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## IMPROVED ACCESS TO QUALITY WATER

## FOR VILLAGES AND SCHOOLS IN RURAL BENIN

The project «Qualité de l'Eau auprès des Communautés Défavorisées du Nord Benin (QualiEau)<sup>1</sup>» and the «Approvisionnement en Eau Potable des Ecoles et Centres Sanitaires (EPECS)<sup>2</sup> program» has been implemented by HELVETAS Swiss Intercooperation since 2009 in the departments of Borgou and l'Atacora in Northern Benin. The QualiEau program is active at the village level. It transforms existing unprotected wells into protected wells with pumps. The EPECS program is similar, but in addition, the EPECS program installs a small scale piped system that provides health centres and schools with a tapped supply of running water via a water reservoir. Both programs provide hygiene trainings promoting hand washing, maintenance of toilets, and handling of drinking water. Since 2009, 152 water points have been transformed or built. In 2013 HELVETAS Swiss Intercooperation commissioned ETH-NADEL to conduct a quantitative impact analysis. The study showed that the project could improve the water quality at the source and improve the hygiene behaviour of students.

<sup>1</sup> Financed by Medicor and other foundations

<sup>2</sup> Financed by SDC and SIGE



## CONTEXT AND PROJECT ACTIVITIES

The Government of Benin made a major effort in the 1970/80s to provide access to drinking water in rural areas, constructing open wells in many villages. Unfortunately, these water sources have become a threat to public health as they are unprotected and neglected by national drinking water supply programmes. The quality and potability of the water has dropped to critical levels. In Bourguou and Atacora, only 39%–60% of the population has access to drinking water, depending on the commune concerned. The lack of water points and poor water quality leads to high infant mortality, precarious health services and high school absences due to sickness amongst the pupils.

In response to this situation, HELVETAS Swiss Intercooperation has developed a simple and low cost method to transform the open wells into a closed and safe water source. The transformed wells with a pump can serve the dispersed population, where a piped system would be far too expensive. Based on this cost-effective and easy technology, which received a World Bank award, HELVETAS Swiss Intercooperation has initiated two projects – EPECS and QualiEau – scaling up this innovation in the departments of Bourguou and Atacora.

These two projects are in line with the strategy of the Government of Benin to decentralize responsibility for the management and maintenance of the water and sanitation infrastructure to the local level. Under Benin's decentralization process, the communes are charged

Maintenance of the improved well by the operator.



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Handwashing station for the students in a school.

with the planning, construction, monitoring as well as the management of the infrastructure. This institutional set-up has allowed the construction of 152 improved water sources between 2009 and 2012, serving approximately 230'000 users.

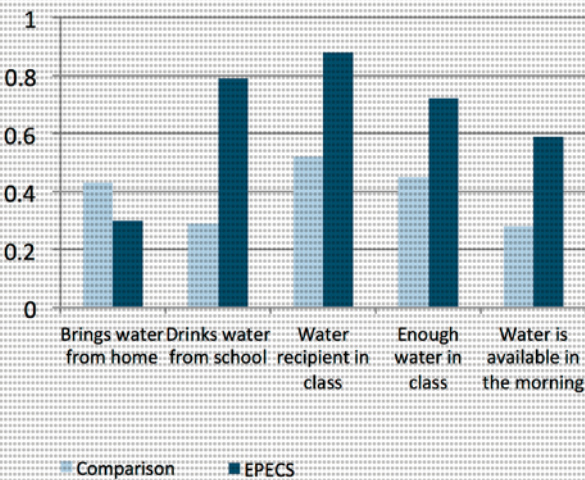
## STUDY METHODOLOGY

The Impact study conducted by Nadel/ETH in 2013 chose a cross-sectional design comparing 30 villages and 25 schools that benefitted from EPECS or QualiEau between 2011 and 2012 with 30 villages and 25 schools that will benefit from EPECS or QualiEau programs between 2013 and 2014. In total 61 villages, 602 households, 50 schools and 499 children were surveyed using a questionnaire that was completed in real time with the help of mobile phones. In addition, simple water tests (using the presence of E. coli as indicator) were taken at the water points, at the household level and in the schools. The survey was complemented by semi-structured interviews with individual persons at school and health centres. At school level, additional concentration tests were conducted with the students in order to measure their attentiveness to learn.

## IMPACT ON WATER COLLECTION AND USE

The provision of water to schools through a small scale piped system leads to significant reported improvements in supply (in reliability, and time taken in collection). As a result, the reported quantity of water consumed increases about 0.5 liters per student, per day. Children in schools that benefitted from EPECS apparently drink twice as often water as children in comparison schools (control group). Moreover, in EPECS schools, 72% of the children report that there is enough water in class, whereas this is only the case for 45% of children in comparison schools (see Figure 1). Hence, water access and use improves considerably in schools through small scale piped systems. The only worrying fact is that girls continue to be (also in schools) much more often responsible for water collection (75%) than boys (34%).

Figure 1: **Water Use in EPECS and Comparison Schools**



On average, households had collected 6 containers of water (25–35 liters each) the day before the interview; about 7 containers in comparison villages and about 5 in EPECS/QualiEau villages. The lower number of containers collected in EPECS/QualiEau villages could either be the result of the longer time needed to collect one water container, because only one person can use the pump at a time or due to the fact that payment is more frequently demanded for water to cover the maintenance costs of the wells (81% in EPECS/QualiEau villages pay for water and 54% in comparison villages). In some villages conflicts have arisen between schools and communities for the shared use of the improved water point.

