

Provision of Help-desk Service for Collection and On-site Recycling of Source Separated Food Waste

Executive Summary

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Background

1. In February 2011, the ECF Committee endorsed the provision of funding support to the Projects with an earmarked amount of \$50 million. In July 2011, the Environment and Conservation Fund (ECF) allocated \$50 million as a subsidy and launched the "Food Waste Recycling Projects in Housing Estates" (FWR) to encourage the source separation and recycling of food waste. The subsidy will provide funds to support housing estates to set up on-site food waste treatment facilities, organize food waste collection and recovery programmes and associated activities for 2-year. These projects also encourage housing estates to engage non-governmental organizations (NGOs) to organize educational and promotion activities in order to raise residents' awareness towards food waste reduction and encourage their participation in food waste recovery. In Sept 2014, the earmarked amount was increased to \$60 million and the extension scheme was introduced to support those satisfactorily completed project, for another 2-year subject to terms and conditions.
2. A help-desk service has been set up since July 2011 by appointing the Hong Kong Productivity Council to provide technical support to the housing estates and to conduct review of the Project. This report gives an overview and evaluation of the performance and outcomes of the on-site food waste recycling projects during the period from August 2017 to February 2019.

Progress of the Phase 1 & 2 Projects

3. 11 housing estates were approved for the Phase 1 Projects in November 2011. The 11 housing estates are Lung Poon Court (龍蟠苑) (FWR001), The Capitol, LOHAS Park (日出康城首都) (FWR002), Laguna Verde (海逸豪園) (FWR005), Woodland Crest (奕翠園) (FWR007), Grand Promenade (嘉亨灣) (FWR008), Braemar Hill Mansion (賽西湖大廈) (FWR011), Park Island (珀麗灣) (FWR014), Gold Coast (黃金海岸) (FWR015), Hong Lok Yuen (康樂園) (FWR016), Discovery Bay (愉景灣) (FWR017), Sereno Verde (蝶翠峰)(FWR018).
4. All the 11 housing estates in Phase 1 completed the projects. Five of these housing estates, namely Laguna Verde (FWR005), Woodland Crest (FWR007), Park Island (FWR014), Sereno Verde (FWR018) and the Capitol, LOHAS Park (FWR002), were approved to extend the project. The first four estates already completed the extension projects. Hong Lok Yuen (FWR016) and Discovery Bay (FWR017) were approved the transfer of inventory of composter.
5. 24 housing estates were approved for Phase 2 Projects between Jan 2013 to Dec 2018. 21 housing estates commenced the projects between the period of September 2014 and February 2019 and 18 of them completed the 24-month projects. The 21 housing estates are Sceneway Garden (匯景花園) (FWR004), Serenade Cove (韻濤居) (FWR012), Manhattan Hill (曼克頓山) (FWR023), Pacific Palisades (寶馬山花園) (FWR030), Tin Shing Court (天盛苑) (FWR036), Wonderland Villas (華景山莊) (FWR040), Peak One (壹號雲頂) (FWR041), The Latitude (譽 港灣) (FWR042), Ming Nga

Court (明雅苑) (FWR043), Scenic View (曉暉花園) (FWR046), Po Sing Centre (寶星中心) (FWR047), The Parcville (采葉庭) (FWR050), Grand Del Sol (朗晴居) (FWR054), Grand Pacific Views / Grand Pacific Heights (浪琴軒/海琴軒) (FWR057), Metropolis Plaza (新都廣場) (FWR063), Aegean Coast (愛琴海岸) (FWR064), Lei On Court (鯉安苑) (FWR065), Aria Kowloon Park (峻弦) (FWR072), Rhythm Garden (彩韻花園) (FWR081), Tierra Verde (盈翠半島) (FWR083) and Residence Bel-Air (貝沙灣) (FWR084).

6. For those housing estates in Phase 2, Manhattan Hill (FWR023), Pacific Palisades (FWR030), Wonderland Villas (FWR040), The Parcville (FWR050) and Rhythm Garden (FWR081) were approved to extend the project after the completion of the Project. Tierra Verde (FWR083) was approved on transferring to extend project after completion of ECF WRP Scheme. The Latitude (FWR042) was approved the transfer of inventory of composter.
7. Three housing estates in Phase 2, namely Siu Lun Court (兆麟苑) (FWR088), Chi Fu Fa Yuen (置富花園) (FWR087) and Allway Garden (荃威花園) (FWR091) were approved in 2018 but have not commenced the project. Tender was underway as at Feb 2019.

