環境保護署
Environmental Protection Department

Food Wise Campus

Pilot Programme on Provision of Small Food Waste Composters at School

Education Kit (Secondary School Version)

June 2021

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Introduction

Food Wise Campus

The Chief Executive announced in his 2017 Policy Agenda "Provide appropriate professional support for organisations such as tertiary institutions, and primary and secondary schools with suitable venues for on-site treatment of food waste, so as to reduce food waste disposal at landfills and at the same time enhance teachers' and students' awareness of the food waste problems and food wise culture". To take forward this initiative, the Environmental Protection Department (EPD) has launched the Pilot Programme on Provision of Small Food Waste Composters at School (Pilot Programme) in 2018 through the Environment and Conservation Fund (ECF) to provide the primary and secondary schools with a small food waste composter, Education Kits and educational materials in order to assist the school in cultivating the teachers' and students' "Food Wise" culture, reducing food waste and demonstrating the recycling of food waste into compost for use in planting on campus.

About this Education Kit

This Education Kit is designed for teachers and students in secondary schools, with the aim of providing various food waste-related information, including an introduction of the food culture in Hong Kong, the problems of food waste and food waste management strategies. This Education Kit will also explain the causes of food waste in schools, the concept of Green Lunch and the operation of Composter, to facilitate the schools to prevent and reduce food waste generation as well as to recycle unavoidable food waste into compost, with a view to reducing food waste disposal of at landfills.

The Education Kit also provides methods of food waste separation, quantification and recording, so as to facilitate the on-site food waste recycling by teachers and students.

If participating schools of the Pilot Programme have any opinions on the contents of the Education Kit or any questions during the process of recycling food waste, please contact the Pilot Programme by phone or email:

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Eating Habits in Hong Kong

Hong Kong is the confluence of eastern and western food culture and develops a set of eating habits that combined Chinese cuisine (mainly Cantonese cuisine) and Western cuisine.

Traditional Chinese culture emphasizes “Be Well-fed and Well-clothed”. In traditional banquets and festivals such as New Year, winter solstice and etc., Hong Kong people will prepare extra amount of food and save some as leftovers to symbolize “Surplus in every year”. Hong Kong-style banquet generally has eight to ten dishes excluding rice, noodles, desserts and fruits, therefore, the quantity of food far exceeds the usual eating amount and the food will may easily become “Food Waste”.

What is food waste

Food waste refers to any waste generated, including raw/cooked food, edible and inedible, during the processes of food production, distribution, storage and meal preparation or consumption of meals.

Food waste is not only found in kitchens but also ubiquitous in our daily lives: leftovers at home, leftovers from restaurant customers, expired food from supermarkets, waste ingredients produced by food manufacturers, leftovers from hotel buffets, the bones from chicken drumsticks or chicken wings and fruit peels are also known as food waste.

Classification of food waste

Avoidable food waste

Food that is edible, yet being disposed of (including all kinds of food that has not deteriorated such as fresh fruit, meat, cooked food like noodles and rice, packaged food, etc.)

Possible avoidable food waste

Food that is consumed only by some people (such as bread crusts, potato skins, fruit peels, vegetable stalks, etc.)

Unavoidable food waste

Food parts that are not edible (such as egg shells, tips of vegetables; left-over bones, shells from shellfishes, etc.)

What are leftovers

Leftovers are food that are still edible and are not harmful to human body. Food that has not expired and has not deteriorated, such as food with unsatisfactory taste or unsold food, can also be considered as leftovers.

Innovative thinking

The "Oil Street Art Space" located at Oil Street in North Point in Hong Kong had launched a "XCHANGE: Social Gastronomy" project in August 2018. The public can bring their surplus fresh fruits and vegetables, unexpired canned food, packaged food and seasonings to "Oil Street Art Space" for exchanging dried fruit drinks or flower tea made from leftovers or vanilla grown in the garden of Oil Street Art Space. Besides, since July 2014, ECF has subsidised Hong Kong community organisations to implement surplus food recovery projects, such as "Food Donation Project", "Food Sharing Project", "Save and Share, Reduce to Produce", etc., to collect unsold fruits and vegetables from vegetable vendors in wet markets, surplus food from chain or family bakers, then distribute them to the needy for free.

Innovative thinking

In view of the whole food assistance service sector is facing different challenges such as lack of information, unmatched supply and demand and high operational cost, a community organisation had applied for "The Social Innovation and Entrepreneurship Development Fund" in 2017 to launch a food assistance project, using information technology and data analysis to connect food assistance service providers, food donors and volunteers. Through the service platform (mobile application), food donors and service providers can share information on the situation of food supply and demand and related services so as to coordinate food assistance services in the district more effectively.

Problems produced by food waste

Impacts on carbon footprint

Carbon footprint refers to the total amount of greenhouse gases emitted from human activities. Its standard unit is carbon dioxide equivalent (CO_2e). Carbon dioxide is emitted during the production and transportation of food. Food production, transportation and processing incur significant environmental and carbon loadings. Food wastage increases greenhouse gases emissions and exacerbates climate change.

Impacts on environment

Most of the food waste is now disposed of at landfills. Not only does this treatment approach takes up landfill space and wastes the useful organic matters in food waste, but also generates problems such as odour and wastewater during the collection, transportation and decomposition of food waste.

Food wastage will indirectly increase carbon footprint. According to the UK report "Strategies to achieve economic and environmental gains by reducing food waste" in 2015, food waste accounted for 7% of global greenhouse gases (GHG) emissions, which equals to 3.3 billion tonnes of carbon dioxide equivalent (CO_2-e) per year.

According to the Hong Kong Climate Change Report 2015, the total GHG emissions in Hong Kong from 1990 to 2012 ranged from 3,330 to 4,310 tonnes of CO_2-e. In 2012, the total GHG emissions was about 4,310 tonnes of CO_2-e. Among these emissions, waste treatments accounted for 5% of the emission sources.

Impacts on water resources

Agriculture accounts for around 70% of the world's total fresh water usage. The food production process requires a large consumption of water resources. It is estimated that disposing a kilogram of beef will waste around 15,000 litres of virtual water (i.e. the amount of water embedded in the production and transportation of products). According to the statistics of the Water Supplies Department, the daily consumption of potable water in Hong Kong in 2017/18 was about 2.72 million cubic metres and the water consumption was about 370 litres per capita.

