A SURVEY OF PLASTIC BAG & WASTE DISPOSAL BY HOUSEHOLDS IN CẦN THƠ CITY

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Recently, plastic bag rubbish has become a problem of concern for researchers in both environmental and economic issues. Results of a survey of 401 households in Cần Thơ city show that most of the respondents use plastic bags for shopping and containing rubbish. However, about 55% of them are aware of the harm that plastic bags cause for the environment and life. People living in distant and remote areas are much less aware of this sort of harm. Moreover, the burning of rubbish still occurs in the countryside due to the absence of garbage collection. About the issue of waste disposal, the mass media play a more important role in providing perception of the harm from plastic bags than posters or propagation.

Key words: plastic bag, perception, rubbish.

1. Introduction

Cần Thơ City, with a population of 1.1 million people and a population density of over 800 people per square kilometer (2009 census), is a socioeconomic center of the region (Mekong Delta). During the process of development, Cần Thơ City in particular and other big cities nationwide in general, has been facing with challenges from pollution due to various causes. Particularly, in recent years, pollution caused by plastic bag rubbish has become an important issue that draws much attention from scientists and authorities.

Experts from the Ministry of Natural Resources and Environment estimate that, on average, each Vietnamese household uses and gets rid of at least one plastic bag a day. All in all, this is a very tremendous figure. If plastic bags keep being dumped disorderly everyday without any action to stop it, then in a not far future, the environment in Vietnam would suffer great consequences. It takes plastic bags, in all sizes and shapes, about 500 to 1000 years to decompose; so if people continue using plastic bags as they do now, they would have to pay the penalty for the environment being polluted hour by hour and day by day.

Recent researches show that the damaging effect caused by plastic bags is more and more serious. This pollution not only affects soil land but also does harm to the living environment of aqua animals and of people themselves. On average, each person would use 83 plastic bags annually and a household with four members each would consume 332 plastic bags per year (Jacobsen,

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2005). If each of us uses plastic bags economically or refuses to consume them, we would play a great part in reducing pollution.

Although warning of the harmful effect caused by plastic bags has been propagated recently, plastic bags are still consumed widely in our daily life. Up to now, it seems that there have been no studies on the habit of using plastic bags of people living in big cities, especially in Cần Thơ City. The purpose of this research is to describe the actual situation and habit of using plastic bags, and perception of the damaging effect of plastic bags on the environment of residents in Cần Thơ City. The research consists of the following specific objectives:

- Describe the actual habit of using plastic bags of people

- Study behavior when using plastic bags and dealing with waste

- Recognize the information channel and level of perception of the harmful effect of plastic bags

The research tries to give a more specific picture of the actual use of plastic bags and enhance the knowledge of this issue for the authorities so that they could set up action programs and appropriate policies to make the best use of plastic bags and reduce the pollution.

This paper includes the following main contents: Part 2 is about the method of selecting samples and collecting data. Part 3 presents the results of the analysis of the actual situation and behavior in using plastic bags. Some conclusions appear in part 4.

2. Description of data

a. Size of samples:

In this research, samples comprise local households. The size of sample means the total of households in the surveyed region corresponding to the expected variable. Since we have the total number of households in Cần Thơ City, the number of samples expected is calculated by the following formula (Calderon, 2003):

$$n = \frac{N}{(1 + N * e^2)} \qquad (1)$$

Where n is the number of samples (households) to survey, N is the total number of households in the surveyed districts, and e is the expected error (usually 5%).

Based on data from the 2007 Statistical Yearbook and the author's calculations, Cần Thơ City has 256,556 households and the expected error is 5%. The number of households where data are collected is at least 399.

b. Method of selecting samples:

The number of samples is based on the total number of households in surveyed districts. It would represent the surveyed districts and is shown in detail in the following table:

Table 1: Surveyed samples

District	Total of households	Density of households	Number of households of study
Ninh Kiều	46,667	18.2	73
Bình Thủy	21,567	8.4	34
Phong Điền	22,822	8.9	36
Cái Răng	18,256	7.1	28
Thốt Nốt	35,684	13.9	56
Vĩnh Thạnh	26,207	10.2	41
Cờ Đỏ	27,214	10.6	42
Thới Lai	28,187	11	44
Ô Môn	29,952	11.7	47
Total	**256,556**	**100**	**401**

Source: Calculations from Cần Thơ Statistical Yearbook – 2007 and Investigation of the living standards of households- 2006.

Moreover, the samples are collected from both rural and urban areas. According to the 2007 Statistical Yearbook, the percentage of Cần Thơ urban residents was 52%. Distribution of samples is as follows:

Table 2: Distribution of samples

Region	District	Urban	Rural	Total
1	Ninh Kiều, Bình Thủy	107	0	107
2	Phong Điền, Cái Răng	26	38	64
3	Thốt Nốt, Vĩnh Thạnh	56	41	97
4	Cờ Đỏ, Thới Lai, Ô Môn	20	113	133
Total of samples (households)		209	192	401
As % of total		52.1	47.9	100

Source: Survey data, 2010.

