



Demonstrating and upscaling an innovative sanitation value chain for the (peri) urban low income areas in Nakuru County, Kenya

Most (peri) urban low income areas (LIAs) of Nakuru County are poorly planned and sanitation infrastructure is inadequate. The access to improved sanitation facilities is low, with 46% for Nakuru Town and 53% for Nakuru County (Maji Data, 2012). Out of the existing toilets, 51% are unimproved pit latrines. Due to the sandy soils in Nakuru town, pit latrines contaminate ground water through faecal sludge and urine that percolate to the ground water table.

Wide application of sewers in LIAs is not realistic in the coming decade because of high costs. On the other hand, on site solutions (pit latrines, ecosan) are much dependent on the interest of individual users for removal of faecal sludge and urine from their surroundings which may lead to groundwater pollution and public health risk. Hence, demonstrating an innovative and sustainable (in economic and ecological terms) sanitation value based approach is considered key to promote a breakthrough in sanitation improvement acceleration in Nakuru and other parts of Kenya.

The **Nakuru Water and Sanitation Services Company (NAWASSCO)** implements the project with support of **Vitens Evides International (VEI)**, **SNV Netherlands Development Organisation**, **Umande Trust** and the **Nakuru County Government**.

Project objectives

The overall objective of the action also known as the Nakuru County Sanitation Programme (NCSP) is to demonstrate and implement a commercially viable sanitation value chain, benefiting residents of unsewered (peri-)urban low income areas in Nakuru County.

More specifically, the action has the following (specific) objectives:

1. Increase hygiene awareness and sanitation coverage (towards 95%) coverage in Nakuru Town and County;
2. Establish collection facilities and large scale transport services for hygienic and financially sustainable capture and removal of human excreta from the LIAs;
3. Controlled and certified production and sales of human excreta products;
4. Demonstrate financial sustainability of the implemented sanitation value chain;
5. Upscale the outcomes of the project to other towns and cities in Kenya.

Key milestones and results

Hygiene awareness and toilet construction

Up to now the programme has reached over 230,00 people with hygiene awareness messages through different channels including mass communication using radio messaging, Global hand washing days and World toilet days, house-to-house visits by trained community health volunteers and hand washing campaigns in both public and private primary schools.

Households: Over 5,000 toilets have been constructed in and/or rehabilitated in Nakuru Town's Low Income Areas in partnership



Photo 1: Fahariloo Household Toilet

with households, plot owners and the County government.

School Sanitation:

Safe and dignified toilet blocks with water connection for hand washing have been realised in 26 public primary schools with over 18,000 pupils.



Photo 3: New Toilet Facilities at a Public Primary School in Nakuru

County Estates: In partnership with the County Housing Department 280 toilet facilities have been renovated in Kaloleni and Kivumbini. The previous facilities were over 40 years old and sludge was overflowing into the estate areas.



Photo 4: Rehabilitated County Estate Toilet Facilities

Collection and transportation system

Working closely with the Public Health Office and County Government, NCSP explores innovative safe and hygienic emptying and transport of faecal sludge suitable for LIAs. The Gulper technology has been tested, pit-emptier associations are engaged and a mobile sludge transfer station designed that will facilitate safe disposal of the sludge in LIAs. The sludge will then be transported to the waste water treatment plant.



Photo 5: Testing the Gulper technology



Photo 6: The mobile sludge transfer station

Production of faecal matter and urine products

The programme engaged local social enterprises and a University to design production processes for the intended products. Two types of products have been developed and tested: bio-fertilisers and biomass-fuels.

Bio-fertilisers: (Vermi-)compost and Struvite

Composting an eco-friendly natural fertiliser product prepared from biodegradable organic wastes (obtained from Nakuru's main market) and human waste.

Vermi-compost is produced by the consumption of organic matter by earthworms which speed up decomposition and provide a nutrient rich end product.

Struvite is a high quality phosphorus fertiliser. It has many fertilising properties of urine with several advantages: reduced volume and weight, easily stored in a compact form and it is easy to handle, transport and apply.



Photo 7: Composting boxes



Photo 8: Struvite production on lab-scale

Bio-mass fuels: Briquettes and fuel-pellets

The fuels can be made out of dried or carbonised faecal matter. Other organic wastes like saw-dust, banana stocks and market waste can be added to increase the calorific value and volume of the products. Faecal matter, starch or molasses can be used as a binder. Biomass-fuels can be developed to suit the diverse range of cook stoves available, from the traditional cook stoves to improved cook stoves (ICS) like the gasifier stoves which are designed to reduce fuel consumption and curb smoke emissions.



Photo 9: Carbonised briquettes (left) and non-carbonised pellets (right)

NCSP is currently developing the business models and partnership arrangements to create financially viable and scale-able businesses.

Demonstration of use of excreta products

The developed products have been tested in preparation for certification in partnership with Egerton University and Nairobi University. Products have been found safe from pathogens and harmful bacteria as well as dangerous levels of heavy metals. The biomass-fuels were tested for their physical, combustion and performance characteristics and found to compete with charcoal and other biomass products. The bio-fertilisers are tested on field crops (maize), horticulture crops (cabbage) and as a soil amendment (potatoes).

Institutional embedding

In order to guarantee sustainability of the developed concept, NCSP, in close collaboration with NAWASSCO, looked into the role NAWASSCO could play in on-site sanitation. Various business models are currently under development. They range from area concentrated collective sludge collection, sludge treatment and production of products to marketing and sales of bio-mass fuels and fertilisers. In the business models also options for joint venture with private companies or outsourcing is being looked at.

In addition a tool was developed with which the cost implications of on-site sanitation on operational management for NAWASSCO can be calculated. This could assist NAWASSCO in the development of an on-site sanitation unit under the current sewerage section.

Target Population

The project benefits residents of (peri) urban LIAs of Nakuru County, i.e. some 412,000 people.

Contract value and financing

The total contract value amounts to 4.2 million euro of which 2.5 million euro is ACP-EU Water facility co-financing.

Duration of the contract

Five years (1 January 2013 – 31 December 2017)

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 Nakuru County Sanitation Programme