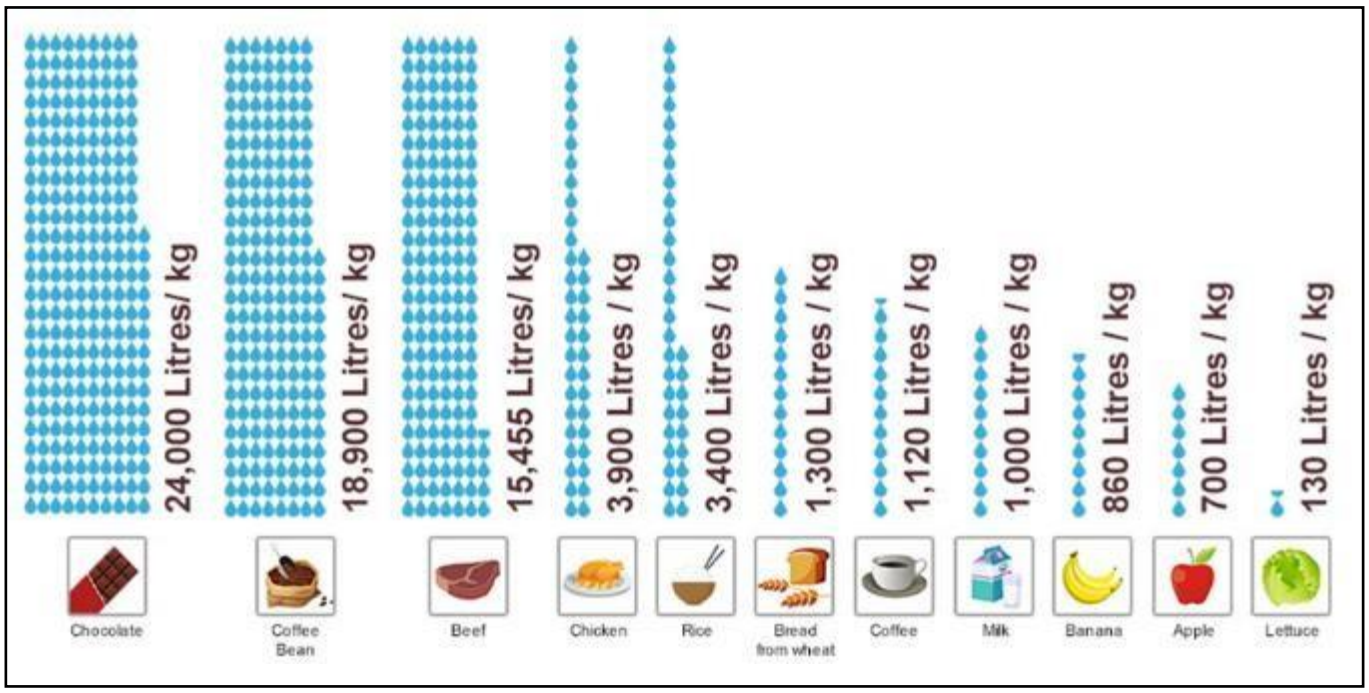
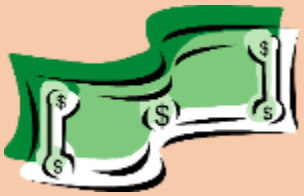


Figure 1： Fresh water used to produce one kilogram of food or one litre of drinks

Impacts on social cost

Disposing of large amount of food waste will increase the pressure on landfills and accelerate their saturations. At the same time, this will increase the operating costs of landfills and other waste processing facilities. These social and economic costs will be borne by the society.



The Hong Kong government planned to implement municipal solid waste (MSW) charging. Citizens will need to pay for the MSW (including food waste) disposed by themselves. This implies that food waste reduction at source or proper food waste recycling will be effective approaches of saving expenditure.

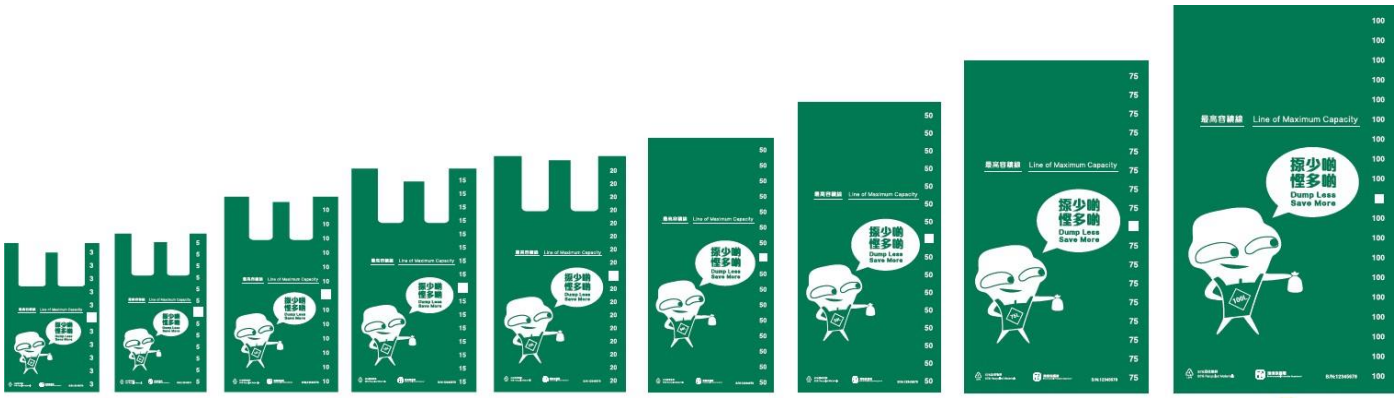


Figure 2: Designated garbage bags of MSW Charging

Current situation of food waste in Hong Kong

According to the statistics in the report "Monitoring of Solid Waste in Hong Kong", on a daily average basis, 11,128 tonnes of municipal solid waste (MSW) were disposed of at landfills in 2022, including 3,302 tonnes of food waste, which accounted for 30% of the MSW. Therefore, reducing food waste generation and disposal is one of the components of waste management in Hong Kong that should not be overlooked.

Food waste disposal rate is comprised of domestic food waste and industrial and commercial food waste. Industrial and commercial food waste is produced by restaurants, hotels, markets, food production f

industries, etc. As shown in Figure 3, in the past 16 years, food waste disposal rate has increased by around 9%. Among which, the disposal rate of domestic food waste remains steady and tends to decrease slightly, but the amount of industrial and commercial food waste has significantly increased.