Overview and Evaluation of Food Waste Recycling Projects in Housing Estates

8. Three questionnaire surveys (survey1: on or before installation of food waste composting machines; survey 2: six months after the commencement of the ECF FWR Scheme; survey 3: after completion of the project) were distributed to the participated housing estates of Phase 1 and Phase 2 to measure the effectiveness of the educational programme and behavioral change of the residents on food waste reduction and separation.
9. This review is based on the information and routine operation data of the 11 housing estates of Phase 1 and 21 housing estates of Phase 2 and their food waste education and recycling activities collected up to February 2019; as well as the results of household questionnaire surveys of 32 housing estates of Phase 1 & 2.
10. The review of the project based on 2 aspects: (A) Behavioral change of the residents and the effectiveness of the educational programme (B) Households' participation and on-site recycling. The major findings of the review are summarized below.

(A) Behavioral change of residents and the effectiveness of educational programme

11. The results of the third survey carried out after 24-month project period reveals the behavioral change of the residents on food waste reduction and separation and the effectiveness of the educational programme. It was observed that in general there is a reduction in food waste from the households participated in the Projects. More than half (66%) of the respondents indicated that the food waste generation by themselves has decreased after the project implementation as shown in Figure 1. Besides, among these respondents, there were about 42% of the respondents replied they had decreased more than 10% of food waste generation after joining ECF FWR Scheme as shown in Figure 2.

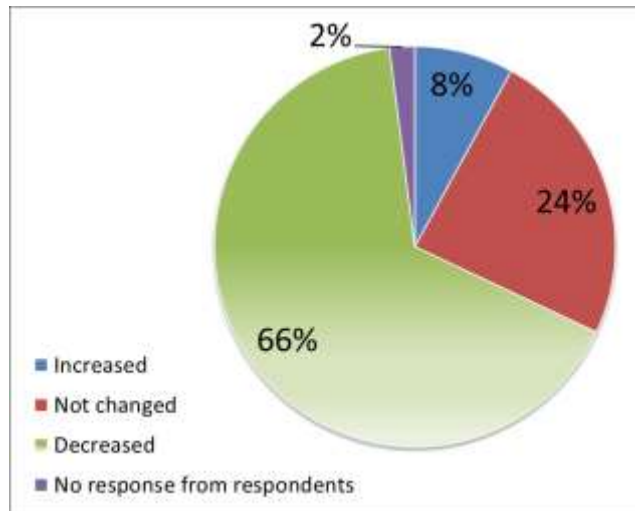


Figure 1: Change of food waste generation after participating in ECF FWR Scheme

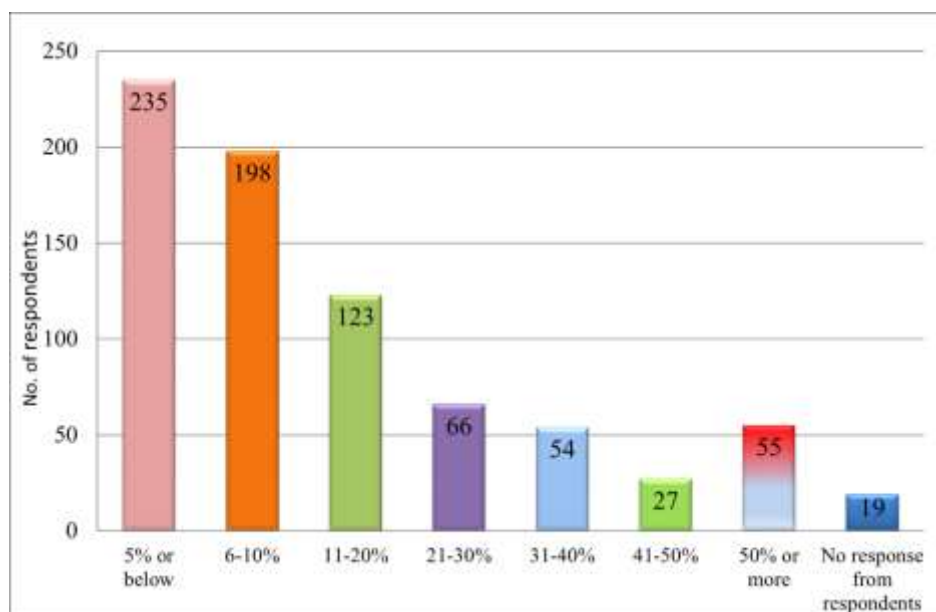


Figure 2: Percentage decrease of food waste generation after participating in ECF FWR Scheme

