20. MOTIVATION FOR WASTE SEPARATION AMONG HANOI CITIZENS

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Households are the main contributor to the alarmingly growing rate of the quantity of solid wastes which lead to many issues in waste man-agement system. As a solution, encouraging recycling behavior among households is of extreme importance and should be prioritized. This paper tried to explore different incentives for recycling at household level and assess the social connection within one neighborhood and its impact on community projects.

The results show numerous potentials for waste separation. The informal recycling system already existing is working quite efficiently; for household food waste, making animal feed and composting is undoubtedly a source of separation even if small in scale. A strong sense of belonging to the community also encourages people to take action to improve the environment of their neighborhood.

Key Words : *household waste, waste separation, recyclable waste, food waste, incentives*

1. INTRODUCTION

Growing population and urbanization in Vietnam are putting pressure on urban areas that are already struggling with limited land resource and under-developed infrastructures like Hanoi city. This results in the increasing amount of municipal solid waste (MSW), which accounted for about 80% of waste generation in Vietnam in 2003[1)]. While MSW management is carried out by government agencies, part of the responsibility lies within the citizen.

Households are the main contributor to the alarmingly growing rate of the quantity of solid wastes which lead to many issues in waste management system such as landfill sites becoming overload and causing environmental degradation. A solution to reduce the amount of solid waste is separation of waste at the source which is admittedly better than recovery of materials from the mixed wastes, because it produces cleaner and higher quality materials as well as minimizes the disposal of solid waste, hence decreasing costs. Correspondingly, encouraging recycling behavior among households is of extreme importance and should be prioritized.

Past studies are primarily focused on the current state of solid waste management. More often the role of the government is highly emphasized and not private responsibility for waste. Especially in the case of Vietnam, a large body of literature has studied the current MSW system. For instance, Ngo et al. did a comprehensive review of the solid waste management in major urban areas of Vietnam in 2010[2)]. Verma et al. (2016) also developed a dataset on MSW, especially in Ho Chi Minh city, and identified several gaps in regulations and economic policies relating to MSW management[3)].

As a new approach to tackle the problems existing in waste management, there is a need for better understanding of public's view of MSW and bringing into awareness the responsibility of each individual in the society. What is missing from previous studies is a project that helps bring into awareness and encourage proper waste behavior at the individual level. Therefore, the objective of this paper is to explore different incentives for recycling at household level and assess the social connection within one neighborhood and its impact on community projects in order to further discuss community capacity building.

2. SURVEY OUTLINE

(1) Study area

Since 2008, Hanoi has undergone a large-scale expansion where several adjacent provinces were merged into the metropolitan area of Hanoi. Hanoi's total area then increased to 334,470 hectares in 29 subdivisions with the new population being 6,232,940., effectively tripling its size[4]. However, despite the rapid rate of urbanization, the majority of Hanoi population still concentrated in the most central part of the city.

With total area of urban districts approximately 10 times smaller than the rural division, the 12 urban districts populate almost the same number of inhabitants. This extremely dense area is facing many challenges in the field of waste management.

Table 1 Hanoi MSW volume (Source: Vietnam Environment Administration Magazine, 2016) [5]

	MSW volume (tons/day)	**Collection rate (%)**
12 urban districts	3,388	98
17 rural districts	2,127	89
Total	5,515	-

The collection rate in urban cities is high but the collection process is still rudimental and primitive. Waste collection consists of three stages: gathering manually, picking by vehicles at collection points, and transporting–dumping at the landfill. In 2011, there were 5 sanitary solid waste management facilities in operation, with Nam Son landfill (3500 tons/day) as the biggest site.

The technical standards and requirements on solid waste disposal technology have been detailed, however, not strictly apply comprehensively. There is also a lack of regulation regarding waste collection and transportation, especially for the private businesses that are in charge of waste collection and disposal in suburban areas.

Another problem Hanoi is facing is the inefficient of land use hence the shortage of waste collection points. Current collection points are becoming overload with the increasing amount of waste. Moreover, most of these stations are located inside residential areas, and few of them meet the environmental standards. This means that everyday people are facing air pollution and water pollution.

(2) Survey design

The crucial objective of this survey is to identify the motivation for waste separation behavior among Hanoi citizen. For this purpose, the questionnaire sheet was designed with 20 multiple choice questions divided into 3 parts. For each multiple-choice question, different options were constructed based on literature review and actual observation of the situation during a field trip in Hanoi in August 2018. The first part asked about personal knowledge and behavior regarding waste and recycling. The second part looked at the relationship between an individual household with its community, and the last part aimed to gather social-demographic information of the respondents.

This questionnaire survey was launched using an internet application. From February 4th to February 18th, 2019, 78 samples were acquired from the online survey. After an initial check of the result, another approach was adopted to avoid having more young respondents than the elderly because of the use of the internet. Therefore, intercept interviews were conducted at several designated locations. Outside of random primary schools in the city, a survey assistant was able to acquire samples from parents and grandparents who waited to pick up their children after school. In total, 100 valid samples were collected.

(3) Respondents' profile

More men than women had participated in this online questionnaire, taking up to 39% of all respondents. The number of survey participants in different age groups is also relatively equal, with slightly more people from age 25 to 35 than any other group (32% of the overall 100 samples) and young adults of under 25 account for the smallest portion (8%). The average family size is 3.89 people.

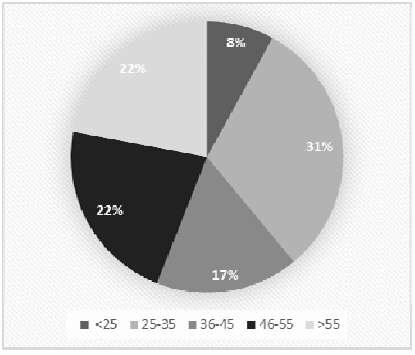

Fig.1 Age of the respondents.