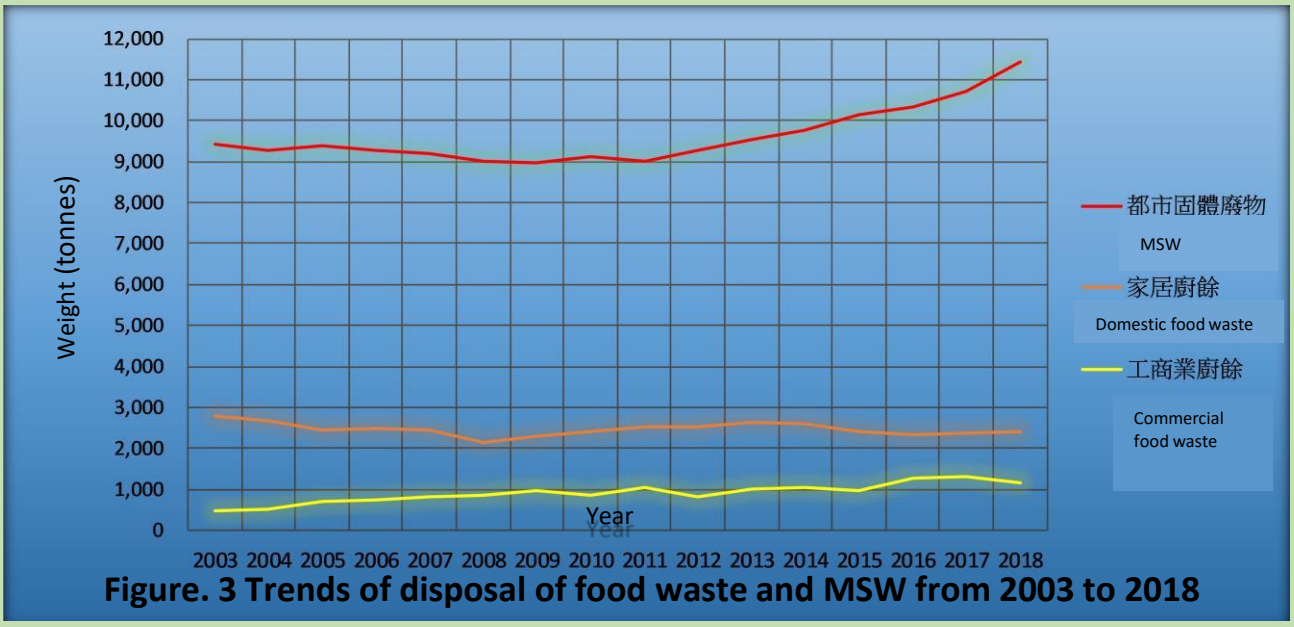


Figure. 3 Trends of disposal of food waste and MSW from 2003 to 2018

Current situation of food waste in nearby cities

Seoul

Under the Act on the "Promotion of Saving and Recycling of Resources" enacted in 1992, residents in South Korea have a "responsibility" to separate waste at source. Generally, residents must separate and collect household waste into the following four categories: 1) general recyclable items; 2) food waste; 3) bulky waste; and 4) residual waste. As early as 1995, South Korea had implemented municipal solid waste (MSW) charging. Residents must purchase prepaid garbage bags based on the quantity of waste to be disposed of.

Since 2013, a quantity-based charging scheme for food waste has been implemented in Seoul. Residents must separate and dispose of food waste in accordance with the established guidelines. In general, food waste can be collected using 1) pre-paid garbage bags which will be disposed of in designated collection boxes; 2) waste collection bins (which must be labelled by small signs or stickers purchased from regional government offices, otherwise the food waste inside the bins will not be collected); and 3) collection bins with Radio Frequency Identification (as shown on the right) which can record the details of charges by weight. All food waste in residential buildings are collected and transported to transfer stations by private contractors. Afterwards, the collected food waste will be transported to the food waste recycling facilities by larger trucks.

Seoul has been widely considered as a city with outstanding solid waste management. Its policies can effectively mitigate the pressure on landfills.

Taipei

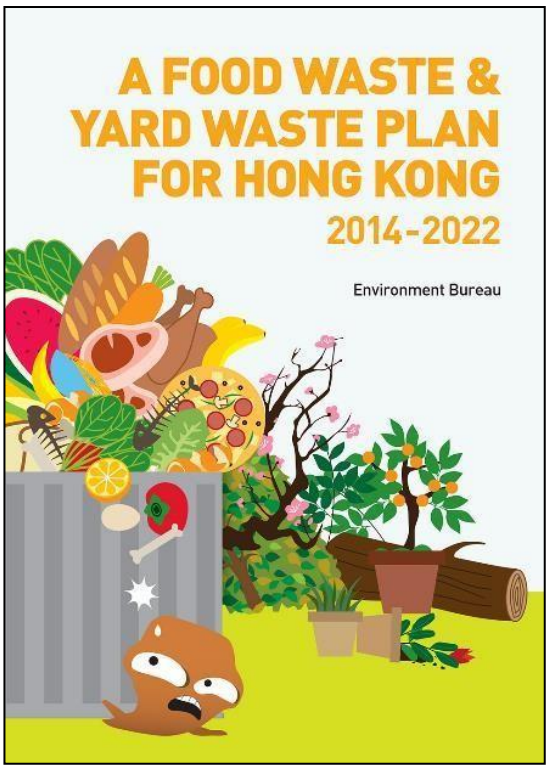
Since March 2001, pursuant to the Waste Disposal Act, the Taipei City Government had required residents to separate recyclable items from garbage before disposal. Currently, residents must separate their waste into the following four categories: 1) recyclable items; 2) food waste; 3) bulky waste and 4) residual waste. As early as 2000, Taipei had implemented municipal solid waste (MSW) charging and residents had to purchase prepaid garbage bags for the disposal of MSW.

Since the end of 2003, Taipei has started promoting the food waste recycling policy, and residents must first subdivide food waste into: 1) food waste that is suitable to be converted into livestock feed for pig feeding; and 2) food waste that can be converted into compost and fertilizer for farming or landscaping. Food waste must be collected separately in ordinary plastic buckets or bags for free collection offered by the local Government cleaning teams at designated days, time and locations. The Environmental Protection Bureau will provide food waste bins for residents living in multi-storey buildings to collect food waste collectively. Besides, residents may also deliver food waste to fixed collection stations that are opened daily, or dedicated food waste collection stations that are opened on specified dates.

To increase the treatment capacity of the food waste and turn waste into energy, Taipei City Government is planning to build the first anaerobic digestion facility with a capacity of 200 tonnes per day. The facility is expected to be completed in 2021.

