this area to be minimal given relatively solid state of the existing tanks. Necessary repair and works will be conducted by local companies who will be chosen by the Organizational Committee and in collaboration with local authorities and water supply company.

The water disinfection system (Task 2) will result in the application of chlorine solution NaOCl (hypochlorite) with automatic dosing. The hypochlorite disinfection device will be installed in the latch chambers of the water tanks or it will be connected directly to the local distribution pipeline. The flow measurement data will collect either water level in the water tank or flow amount in a pipeline. The flow measurements will be used for definition of hypochlorite quantity which will be delivered to the network via dosing pumps. If the dosing should be installed directly to the pipeline, then an insulated and ventilated container shall also be installed on the connection point. The container will provide a safe access to the pipe and a safe storage of hypochlorite tanks. This is the case when the water tank is either missing or it is installed in remote area with insufficient solar radiation (e.g. in a dense forest). The system will be powered by solar cells.

Public Health Institute annually monitors water quality in the local water supply systems. The most common cause of poor water quality is microbiological contamination at sources where 50%+ of samples are microbiologically defective. The most common cause of microbiological issue was the presence of E.coli total coliforms and enterococci. The automatic hypochlorite dosing was already implemented in the two previous projects by our Rotary club for local water supply systems Stari Golubovec in 2014 and for the settlement Strupari-Jureni in 2019. The technology was proven to be successful for water disinfection as documented by the results of water quality monitoring after the installation. The additional benefits of this technology are low maintenance requirement, low training level of individuals and it is economically feasible.

The automatic disinfection system after implementation will be overtaken by local communities. The local community will have dedicated individuals/ technicians - in each village at least two persons - who will be trained for the purpose of maintenance and monitoring of the system. The equipment

supplier will conduct the training and will provide the safety operation and maintenance manual and safety gear. The participant will be trained on safe storage of hypochlorite, on safe maintenance of hypochlorite solution amount and on the drill during potential accidents. For advanced technical support the individuals/ technicians will be able to consult equipment supplier or local Public Health organisation.

The suppliers of hypochlorite and dosing pump as well as of solar cells will be local companies, as in previous two projects. The container will be manufactured locally as it was the case in the project for settlement Strupari-Jureni in 2019. This will ensure that replacement parts are readily available to communities and service providers.

The system will be installed in a closed block with locked door. This will ensure security against theft and vandalism and safe storage of hypochlorite.

After project implementation the annual monitoring of water quality of the systems will be provided by local Public Health Institute. The organisation will issue a certificate of conformity with Standards of testing methods and compliance of water for human usage (NN br. 125/17) for each sample.

3. FINANCIAL PLANNING

100% of the project cost relate to installation of water system purifiers in the villages encompassed by the project. After installation, costs related to operation and maintenance of installed equipment will be fully borne by the local administration. This will be stipulated in the terms of agreement with the local authorities. Therefore we expect no costs will incur to our Rotary club after successful equipment commissioning and start up.

Operation and maintenance costs are covered by the contribution raised from households by local authorities for the local water supply system. We expect that these contributions will stay at similar level as today – this is also the experience from the previously completed 2 projects.

Below is an overview of estimated project costs and funding sources.

Estimated project costs (1 USD = ca 6,7 Croatian kuna):

Item	Quantity	Total amount in Croatian kuna
Local water system purifier – all equipment, solar panels, installation, training and promotion	7	490,000
Site preparation and construction	7	70,000
Local system sewage purification	4	280,000
Total excl. VAT		840,000
VAT 25%		230,000
GRANT TOTAL		1,050,000

Funding sources (1 USD = ca. 6,7 Croatian kuna):

Activity, contribution	Total amount in Croatian kuna	World Fund match
Rotary Club Zagreb Medvedgrad activities	80,000	40,000
1913 District support	80,000	80,000
Rotary Clubs in Croatia	80,000	40,000
Districts abroad	140,000	140,000
Rotary Clubs abroad	134,000	67,000
Corporate and public donors	112,000	56,000
TOTAL	626,000	423,000
GRANT TOTAL	1,050,000	

