



Singapore's Food For Thought

By reducing, reusing, and recycling, we hope to mitigate our landfill impact as much as possible. We are careful to recycle any cans or bottles that we use throughout the day and often take the time to separate paper from plastic waste. But in most homes, workplaces, and city streets, there is no special recycling bin for food. Food is discarded as garbage for several reasons: it may be inedible (bones, peels, and shells), expired or stale, spoiled, or simply unwanted. Singapore's National Environment Agency (NEA) reports that in 2017, the country threw away 809,800 metric tons (m.t.) of food, which accounted for 10% of total waste generated in the country. This corresponds to a 40% increase in food waste over the past 10 years. Due to the country's rising population and growing economy, the amount of food waste in Singapore is projected to further increase in the coming decades.

Singapore imports over 90% of its food supply, and when food is wasted, more food must be sourced to support the population's food demand. This in turn threatens the country's food security. Food waste also strains resources — disposal facilities must be built to accommodate the waste increase, which is difficult for a land-scarce nation like Singapore. In addition, food waste contaminates recyclables, impeding the nation's recycling effort. Food waste mismanagement generates bad odors and attracts vermin, which can create a public health risk and are a nuisance to residents.

The NEA has come up with four strategies to holistically manage food waste. Ranked from most preferable to least, they are: prevent and reduce food waste at the source, redistribute unsold and excess food, recycle or treat food waste, and recover energy. These initiatives started in 2015 after the Sustainable Singapore Blueprint was released that same year.

The preferred method of managing food waste is to avoid it altogether. The NEA has determined that the top reason food is discarded is that it has expired and/or spoiled. With this in mind, they developed a program to encourage smarter food purchases and better storage and preparation habits. The NEA collaborates with over 40 supermarkets, restaurants, and schools to educate and motivate the public to make better choices when it comes to food. The Food Science and Technology program at Nanyang Technological University (NTU) is collaborating with F&N, a food and beverage company, to develop ways to prolong the shelf life of produce.

The second strategy focuses on encouraging organiza-

tions and consumers to donate their excess or unsold food to local food distribution organizations, such as Food Bank Singapore or Food From the Heart, so that it may benefit households in need. Shopping malls and offices have posted food bank boxes to serve as convenient drop-off points where unwanted, unopened, and unexpired food items can be donated.

The third strategy targets food waste that is currently unavoidable, such as waste from soy bean and bread processing, fruits and vegetables that do not get sold, and food scraps from cooking. This strategy works on an industry level by encouraging manufacturers to send food waste materials to be converted into animal feed, and on a consumer level by educating households on do-it-yourself composting. Currently, only 16% of food waste is recycled, but the NEA is testing the viability of collecting and treating food waste to produce biogas energy from an anaerobic co-digestion process with water sludge. A two-year trial conducted by the NEA and Singapore's National Water Agency concluded that this process can produce up to 40%, more biogas than water sludge processing and food waste digestion carried out separately.

Another effort is a digester that can convert food waste to fertilizer for gardens in just 24 hours, created by the joint efforts of the Agency for Science, Technology and Research (A*STAR) and Westcom Solutions.

The last and least preferable strategy to treat food waste is disposing it in a waste-to-energy (WTE) plant to recover energy via incineration. The majority of Singapore's food waste is currently processed this way. Ideally, incineration should only be used when the other waste handling methods are not applicable.

While Singapore is struggling with managing food waste, it is not alone. Nations across the globe are working to eliminate food waste and create a more sustainable food industry. Join us at one of the Food Innovation and Engineering (FOODIE) conferences taking place at NTU in Singapore (Dec. 5–6) and in Philadelphia, PA (Dec. 8–10) to learn more about sustainability and food. Find more information at www.aiche.org/FOODIE or www.aiche.org/FOODIEAsia.

