

UrbanCircle

Turning urban waste into
circular economy benefits



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Every day, African cities create thousands of tonnes of organic waste that could be monetised. Sanitation waste and other wastewater, along with food and agricultural waste, can be turned into profit in the form of commercial fertiliser and soil conditioner, clean energy, and more, as well as contributing to a thriving, healthy, forward-looking economy. The UrbanCircle project will help cities, starting with Naivasha, Kenya, to explore how they could unlock this hidden potential.

Background

A circular economy is an economy that keeps the resources that enter the system in productive use as efficiently and as long as possible in order to maximise economic value – and reduce pressures on the natural environment. While nature is full of such circular systems, most human economies work very differently, in a “linear” way: extracting natural resources, using them, discarding them, then extracting more resources.

The food system is a good example of this kind of inefficiency. Food crops take nutrients and water from the soil. The edible parts are taken away to market, while the residues – and the nutrients and organic matter in them – are discarded instead of being put back in the soil. Excreta – which also contains nutrients and organic matter – is often put in landfills, or released after poor treatment or no treatment at all, into rivers and lakes, where it spreads disease and poisons plants, fish and other wildlife.

The World Bank estimated a few years ago that this poor sanitation cost the Kenyan economy 27 billion Kenyan Shillings each year, equivalent to US\$324 million, or nearly 1% of the national GDP – due to increased health care costs, productivity losses, premature deaths and access time (World Bank 2012). Added to this, rotting food, crop waste and excreta release a lot of methane, one of the most potent greenhouse gases.

From waste streams to revenue streams

Wastewater, excreta, farm waste and food waste are all rich with raw materials that can be safely processed back into economically valuable – and environmentally sustainable – products. These include agricultural fertilisers and soil conditioners that are just as effective as commercial chemical alternatives, if not more so; dry fuels and biogas – for home use or large-scale energy production; irrigation water; and more.

Photo (above): © KIM ANDERSSON / SEI

Collecting, processing and marketing these products can create new business opportunities for local entrepreneurs. At the same time, the local economy gains through healthier environments and healthier, more productive populations, as well as tax revenue from new businesses. Moreover, food and water security, climate change mitigation, energy security, education, employment and other sustainability targets are brought closer.

To unlock all these benefits requires the right investments – in infrastructure, sanitation and wastewater services, marketing and public education – as well as public institutional set-ups, regulations, financing opportunities and incentive systems that enable and encourage these investments. Revenues from resource recovery products can also be reinvested in sanitation and waste management services, leading to continually improving public health, employment, welfare and well-being.

The UrbanCircle project

UrbanCircle is an initiative of the Stockholm Environment Institute (SEI) that helps authorities and businesses explore the opportunities and benefits a circular economy approach to sanitation and waste management could bring for a given urban centre and its surroundings. This year, UrbanCircle is studying Naivasha sub-county in Kenya, in collaboration with Sanivation.

In the first step, UrbanCircle will analyse what waste streams are available in the city, and what reusable resources they contain. The team will also investigate the potential demand for reuse products in Naivasha, and what market prices they could command.