4. TRAINING AND EDUCATION

4.1 Hygiene education and behaviour change communication

The current water disinfection practise in Krapina-Zagorje communities usually involves **uncontrolled application of chloride in the drinking water system** (e.g. in water tank). Such chloride applications can have long term detrimental impact on children and adults. The second common issue are domestic wastewater systems that are poorly designed and/or improperly maintained, so the drinking water gets mixed with the sewage water leading to occasional intestinal infection. Microbiological contamination at sources of local water supply system is not known enough.

The information on detrimental effect of uncontrolled chloride application on humans and sources of drinking water contamination have not been anticipated nor understood enough by local communities. The information sharing campaigns in communities can mitigate and change the current behaviour practise to some extent. However, it is understood that the wider and stronger impact should also include education and training campaigns with primary school teacher and pupils for local issues in the drinking and wastewater systems.

The project will start with the awareness raising and behaviour change campaigns among communities on three main topics: (a) issues on mismanagement of local drinking water systems, (b) issues on mismanagement of local sewage systems, and (c) best management practise with examples (such as this project and two previous projects by our Rotary club) on sustainable solutions for treatment of water and wastewater in communities. The information on three main topics will be shared within communities through dedicated seminars and leaflets. During project implementation phase we will organise several dedicated seminars and will produce leaflets which should increase knowledge capacity and responsibility level in communities and should initialise behaviour change of individuals.

Dedicated annual seminars and dissemination of leaflets will continue in a 4-year period after the project implementation with addition of information on experiences and best management practise gathered from the implementation of this and two previous projects by our Rotary club. The information sharing campaigns will be followed by education and training campaigns with the main goal on the knowledge increase among primary school pupils and teachers on (a) detrimental effects of uncontrolled chloride application in drinking water systems and (b) mechanism of microbiological contamination of local water supply systems. The primary school teachers will attend annual dedicated training seminars. Education campaigns will be also supported by dedicated pamphlets.

The content of seminars, trainings and pamphlets will be coordinated with the Croatian waters and Ministry of health. Seminars and trainings will be performed by experts from Croatian waters and local Public Health Institute.

Local community commitment to facilities, labor and advertising connected to water safety education will be stipulated in terms of agreement. Rotary club will continue to support local training by

engaging professionals and raising awareness within the Rotary community. We expect these costs to be relatively small and we will cover them from Club's funds.

4.2 Training for service providers and technical workers

After project implementation, the automatic disinfection system will be overtaken by the local community. The local community will identify dedicated individuals/technicians (in each village at least two people) who will be trained on the safe operation, maintenance and monitoring of the system. The equipment supplier will conduct the training and will provide the safety operation and maintenance manual and safety gear at the end of project implementation. The re-training of technicians is envisaged every 2 years. All cost for the training are included in the system purchase price so we foresee no additional cost. We will ensure that training is included in the equipment purchase contract.

The technicians will be trained on safe storage of hypochlorite, on safe maintenance of hypochlorite and hypochlorite solution and on the drill during potential accidents. For advanced technical support the individuals/technicians will be able to consult equipment supplier or local Public Health organisation. Local communities and Rotary club will sign terms of agreement on the water system ownership transfer. The individuals/technicians who will be responsible for the operation and maintenance of the system will be specified in the agreement together with the obligation of their re-training every 2 years.

5. MONITORING AND EVALUATION

During project implementation phase we shall organise a routine oversight to ensure that basic needs are being met and that we are on track to meet project targets. For this purpose, Organization committee who will take care of the project management, planning, finances, and the coordination of the project, shall be established. Organizational committee will include members and professionals from partnering Rotary Clubs and RCC many of whom are professionally connected to public water supply system, engineering and management.

We are going to regularly monitor these measurements:

1) *Total number of direct beneficiaries*

Organisation committee will be in charge of monitoring total number of beneficiaries which shall include, but not be limited to: total number of directly included inhabitants (and households) with improved drinking water, total number of informed, educated and trained individuals, total number of directly included individuals in project activities, total number of media covered (TV, radio, paper and internet articles, etc).

