

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

Executive Summary

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Prepared By

Environmental Management Division

Hong Kong Productivity Council



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Executive Summary

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" programme 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 organization (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. By the time of this report compilation was from July 2015 to June 2017, 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).
3. 19 housing estates were approved for Phase 2 Projects in 2013. 18 housing estates had been commenced before June 2017 and 1 housing estate will be commenced in July 2017. The 19 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 (彩頤花園) (FWR081).
4. 3 housing estates were approved for the Phase 2 Projects in 2017. The 3 housing estates are Residence Bel-Air (貝沙灣) (FWR081), Hilton Plaza Shatin (希爾頓中心), Siu Lun Court (兆麟苑).
5. 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.

Progress of the Phase 1 & 2 Projects

6. All of the 11 housing estates in Phase 1 completed the food waste separation and recycling programme. Laguna Verde (FWR005), Woodland Crest (FWR007), Park Island (FWR014) and Sereno Verde (FWR018) had approved the application of Extension Project Scheme. Hong Lok Yuen (FWR016) and Discovery Bay (FWR017) had approved the transfer of inventory of composter.
7. 18 housing estates in Phase 2 had commenced food waste recycling since September 2014. 8 of 18 housing estates had completed the 24 months programme, among these housing estates, Manhattan Hill (FWR023), Pacific Palisades (FWR030), Wonderland Villas (FWR040) and The Parcville (FWR050) had approved to extend the project after the completion of the Project. The Latitude (FWR042) applied the transfer of inventory of composter after the completion of the Scheme and the application was approved in 2018. Peak One (FWR041) has already commenced in July 2017, others housing estates are under the tendering of the composter.
8. Since 2012, the help-desk has been collecting information and data from the housing estates in Phase 1 and Phase 2 to evaluate the performance of the Projects. Three questionnaire surveys (survey 1: before the installation of food waste composting machine; survey 2: six months later after the commencement of the Scheme programme and survey 3: the 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 18 housing estates of Phase 2 and their food waste education and recycling activities collected up to June 2017; as well as the results of household questionnaire surveys of 29 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. More than half (62.5%) of the respondents indicated that the food waste generation by themselves has decreased after the project implementation as shown in Figure 1. Besides, within these respondents, there were over 79% of the respondents replied they had decreased more than 10% of food waste generation after joining FWR as shown in Figure 2.

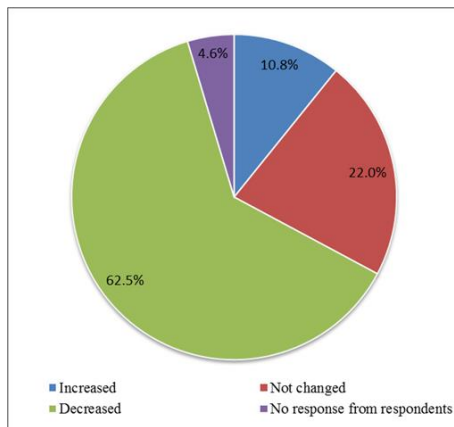


Figure 1: Change of food waste generation after participating in FWR

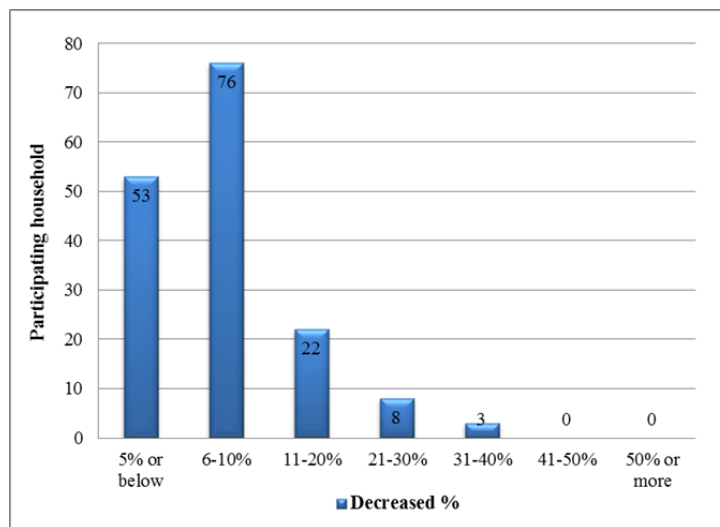


Figure 2: Percentage decrease of food waste generation after participating in FWR

