ASSIGNMENTS:

1. why is community based managed essential in management of water resource?

According to the UNHABITAT manual: On the right to water and sanitation “Communities (including community-bases organizations and residents’associations) have the knowledge of their environment, their needs and motivations to improve their situation.”[[1]](#footnote-1) It are the communities and their representing organizations that are aware of the local necessities on water and sanitation and what has to be done to improve and maintain the infrastructure. It are the same organizations that can select the poor and extreme poor households that have no access to the facilities because of their economic situation and take care of this.

Communities that are in charge of the management of the water resources become empowered. They will not only take care of the maintenance of the water resource (not necessarily by themselves- it can be outsourced to third parties) but can also undertake the necessary lobby and advocacy activities towards the (local) government and water company. Women play an essential role in this. According to John Oldfield *Community-based small-scale solutions work well if designed, built, and maintained effectively[[2]](#footnote-2)*. This decentralization of managment and financing is very important, especially in rural areas but the role of government is important to scale up these initiatives and /or bring those to peri-urban areas. Projects that focus on WASH and not only water turned out to be more successful.[[3]](#footnote-3)J.Oldfield defines community based as follows: *Community-based: A community-based solution involves decentralized (village-level) decision-making, village-level ownership, locally appropriate technology, and locally sustainable business and financial models as much as possible.* [[4]](#footnote-4) But in my opinion, this is rather utopic. It can work only in case a local enterprise has been setup that takes care of the operations and maintenance of the services. And people need to pay a fee for the services delivered. It is important that the community as a whole claims its right to the water source. The right to water and sanitation is adopted by the UN General Assembly in 1966 and entered in force in 1976[[5]](#footnote-5). But if everybody is responsible, nobody is. Several studies show that as soon the donor leaves WASH infrastructure deteriorates. There are several reasons for this. The project design has not be done in a proper way. Or water points were constructed without taking care of hydrogeology. An important factor is that people in the communities simply do not have the opportunity to take care of the maintenance if they are not well trained and do not get paid properly. That is a botleneck experienced by a lot of water projects. So yes community based project management is important and relevant because it guarantees the right to the local water source of all inhabitants. But at the same time it is important to take care of a sustainable maintenance and operation system.

1. With examples, discuss the difference between Community management and Community Participation.

Community participation means that the community participates in all stages of project development and implementation. Community management refers to community based development projects were people have direct control over key issues like financing and investment. They are the ones in control.[[6]](#footnote-6)

In a study performed by Gwynneth Smith (2011) [[7]](#footnote-7) she comes to the conclusion that if communities are not involved in the whole project management cycle, projects lose their impact. The consensus of the whole community is important, but it is not enough to involve them only in the design and initial implementation phase. The building contractor responsible for the construction of the rural water systems did not involve the communities in all stages of the project. The feasibility study did not include the environmental aspects and so the project had a negative impact after completion. There was no official management plan for the water system and after a couple of months of completion the water committee was not functioning anymore. Although they played an important role in the water supply of the households, women were not actively involved. Because of missing checks and balances for the financial administration people started to suspect financial mismanagement. A lack of a final budget review continued this misunderstanding. So the difference between community participation and management is that in the first case community is involved but only in the second case they are owner of the project/process.

1. Give five maintenance problems and difficulties. How can you overcome maintenance difficulties in the water supply system management?
2. Spare parts are not available locally
3. Technical staff not trained enough
4. Maintenance is performed on voluntary base and no one take responsibility for it
5. Used technology too expensive to maintain
6. In rural areas it can be rather expensive and ineffective to perform maintenance on regular base.

Ad a When system is installed spare parts for at least 1 year should be delivered if they are not available locally/ nearby.

Ad b train staff better and take care that they earn an income. This can be done by letting people pay for the services

Ad c See b: connect a local entrepreneur to the water supply system

Ad d Not use high tech technology but technology that fits in local context

Ad e Install fully automated systems using water ATM system. The software provides information on water production and disruptions and technicians get the information via their smartphones. So, they only have to travel if necessary. People can pay with coins or upload balance on their water ATM cards (local shopkeeper can do this).

1. What are Water technologies available in your area? Explain five.

I am living in the Netherlands, so I do not have to worry about water safety. We use groundwater and surface water. We use sand filtration (dunes), coagulation, flocculation, sedimentation, membrane filtration, active carbon filtration, UV lamp, chlorine, and aeration.

