NP1005 UNIVERSITY OF SOUTH AUSTRALIA NODE OF EXCELLENCE

CARBON REDUCTIONS FROM COMPOSTING FOOD WASTE

Research question

While onsite composting is emerging in overseas cities that have banned the disposal of food waste to landfill, it is not clear how small-scale onsite composting compares with the large-scale offsite composting in Australia with regard to reducing greenhouse gases (GHG).

To address this question, two forms of modelling will be developed: Optimisation and Input-Output (IO) Analysis. The modelling will identify and optimise the net GHG emissions from diverting food waste from commercial kitchens (post-consumer) in metropolitan Melbourne taking into account the GHG benefits from avoided landfill methane generation, reduced waste transport and soil carbon sequestration.

Fig 1: Closed Loop composter being installed at Swinburne University, Melbourne (Sep 2016).

Methodology

The research methodology will have four stages: (1) Desktop overview of food waste diversion in Australia; (2) GHG composting experiments with Swinburne University; (3) Development of an Optimisation model to determine the least GHG combination of food waste diversion technologies in metropolitan Melbourne; and (4) Development of waste-based IO models to compare with the first model.

The experimental data (e.g. GHG generation rates) will be sourced mostly from related onsite food waste compost trials. The technologies trialled include in-vessel composting systems from Closed Loop and WDU Composting Technologies (OSCA), and worm farms manufactured by Hungry Bins.

Fig 2: Hungry Bin worm farms being commissioned at Plant 4 IGA supermarket, Adelaide (Oct 2016).

Results

The GHG modelling PhD is part of a larger CRC Composting Food Waste for Food Production project with a focus on microbiological and sociological outcomes as well. The composting technology partners have been selected and several trial sites have been identified including multi-unit residential towers, office tenancies, café precincts and large scale hospitality facilities. The Swinburne University onsite technology trials are still ongoing.

The Optimisation model is expected to be completed by the end of 2017 and the Input-Output based models are expected to be completed by June 2018.

Conclusions

With the movement towards higher density living in Australian cities, new GHG models for food waste diversion and processing need to be researched and developed. In particular, including small-scale onsite composting systems that integrate well with local food production systems.

The GHG modelling PhD is linked with a microbiological PhD and a behavioural PhD to validate onsite composting systems from three perspectives: carbon reduction, composting performance and user engagement.

Anticipated impacts

A potential breakthrough is that small-scale onsite composting may be the better food waste processing option for particular types of high-density facilities in terms of GHG reduction instead of transporting food waste to the larger offsite composting facilities.

This breakthrough would assist developers and planners to incorporate the ideal mix of smaller onsite and larger offsite food waste processing options into the inner city built environment.

Key statement

Optimisation and waste-based Input-Output models can assist decision makers in identifying the most carbon efficient processing options for diverting post-consumer food waste from landfill.

Further information

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