

Food Waste Recycling Projects in Housing Estates

Executive Summary

Hong Kong Productivity Council



November 2013

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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. The objectives of the Projects are to facilitate housing estates to organize educational programmes for promoting participation, behavioral change and residents' awareness raising towards food waste reduction, and set up on-site composters to treat food waste from households for educational purpose. In view of the anticipated operational challenges in the separation, collection and on-site treatment of food waste at housing estate, it was also agreed to adopt a phased approach in implementing the Projects in order to gain experience for fine-tuning the operation and logistics.
2. 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. 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 Phase 1 Projects.

Progress of the Phase 1 Projects

4. Out of the 11 housing estates, 10 housing estates have already commenced food waste recycling and the remaining estate (i.e. The Capitol, LOHAS Park) is at the stage of purchasing the composter.
5. Since 2012, the help-desk contractor has been collecting information and data from the 11 housing estates to evaluate the performance of the Projects. The help-desk contractor has also visited all the 11 housing estates and invited these housing estates to carry out household surveys in April 2012 and April 2013 to measure the effectiveness of the education programmes and behavior change in food waste reduction.

Review of the Phase 1 Projects

6. This review is based on information and data of the 11 housing estates and their food waste education and recycling activities collected up to June 2013 as well as the results of household surveys carried

out in April 2012 and April 2013.

7. The review covers two major aspects: (A) household education and participation; and (B) food waste collection and recycling. The major findings of the review are summarized below.

(A) Education and Participation

8. One objective of the Projects is to organize education programmes for encouraging participation from residents, promoting behavioural changes and raising residents' awareness towards food waste reduction & recovery.
9. The results indicate that: (a) 10 housing estates have carried out at least 47 food waste education and promotion activities; (b) the property management companies generally considered that carnivals and workshops have the best participant responses.
10. The responses to the education programmes carried out by the housing estates are also revealed from the results of the household survey conducted in April 2013 (after commencement of recycling). The results of surveys indicate most respondents have participated in display panels exhibitions (over 63%), followed by carnivals (over 35%), seminars/sharing sessions (19.3%), and workshops (13.6%). In addition, as shown in Figure 1, most respondents considered the most effective and impressive educational programme is exhibition of display panels exhibition (over 50%), followed by carnivals (over 35%), seminars/sharing sessions, and workshops. These results (and also that depicted in paragraph 10 above) suggest that the different forms of education programmes including display panel exhibition, carnivals, seminar/ sharing sessions and workshops are generally well received and they could continue be used by the housing estates for food waste education and awareness raising in the coming year.

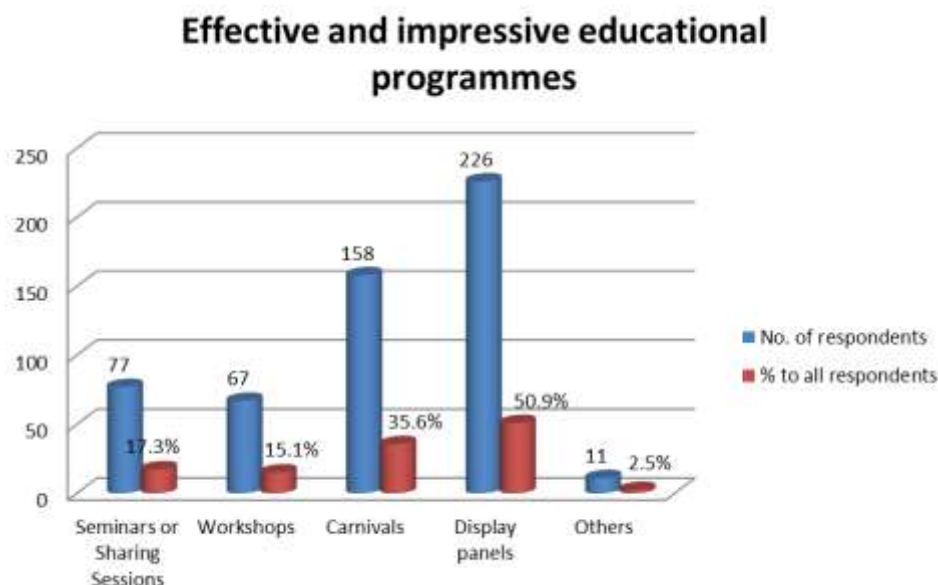
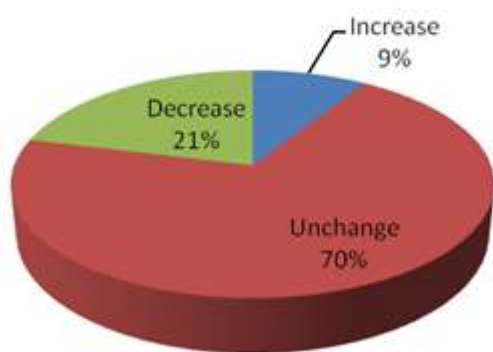


