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## Case studies of interdisciplinary research projects on urban futures: process and lessons learned

### Research in Water and Sanitation for Developing Countries

Sandec—the Department of Water and Sanitation in Developing Countries at the Swiss Federal Institute of Aquatic Science & Technology (Eawag)—researches effective implementation of point-of-use water treatment, excreta management, solid waste management, and strategic sanitation planning in the developing world. Sandec’s goals are to design and validate new concepts and technologies in water supply and environmental sanitation, improve existing research and expertise in the field of water supply and environmental sanitation in low and middle-income countries, and increase awareness of and expertise in water supply and environmental sanitation issues that face low and middle-income countries. Sandec’s research is transformational in nature. Most of Sandec’s research is conducted in Asia and Africa and aims to improve knowledge of how to realize transitions to a desired situation by transforming how sanitation practices are planned for and implemented.

Implementing adequate sanitation is a global problem, but is significantly more urgent in developing countries. The urban poverty cycle leaves sanitation to local officials or individual households. Improved sanitation coverage is one of the big laggards in the United Nations Millennium Development Goals.<sup>8</sup> Approximately 2.6 billion people, about one third of the current world population, do not have access to public water or sewer systems. This lack of proper sanitation is responsible for most infectious disease and child mortality, greatly affecting impoverished populations in developing countries. While there are significant sanitation deficiencies in Asia, African countries are the most vulnerable. The research challenge is how to effectively improve current sanitation practices with the implementation of more cost-effective and sustainable sanitation methods from the household to treatment and disposal.

Countless NGO projects have invested significant amounts in failed sanitation projects throughout the developing world. This highlights the need for alternative approaches to planning and implementation that frame solutions to the sanitation problem within the context of sustainability. A specific project conducted by Sandec in Chang’ombe in Tanzania helps outline important lessons for successfully executing transdisciplinary research. Chang’ombe is the largest shantytown in Dodoma, Tanzania, with about 35,000 people and a population density of 211 person/ha. However, the area is subject to rapid migration from outskirts and rural areas. The initial sanitation situation in Chang’ombe was rudimentary and of very poor quality.

In Chang’ombe, Sandec sought to improve sanitation conditions by installing prototype latrines, and strengthen resilience to urban sanitation problems through involvement of stakeholders in planning, construction, and management.

<sup>8</sup> United Nations (2008) Millennium Development Goals Report. United Nations, New York.  
[www.un.org/millenniumgoals/](http://www.un.org/millenniumgoals/)

During the twelve month process, we developed and tested a planning tool to improve sustainability of future sanitation interventions. To achieve its goals, the project integrated interdisciplinary groups, such as social planners, anthropologists, and sanitary engineers. If you do not frame your research and select your research carefully, things can go wrong.

*Lesson learned: Choose your research partners carefully!*

To guarantee the information flow throughout the project, we ensured there was a clear understanding between the involved organizations and team members as to who was responsible for which portions of research, and who was in charge of the project on the ground.



*Lesson learned: Develop the research proposal jointly and agree on a clear communication strategy!*

Our method employed a three-part process. Prior to starting construction, we conducted a baseline survey to assess the current sanitation situation and motivations for improving sanitation at household level. This survey was directly followed by construction of the prototype latrines. We selected three options for latrine products, ranging in cost from US\$ 80 to US\$ 300: the Arbor loo, the ventilated improved pit latrine, and the Ecosan toilet.<sup>9</sup> These products were chosen for their foundation in sustainability: all three satisfy the criteria for human health and affordability, and the Ecosan toilet also recovers the nutrient resources for use in urban agriculture. Individuals were able to select the latrine which best suited their situation, and they were built by local masons and local groups, which kept costs at a minimum. Following construction and use of the latrines, we surveyed the citizens to judge users' motivations and preferences. During the survey confusion in terminology between engineers and social scientists led to a large amount of unusable information and poor statistics.

Surveys were conducted to assess the current sanitation situation and motivations for improving sanitation at the household level.

*Lesson learned: Fine-tune the language of engineers and social scientists!*

In the final stage of the research project, we devised a participatory planning tool that builds on informed decisions of the community. Sandec has been holding workshops to test the new sanitation planning strategy in other locations around the world. The workshops help improve locals' understanding of the sanitation chain from the toilet to disposal and reuse, while providing information to local authorities and NGOs about improvement and implementation of effective sanitation strategies.

*Lesson learned: Allow time for strengthening of partner researchers and research institution capacities!*

<sup>9</sup> Tilley, E., Lüthi, C., Morel, A., Zurbrügg, C., Schertenleib, R. (2008) Compendium of Sanitation Systems and Technologies. Eawag, Dübendorf. [www.eawag.ch/organisation/abteilungen/sandec/publikationen/publications\\_sesp/downloads\\_sesp/compendium\\_high.pdf](http://www.eawag.ch/organisation/abteilungen/sandec/publikationen/publications_sesp/downloads_sesp/compendium_high.pdf)