

# WASTE WISE CITIES



UN HABITAT  
FOR A BETTER URBAN FUTURE

## Waste Wise Cities Newsletter #9

February 2021-  
Organic Waste



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## Organic Waste Management

Organic waste is the biodegradable fraction of waste. Under the scope of municipal solid waste management, it typically includes green waste (leaves, grass, garden waste) and food or kitchen waste (food leftovers and bones, spoiled vegetables and fruits, and waste from food preparation such as peels, pits, etc.). Organic waste is one of the largest fractions of municipal solid waste globally (the proportion of total waste varies across income levels between 32% and up to 80%), with approximately 38 billion tons of organic waste generated annually across the world.

It is estimated that globally, less than 10% of organic waste is utilized as a resource - landfill and open dumps remain the dominant disposal means. When

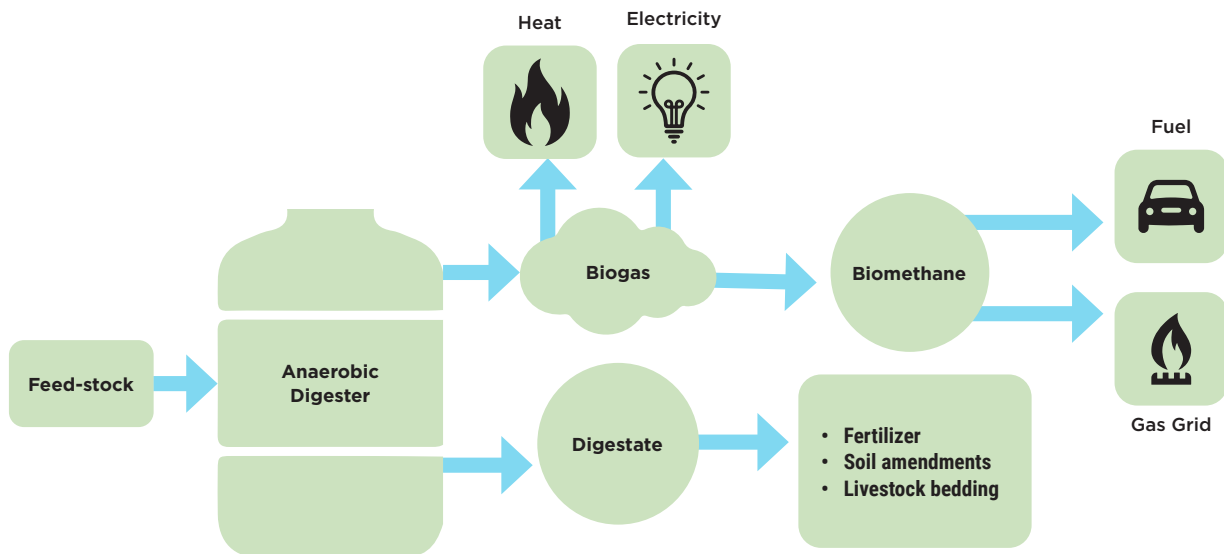
decomposed under anaerobic conditions (absence of oxygen) methane (CH<sub>4</sub>) is generated, which is a greenhouse gas that when measured over two decades, is 84 times more potent than carbon dioxide (CO<sub>2</sub>). Although methane from sources like fossil fuels and livestock is higher, mismanaged organic waste is thus contributing to climate change. Greenhouse gas emissions associated with organic waste disposed at landfills and dumpsites can be reduced by using recovery and recycling processes for organic waste including anaerobic digestion, vermicomposting, black soldier fly larvae composting, etc.

Inadequate management of organic waste also results in other direct and indirect negative impacts including

increased risk of waterborne diseases, soil and water pollution through leachate, spread of diseases by serving as breeding ground for vectors and rodents, contamination of recyclable materials, and occupation of space at landfills, to name a few. Diversion of organic waste from landfills can save municipalities operational costs and prolong landfill lifespan. Likewise, utilizing preventive, recycling, or recovery methods to manage the organic fraction of waste can be beneficial: depending on the treatment method, it can bring nutrient and organic matter back to impoverished soils, improving soil quality, generate biogas and feedstock. Adequate organic waste management is therefore critical to sustainable waste management.