Figure 1 Effective and Impressive Educational Programmes from Household Survey

11. The overall effectiveness of the education programmes carried out by the housing estates could be deduced from the results of the household surveys conducted before and after commencement of food waste recycling in the housing estates. As shown in Figure 2, prior to the commencement of the food waste education programmes in April 2012, 21% of the survey respondents replied that they reduced food waste generation in the past 6 months. The survey in April 2013 after the education programmes indicated that the percentage of respondents saying they had reduced food waste generation had increased to 44%. As shown in Figure 3, out of those that responded in decrease in food waste generation, about 85% responded the reduction is due to the participation of the Projects. The result suggests that the food waste recycling together with the education programmes in the housing estates are effective in encouraging more households to reduce food waste.

Survey 1. Perception of change in food waste generation



Survey 2. Perception of change in food waste generation

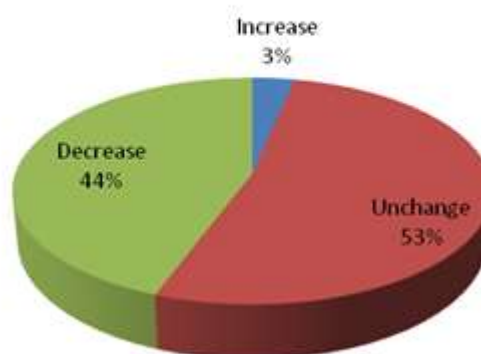


Figure 2 Comparison of Results of Survey 1 and 2 – Change in Food Waste Generation

Reasons of decrease in food waste generation

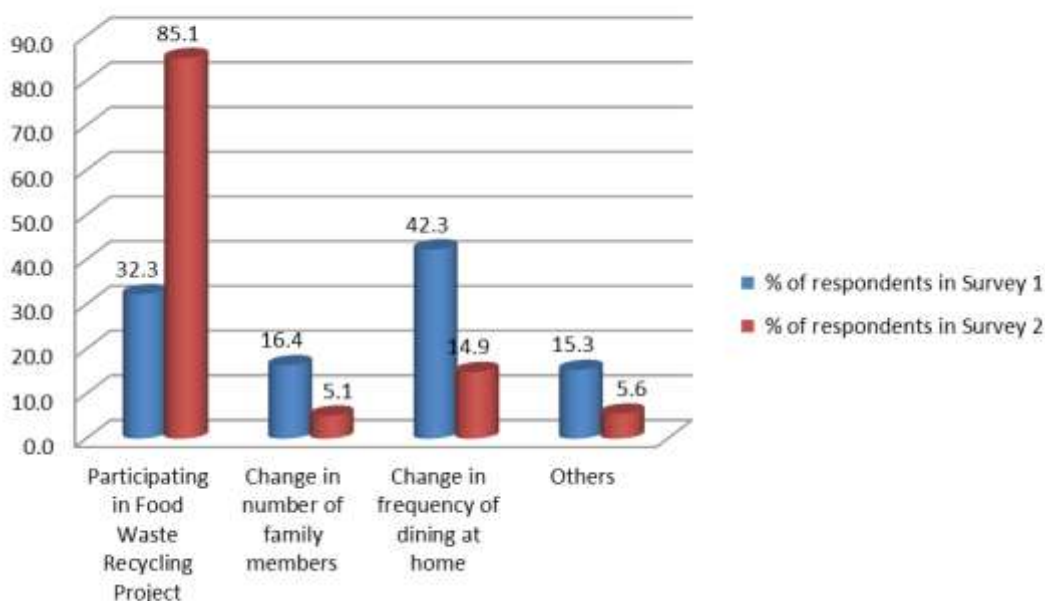


Figure 3 Comparison of Results of Survey 1 and 2 in Reasons of Decrease in Food Waste Generation

