

# POLICY BRIEF

## Studying health impacts associated with the Live With Water project

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### PROJECT IDENTITY:

**Project's name:** Live With Water

**Funding scheme:** DFID

**Project's partners:** CRES, BG, GROUPE SENGHOR, NIYEL, REFDAF, EAWAG, TPH Swiss, University of BERNE, MRUHCV and EVE.

**Intervention's areas in Senegal:** Yeumbeul nord, Yemubeul Sud, Grand Yoff, Djidda Thiaroye Kao, Malika, Thiaroye Gare, Rufisque Ouest, Medina Gounass, Whakinane Nimzatt et Mbaou



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## INTRODUCTION

### *What is the policy problem?*

Under an optimistic scenario of continued future socio-economic development and adaptation to climate change, a recent study published by the World Health Organization (WHO) estimated climate change induced mortality at 250,000 additional deaths per year due to coastal flooding, heat, diarrhoeal diseases, malaria, dengue and chronic malnutrition in the years 2030 to 2050. In terms of geographical distribution, adverse health impacts of climate change are projected to be greatest in South Asia and sub-Saharan Africa. In parallel to these changes induced by global climate change, rapid urbanisation puts strains on existing infrastructures in urban centres, including storm-water drainage systems and rainwater retention basis. The combination of both, changing rainfall patterns and rapid urbanisation, result in urban flooding even becoming more common in large cities in low- and middle-income countries such as Dakar, Senegal.

Apart from the direct health risks from flooding like drowning and injuries, a large part of the public health burden stems from indirect effects. Flooding events usually do not cause communicable and non-communicable diseases directly, but exacerbate existing risk factors like insufficient hygiene, sanitation and abundance of vector breeding sites. Indeed, during flooding events pathogens can be mobilized in the environment from sewage systems and thereby deteriorate the quality of surface water and potentially also drinking water. This can lead to outbreaks of water- and waste-related diseases, such as acute diarrhoea, cholera and typhoid. Furthermore, depending on the geographical location, standing water can serve as breeding sites for vectors of malaria, dengue fever and other vector-related diseases. In addition, mental disorders are long-term effects of flooding events that often have a gradual onset. Most commonly post-traumatic stress disorder, anxiety and depression have been described after such events. Last but not least, urban flooding do also negatively affect determinants of health including household income, schooling rates and access to health care.

Hence, urban flooding are threatening public health in affected communities in many ways. Therefore, it is of public interest to find effective strategies for building up resilience to human health in order to minimize the many potential adverse impacts while maximising potential health opportunities. The "Living with Water" project – combining flood infrastructure measures with adaptive and transformative processes of resilience-building – presents a unique opportunity to study whether an integrative approach to flood management and resilience-building allows to safeguard human health or even result in health benefits. Specifically, the health impact evaluation that was implemented along with the other research components, pursued the following research question in the given context: does improved infrastructure and resilience result in: (i) a reduction in fever and diarrhoea rates in children under the age of 5 years; (ii) improve access to health care; and (iii) improve mental wellbeing in the adult population?

## EVIDENCE AND ANALYSIS

Overall, the findings of the health impact evaluation show that the LWW project interventions did not significantly affect the number of diarrhoea and fever cases in children aged under 5 years identified in the benefitting communities when compared to comparison communities. On the other hand, the qualitative data collected show that community leaders and beneficiaries perceived a range of positive changes in terms of health and sanitation due to the implementation of the LWW project. This was mainly explained by improved accessibility of health centres, a reduction in waste disposal and improved hygienic conditions. Finally, the quantitative data show that the interventions of the LWW project seem to have had a positive impact mental wellbeing in the adult population. Specifically, the percentage of adults who felt calm and peaceful at the time of the household survey was significantly higher in the intervention group compared to the control group.

Hence, the data generated in the frame of the LWW shows that resilience-building can have a positive effect on mental wellbeing in the adult population,

along with a range of perceived positive health effects as reported by beneficiaries and community leaders. The research undertaken does, however, not allow to fully determine the range and extent of other potential positive health effects such as a reduction in diarrhoea and malaria cases, as these effects might only show a clear pattern in subsequent rainy seasons.

## POLICY IMPLICATIONS

**Reduction in adverse health effects associated with urban flooding:** beneficiaries of the LWW interventions perceive a number of positive effects related to health and access to health care. An additional health benefit of the LWW project is improved mental wellbeing in the adult population. Hence, interventions such as the LWW project have the potential to make a contribution to public health as a positive spill-over effect.



*Before*



*After*

# RESEARCH PARAMETERS

The Living with water is a project that started in 2015 aiming at improving the resilience of vulnerable households located in the Dakar suburbs to flooding. Four types of interventions were implemented: a) drainage infrastructure to reduce flood exposure and improve the mobility, living conditions and health of the targeted population; b) waste management, including waste collection and recycling; c) creating income generating activities through urban gardening and waste recycling; d) supporting community organisation and contingency planning to organise flood relief and the management of drainage infrastructure. The four types of interventions were implemented from the end of 2016 to the end 2017.

Data was collected in 10 Communes of the departments of Pikine and Guediawaye: **Yeumbeul Nord, Djida Thiaroye Kao, Grand Yoff, Malika, Mbao, Medina Gounass, Rufisque Ouest, Thiaroye Gare, Wakhinane Nimzatt, Yeumbeul Sud.**

Flood exposure index captures how each household was physically affected by flood, the level of water entering a house, the level of flood in the street surrounding the house and the general perception of damages to households caused by flood.

A semi-experimental before-after-control intervention (BACI) approach was adopted to capture the baseline conditions before and the impacts after the interventions drawing on samples from the targeted population (treatment) and from non-targeted population (control). A difference-in-difference (DID) statistics comparing means was used to capture the relative change attributable to the LWW project.

**The health impact evaluation was a sub-topic of the human and social capital dimension of the resilience assessments. Key indicators were as follows:**

- *Number of children aged under 5 years suffering from fever (disaggregated by gender) (impact indicator 1).* This indicator will be assessed by asking the mother whether any of the children under the age of

5 years present in a household has had fever in the two weeks preceding the survey.

- *Number of children aged under 5 years suffering from diarrhoea (disaggregated by gender) (impact indicator 2).* This indicator will be assessed by asking the mother whether any of the children under the age of 5 years present in a household has had fever in the two weeks preceding the survey.
- *The percentage of children with fever and/or diarrhoea that went to a health facility will be used as an indicator for access to health care.* This indicator will be assess for all the children that presented with fever and/or diarrhoea the two weeks preceding the survey.
- *Mental health status of the adult population:* this indicator will be a composite measure of the 5-item mental health index (MHI-5) and the energy and vitality scale (EVI).

In addition to the quantitative data collected in the panel survey, routine health information system data on malaria and diarrhea cases were collected analyzed from health facilities being located directly in the intervention areas (n=8), control areas (N=14) and outside the intervention and control areas (n=19).