## Overview Anaerobic Digestion

Figure 1: Anaerobic digestion process (Graphic by Sara Tanigawa, EESI)



Credits: <https://www.eesi.org/papers/view/fact-sheet-biogasconverting-waste-to-energy>



*This article was provided by Max Grau, Expert at Eawag, Department of Sanitation, Water and Solid Waste for Development (Sandec).*

Anaerobic digestion (AD) is an organic waste treatment technology that reduces the amount of waste and generates valuable products, such as biogas and nutrient-rich digestate. AD can be applied in various scales from household level to medium size installations at farms and large-scale industrial biogas plants, producing thousands of cubic meter biogas per day. The energy rich biogas can be used for cooking in small installations, to producing electricity at medium and large installations, or be purified to natural gas. The nutrient rich digestate is often used as soil enhancer and is a valuable product for regenerative agriculture. While there are already many AD installations

around the world, it is crucial that factors like feedstock security, final use of the biogas and off-take agreements for the digestate are looked at in detail to create a successful project. Good maintenance and taking ownership of the installations are important to achieve a well performing digester in the long term, especially in household installations. AD is a well-studied and widely applied technology to treat biowaste and other organic feedstocks. It is an important process, among other established and emerging waste treatment technologies, to create a circular economy. Read more about AD application in developing countries [here](#).

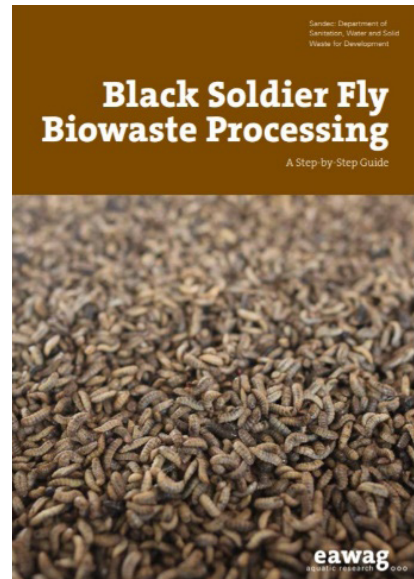
## Overview: Black Soldier Fly Larvae Composting



*This article was provided by Moritz Gold, Post-Doctoral researcher at [ETH Zurich](#) & [Eawag](#).*

Biowaste treatment with black soldier fly larvae (BSFL) is an emerging treatment technology. BSFL grow on a variety of biowastes (e.g., manures, food waste, agri-food byproducts) and convert it into insect biomass and a compost-like residue.

The larval biomass has a higher market value as raw material for production of animal feeds, typically higher as those of other biowaste treatment products such as composting or anaerobic digestion. This has the potential to contribute to partially offset waste management costs. In recent decades, the natural BSFL life cycle has been translated into insect-based waste management facilities, treating between less than one ton, to several hundred tons of biowaste per day. One challenge of operating such facilities are variable bioconversion rates because of the intrinsically variable biowaste nutrient composition. This can be partially addressed by formulation of biowaste into mixtures with more similar nutrient contents. Use of bacterial inoculants and other substrate pre-treatments (e.g., mechanical, thermal, alkaline) are also current research areas. Careful safety assessments of the entire treatment processes are needed, since biowaste



typically contain chemical and microbial hazards, and the insect-based feeds are used for food production. For practical knowledge and research visit the [Sandec](#) and [ETH Zurich](#) websites.

## Safe and cost-effective waste management solutions for today's cities a Case Study from Sanergy, Kenya



*This article was prepared by Sheila Kibuthu, External Relations Manager at Sanergy, Nairobi, Kenya.*

Sanergy cleans up today's cities by converting organic waste streams into valuable products that enhance economic growth, improve people's livelihoods, and safeguard our environment.

Launched in 2011, Sanergy uses a closed loop circular economy approach for waste management where they design, build, and operate safe organic waste collection networks that professionally remove sanitation, kitchen, market, and agricultural waste streams. Every year, they collect more than 12,000 tons of waste that is treated and upcycled at their organics recycling factory.

Sanergy uses modern technologies developed in-house with robust proven equipment, layered to extract multiple products from each ton of waste collected. To date, Sanergy has developed 3 key product lines. The first one is an insect-based protein for animal feed that is manufactured through rearing of black

soldier fly larvae, which feeds on waste and converts it into high protein content and residue.

The second is environmentally friendly biomass fuel that is manufactured through drying and compressing the black soldier fly residue at high temperature and pressure to create a high-calorie briquette for use in any industrial biomass boiler. Finally, the third product is organic fertilizer manufactured through co-composting the residue from black soldier flies and agricultural inputs in mechanically aerated windrows, which are then sieved and packaged for sale. Read more about Sanergy [here](#).

## Organic waste management through anaerobic treatments in Kochi, India



*This article was prepared by Simmi Sasha, Project Coordinator at Centre for Heritage, Environment and Development (C-HED), Kochi, India.*

Rise in population, rapid urbanization, booming economy, and the rise in community standards have greatly accelerated the municipal waste generation rate in developing countries like India. Though several waste management techniques are in place, interest in bio-gas technology is increasing in the city of Kochi with growing awareness on renewable energy and increase in organic farming and gardening activities.

