

Towards a Wide-Scale Replication Scenario for Small-Scale Sanitation in the Nile Delta, Egypt

In the past few decades, various attempts were made to develop a sustainable sanitation model for the numerous small settlements scattering Egypt's agricultural land. Yet, none of these initiatives turned into an upscalable model. The SECO-funded ESRIS Project (Egyptian-Swiss Research for Innovation in Sustainable Sanitation) seeks to understand why wide-scale replication has not occurred, bridge the gaps and develop an innovative and cost-effective system in partnership with the Egyptian Holding Company for Water and Wastewater (HCWW). Philippe Reymond¹, Christoph Lüthi¹, Rifaat Abdel Wahab², Moustafa Moussa³

The Nile Delta resembles an extremely large peri-urban area, scattered with thousands of compact settlements of various sizes. Only a small percentage of these settlements are served by proper sanitation schemes (Photos 1 and 2). Increasing sanitation coverage in such areas is a central issue in Egypt. A cluster approach has been adopted, focusing on the main urban centres while connecting smaller settlements within a few kilometers distance. However, numerous settlements are located too far to be connected to those large-scale centralised treatment plants in the foreseeable future and need alternative solutions.

So far, no wide-scale replication model is available in Egypt for these smaller settlements. Development of a cost-effective, context-appropriate and wide-scale replicable small-scale sanitation system (i.e. for up to 5000 inhabitants) is the ulti-

mate goal of Sandec's ESRIS project. In a first stage, the results obtained from the project will support the World Bank-funded project ISSIP (Integrated Sanitation and Sewerage Infrastructure Project) and the 30 small settlements expected to be served. Beyond ISSIP, the resulting outcomes have the potential to benefit other large-scale sanitation projects and to support the National Rural Sanitation Strategy currently under revision.

Assessing the small-scale sanitation sector

In a first step, a nation-wide assessment of the rural/peri-urban sanitation sector and existing small-scale initiatives was conducted. Different approaches were applied: (i) interviews with key stakeholders of the sector to identify the initiatives, collect the scattered data, knowledge and experience available; (ii) conduct a literature

review; (iii) select the most prominent initiatives, field visits and detailed assessments with evaluation questionnaires and sample analyses. The evaluation questionnaire was designed in an integrated manner and based on the "Enabling Environment" framework (Fig. 1) [1]. The aim was to assess all the components of the sanitation systems, from the technical parameters to the management scheme, financial sustainability and social acceptance.

Individual trials vs. wide-scale replication

This assessment reveals that isolation of existing initiatives and lack of commitment by government agencies are the main factors preventing wide-scale replication. None of the approaches has been institutionalised. Furthermore, entirely community-based approaches do not appear to work in the Egyptian context. It is consequently clear that the Utility (HCWW and Affiliates) must play a pivotal role in the development and management of small-scale sanitation. So far, the sector finds itself in a vicious circle, as isolated initiatives remain prototypes and, as such, are not cost-effective, do not receive the attention required, are considered too expensive and/or prone to failure, and therefore not replicated.

Development of a model for wide-scale replication requires a clear governmental strategy heading in this direction. The situation could then turn positive, i.e. with a clear strategy, mass-production approaches could be proposed and tried, thereby allowing economies of scale. A model implemented at scale would be significantly cheaper and of better quality than one built on a one-off basis and also allow the Utility to create specialised units in each Affiliate. As such, the interface be-



Photo 1: Typical Nile Delta village (Beheira Governorate).

tween small-scale systems and the Utility (HCWW and Affiliates), including integration of the model in its strategies, forms part of ESRISS' approach.

Advantages of prefabricated units

Use of prefabricated units for part or the entire treatment scheme could control costs and quality as well as reduce overheads. Since it is a commercial product, the price is fixed and the hassle with building contractors avoided in a context where plenty of money is usually spent in the consultant/contractor constellation – mobilisation costs currently carry a big weight in the capital costs of infrastructure in Egypt – and where quality is difficult to control.

Such prefabricated units could easily be manufactured in Egypt and would create a promising new market. The idea, currently under evaluation, is to set up a modular system with several units that can be combined to allow maximum flexibility and adaptability to each village on a case-by-case basis. Such modules could be: (i) anaerobic baffled reactors and up-flow filters; (ii) compact anaerobic and aerobic units for domestic and local industrial wastewater (e.g. cheese factories); (iii) physico-chemical settling and oxidation units. If produced in large quantities, the price of prefabricated units could become highly attractive since the Egyptian market is considerable.

Another advantage of this model is the fact that the companies marketing these prefabricated units can also ensure Operation & Maintenance (O&M) on a public-private partnership (PPP) or private basis. A specialised O&M company contracted

by the Utility could also be created. Development of a strong private sector niche for small-scale sanitation would alleviate government agencies, which have to handle large-scale infrastructural projects.

Creating a baseline for planners and designers

Sector assessment also revealed a lack of baseline data characterising sanitation in rural villages (practices, water consumption, wastewater production, flows, loads), leading to mis-dimensioned infrastructures relating to the actual wastewater characteristics and sometimes even resulting in system failure. Designers do not have the available context-specific values accounting for the various factors influencing quantity and characteristics of the wastewater to be treated.

ESRISS is strengthening the understanding of the specific characteristics of sanitation in the Nile Delta villages by developing such a baseline, including tools and methodologies to rapidly quantify and characterise the wastewater to be treated on a site-specific basis and according to the sanitation-related flow model (Material Flow Analysis).

Rural settlements are highly heterogeneous in nature and differ considerably from urban contexts. Concentrations have to be taken into account, as they are usually far higher due to the lower water consumption and extra loads, such as the liquid part of animal manure. Inflows are extremely variable in time and quantity and lack a buffer effect, such as in large urban treatment plants. The characteristics of each settlement should be described on a case-by-case basis through targeted sampling campaigns, observations of local practices and interviews with key stakeholders (e.g. local authorities, households, farmers, sanitation service providers).

The way forward

In the coming months, ESRISS will be supporting the ISSIP project during implementation of the small-scale component, investigating the potential use of prefabricated wastewater treatment units and completing the village assessment tools by applying them to villages selected by ISSIP. The project will team up with partners to develop the design elements and strengthen the exchange of experience on prefabrication. In parallel, advocacy and awareness raising will be conducted at all levels to favour institutionalisation of the approach. "Strategic niche manage-



Figure 1: "Enabling Environment" framework [1].

ment" [2] may be used as a tool to structure and analyse the wide-scale replication strategy.

Transparency and dissemination of lessons learned are crucial, even if they are not apparent in this context. ESRISS has an important role to play in gathering the available data, filling the existing knowledge gaps, disseminating the results, and supporting a sound development of the small-scale sanitation sector in Egypt.

For several years, Egypt has been a focus country of SECO's economic cooperation and development programme. In the frame of its new programme phases for the years 2013 – 2016, SECO is intensifying its activities in North Africa and setting up a Swiss Programme Office in Cairo together with other federal offices.

- [1] Lüthi, C. et al. (2011): Community-Led Urban Environmental Sanitation, Complete Guidelines for Decision-Makers with 30 Tools. Eawag, Duebendorf, Switzerland.
- [2] Kemp, R., Schot, J., Hoogma, R. (1998): Regime Shifts to Sustainability Through Processes of Niche Formation: The Approach of Strategic Niche Management. Technology Analysis & Strategic Management, Vol. 10, No. 2.



Photo 2: Nile Delta village drain receiving an array of different waste.

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