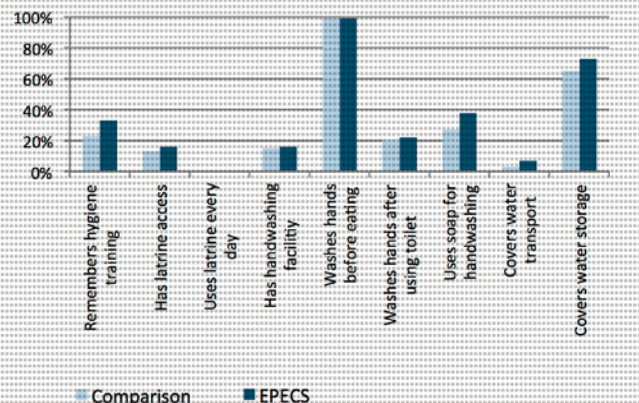
## IMPACT ON HYGIENE BEHAVIOUR

Women living in the villages of intervention remember participating in a hygiene programme more often than women in comparison villages. When asked what they remember from the training, most women remember lessons related to drinking water. Very few women (5%) remember any lessons related to latrine cleaning and/or hand washing (14%). The reason might be that very few households (less than 20%) possess a latrine and/or hand washing facility.

Children in schools seem to show better hygiene behaviour than female adults in villages. Moreover, the hygiene training of EPECS seems to have a higher impact on hygiene behaviour of pupils than of adults – the difference between EPECS and comparison schools is much more pronounced than the difference between EPECS/QualiEau villages and comparison villages. Almost 80% of children in project targeted schools remember being visited by a health worker as compared to only 35% in other schools. In contrast to the women in villages, most of the children remember contents related to hand washing and to a smaller extent related to drinking water and toilet use. This also transfers into better self-reported behaviour with regard to hand washing of children. Moreover, almost 100% of students have access to a toilet in school.

However, only 20% of students use the toilet daily. One reason for this could be the high number of students per toilet (on average almost 50 students per toilet). EPECS toilets are significantly cleaner (24% of the respondents describe them as dirty) than in comparison schools (44% dirty).

Figure 2: **Percentage of Students with appropriate Hygiene Behaviour**

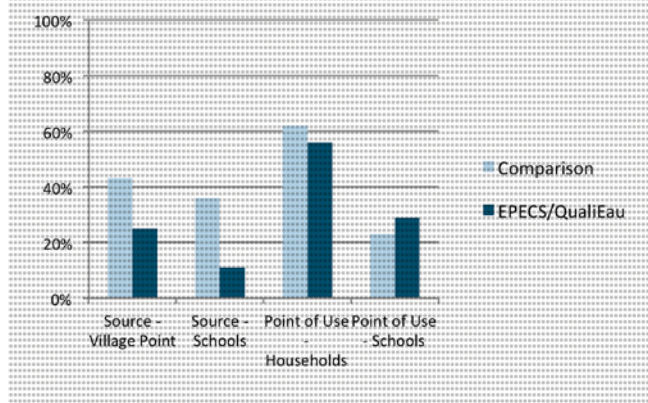




## IMPACT ON WATER QUALITY

Figure 3 indicates that transformed wells considerably reduce E. coli contamination at the water source for villages and schools. The contamination at point of use, i.e. in the storage containers, of households and class rooms remains however high. It seems that the good water quality at source is not maintained until consumption in class rooms and households. One possible reason is that water storage vessels are often used for multiple purposes (apart from drinking water), including hand washing (67 % of households). Only 77% of households use soap for cleaning their water storage vessels, and very few water storage vessels are closed and furnished with a water tap. The risk of recontamination is therefore high.

Figure 3: **Percentage of Water Tests with E. Coli Contamination**



## HEALTH EFFECT

Diarrhoea incidence (within the last 2 weeks) is high among women (13%) and children (22%) and no difference can be found between comparison and EPECS/QualiEau villages. However, children in EPECS schools have on average been sick 0.3 days the week before the interview whereas children in comparison schools have been sick 0.5 days during the previous week. Test results indicate that children in EPECS schools perform better in concentration tests than children in comparison schools, which relates to higher water consumption.

## KEY RESULTS OF THE PROJECTS

- In four years, more than 150 unprotected wells have been transformed into protected wells. The same number of villages and schools has received hygiene training.
- The improved water infrastructure leads to significantly better water quality at source in the villages and the schools.
- The water quality has not been maintained until the point of consumption at household and school level.
- Hygiene promotion campaigns seem to be more likely to be remembered, and hygiene behaviour changed, in schools (among children) than in households (among female adults).
- Interventions at schools have a large impact on the use and consumption of water and improve the concentration of students. This should lead to better learning results.
- In the intervention village there are more households ready to pay for drinking water to ensure infrastructure maintenance.

## KEY RECOMMENDATIONS/PERSPECTIVES

- Define project activities to increase hand washing with soap and safe storage to improve water quality at the household level to the point of consumption.
- Better analyse behaviour change factors in order to improve the design and implementation of hygiene promotion measures at household level.
- Define a set of water, sanitation, and hygiene indicators that are collected before program commencement and are then monitored during implementation.
- Improve toilet cleaning and water storage in school class rooms.
- Address the conflict at the water points between the communities and the school.

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