Food waste management plan by the Government

In February 2014, the Environment Bureau unveiled "A Food Waste & Yard Waste Plan for Hong Kong 2014-2022" (the Food Waste Plan) that maps out a comprehensive strategy, targets, policies and action plans for the management of food waste and yard waste in the coming years. According to the Food Waste Plan, the Government maps out four strategies (as shown in Fig. 4) to tackle food waste, namely **reduction at source, reuse and donation, recyclable collection, and turning food waste into energy.**



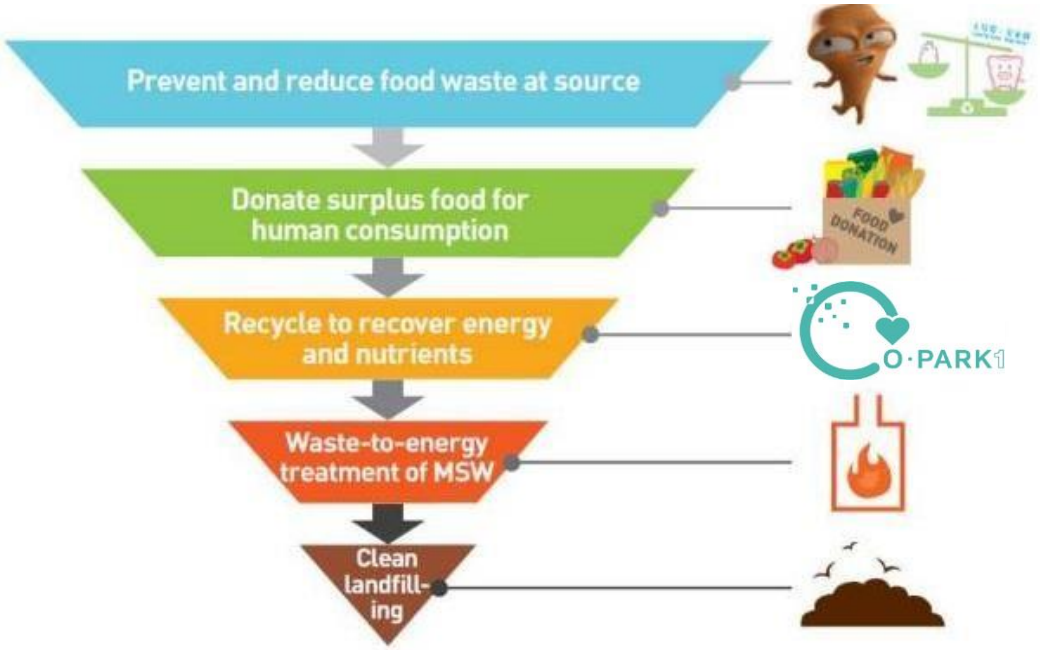


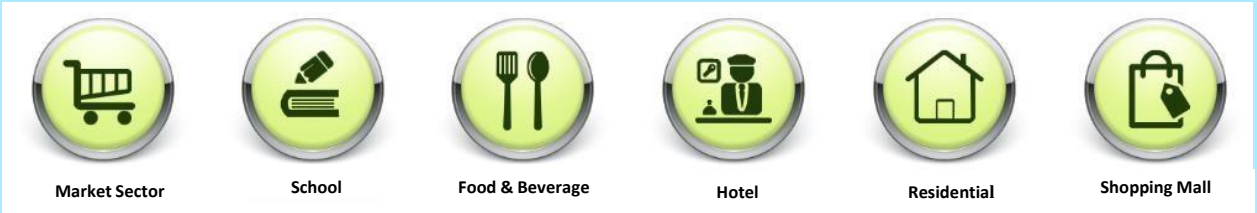
Figure 4: Food waste management hierarchy

Reduction at source

The Food Wise Hong Kong Campaign, launched in May 2013, is a territory-wide food waste reduction campaign which aims to promote public awareness of food waste problem and instill behavioural changes in various sectors of the community, including commercial & industrial sectors and domestic households. As of December 2019, more than 860 local organisations and companies have signed the "Food Wise Charter" and committed to reduce food waste. Apart from that, around 860 eateries have also participated in the Food Wise Eateries Scheme. These eateries have provided food portion options and adopted other food waste reduction measures to reduce food waste generation as far as practicable.

Food Wise Eateries 咪嘥嘢食店

Food Wise Hong Kong Campaign has also developed "Food Waste Reduction Good Practice Guides" to provide feasible advice to prevent and reduce food waste generation for six different sectors, including schools.



Food donation

In order to achieve a win-win outcome for caring the grass roots and "Use less, Waste Less", the Centre for Food Safety of the HKSAR issued a set of food safety guidelines for food recovery in August 2013 and listed out food safety principles to be followed when donating food (regardless of types and sources) to charitable organisations. Some non-governmental organisations (NGOs) have also reached food donation agreements with donors to clarify responsibilities.

In addition, ECF also subsidized non-profit organisations to collect surplus food from wet market, food retailers and wholesalers, then distributed them within the community in order to reduce food food waste to be disposed of at landfills. As of December 2019, 55 food recovery projects have been approved by ECF. It is expected that about 12,590 tonnes of leftovers would be recovered and more than 20.53 million headcounts would be benefited.

NGOs, such as charities and non-profit organisations, have launched food wise activities in various districts to advocate surplus food recovery, promote assistance schemes and share the idea of cherishing food. These NGOs recover surplus food (such as unopened and intact dry food or drinks, fresh fruits and vegetables, grains and oil groceries, etc.) from the community and different sectors. After performing food safety tests, food that can be safely consumed will be donated for free to families and individuals with financial difficulties as a temporary meal assistance. In addition, they will organise various types of educational activities, workshops and food wise activities to promote food waste reduction at source.

Food waste collection

The Government has launched a pilot scheme for free food waste collection service, which now primarily collects food waste generated from markets and cooked food centres under the Food and Environmental Hygiene Department, as well as markets and shopping centres managed by the Hong Kong Housing Authority. This pilot scheme will also provide free food waste collection services for all primary and secondary schools, and tertiary institutions in Hong Kong through the school lunch suppliers or the canteens of the tertiary institutions which are interested to join. This helps educate and encourage students to practise separation of food waste at source, and to promote the messages of "Food Wise, Waste Reduction" and "Turning Waste into Energy" to schools and the community.

To accumulate the experience of food waste separation and collection, ECF had funded some housing estates to install a composter for onsite recycling of the generated food waste under the "Food Waste Recycling Projects in Housing Estates". In addition, the project also encourages the housing estates to organize promotional and educational activities to cultivate residents to develop a habit on food waste reduction and separation.

