



Decentralised water treatment: from motivation to implementation

February 16, 2023 | Bärbel Zierl

Topics: Drinking Water | Wastewater | Water & Development | Society

Putting decentralised water treatment technologies into practice is not always easy. It often takes many small steps to motivate people to use these technologies. In a recent article, two environmental health psychologists from Eawag summarise in a “Theory of Change” what is known so far about the psychological factors influencing the use of decentralised water treatment technologies and the measures that could promote their adoption.

The United Nations have set 17 goals for sustainable development. Goal 6 calls for ensuring the availability and sustainable management of water and sanitation for all. But the world still has a long way to go. About one fifth of the world’s population has no access to clean drinking water, and about one third has no access to safe sanitation.

Sometimes the technological means for treating water would be readily available. In particular, decentralised technologies make it possible nowadays to treat water cost-effectively and directly on site. Nevertheless, in some places they are not used. Nadja Contzen, head of the research group Environmental Health Psychology at Eawag, and Josianne Kollmann, postdoctoral researcher in the group, have compiled current psychological knowledge on why decentralised water treatment technologies are sometimes rejected and what measures could be taken to promote their use in a “Theory of Change”. They published the model today in the journal “Nature Water”. It focuses on two types of decentralised water treatment technologies, technologies for purifying drinking water and technologies for wastewater treatment and reuse. They present the most important aspects and findings here in an interview.

Especially in middle- and low-income countries, decentralised water treatment

technologies could help to provide safe drinking water. Nevertheless, technological developments are sometimes rejected. Why is that?

Josianne Kollmann: There are many factors involved. People must first be aware that unpurified drinking water can cause illness. But even when this knowledge is available, some stick to the status quo out of sheer habit: "We have been drinking this water until now. Why should we change that?"

Nadja Contzen: Some also feel overwhelmed by decentralised technologies. They don't think they will be able to use the technology and so they don't even try. This "lack of self-efficacy" is especially relevant when the introduction of technologies requires people to change their habitual behaviour. Let's take the chlorination of drinking water in the household as an example. People have to develop a new routine. They need to buy the chlorine, measure the right amount of the agent and add it to the water, stir the chlorinated water and then let it sit for at least half an hour, preferably covered. So you have to plan ahead. If you only think about chlorination when you are thirsty, it is already too late.

JK: Local norms are also an important factor: How normal or widespread is the technology already in the familiar environment? If the technology is not yet used in the neighbourhood, many do not like to be the first. They do not want to be different from their community and take on a special role.



About one fifth of the world's population has no access to clean drinking water. Nevertheless, technologies for the treatment of drinking water encounter rejection in some places. A new "Theory of Change" shows which psychological factors promote technology use. The model can be used to design measures that encourage the use of decentralised water treatment technologies such as the water kiosk shown in the picture in Githembe, Kenya. (Photo: Nadja Contzen)

Also when it comes to wastewater treatment and reuse, decentralised technologies sometimes have a hard time. What are reasons for this?

JK: When wastewater is treated and reused decentrally, that is directly on-site, similar factors apply as in the treatment of drinking water. In addition, the feeling of disgust comes into play here. People are disgusted by using water that has been used before. However, this also depends on the reuse purpose of the treated water. For most people it is acceptable to use it for washing their car, flushing the toilet or watering the garden. However, the physically closer the water gets to humans, the greater the feeling of disgust and thus the rejection. For example, many people oppose the idea of washing their hands or doing their laundry with the treated water. And only very few can imagine to drink the water.

NC: There are some further interesting findings here: People often trust nature more than technology. If the treated water is first discharged into a river, then taken out again several kilometres downstream and again treated, people trust the water more than if the wastewater is treated and reused directly without any detours in nature. For many people, nature has a cleansing and healing effect, so to speak.

In your article, you summarise what is known so far about which psychological factors are important in motivating people to use decentralised water treatment technologies. What are your most important findings?