With a noticeable percentage of the community installing and successfully using bio-gas plants at home as an alternative for waste disposal, the demand for bio-gas plants are increasing. So far 414 households, and six schools have installed bio-gas plants of different sizes with great success. In Kochi, over the course of time the technology has proven itself and is now socially acceptable, economically viable, environmentally friendly, technically feasible and institutionally very stable keeping aside some very minor issues.

The bio-gas technology is slowly gaining momentum in the city serving the 3Rs – reduce, reuse, and recycle thereby effectively contributing to the triple function: waste removal, sustainable management of the environment, and energy production. Looking ahead, it will be important to spread awareness about the importance of self-resilient waste management, and to further develop the bio-gas plants to ensure that more people and institutions will install them.



## Get to know our Affiliates

In this section we give our Waste Wise Cities Affiliates the possibility to introduce themselves

### Wildlife Clubs Kenya



*"Can you imagine a world of well empowered youthful population, who are skilful and able to make informed decisions on waste management practices?" asks Gabriel Ngale from Wildlife Clubs of Kenya.*

*"Well as a proud affiliate of the Waste Wise Cities, the Wildlife Clubs of Kenya strive to build, influence and guide our young people in achieving the circular economy goal. We integrate environmental education, sustainable solid waste management practices and innovations in training our youth. In collaboration with the Kenya Association of Manufacturers, our Project Shule PET take back scheme has transformed 19 learning institutions in Nairobi city into waste management action learning centres for over 25000 school children and 60 teachers. We have designed a plastic collection and recycling process that complements the youth empowerment initiative while promoting sustainable consumption and production patterns in line with the Sustainable Development Goals.*



*Currently 1625kgs of waste plastics has undergone recycling through Mr Green Africa partnership. Our initiative has ameliorated the plastic end user value chain benefits through incentives. The incorporation of Plastic Bottle Tracker application in this initiative has nurtured sustainable technologies and innovations amongst the school youth. Being Waste Wise Cities affiliate has created for us an incredible new platform for networking and capacity building opportunities." gabrielngale@wildlifeclubsofkenya.org*

### CCET



*"IGES Centre Collaborating with UNEP on Environmental Technologies (CCET), established in 2014 under a joint partnership initiative between Institute*

*for Global Environmental Strategies (IGES) in Japan and United Nations Environment Programme (UNEP), delivers various projects to enhance waste management capacity in partner*

*countries and cities, especially in rapidly growing Asian nations, through the main three pillars of activities; 1. Strengthening waste management policy and implementation (e.g. Plastic Waste Management Strategy for Hyderabad, India), 2. Developing tools and guidelines for capacity development (e.g. Guideline Waste to Energy), and 3. Generating large impact through extended partnership (e.g. CCET event on COVID19).*



*CCET also contributes to knowledge and information sharing on urgently emerging issues including COVID-19 which has drastically affected the global economy since the beginning of 2020. A sudden change in consumption and disposal pattern has created additional challenges in infectious waste management especially in developing countries. To quickly support them through knowledge sharing, CCET together with UNEP produced a report (the COVID-19 Waste report) which identifies various approaches, best practices and technologies and provides recommendations for policy-makers and practitioners worldwide based on a rapid survey which was conducted over 14 developing countries in the world. Plastic waste management is another focus area where CCET provides policy advice and support for national and local authorities. (e.g. Strategies to Reduce Marine Plastic Pollution)".*

## Waste Wise Cities Affiliates

Do you want to:

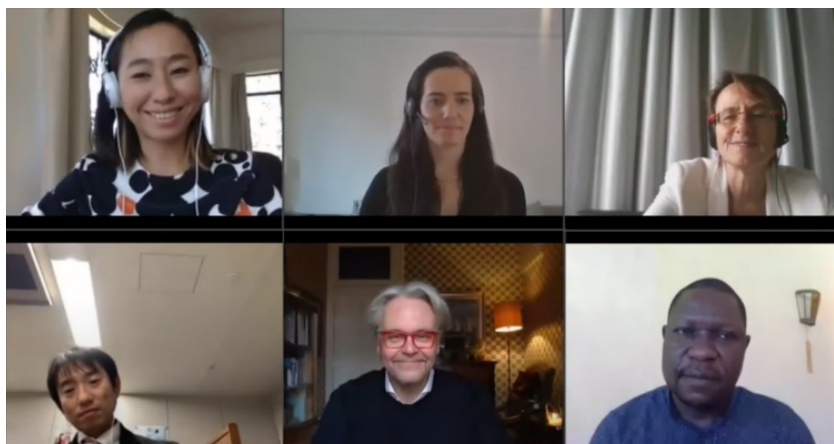
- Support Waste Wise Cities and improve waste management in cities around the world?
- Be an official partner of Waste Wise Cities and UN-Habitat?
- Show up on the soon to be updated Waste Wise Cities website (after the update)?
- Implement the Waste Wise Cities Tool?
- Read about your activities in this newsletter?
- Do much more?