12. On the basis that the on-site composters set up by the housing estates would have a treatment capacity of 100 kg food waste each day, it has been estimated that the housing estate would enroll about 120 households for food waste recycling. By June 2013 a total of about 900 households in 8 housing estates were enrolled to the Projects, and the number of households enrolled in individual housing estates varied considerably. Six of the estates have each enrolled over 100 households while 2 estates have enrolled only about 70 households. It is noted that the food waste recycling programmes for these 2 estates with lower enrollment were not fully implemented in June 2013.
13. The overall average daily food waste collected per household for the individual housing estates ranges from about 1.31 kg food waste per household to about 0.43 kg food waste per household. It is noted that over the months, there is a general downtrend in the amount of food waste collected per household for most housing estates. The overall average daily food waste collected per household for the estates also reduced from 1.09 kg per household in Sept 2012 to 0.78 kg per household in June 2013 (about 28%). While the data represents the daily food waste collected per household, rather than the amount of food waste generation per household, this downtrend is consistent with the survey result discussed in paragraph 11 above that higher percentage of households in the housing estates has reduced food waste generation since the implementation of the Projects.
14. It is noted that while the average daily amount of food waste treated by the on-site composters varies amongst individual housing estates, some of them are considerable less than the claimed treatment capacity of the composters. Given this, and that the number of households enrolled in some of the housing estates were considerably less than 120 (see paragraph 12 above), there should be scope for some of the housing estates to enroll more households for food waste recycling.

(B) Food Waste Collection and Recycling

15. The Help-desk contractor has produced technical guidelines to facilitate housing estates in collecting source separated food waste, application of on-site composter, including requirements for maturization, application rate and frequency, and other technical advice etc. The guideline is available at the help-desk website (http://hd-fwrs.hkpc.org/tec_en.html) for easy access to the housing estates.
16. Among the 10 housing estates, there are several settings of buildings leading to various kinds of food waste collection methods developed. Individual town houses mainly adopt individual household collection by operators. Most multi-storey estates adopt 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. The experience of collection of source separated food waste in the housing estates indicates that collection was in general smooth and no major problems were identified. For collection of food waste by communal bins, the experience suggests the strengthened education and training with close monitoring is necessary to ensure absence of significant contamination in the collected food waste.
18. All the housing estates adopted on-site electrical composters for food waste recycling, though the composter supplier and model differs. Prior to commissioning, functional tests of the composter's equipment and the inspection of the electrical protection for the component according to the Code of Practice for the Electricity (Wiring) Regulation had been conducted by composter supplier on site. Technical staff of the Help-desk contractor witnessed the testing of the composters with the suppliers.
19. The treated food waste residue after discharge from the on-site composters has undergone maturation in the housing estates. After that, the housing estates used the compost for many ways, such as planting areas inside the estates, as souvenir giving to participants and donation to non-profit farms. There was no adverse effect observed or noted in their applications so far.
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 the 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 suggest that maturation of the compost might be incomplete. Nonetheless, provided that such compost is not used for seedlings or immature plants and sufficient dilution/mixing with soil is adopted, it can still be used beneficially as supported by the experience of the housing estates.
21. As the food waste recycling programmes of the housing estates are still at the early implementation stage, more data and experience are required to assess the performance of composters, especially when the treatment of food waste approaches the claimed capacity of composters.

Conclusion

22. In light of the major findings of the review presented above, it is observed that :
 - (a) the housing estates have implemented food waste education programmes through display panel exhibition, carnivals, seminar/ sharing sessions and workshops. They were generally well received;
 - (b) 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. There is also evidence of behavioural change or a change in habits among participating households as a result of the education programmes initiated;

- (c) considering that the daily amount of food waste collected by some of the housing estates are well below the composter capacity, there is scope for the housing estates to enroll more households for the Projects;
- (d) different modes of food waste collection were adopted and they were found to be acceptable. Yet for use of communal bins, strengthened education and training is required.
- (e) the most common operation problem associated with the on-site composter is odour nuisance while overall the composter operation so far is acceptable. Yet the operation period and experience of the composters is still rather limited, hence longer time is need to assess the composter performance particular when the food waste loading approach the claimed treatment capacity;
- (f) compost produced are used beneficially without adverse comment reported. Nonetheless in view of the possibility that the compost might not be fully matured, it should not be used for seedlings and immature plants, and application with sufficient dilution/mixing with soil is advisable.