2) *Number of people with access to improved sources of drinking water*

Organisation committee will be in charge of regularly monitoring the number of people with access to improved sources of drinking water. This number can be easily monitored since we know exact number of households and inhabitants that we are covering with each source of drinking water linked to a specific village.

3) *Number of individuals trained*

Organisation committee will be in charge of regularly monitoring the total number of trained individuals (see part 4.)

In addition to the Organization committee and for the purpose of monitoring project's short term and long-term water, sanitation and hygiene systems being implemented, a Technical committee shall be established.

Technical committee shall be established to monitor short term project activities (during the project implementation phase) and long-term project implementation (phase after the project implementation and test phase). Technical committee shall be in charge of preparing and supervising the inviting tenders, supervising the quality of technical equipment installation process and general short-term project implementation monitoring. Technical committee will be closely linked to local government and community (at least 2 individuals from each village shall be educated for these purposes, see part 4.). Members of the Technical committee have professional background in engineering and water supply.

6. GOVERNANCE

After the project implementation phase the annual monitoring of water quality of the systems will be provided by the local Public Health Institute. The Public Health Institute will issue a certificate of conformity with Standards of testing methods and compliance of water for human usage (NN br. 125/17) for each sample. Local community and local government will be directly linked to this and in case of any issue or any other malfunction shall immediately warn the Technical committee in order to find a best problem solution. Responsibility for operation and maintenance of the installed equipment will be transferred to local community via Terms of Agreement which will be signed with each individual community in the 7 locations included in the project. We are in process of drafting and aligning the terms with local community representatives.

Our Organisational and Technical committee include individuals with strong Rotarian and professional background. Roughly one third of the committee members are female. All members have vast experience in complex project management and many of them participated in the implementation of our previous two water sanitation projects. As the project moves forward and we gain partners from further Rotary Districts and Clubs, we envisage inclusion of additional members into the Organisation Committee which will enable broad inclusion, oversight and support of all contributing stakeholders.

Organisational committee:

1. Dr. Sc. Hrvoje Čeović (RC ZG Medvedgrad, Male)
2. Domagoj Lakoš, MBA (RC ZG Medvedgrad, Male)
3. Dipl. Ing. Ana Šijaković, MBA (RC ZG Sesvete, RC Female)
4. Doc. Dr. Sc. Damir Bekić (RC ZG Medvedgrad, Male)
5. Dipl. Ing. Dean Smolar (RC ZG Medvedgrad, Male)
6. Dr. Sc. Mara Pavelić (RC ZG Dora, Female)
7. Prof. Dr. Sc. Vedran Mornar (RC ZG Medvedgrad, Male)
8. Branimir Ogrišak (RCC Hrvatsko zagorje, Male)
9. Dipl. Ing. Danijel Jozić (Governor District 1913, Male)
10. Dip. Iur. Kosjenka Krapac (RC ZG Dora, Female)
11. Mrs. Ana Kanjera (RC Zagreb Metropolitan, Female)
12. Doc. Dr. Ivana Burcar Dunović (RC Zagreb Ilica, Female)
13. Ivan Pešić, (RC Zagreb Metropolitan, Male)
14. Dr. Gordan Akrap (RC ZG Medvedgrad, Male)

Technical committee:

1. Doc. Dr. Sc. Damir Bekić (RC ZGb Medvedgrad, Male)
2. Dr. Sc. Mara Pavelić (RC Dora, Female)
3. Stjepan Kordek (RC Zagreb Sesvete - M)
4. Doc. Dr. Ivana Burcar Dunović (RC Zagreb Ilica, Female)
5. Mr. Sc. Saša Petričić (Water professional and former club's scholar, Male)
6. Višnja Kljaić (RC ZG Sesvete, Female)
7. Davor Poljak (RC ZG Sesvete, Male)