12. The educational programmes organized by the property management company and non-governmental organization were mainly comprised of briefing, workshop, visiting, carnival, poster and competition. The housing estates have implemented food waste education programmes through display panel, exhibition, carnivals, seminar/ sharing sessions and workshops. As indicated in Figure 3, 75% of respondents found that education activities were interesting, useful and providing educational knowledge. In addition, over 90% of respondents were aware of food waste problem in Hong Kong, the need and methods in reducing food waste, and food waste could be recycled to useful materials such as compost and detergent, it is shown in Figure 4. This suggests that the education programmes are effective in encouraging more households to reduce food waste.

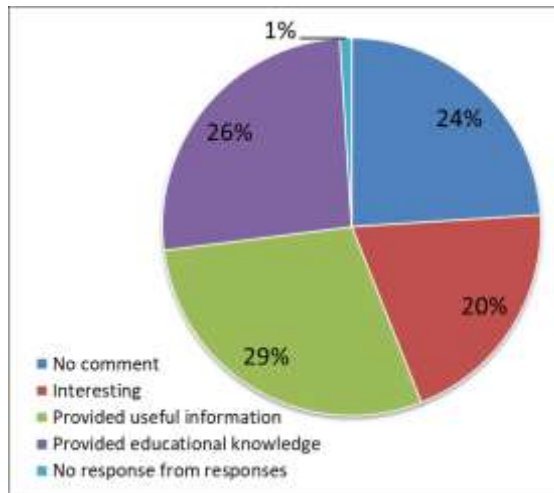


Figure 3: Comment of educational programme from residents

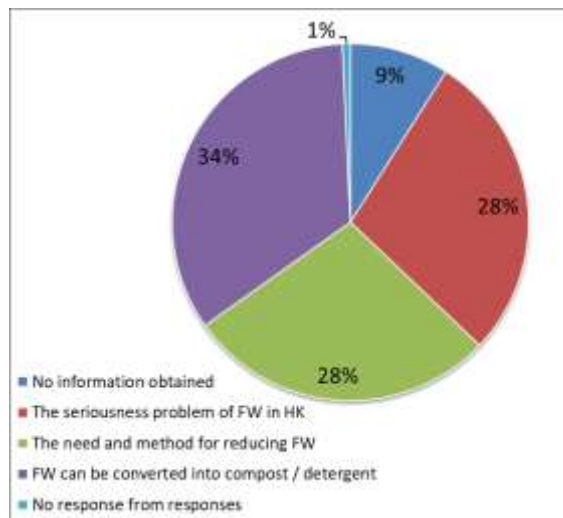


Figure 4: Information obtained from the educational programme

Households’ Participation and On-site Recycling

13. Participation rate is defined as the ratio of actual number of households participating in food waste recycling against the number of households expected to participate. In general, the participation rate has gradually increased from 39% to 66% for the 78-month project period. The median of overall participation rate of Phase 1 and Phase 2 housing estates was 52% (except Discovery Bay (FWR017B)). 15 out of 31 housing estates achieved more than 52% and only 2 housing estates achieved below 20%. There were one Phase 1 housing estate and three Phase 2 housing estates could achieve more than 80% of the average participation rate.
14. All the housing estates adopted on-site electrical composters for food waste recycling, with design treatment capacity within the range 50 to 100 kg/day. Under the Guide to Application of June 2014 or before, estate was expected to recruit at least 60 and 120 households for 50kg/day and 100kg/day composter respectively. According to the Guide to Application of January 2015 and the latest one dated January 2018, estate was expected to recruit at least 100 and 200 households for the composters with capacity of 50kg/day and 100kg/day respectively.
15. Utilization rate is defined as the ratio of average daily food waste input against the designed daily treatment capacity of composter. The overall average daily food waste fed into the composter with capacity of 50 kg/day and 100 kg/day was about 32 kg and 52 kg for respectively. Hence, the

utilization rate for the composter of 50 kg/day and 100 kg/day was about 64% and 52% respectively. Quantity of food waste fed into the composter was far lower than the designed treatment capacity at some housing estates. The recycling rate of the composter may also be affected by other factors, such as participation rate, food waste quality and operation practices.