Then [contact us](#) and become a Waste Wise Cities Affiliate! Together we can become Waste Wise!

## Global Launch of Waste Wise Cities Tool

On 2<sup>nd</sup> of February 2021 we launched the Waste Wise Cities Tool (WaCT) through a [virtual, global event](#). A panel of experts joined us, including Takayuki Shigematsu, Deputy Director Office for Promotion of Sound Material-Cycle Society, Environmental Regeneration and Material Cycles Bureau, Ministry of the Environment, Japan; Dr. Regina Dube, Director General, Water Management, Resource Conservation, Adaptation to Climate Change, Federal Ministry of the Environment, Nature Conservation and Nuclear Safety, Germany; Philip Heylen, Mayors and Municipalities Initiative, International Solid Waste Association; Roisin Greene, Global Plastic Action Partnership, World Economic Forum; and Dr. Godfrey Nato, CECM Environment, Waste Management and Energy, Mombasa County.

Over 230 people participated in the Waste Wise Cities Tool Launch, which was hosted by Wuppertal Institute under the [Urban Pathways](#) project.



Following the launch, a two day deep-dive training on the WaCT was held primarily for Waste Wise Cities and African Clean Cities Platform members. This training was organized in collaboration with Wasteaware and took the participants through the seven steps of the WaCT, ending with discussion groups to go deeper into how it can be applied in different cities. Around 70 participants attended the deep-dive training.

### New website

In relation to the WaCT launch, Waste Wise Cities also got a new website. On the new website you can find the WaCT and a link to report you data, among other things. New things are constantly being uploaded on the website, so visit regularly to catch all the updates. You can find us at [www.unhabitat.org/waste-wise-cities](http://www.unhabitat.org/waste-wise-cities)

The website was developed with support from Vanke Foundation.

## 1<sup>st</sup> East African Social Business Forum



On 23<sup>rd</sup> of December 2020, Waste Wise Cities participated in a panel discussion on waste management at the 1<sup>st</sup> East African Social Business Forum (EASBF).

The EASBF took place virtually on 22<sup>nd</sup> and 23<sup>rd</sup> of December and was organized by Friends of Social Business. It showcased

keynote speeches, presentations and panel discussions exploring different dimensions of social business.

The 2<sup>nd</sup> EASBF will take place on 12<sup>th</sup> and 13<sup>th</sup> April 2021 and in the meanwhile a [YY East Africa Community](#) was created on Facebook.

## Webinar series Waste Technology Deep Dives

On 21<sup>st</sup> of January 2021 we took another deep dive into waste technologies, this time starting with a focus on Black Soldier Fly Larvae Composting. We had an expert from ETH Zurich & Eawag explain the fundamentals of Black Soldier Fly Larvae Composting, what it is, how it works, when

it makes sense to use, etc. followed by a practitioner's perspective from Nairobi, Kenya.

The webinar is part of a series of Deep Dives into selected waste management technologies, organized by UN-Habitat's Waste Wise Cities, African Clean Cities

Platform and the Wuppertal Institute, under the [Urban Pathways Project](#).

You can find the recordings of past webinars and the registration for upcoming webinars [here](#). The next webinar will look at Material Recovery Facilities, don't miss it!

## Waste Wise Cities at Let's Do It World Annual Conference

On 28<sup>th</sup> of January 2021, UN-Habitat conducted a 90-minute-long workshop at the Let's Do It! World Conference, presenting the Waste Wise Cities Tool (WaCT) and sharing success stories from three UN-Habitat country offices (Ethiopia, India, Lebanon) to explore solutions for sustainable waste management and transfer of waste-related projects in cross-regional and varying socio-economic settings. Swati Singh Sambyal from the India office presented zero waste wards initiatives in Indian cities to adopt circular strategies for waste reduction. Elie Mansour from the Lebanon office talked about the case of reverse vending machines discussing the much-needed engagement with local authorities, communities, and the private sector towards a clean environment and circular economy. Berhanu Dassa from the Ethiopia office briefed about the Fukuoka method for dumpsite rehabilitation. You can find the recording of the workshop [here](#) and other outcomes of the conference [here](#).



Graphic recording by Nathalie Töpperwien Blom, [nathalie.tb@gmail.com](mailto:nathalie.tb@gmail.com)

### Call to Action

- Avoid food waste by shopping and storing food smartly!
- If you don't have separate collection of organic waste at your city, consider home composting – you don't need a large garden, a small box is sufficient!
- Promote separate collection or organic waste and its utilisation in your ward/city!
- Become a Waste Wise Cities member or affiliate and share your good practices with us!