4.1 Reverse osmosis: in areas with saline water RO is necessary to purify the water. The unpurified water is first going to a filter to remove larger particles like sediment. The water is pressed through a RO membrane. By this process all contaminants will be removed. After this the water is treated by a UV filter. The water that comes out is called flat water and it is better to remineralize it for a better taste and it is also healthier. This process needs a lot of energy but there are off grid systems on the market that work on solar energy. System is rather expensive and for the maintenance specialized technicians are requested. Although no chemicals are used the rest product is brine: water with high concentration of salt. If the plant is nearby sea this is not a problem because the sea is much saltier.

4.2 Superfloc (we developed this in India- is an integrated technology): to remove iron, fluoride, arsenic and bacteria can be removed as well as viruses and protozoa. Source water is routed through an electrolysis cell and automatically mixed with small concentrations of coagulant/flocculant. Pollutants react with the chemicals forming flocs because the flocs have a higher density than water. The floc sinks down and can be removed using an automatic valve system. Bacteria, viruses and protozoa are removed using a small dose of disinfectant (harmless) chemicals. It runs on solar power.

##### 4.3 Ceramic filters: such a filter is made of clay and sawdust mixed with colloidal silver powder and water. The most used model is designed by Potters for Peace, locally produced in Nicaragua. [[8]](#footnote-8) The filters are impregnated with colloidal silver powder to ensure complete removal of bacteria in treated water and to prevent growth of bacteria within the filter itself. It however does not remove viruses.

##### A more sophisticated version of the ceramic filter is the Tulip filter [[9]](#footnote-9)  The filter is made of diatomaceous earth treated with nano silver.To clean the water and avoid recontamination and algae growth. The filter contains carbon to improve taste and remove colour.

4.4 Disinfection by boiling or chlorine:water can also be boiled or exposed for six hours to the sun. In Bolivia people in the Highlands were teached to put a coca cola bottle filled with water on their roof and after 6-8 hours in the sun it was safe to drink. It is also possible to use chlorine (or iodine) tablets to remove bacteria but the disadvantage is the change of taste. People do not like it. It is used during emergencies because it is easy and cheap to apply.

4.5 Clothes: this I have seen in India and Bangladesh. People put a cloth in the water to get microorganisms out. It is mainly used by poor people. But also by the Jain people who do not want to kill animals/organisms. People (women) fold a sari cloth 4-8 times to filter (surface) water. Laboratory tests have proved that this method removes cholera bacteria [[10]](#footnote-10) Water treated this way has a reduced pathogen count of almost 99%. [[11]](#footnote-11) Where no options are available or affordable the cloth solution is a good option.

1. How do you ensure cost effectiveness in supply of water?

This can be done by keeping the capex and opex as low as possible. In our water company in India we do this by setting up fully automated systems. As already described above using software which facilitates monitoring from a distance. The technology should fit in the local context and, if possible, produced locally. In India we buy the RO systems locally and developed the Superfloc with a local partner. Produce the technology in the Netherlands would be too expensive.

People come to fetch the water. Home delivery is organized by our company but is performed by private entrepreneurs. We setup water kiosks that are managed by local franchisees. They want to have an income and are keen on low costs. As a company we are responsible for the quality of the water and this sometimes causes some tension between the company and the franchisee.

1. UNHABITAT manual 2007, Geneva, page 50 [↑](#footnote-ref-1)
2. J.Oldfield, COMMUNITY-BASED APPROACHES TO WATER AND SANITATION: A SURVEY OF BEST, WORST, AND EMERGING PRACTICES, retrievd from https://www.wilsoncenter.org/sites/default/files/WaterStoriesCommunity.pdf [↑](#footnote-ref-2)
3. Idem. [↑](#footnote-ref-3)
4. idem [↑](#footnote-ref-4)
5. UNHABITAT manual on the righ to water and sanitation, 2007, Geneva, page 11 [↑](#footnote-ref-5)
6. Mansuri.G and Rao V, Community-Based and -Driven Development: A Critical Review, retrieved from http://web.worldbank.org/archive/website01066/WEB/IMAGES/10650632.PDF [↑](#footnote-ref-6)
7. Smith,G (2011), RURAL WATER SYSTEM SUSTAINABILITY: A CASE STUDY OF COMMUNITY-MANAGED WATER SYSTEMS IN SARAMAKA COMMUNITIES, retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.727.9793&rep=rep1&type=pdf [↑](#footnote-ref-7)
8. Retrieved from https://www.cdc.gov/safewater/pdf/ceramic\_2011-final.pdf [↑](#footnote-ref-8)
9. Retrieved from http://www.basicwaterneeds.com/tulip-technology/ [↑](#footnote-ref-9)
10. Hug A. et al (2010)Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2912662/ [↑](#footnote-ref-10)
11. Retrieved from http://www.pantoto.org/waterfilter/ [↑](#footnote-ref-11)