

# Imagining the Future of Food Waste Management in Singapore

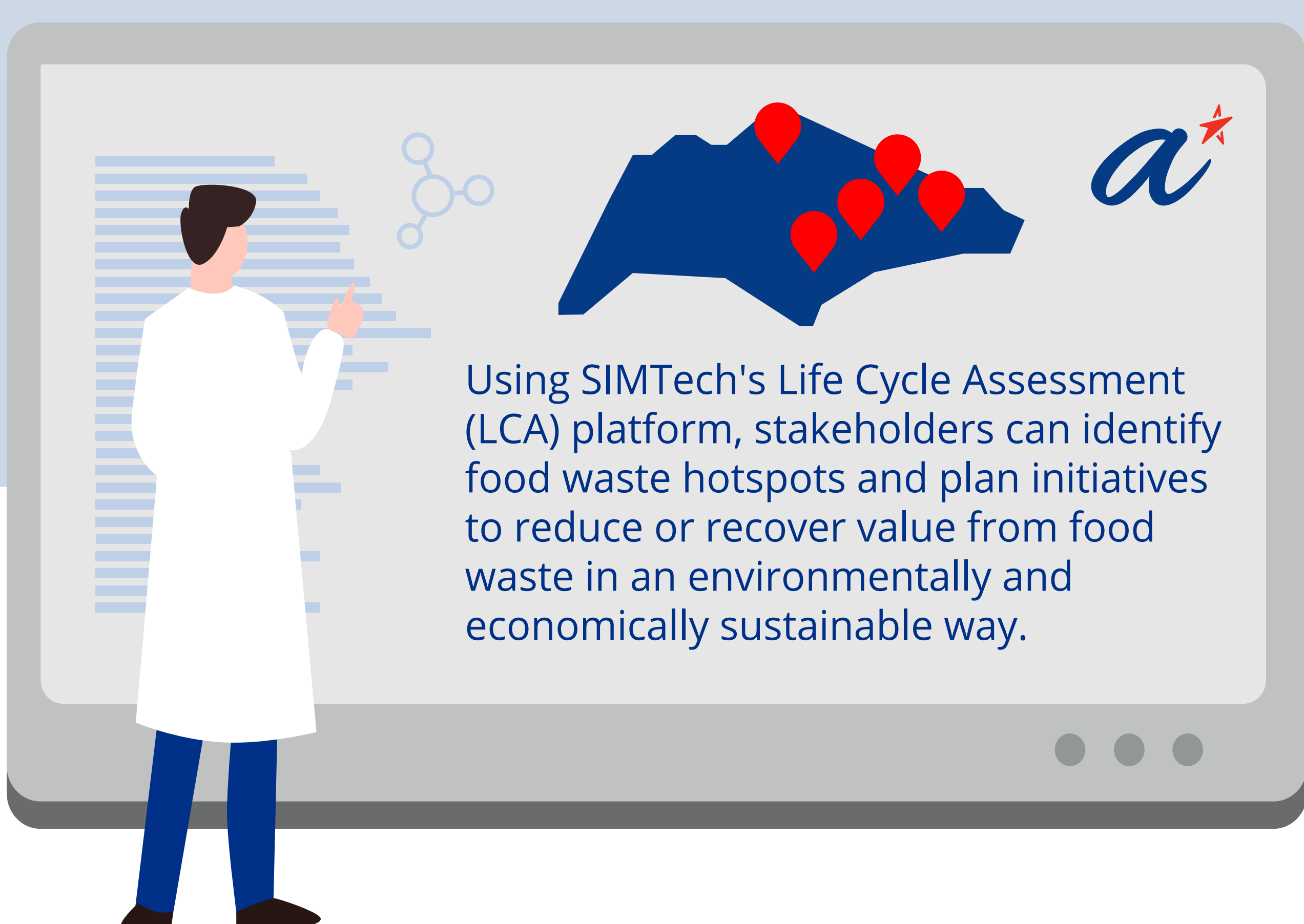
In 2019, Singapore wasted **744 million kg of food\***



As heavy as **50,000 double-decker buses!**

\*Source: NEA Waste Statistics and Overall Recycling

A\*STAR's Singapore Institute of Manufacturing Technology (SIMTech) worked with the Singapore Manufacturing Federation Standard Development Organisation (SMF-SDO) and other stakeholders to develop two Singapore Standards on Food Waste Management. SIMTech, A\*STAR's Singapore Institute of Food and Biotechnology Innovation (SIFBI), A\*STAR's Institute of Materials Research & Engineering (IMRE), NUS and NTU are now working on analysing the entire food value chain and doing R&D to tackle the food waste problem.