16. From September 2012 to February 2019, total amount of food waste collected from the participating households was 2,034 tonnes among which 1,645 tonnes of food waste was treated on-site and it was about 81% of the total amount of food waste collected. The difference in the collected and treated food waste quantities was due to the actual operation constraints, practical treatment capacity and quality of food waste from individual sites, etc.
17. It is noted that while the average daily amount of food waste treated by the on-site composters varies amongst individual housing estates. From September 2012 to February 2019, the range of average daily food waste generated per household was 0.31 to 1.82kg per day and the median of food waste generated per household was 0.93 kg per day.
18. Among the housing estates of Phase 1 and Phase 2, there were several settings of buildings leading to various kinds of food waste collection methods developed. Individual town houses mainly adopted individual household collection by operators. Most multi-storey estates adopted centralized food waste collection method where participating households hand in air-tight containers with source separated food waste to the centralized collection point(s). It is observed that operation in both types of developments and collection methods were in general smooth and no major problems were identified.
19. Total amount of compost produced was about 234 tonnes. Quality of compost samples was test by laboratory analysis according to Compost and Soil Conditioner Quality Standards 2005 which published by Hong Kong Organic Resources Centre. Although the pH and Seed Germination Index of the discharged samples from the composter did not meet the Compost and Soil Conditioner Quality Standards 2005, the safety tests with regard to heavy metal and pathogen content in all the compost samples showed that they were safe for use in general non-agricultural such as soil conditioner. Hence, the compost was suggested to be applied in 1) landscaping in housing estates, 2) distribution to participating households for gardening; and 3) donating to the non-profit organizations.
20. The most common operation problem associated with the on-site composter was odour nuisance while overall the composter operation was acceptable. With occasional reports from the Property Management Company (PMC) of some Phase 2 housing estates, odourous smell was found at the composting area of installed composters. With the technical advice from Help-desk Service and the improvement work by supplier/PMC, the odour was controlled to the minimum level. Activated Carbon and/or Bio-filter were installed in the composters to treat the odour so as to alleviate the odour.

21. Samples of compost after maturation in the housing estates were collected for laboratory analysis. In general, the collected samples met most of the parameters in the Compost and Soil Conditioner Quality Standards 2005 except pH, moisture content and Seed Germination Index. The compliance with heavy metals and pathogen parameters indicated that the compost would be safe to use without major health concerns. The non-compliance with pH and Seed Germination Index standards suggested that maturation of the compost might be incomplete. According to the Compost and Soil Conditioner Quality Standards 2005, most of samples from the composter might not be suitable for organic farm; but they were suitable for non-agriculture use, such as landscaping planting.
22. The compost was mainly used at the planting area inside the housing estates, distributed to residents, donated to the nearby school and non-profit making farm for education purpose or farming respectively.

Recommendations

23. It was observed that the logistic, location and time of food waste collection would affect the participation rate. Therefore, PMCs should arrange food waste collection properly and communicate with residents to attract more participants.
24. PMCs are encouraged to increase the utilization rate of the composter if there is still capacity in the composting machine for treatment by recruiting more residents to participate in the FWR Scheme. For those estates with low participation rate, PMCs should review the food waste collection time and logistic to suit more residents' habits.
25. The educational programme should be organized all-around 24-month period to maintain the momentum of the residents to join the project. The education talk can be organized together with some popular workshops to attract more participants.
26. In operating composters, PMCs should ensure that
 - i) ventilation or air change is sufficient;
 - ii) the ventilation system should be switched on all the time during the composter operation;
 - iii) the exhaust discharge point of the ventilation system should be remote from residents, building or pedestrian on the walk-path/main entrance;
 - iv) clean the screen of the OTU filter regularly,
 - v) the effluent discharge point for wastewater should be connected to Government foul sewer.
27. Since water content of the food waste would affect the performance of the composters, PMCs are reminded to drain off the liquid from the collected food waste.