12. The educational programmes organized by the property management company and non-government organization were mainly comprised of briefing, workshop, visiting, carnival, poster and competition. As indicated in Figure 3, 45% of respondents found that education activities were interesting, useful and providing education. In addition, over 84% of respondents were aware of food waste problem in Hong Kong, need the 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.

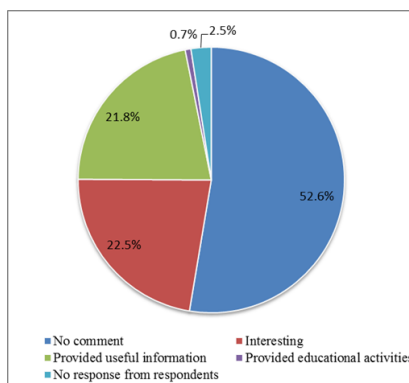


Figure 3: Comment of educational programme from residents

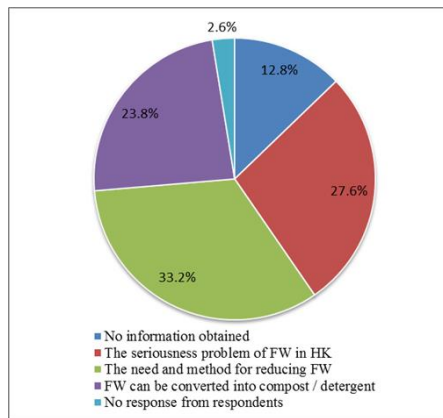


Figure 4: Information obtained from the educational programme

Households' participation and on-site recycling

13. On the basis that the on-site composters set up by the housing estates would have a designed treatment capacity of 50kg/day and 100kg/day food waste respectively. Under the Guide to Application of June 2014 or before, estate was expected to recruit 120 and 60 households for 100kg/day and 50kg/day composter respectively. With the Guide to Application of January 2015, estate was expected to recruit 200 and 100 households for 100kg/day and 50kg/day composter respectively.
14. When compare the expected participating household number with the average actual participating number of participating housing estates, except Discovery Bay (FWR017). The median of overall average participating rate of participating housing estates was 46.8%. 14 out of 28 housing estates achieved more than 46.8% and only 2 housing estates achieved below 20%. There were 2 housing estates of Phase 1 housing estate and 3 housing estates of Phase 2 housing estate could achieve the overall average participating rate more than 80%. However, up- trend of overall participating rate was observed over the 58-month project period.
15. It is noted that while the average daily amount of food waste treated by the on-site composters varies amongst individual housing estates, the range of average daily food waste generated per household was 0.28 kg per day to 1.16kg per day and the overall average food waste generated per household was 0.93kg per day. In general, it shown to be decreasing from 0.95kg to 0.83kg from September 2012 to June 2017.
16. Among the participated 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.
17. All the housing estates adopted on-site electrical composters for food waste recycling. 5 models of composters were adopted in the housing estates. There was no major mechanical and electrical fault of the composters during the implementation of the project.

18. As the quantity of food waste daily put into the composter was far lower than the designed treatment capacity at some housing estates. In addition, the recycling rate of the composter was also affected by other factors, such as, participation rate, food waste quality and operation practices.
19. With occasional reports from the 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 respectively to treat the odour so as to alleviate the odour.
20. 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.
21. For the usage of the compost, housing estates mainly used the compost 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.