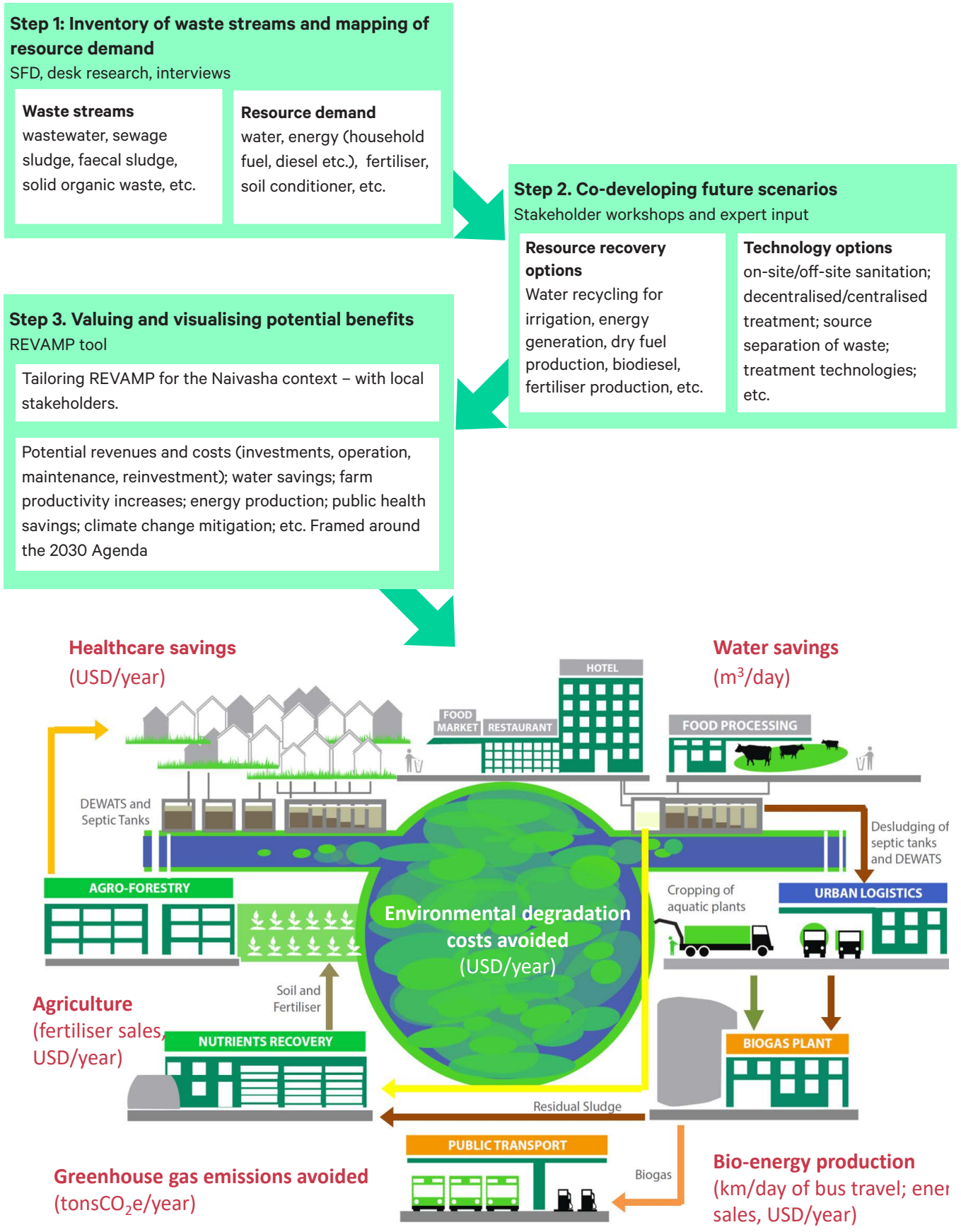
The project team will then sit down with stakeholders in Naivasha to sketch out possible future scenarios for conventional and resource-oriented sanitation and waste management in Naivasha, given what is available.



Charcoal briquettes derived from waste drying at the Sanivation treatment site.

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Figure 1. Suggested UrbanCircle process for Naivasha



SEI, based on Cityblues++



A tool called REVAMP (Resource Value Mapping) that is being developed by SEI (see Ddiba et al. 2016) will then be used to estimate the economic costs and benefits of each scenario, based on discussions between UrbanCircle and local stakeholders. These estimates can help stakeholders to determine what reuse products would offer the best results for Naivasha and its businesses – in terms of income, savings and other co-benefits.

REVAMP is being developed under the SEI Initiative on Sustainable Sanitation to support the planning of urban sanitation, waste and natural resource management. The current (beta) version of REVAMP estimates energy, nutrient and organic matter recovery potential from sewage sludge, faecal sludge and organic solid waste. As well as helping Naivasha's entrepreneurs and authorities to make key decisions, the project in Naivasha will be an opportunity for us to further refine and improve REVAMP, with the help of local partners and stakeholders.

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Naivasha

Naivasha is a sub-county in Nakuru County, Kenya. It includes Naivasha city and the surrounding countryside, with an estimated population of around 315 000 (Republic of Kenya 2013). Naivasha's current sanitation and waste management systems have served the area since the 1960s, but will not be able to cope with the area's rapidly growing population. With a burgeoning economy and increasing demand for natural resources, Naivasha is well placed to benefit from switching to a circular economy approach to sanitation and organic waste management.

Project duration

2018–2019

Funding

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