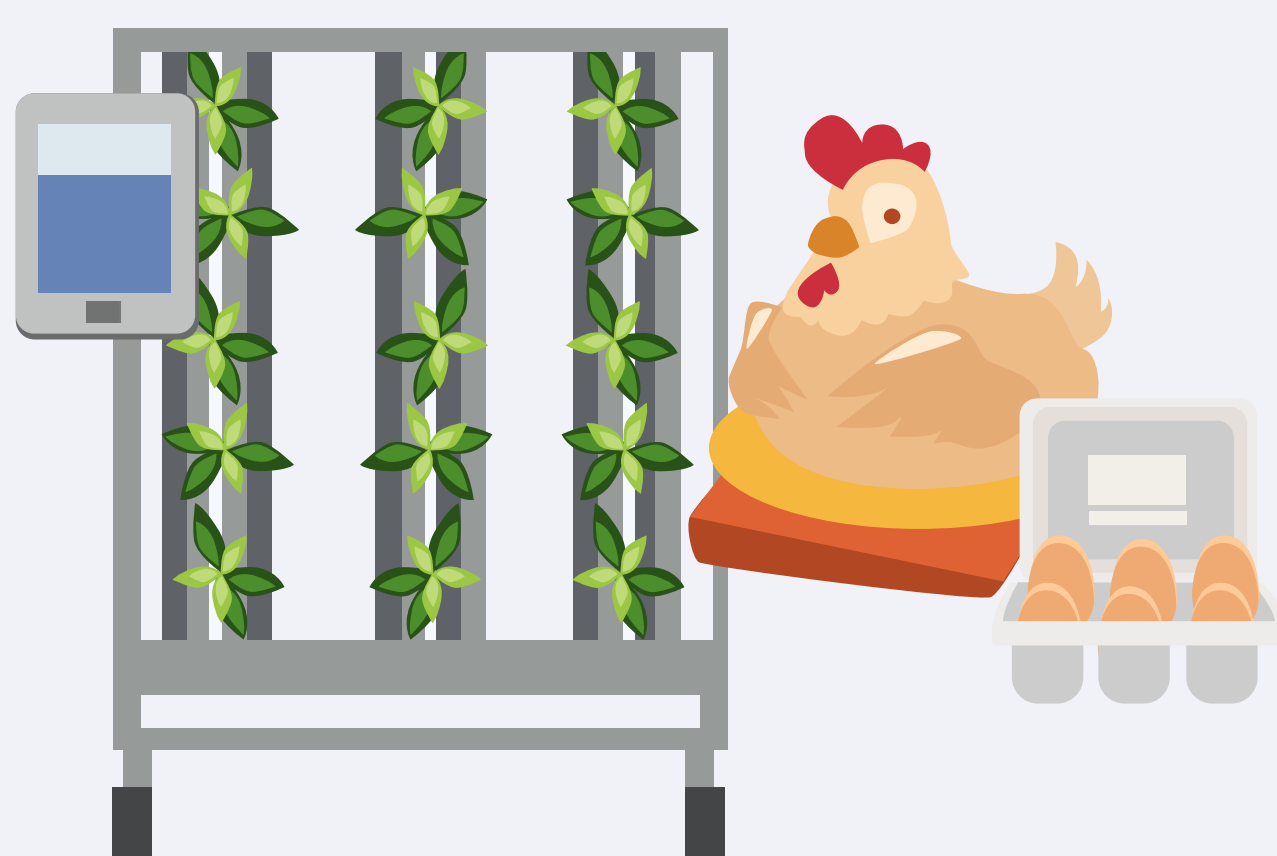


**Here are some ways food waste can be reduced in the near future from production to consumption.**

## PRODUCTION

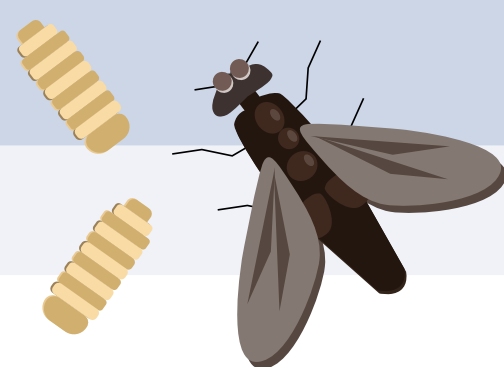
### Technology: Digitalised Precision Farming

To improve urban farm management processes and yields, A\*STAR works with companies to implement technologies in sensors, data science and Internet of Things.