With young adults of under 35 years old being the majority of the respondents, the percentage of people with university and higher education degree is also high. This amounts to 54% of the participant population, with the number of university graduates 4 times bigger than the number of people going to graduate school.

3. SURVEY RESULT AND ANALYSIS

(1) Current state of waste separation

Fig.2 Motivation for food waste separation.

A significantly large portion of respondent said yes to the question of whether they are sorting out organic waste. Only 44% of the survey participants are not separating kitchen garbage. To the question "Do you separate food waste at home", the given options included "Making compost", "Feeding pets/cattle", and "Other". In result, 56 people are using kitchen waste for compost and 48 for household pets or cattle feed.

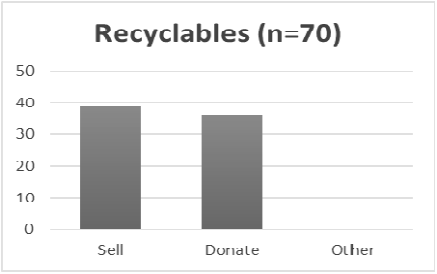

Fig.3 Motivation for recyclables separation.

70% of this survey's interviewees are separating recyclable matter. One of the incentives for recyclable waste separation is the money reward from selling salvaged materials to the informal collector (39 out of 70 respondents). Contrary to prior hypothesis, monetary is not the absolute motivation, as 36 people sort out recoverable matters to donate to charity.

(2) Discentives for waste separation

Fig.1 Disincentives for food waste separation.

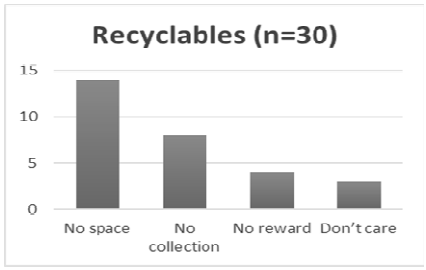

Fig.2 Disincentives for recyclables separation.

For both food waste and recyclables, the biggest obstacles for separation is the lack of storage space inside the house. Regarding recyclable waste, the percentage of people stressing on this issue is significantly larger than other disincentives to separate such as "no collection" or "no reward".

The lack of proper collection for different kind of wastes also discourage a big portion of the population from separating both food waste and recyclables, as it is the reason 21 out of 44 people don't sort out kitchen garbage, and 8 out of 30 people don't sort out recyclable matters.

Because of the informal collection system for recyclables that is currently in place, 52% of respondent who are salvaging their household waste is selling the materials for extra income. However, without the money reward, several interviewees are refusing to sort out kitchen waste, and that portion took up to 10% among different obstacles that hinder source separation of organic matters.

For both food waste and recyclables, there were some people who do not practice source separation because of lack of concern. The portion of these respondents are 6.8% and 10% respectively.

(3) Community aspect

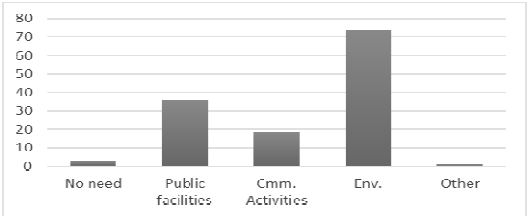

Fig.3 Opinion on the improvement of the neighborhood.

This figure describes the respondents' concern over several aspects of their community, such as the improvement of public facilities, the need for more public activities to enhance community relation, and environmental concern.

The most worrying problem for the public is the environment issue. 74 out of 100 survey participants selected this answer on the questionnaire, with one respondent specifying in the need for a penalty for illegal dumping and vandalism of public spaces.

Next in demand is the need for more public facilities, with 27% opinion voicing the need for playing field for children or place for the elder to gather and socialize. Not as prioritized is the addition of community activities which only 19% of the survey participant expressing their aspiration.

There are, however, 3 respondents who thought that there is no need for any improvement of the living environment in their neighborhood, accounting for 3% of the participant population. Comparing with the type of housing, it is apparent that people who rent the house have the least concern over their living environment, hence 14% of them thought that no improvement was needed, while only 1% of the house owner population agreed so.

4. DISCUSSION AND CONCLUSION

Despite having no regulation for source separation, voluntary recycling behavior is at a certain degree and the informal recycling system already existing is working quite efficiently. Moreover, survey results show that there are almost as many people who donate recyclables as people who are after monetary reward. Almost all public and private schools in urban cities have been having a long tradition of donating clean used clothes and books for children living in isolated less developed areas. Other charity activities are also getting more and more popular among the public with the generalization of the internet.

A component of daily household waste that is more often overlooked is kitchen refuse. Even though some people are sorting out their organic waste to avoid odor and bugs according to survey results, waste collection operates daily so sanitary inside the house is not a huge concern for most citizens. Nonetheless, a portion of the population is separating kitchen garbage for a variety of reasons.

In the face of the growing rate of urbanization, recovering organic materials from household waste to use as animal feed (for house pets, chicken, pigs, and cattle) is still practiced though in small quantity. In general, animal feed and composting even though small in scale, is undoubtedly a motivation to separating household food waste.

Survey results also demonstrate the overwhelming number of house owner and longtime residentship among Hanoi citizens. Ownership improves the residents' feeling of belonging to the place and thus encouraging people to take action to improve the environment of their neighborhood. These outcomes suggest the feasibility for community-based waste separation initiative.

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