Co-management of Faecal Sludge and Wastewater Sludge in Vietnam

Sandec launched the Partnership for Urban Resource Recovery Project (PURR) in January, 2013. Concentrating on five urban areas in Vietnam, this project will evaluate, develop and test strategies for the co-treatment and resource recovery of faecal sludge and wastewater sludge. Magalie Bassan[1], Viet-Anh Nguyen[3], Christof Holliger[4], Linda Strande[2]

Introduction

Almost 30 % of the population of Vietnam lives in urban areas and this number is expected to increase by 1 million people annually. Urbanization increases the challenge of providing sanitation, and affects natural resources and the environment, especially, in terms of water pollution.

Vietnam has set a target for 80 % of all urban households to be connected to sewers with operational wastewater treatment plants by 2020. However, on-site sanitation technologies will still play an important role, as:

- the remaining 20 % of all households will continue to be served by septic tanks, and
- households with existing septic tanks will be connected, with the effluent going to the combined sewerage and drainage system.

Thus, faecal sludge from septic tanks will continue to be a sanitation management concern.

Context

KfW and SECO fund programs to improve drainage and sewer networks, and to build wastewater treatment plants in Vietnam. They have recently turned to projects that integrate strategies for faecal sludge and wastewater sludge treatment and resource recovery. PURR was developed by Sandec, the Hanoi University of Civil Engineering (HUCE) and École Polytechnique Fédérale de Lausanne (EPFL) to address this issue and is funded by SECO. Sandec's long-term experience in working with the Environmental Science and Engineering Department of HUCE, leaders in sanitation and wastewater management in rural and urban areas, led to the development of this three year collaborative project. It will take place in five cities in Vietnam (See Figure 1).

Objective and activities

The objective of PURR is to evaluate viable options for sludge management, treatment and resource recovery for mid-size cities in Vietnam with populations of 85 000 to 165 000 people. It will investigate anaerobic co-digestion of sludge, which is considered to be a promising technology for co-treatment, because it allows for simultaneous treatment and energy production.

Field studies to assess the appropriateness of technical solutions in local contexts will be done. Surveys will be conducted in the five project cities, focusing on the aspects that influence the production and types of sludge (e.g. onsite sanitation coverage and management systems). Market demand analyses will also take place in the five cities to assess the potential use of and demand for different end-products, such as biogas and soil amendments. The potential for reuse of the end products by agriculture and/or industry will be explored, according to the specific conditions of each urban area.

The anaerobic co-digestion component of the project will first focus on a detailed understanding of the characteristics of the waste streams, specifically, of the parameters that influence anaerobic degradation.

Figure 1: The five cities in the project.

Samples of faecal sludge and wastewater sludge will be collected and analysed in laboratories. Then, solutions in the lab will be made to mimic the characteristics of these samples. Bench scale tests of the solutions will take place in EPFL's Laboratory of Environmental Biotechnology to assess their anaerobic digestibility (e.g. mixing ratios and feeding rates). Afterwards, a pilot scale digester in Vietnam will be built to test operational parameters and treatment performance with real faecal sludge and wastewater sludge.

Challenges and perspectives

This project aims to simultaneously increase knowledge of the characteristics of faecal sludge, and its potential co-digestion with other organic waste streams, as well as to specifically assess solutions for the co-treatment of faecal sludge and wastewater sludge. Specific aspects that will be addressed include:

- the different geographic, socio-cultural and climatic contexts in Vietnam,
- the different management schemes of faecal sludge and wastewater sludge and how they affect co-treatment, and
- the wide variation of faecal sludge characteristics that make it difficult to reliably predict operating parameters and performance.

PURR aims to provide the required data to deal with variations in faecal sludge and wastewater sludge management in urban settings. We believe that the project's comprehensive laboratory analyses, bench scale experiments, and field pilot tests will produce results that could improve future work in the treatment and resource recovery of faecal sludge and wastewater sludge in Vietnam, and in similar urban areas worldwide. Watch here for future news….

[1] Eawag/Sandec and EPFL, Switzerland
[2] Eawag/Sandec, Switzerland
[3] HUCE/IESE, Vietnam
[4] EPFL, Switzerland
Contact: magalie.bassan@gmail.com