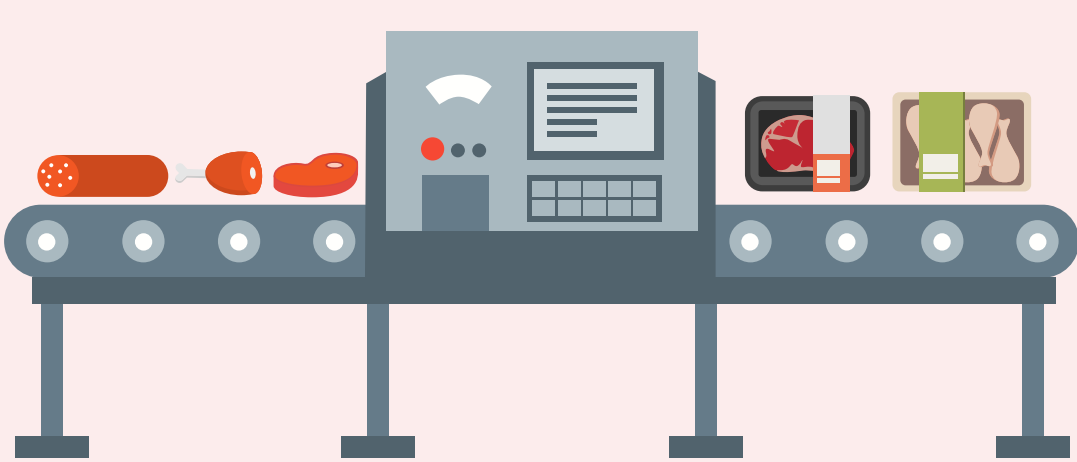


### Technology: Microbial Conversion

There are more sustainable ways of converting food waste at the production stage. A\*STAR's Singapore Institute of Food and Biotechnology Innovation (SIFBI) uses microbial conversion agents such as black soldier fly larvae to transform organic waste into insect protein for animal feed.



## PROCESSING & PACKAGING



### Technology: Smart Food Labels

SIMTech has created special labels that serve as freshness indicators to avoid food being discarded unnecessarily.

### Technology: Nanotech-based Food Packaging

A\*STAR's Institute of Materials Research & Engineering (IMRE) has developed a type of food packaging to extend the shelf life of food.

## RETAIL & DISTRIBUTION



### Behavioural Change: Redistribute Unsold Food

Businesses and consumers should donate their unsold and excess food.

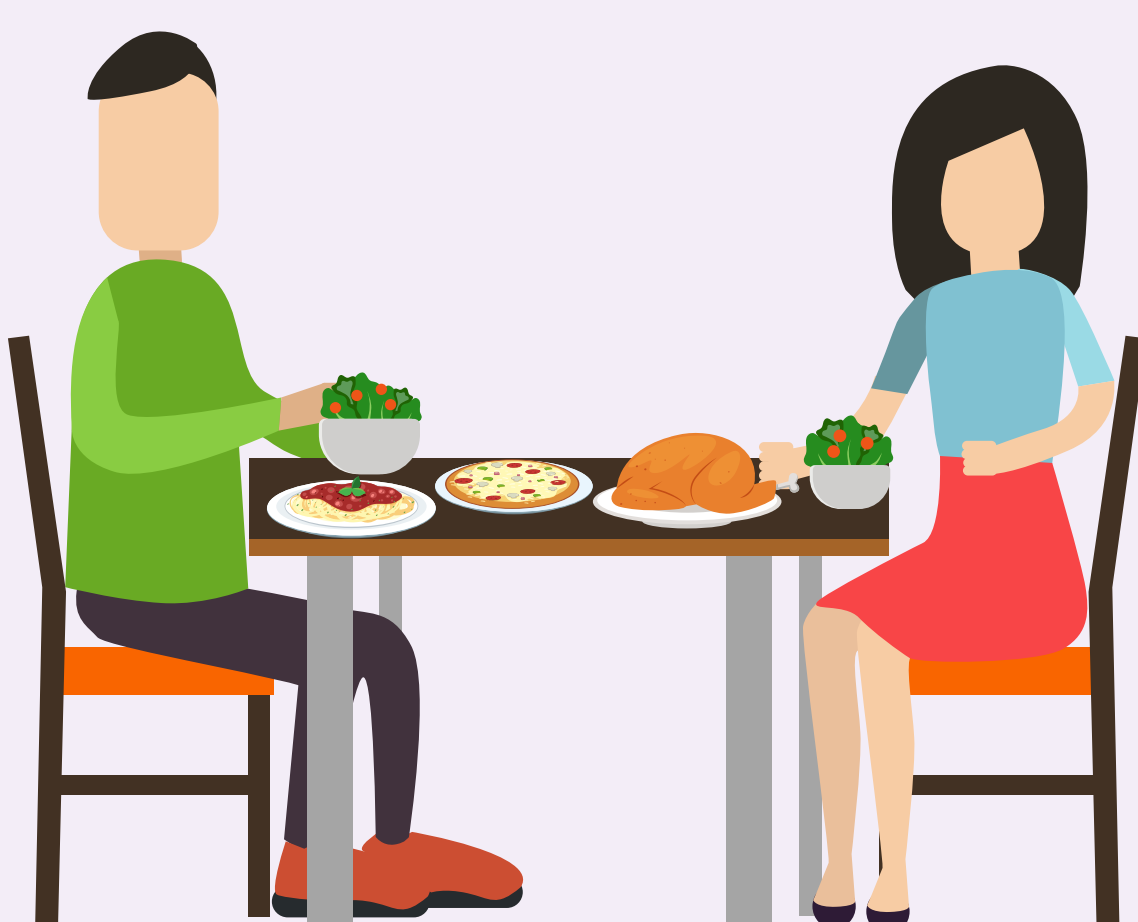


### Technology: Microbial Treatment

A\*STAR's Institute of Chemical & Engineering Sciences (ICES) developed strains of microbes to turn cooked food waste into fertilisers.



## CONSUMPTION



### Behavioural Change: Avoid buying more than needed.

When consumers do not over-order when eating out or buying too much groceries, food waste can be lessened.