Turning food waste into energy

In the “Food Waste Plan”, the Environmental Bureau analyses food waste challenges in Hong Kong and elucidates centralized food waste treatment as the main stream approach to handle food waste. This includes a series of “Organic Resource Recovery Centres (ORRCs)". The treatment capacity of each ORRC is about hundreds of tonnes per day. Considering different food waste characteristics and climate conditions in Hong Kong, ORRCs will adopt appropriate advanced technologies to convert food waste into biogas as renewable energy to generate heat and electricity through anaerobic digestion process. The residue produced during the conversion process can be processed and used as compost for landscaping.

O·PARK1, the first ORRC, is located in Siu Ho Wan at Lantau Island and have commissioned in mid-2018. O·PARK1 can treat up to 200 tonnes of food waste per day and has launched a new mile stone of large-scale food waste recycling in Hong Kong. O·PARK2 is located in Shaling at North District and will be commissioned in 2022, with a treatment capacity of 300 tonnes of food waste per day.

To further expedite and increase the throughput of turning food waste into energy, apart from constructing new ORRCs, Environmental Protection Department and Drainage Services Department are actively collaborating and innovating to further study the use of the existing and planned sewage treatment works for “Food waste/sewage sludge anaerobic co-digestion”. Among these sewage treatment works, Tai Po Sewage Treatment Works Pilot Trial has commissioned in May 2019, with a daily treatment capacity of up to 50 tonnes.

Problem of school food waste

Hong Kong has started to progressively introduce whole-day primary schooling since 1993 that many students are required to have lunch at schools. A community organisation has conducted food waste audits in 31 primary schools in Hong Kong from 2013 to 2016. It was estimated that the average daily food waste generated by a primary school with 700 students was about 55 kilograms. Therefore, food waste is a problem that is faced by most schools and has to be tackled.

Causes of school food waste

The following are three major causes of school food waste:

- Some of the students have inadequate understanding of cherishing food, and thus waste food easily
- Young students or those with small appetite cannot finish the whole meal because of the fixed meal portion
- Students generate leftovers because of picky eating habits or the taste of food

Food waste reduction at schools

At schools, teaching students about the avoidance of food waste generation is the most important job and the most effective solution to solve food waste problems at schools. Therefore, a successful implementation of food waste reduction at source requires stakeholders, including schools, students, parents and lunch suppliers, to collaborate and reduce food waste through a three-pronged approach:

1. Cultivation of "food wise" culture

- Organise study tours to understand food waste issues in Hong Kong
- Appoint students as ambassadors to promote food wise information in schools
- Display posters related to "Food Wise" in schools to promote food waste reduction
- Organise topical talks and workshops regularly to enhance students' awareness of food waste reduction
- Educate students on food wise knowledge in liberal studies, moral and civic education or other appropriate subjects
- Organise food donation programs by collaborating with voluntary organisations and invite parents and students to participate

2. Reducing food waste generation

- Implement on-site meal portioning as far as possible and portion the lunch according to the needs of students
- Request lunch suppliers to adjust the number and portion of lunch set according to the needs of students
- Monitor the amount of food waste generation periodically.

3. Encourage food waste recycling

- Implement food waste source separation for easy recycling by separating food waste from containers, cutlery and other non-recyclables
- Request lunch suppliers or food waste recyclers to recycle food waste properly
- Install food waste composters in schools to convert food waste into useful resources (such as compost)
- Organise planting activities in schools to allow students to use the compost converted from food waste for planting

Food Wise Tips

Schools can adopt On-site Meal Portioning (OMP) for lunch suppliers to cook meals on-site or re-heat the food cooked in central kitchens, then distribute them to students. The meal portion can be adjusted on-site according to the needs of students, meanwhile, the food is fresher, therefore students have less chance of wasting food due to the taste of food. Schools that are interested in adopting OMP can apply for subsidies from Environment and Conservation Fund.

Apart from meal arrangement in groups, lunches can be prepared by parents and then brought to schools by students or delivered by parents. Parents can prepare lunches according to the eating amount of the students to reduce the wastage and assure the quality of food. It is an economical and environmental-friendly practice.

Students can take part in supporting food wise in different ways:

- Cut down on snacks intake before lunch or during recess
- Recognize one's consumption amount, "take and buy only what you can eat"
- Participate in talks and workshops to know more about food wise culture and convey the message of food wise to family and friends
- Participate in the activities related to food waste recycling in schools

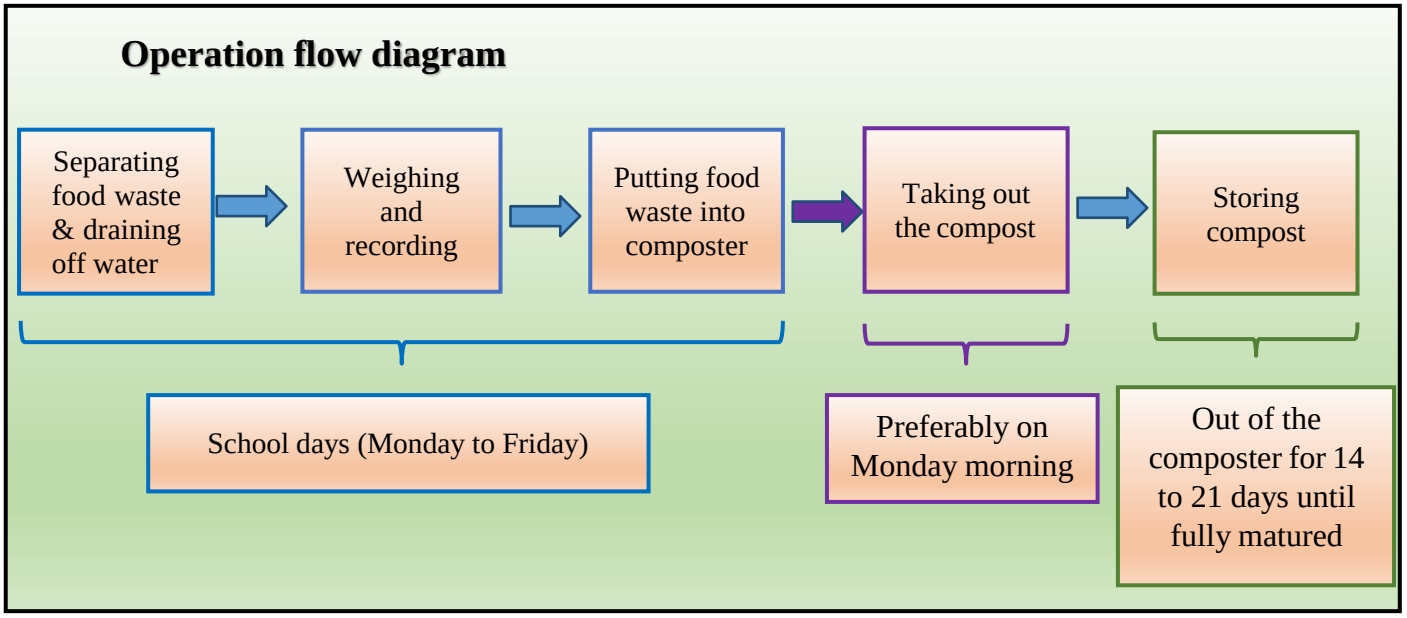
Food waste source separation

Schools must separate recyclable food waste from the non-recyclables before on-site recycling:

Recyclable		Non-recyclable	
 Fruits: fruit core, fruit peel	 Vegetables: leaves, roots, seeds, melon peel	 Liquids: soup and sauce	 Bones: bones of pig, cow, chicken, duck
 Rice: rice and other grain products	 Wheat: noodles, bread and other wheat products	 Cutlery: chopsticks, toothpicks, forks, spoons	 Plastic products: plastic bags, table cloths, nylon ropes and wet wipes
 Beans: all bean products, such as bean curd	 Meats: raw or cooked chicken, duck, pork, beef, mutton, fish	 Cardboards: packaging boxes	 Metal products
 Residues: residue of tea leafs, Chinese medicine and coffee grounds	 Soft shell (small amount): shrimp shells, eggshells	 Glass products	 Household chemicals: detergents, insecticides

Figure 5: Food waste classification

Food waste on-site recycling



A. Separate food waste and drain off the water

1. Put the recyclable food waste (Figure 5) into the collection container
2. Use the colander to drain off the water (until no water dripping)

B. Record the weight of food waste measured by a digital scale

1) Measure the weight of the collecting container (weight 1)
2) Put the drained food waste into the collection container
3) Put the collection container with food waste onto the scale and weigh (weight 2)
4) Record the net weight of the food waste (i.e. weight 2 – weight 1)

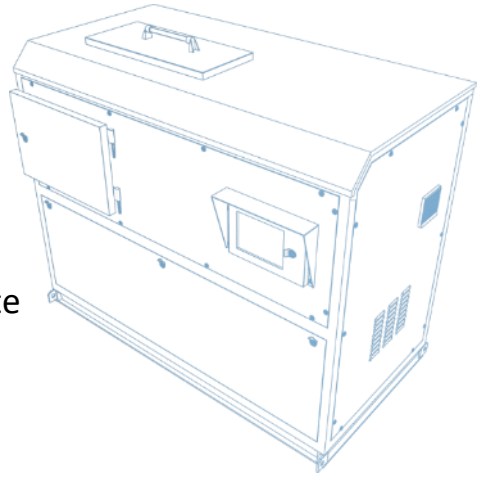
C. Put not more than 5 kilograms of food waste into the composter (please refer to the precautions when operating the composter)

D. Take out the compost next Monday, store it in the compost storage box (please leave the storage box open and wait until the compost becomes mature)

Precautions

A. Collection and transportation of food waste

- Formulate the routes for transporting food waste to avoid generating nuisance to other students
- Prevent food waste, sauce or odour from leaking during the transportation of food waste
- Clean the food waste immediately if there is any spillage
- Transport the food waste to the food waste composter using a container with lid
- Food waste composter and nearby area should be kept clean



B. Space reserved for placing the following items

- Food waste composter
- Tools for measuring and handling separated food waste (for example: colander, buckets, digital scale etc.)
- Food waste to be treated
- Compost storage box
- Compost (since the compost taken out from the composter is not fully mature, it should be stored in the compost storage box and left in a cool and ventilated location for 14 to 21 days until it is fully mature)
- Fully mature and readily usable compost
- Safety passage to the equipment
- Space for operating the equipment, for example: a) measuring and recording the weight of collected food waste, and b) sorting the non-recyclable items

Precautions (con't)

C. Operating the food waste composter (the food waste composter must be operated by trained operators)

Food waste composter has two main parts: 1) Composting tank and 2) Odour treatment unit

1) Composting tank

- Observe whether the compost inside the chamber is normal or not (normal compost should be loose, dark brown in colour with earthly smell; if the compost is too wet or hard, this indicates the humidity inside the composter is too high)
- Observe whether there are water droplets inside the chamber (the presence of water droplets indicates the exhaust devices such as the air supply screen, exhaust screen or the deodorizing unit have been blocked)
- Clean the air supply / exhaust screens regularly (once every one to two days is preferable)
- Check whether the agitation blades have been damaged or not
- Put not more than 5kg of separated food waste into the composter and ensure the volume of the food waste does not exceed the maximum indication line
- Close the lid and the food waste composter will operate automatically; observe whether there are unusual vibrations or noises generated
- Open the lid after operating for about five minutes, and observe whether the food waste is well-mixed in the composting tank

2) Odour treatment unit (OTU)

- Check whether the discharge flow of the OTU is normal or not (low discharge flow indicates that the air supply screen, exhaust screen or an OTU have been blocked)

Contact the food waste composter supplier if there are unusual conditions

Electric food waste composter

Participating schools of "Pilot Programme on Provision of Small Food Waste Composters at School" will receive a food waste composter. Figure 6 shows the provided food waste composter, accessories and the flow schematic of the food waste.