Conclusion and Recommendation

Conclusion

22. 11 housing estates of Phase 1 commenced the FWR so as to conduct the food waste separation and recycling as well as education programme to raise the awareness of residents towards food waste problem. The projects have been conducting more than 58 months, by the data reported were up to June 2017, 4 of the 11 housing estates in Phase 1 had completed the tasks of the projects, 5 housing estates were approved to extend the project in 2016. 2 housing estates were approved the transfer the inventory of the composter.
23. 18 housing estates of Phase 2 commenced the implementation of the FWR so as to conduct the food waste separation and recycling as well as education programme to raise the awareness of residents towards food waste problem. The projects have been conducting more than 34 months, by the data reported were up to June 2017, 4 of the 18 housing estates in Phase 2 had completed the tasks of the projects, 4 housing estates were approved to extend the project after the completion of the FWR project. 1 housing estate was waiting for the transfer the inventory of the composter.
24. According to the submitted data from Phase 1 and Phase 2 participating housing estates, the analysis results are presented as following:
 - a) Participation rate is defined as the average active handling in separated food waste over the number of

households expected to recruit according to the Guide of Application announced before 2014 or after 2015 and expressed in percentage. The median of average overall participation rate of Phase 1 and Phase 2 housing estates was 46.8%, in general, it was gradually increasing from 42% to 84%. Among the participated housing estates, Lei On Court (FWR065) performed at the highest participating rate at 94.9%;

- b) Utilization rate is the long term average of daily food waste input / designed daily treatment capacity of composter. An average overall daily food waste put into the composter for 50 kg/day and 100 kg/day was 37.7 kg and 48.4 kg respectively. The utilization rate for the composter of 50 kg/day and 100 kg/day was about 75% and 48% respectively. However, Wonderland Villas (FWR040E) and Ming Nga Court (FWR043) were performed above 95%;
- c) Total amount of food waste collected from the participating household was 1,356 tonnes among which 1,124 tonnes of food waste had been treated on-site which was about 82.8% 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 of individual sites, etc.;
- d) Total amount of compost produced was about 157 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 organization;
- e) In general, overall average food waste generated per household was shown to be decreasing from 0.95kg to 0.83kg.

25. From the three questionnaire surveys conducted at different timeline of the projects, it was shown that about 16.6%, 37% and 62.5% of residents had decreased the food waste generated at the initial stage of FWRP, 6-month after participated in the FWRP and the 24-month after participated in the FWR respectively. It is also observed that the awareness of the food waste separation and the behavior change in food waste generation were gradually increased among the participating households.

26. The housing estates have implemented food waste education programmes through display panel, exhibition, carnivals, seminar/ sharing sessions and workshops. They were generally well received.

27. The household survey results and the per household food waste collected data suggest that food waste recycling projects with education programmes are effective in encouraging more households to reduce food waste. It has been observed in general that there is a reduction in food waste from the households participated in the Projects.

28. The exactly treatment capacity of the supplied composter could not be evaluated because most of participated housing estates could not collect sufficient amount of food waste in housing estates. To better understand the treatment capacity of the composter, it is suggested that the PMCs should maintain consistent food waste quality and quantity feed into the composter to eliminate factors that could adversely affect the

performance of the composters.

29. The most common operation problem associated with the on-site composter is odour nuisance while overall the composter operation so far is acceptable.
30. The usage of the compost were mainly applied at the planting area inside the housing estates, distributed to residents, donated to the nearby school and non-profit farm for education purpose or farming.

Recommendation

31. The educational programme should be organized all-around 24-month period to maintain the momentum of the residents to join the project.
32. According to the utilization rate of the composter, PMC should encourage the residents to participate in the project.
33. To minimize the odour problem, sufficient ventilation or air change should be provided at the installed area. In addition, the ventilation system should be switched on all the time and the discharged point of the ventilation system should be remote from residents or building or pedestrian on the walk-path.
34. Wastewater generated due to food waste recycling process should be discharged to government foul sewer.