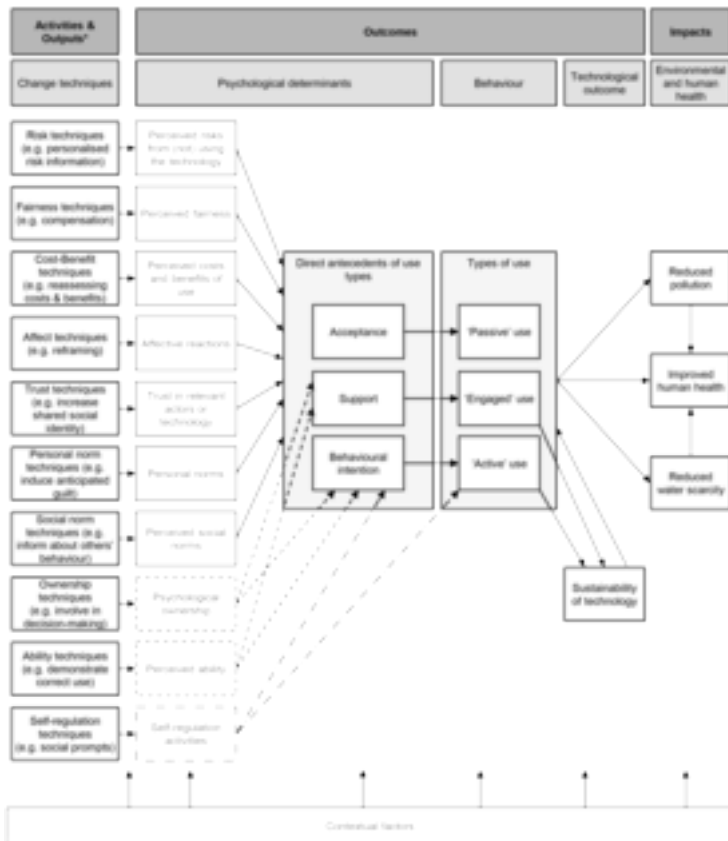
NC: In our view, too little consideration is given to what kind of use the decentralised

technology requires. We distinguish between passive, engaged and active use. Let's take the chlorination of drinking water again as an example. If chlorination can be done passively, that is directly at the source where people get their drinking water, people have no additional expense. If they also do not have to pay anything or not pay any more for the water than previously, we speak of passive use. In such cases, the introduction of technologies is comparably easy. People are unlikely to change the water source in order to avoid the technology.

It becomes a little more difficult when the costs for the treated drinking water increase, for example, if people have to pay more or are responsible for the maintenance of the passive chlorination. The probability that they change to another water source is already greater. It then often takes more convincing, because people not only have to accept the technology, but they also have to support it. So an engaged use is needed.

The most complex task is to motivate people to chlorinate the water in their own households, because this requires a change in behaviour; we then speak of active use. Here we need even more convincing to motivate people to develop new routines and to treat their drinking water.

JK: Our "Theory of Change" provides an overview of the findings in the field to date. At the same time, it is a first step towards a tool to support practitioners, such as companies, NGOs and public authorities, who want to introduce decentralised water treatment technologies in planning suitable accompanying and promotional measures. Depending on the type of use, the model shows which psychological factors can influence people's attitudes and which measures or change techniques could motivate people to use the technology.



Depending on the type of use, the “Theory of Change” shows which psychological factors can influence people’s attitudes towards decentralised water treatment technologies and which measures or change techniques could motivate people to use the decentralised technology. (Source: nature water)

What does that mean on concrete terms?

JK: For technologies with passive use, it may be enough to promote acceptance and thus use by pointing out the health risks of unpurified drinking water or by increasing confidence in the technology. In the case of active use, which requires a change in behaviour, these measures are usually not sufficient. For example, measures may be needed to strengthen people’s self-efficacy - that is, people’s belief that they have the capability or ability to actually use the technology and adapt their behaviour.

NC: It often takes many small steps to motivate people and to support them in putting their motivation into action. It is then also important to show people how they can incorporate the new action - such as chlorinating water - into their daily routine and set reminders. It is best to develop a fixed routine, for example, by always preparing the drinking water at the same time in the morning right after fetching the water.

Cover picture: Nadja Contzen, head of the Eawag research group Environmental Health Psychology (left), and Josianne Kollmann, postdoctoral researcher in the group (right). (Photo: Andri Bryner)

Original publication

Contzen, N.; Kollmann, J.; Mosler, H.-J. (2023) The importance of user acceptance, support, and behaviour change for the implementation of decentralized water technologies, *Nature Water*, 1, 138-150, doi:10.1038/s44221-022-00015-y, [Institutional Repository](#)

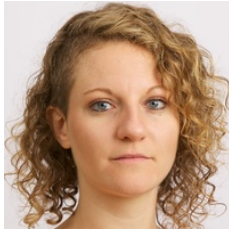
Related Links

Eawag Fair Wings Project

Event information

Webinar on 7 March 2023 with Nadja Contzen and Benjamin Bostick (Columbia University): [Nature Water Talks - Our February highlights: Decentralized water treatment technologies and groundwater arsenic contamination](#)

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