Food waste composter

Accessories

Flow schematic of the food waste composter

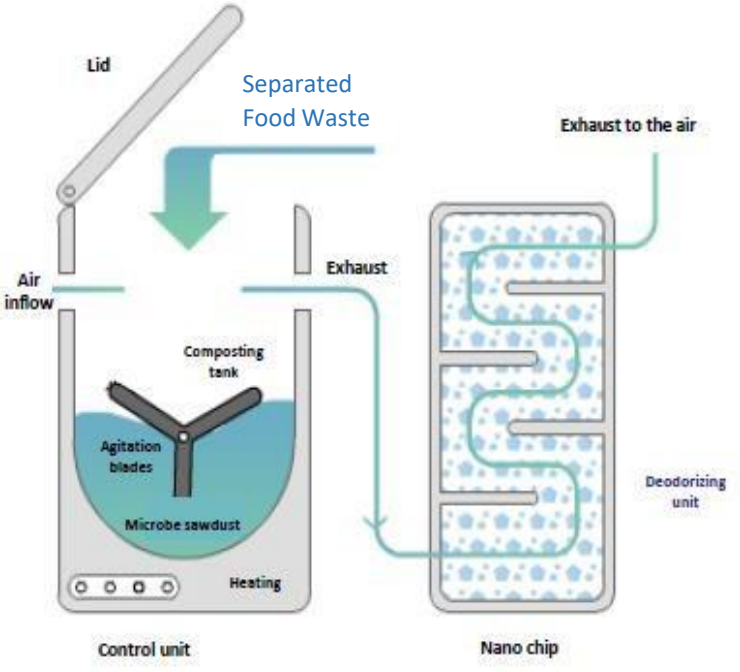


Figure 6: Food waste composter, accessories and operation

Technology and principles behind the electric composter

Composting technology can be classified as aerobic composting and anaerobic composting. Aerobic composting technology (as shown in Figure 7) decompose organic matters more thoroughly, require a shorter composting cycle and generate less odour. Aerobic composting will turn food waste into carbon dioxide, water and organic matter (compost). In Hong Kong, small to medium sized of food waste composters mainly use aerobic composting technology.

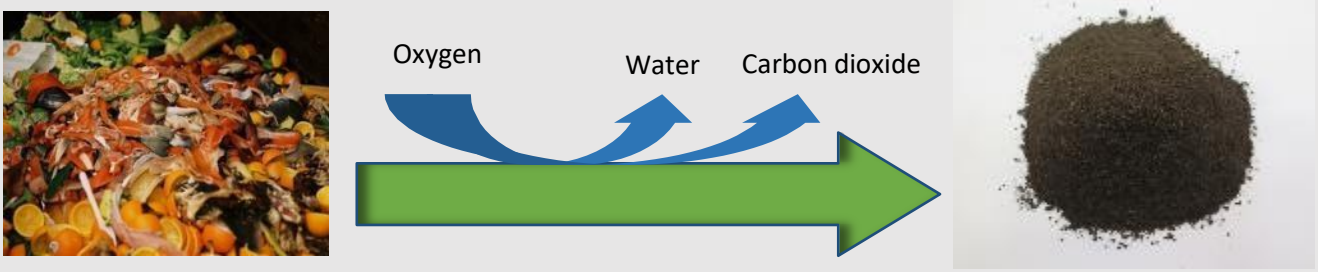


Figure 7 : Principles of aerobic composting

Principles of composting

There are large amounts of microorganisms in the nature, such as bacteria and fungi, etc. Composting uses the growth, propagation and the metabolism of microorganisms to convert organic materials (food waste) into compost.

Compost can improve the physical, chemical and biological properties to facilitate plant growth. The process of the composting can be divided into three phases: 1) mesophilic phase, 2) thermophilic phase and 3) cooling/curing phase.

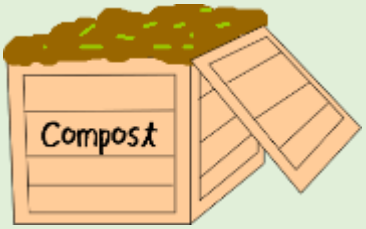
3 phases of composting

First phase: Mesophilic phase

Microorganisms start decomposing organic matters, generating heat, and raising the temperature of the compost. The temperature at this phase should be kept between 25°C to 45°C.

Second phase: Thermophilic phase

When the temperature exceeds 50°C, microorganisms will quickly break down protein, fat, and carbohydrate in the food waste. If the temperature is elevated to above 70°C, the high temperature will kill the microorganisms and limit the decomposition speed of the food waste. Hence, the temperature should be kept between 50°C to 60°C at this phase.



Third phase: Cooling / Curing phase

When there is insufficient organic matter for the microorganisms to consume, the temperature of the compost will drop gradually. When the temperature drops to 45°C or below, the remaining matters will be decomposed and the temperature will continue to drop until a stable level and enter the mature state. This process is called maturation or curing. When the maturation process is completed, the compost becomes dark brown in colour and has an earthly smell. The compost is ready to be mixed with soil for use in planting.

Points-to-note：

As the food waste in the composter needs sufficient time for full decomposition, we suggest that no more food waste should be put into the composter two days before taking out the compost from the composter (i.e. put the food waste into the composter from Monday to Friday and take out the compost on next Monday). The mature process of the composting product can be carried out outside the food waste composter. In general, the maturation process takes 14 to 21 days.

Use of compost

The usage of compost produced by the food waste composter is similar to that of commercial fertilizers. Proper use of compost can provide appropriate amount of nutrients for the plants. The aim of fertilizer application is to maintain the fertility of the soil and prevent restriction on plant growth due to insufficient nutrients. The quantity and location of compost applied are closely related to the soil properties, plant characteristics and growing stages of the plants.

Since different types of food waste contain different organic matters, so the compost converted from food waste also carries different nutrients composition. For this reason, suitable test should be carried out before applying the compost in order to achieve the best effect.

Application of compost

1. Purpose of fertilization

   The purpose of fertilization is to provide the soil with biodegradable matters to increase or sustain the soil fertility and biological activity. Thus, when applying fertilizer, user should focus on reducing the loss of nutrients from the soil and avoiding the accumulation of heavy metals and other pollutants.

2. Use as basal dressing

   Since the fertilization effect of compost is slow-releasing, so compost can be used as basal dressing to improve the soil conditions and facilitate the future growth of plants. To use compost as basal dressing, user can mix the soil with compost thoroughly during the turning up of soil with a recommended amount of 5 to 10 kg of compost per meter square of land.

The principle, method and dosage of the use (con't)

3. Use as top dressing

   There are various methods to apply top dressing, adding compost around the root of the plant, or diluting the compost with water, and spray it on the plant or irrigate it onto the soil for the root to absorb.

4. Use for garden ornamentals

   Compost and soil should be mixed in a 1:10 ratio. Soil should contain sand, mud and gravel, but not weeds, sticky mud, chemical pollutants, and other hazardous materials, in order to enhance the decomposition and effect of compost. If the compost is immature, it is necessary to mix it with soil before use; otherwise, root damage or poor root development may occur. As a common practice, user can adopt the ditching or burrowing approach to apply the compost and then cover it with soil; or spread the compost evenly on the soil and then plough it into the soil.

5. Use for domestic pot planting

   As the amount of compost used for potted plants is relatively less, the recommended compost to soil volume ratio is 1:20 to 1:30.

Points-to-note：Before applying the compost for planting food, users should know the compost composition and ensure the heavy metals content does not exceed the standard for health protection.

Improve soil structure

Improve soil fertility

Apart from the food wise information in the Education Kit, teachers can deepen the student's understanding of the problems of food waste and the awareness of food wise through educative activities.

A. Quiz game **(Answers to the questions and the explanations are shown in page 30)**

1. Which of the following is not food waste?
   A. Coffee grounds
   B. Rice
   C. Toothpicks
   D. Fish bones

2. Which of the following is not a way to reduce food waste when dining out?
   A. Ask for less rice
   B. Take away unfinished food
   C. Ask for no appetizers or side dishes
   D. Take as much as you can at buffets

3. Which of the following is not a way to reduce food waste at source and avoid food waste generation?
   A. Ask for appropriate portion according to the eating amount of oneself during lunch
   B. Avoid buying too much food when shopping at supermarket.
   C. Check the expiry dates of food at home regularly to prevent food disposal because of food expiry
   D. Recycle the food waste into compost

4. Which of the following is the optimal temperature range for the refrigerator (not the freezer)?
   A. 15 to -10°C
   B. -5 to 0°C
   C. 0 to 4°C
   D. 10 to 20°C

5. Which of the following is the correct description of food expiry date?
   A. Food must be deteriorated after the "best before date" and is not suitable for consumption
   B. Consuming food after the "use by date" may pose a considerable health risk
   C. The meanings of "best before date" and "use by date" are the same
   D. All of the above are correct

6. Please provide three possible causes that lead to food expiration or deterioration.

   _____

   _____

   _____

B. Group discussions:

Please ask students to:
1) Recall the food that they disposed of yesterday; and
2) Reflect on why they dispose the food.

Invite students to share their thoughts within the group, and discuss the causes of food waste generation at schools and at home.

C. The school can also use the online resources to nurture the "food wise" culture of teachers and students:

YouTube：

Food waste recycling: Central treatment processing Power generation (Chinese only)
https://www.youtube.com/playlist?list=PLFUFDG9b1H4cQv91ARV6OVY5X_JURcF2O

Educational videos:

Food wastage footprint : https://www.youtube.com/watch?v=IoCVrkcaH6Q
Food wastage footprint 2：https://www.youtube.com/watch?v=Md3ddmtja6s

On-line quizzes：

WWF：https://www.worldwildlife.org/pages/take-the-food-waste-quiz

James Beard Foundation：https://www.jamesbeard.org/blog/food-waste-eat-q

Answers to the questions：

1) C
Toothpick is not food waste because it is neither part of the food nor the materials for preparing dishes or drinks. On the contrary, rice is food, fish bone is part of the fish (food) and coffee grounds is the residue left after brewing coffee.

2) D
Customers who take as much as possible during buffets may end up in food wastage if they cannot finish all. The other three options are good practices of reducing food waste when dining out.

3) D
Food waste recycling is the treatment process after food waste generation and it is not a way to reduce food waste at source. The other three options are the approaches that can avoid food waste generation.

4) C
The 0°C – 4°C environment in the refrigerator allows most food to maintain its quality in low temperatures without freezing. This can inhibit the growth of bacteria and slow down food deterioration to attain the purpose of food preservation.

5) B
The meanings of “best before date” and “use by date” are different.
The former is formulated based on the quality and appearance of the food. In other words, food that has passed the “best before date” does not necessarily maintain its best condition in terms of taste and appearance, but it does not mean that it has deteriorated.
The latter is marked on highly perishable food such as sandwiches and fresh milk. These kinds of food are not suitable for consumption after the “use by date”, otherwise, they may have adverse impacts on health.

Progress Monitoring

Participating schools of the "Pilot Programme on Provision of Small Food Waste Composters at School" should submit the "Food Waste Composter Operation Data" in every three months through the Pilot Programme website (http://www.hd-sfwc.org). Participating schools can refer to the template in Appendix 1.

"Food waste composter operation data" helps students and teachers to understand the operation condition of the food waste composter and whether technical support is required. The progress report records:

1) the quantity of food waste generated and recycled at school; and
2) the quantity of compost generated, used and
   the usage of compost

References

1 Environmental Protection Department :
https://www.epd.gov.hk/epd/english/top.html

2 Virtual Water :
https://www.wsd.gov.hk/en/home/index.html

3 Monitoring of Solid Waste in Hong Kong :
https://www.wastereduction.gov.hk/sites/default/files/resources_centre/waste_statistics/msw2022_eng.pdf

4 Hong Kong: Blueprint for Sustainable Use of Resources 2013-2022 :
https://www.epd.gov.hk/epd/psb_charging/files/pdf/WastePlan-E.pdf

5 A Food Waste & Yard Waste Plan for Hong Kong 2014-2022 :
https://www.eeb.gov.hk/sites/default/files/pdf/FoodWastePolicyEng.pdf

6 Food Wise Hong Kong Campaign :
https://www.wastereduction.gov.hk/en-hk/waste-reduction-programme/food-wise-hong-kong-campaign

7 Food Waste Reduction Good Practice Guide for Educational Sector :
https://www.wastereduction.gov.hk/sites/default/files/green_lunch/Food_Waste_Reduction_Good_Practice_Guide_for_Educational_Sector_EN.pdf

8 O·PARK1 :
https://www.opark.gov.hk/en/index.php

9 Big Waster's Facebook Fan Page :
https://www.facebook.com/bigwaster.hk/

10 Big Waster's Instagram :
https://www.instagram.com/big_waster_hk/

Pilot Programme on Provision of Small Food Waste Composters at School
Food Waste Composter Operation Data

（Record Template）

School Name：_____ (20 ____ - _____ (month)

A. The quantity of food waste generated and recycled, the compost generated and the composter condition

Date	Daily Production of food waste (kg)	Food waste put in the composter (No more than 5 kg per day)	Compost taken out that day (kg)	Please briefly describe the unusual condition of the composter (if any):
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Date	Daily Production of food waste (kg)	Food waste put in the composter (No more than 5 kg per day)	Compost taken out that day (kg)	Please briefly describe the unusual condition of the composter (if any):
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				

Total quantity of food waste generated in this month*	Total amount of food waste added into the composter in this month	Total amount of compost taken out in this month
kg	kg	kg

**The above quantity of food waste generated is collected from about_____students/teachers.*

B. Usage and quantity of compost used in this month

Please list the usage of the compost and its corresponding quantity (such as used for planting and greening in the school, distributed to students, donated to charities[#])

Usage	Used quantity (kg)

[#]Note: If the compost is donated to any parties outside the school, please provide the name of benefiting parties

Participating schools of the Pilot Programme should submit the "Food waste composter operation data" every 3 months through the Pilot Programme website (http://www.hd-sfwc.org).