The surveyed districts are divided into four regions with their particular features as follows: Region 1 consists of 107 urban households; region 2, 64 households (40% in urban districts and 60% in rural ones); region 3, 97 households (50% - 50% respectively); and region 4, 133 households (20% - 80%). The division aims at determining whether their behavior differs when using plastic bags.

c. Data collection:

The firsthand data from 401 samples are collected via questionnaires. The questionnaire consists of four parts: part 1 shows the demographic data of respondents and their households; part 2 describes the purpose of using plastic bags; part 3 reflects the behavior and perception of the harmful effect from plastic bags; and part 4 shows the reaction and the willing of paying expense when using plastic bags.

The secondary data consist of information about the population and households in Cần Thơ City from the Statistical Yearbook and various kinds of materials relating to the damaging effect of plastic bags.

3. Facts about the use of plastic bags in Cần Thơ City

This part shows the results of the analysis of 401 households in Cần Thơ City in three important contents. Firstly, it presents the actual use of plastic bags in Cần Thơ City. Secondly, it analyzes users' behavior when they use plastic bags. Thirdly, it identifies information channels and the level of perception of the harmful effect of plastic bags.

a. The purpose of using plastic bags:

The first question put to the interviewees is, "for what purpose do you use plastic bags?" This is a question with many alternatives for answer. Respondents' answers from 401 surveyed households are as follows:

Table 3: Purposes of using plastic bags (%)

Purpose	Average	Region 1	Region 2	Region 3	Region 4
Shopping at markets	38.8	34.1	39.9	44.1	39.5
Shopping at supermarkets	15.8	20.4	10.8	10.9	16.9
Containing rubbish	31.8	32.8	31	32.7	30.6
Package	11.1	8.9	16.5	9.5	11.6
Others	2.5	3.8	1.8	2.8	1.4

Source: Survey data, 2010.

The above results show that people usually use plastic bags when going shopping at traditional markets much more than at supermarkets. The reason is that recently some supermarkets in Cần Thơ City have launched a movement of limiting the use of plastic bags and have not offered plastic bags for free like the Metro Supermarket. One of the results causing great concern in using plastic bags is that nearly 1/3 of the respondents answer that they use plastic bags to contain garbage. This would have great impact on the environment because it takes plastic bags a very long time to decompose. In addition, some shops use plastic bags as package. It could be said that surveyed districts have no difference in their purposes of using plastic bags.

Moreover, the results show that over 85% of respondents use plastic bags regularly when going shopping at traditional markets at least once a day. Meanwhile, the percentage of those using plastic bags when going shopping at supermarkets is very small (under 1%). This shows that the use of plastic bags at traditional markets is very popular and unlimited. Besides, more than 70% of the respondents say they use plastic bags to contain daily rubbish.

All 401 households are asked whether they reuse old plastic bags. The answers show that 61.6% of respondents use old plastic bags after these bags were first offered free at traditional markets while only 30.4% use old plastic bags after they were given free at supermarkets. The explanation for the above-mentioned difference is: when going shopping at traditional markets, peo-

ple frequently buy many items from many different sellers and each item is usually kept in a separate bag. When going shopping at supermarkets, buyers are usually given one or two large plastic bags to contain all the goods they buy. As a result, the quantity of plastic bags given free at traditional markets is much more than that of plastic bags offered free at supermarkets and thus, the percentages of people re-using plastic bags are, of course, different.

In short, people frequently use plastic bags when going shopping because the bags are given free. Because many shoppers prefer traditional markets to supermarkets, they usually use more plastic bags than those who buy from supermarkets. In addition to using plastic bags when going shopping, most of respondents re-use them for containing daily household rubbish.

b. Analyzing the behavior of using plastic bags:

It is clear that the use of plastic bags is closely linked to daily activities. However, how do the users of plastic bags know the damaging effect of plastic bags on the environment? This is one of the important research-related questions that need answering in order to figure out solutions to improments in users' perception of damage caused by plastic bags.

Results of the survey show that 54.9% of the respondents say they are well aware of the harmful effect of plastic bags on the environment. More importantly, over 62.3% of male respondents say they are aware of this issue while 53.7% of female ones answer they are aware of the problem. The awareness of the damaging effect of plastic bags on the environment depends not only on demographic factor but also on outside ones. Table 4 shows the percentage of people's awareness of the harmful effect of plastic bags on the environment in four regions of study.

Table 4: Perception of the harmful effect of plastic bags (%)

Target	Average	Region 1	Region 2	Region 3	Region 4
Perception percentage	54.9	72.9	51.6	58.8	39.1
Degree					
- Very low	6.3	2.6	5.9	3.4	15.4
- Low	18.8	17.9	11.8	25.4	17.3
- Average	33.6	43.6	29.4	30.5	25
- High	34.5	26.9	52.9	39	28.8
- Veru high	6.8	9	0	1.7	13.5

Source: Survey data, 2010.

The results presented in the above table show that there is a difference in the percentage of perception of the harmful effect of plastic bags on the environment between different geographical regions of Cần Thơ City. People living in the central area and around the city are better aware than those living in distant areas and in the countryside. There are two potential explanations for this difference: Firstly, it may be because of the educational level (the number of schooling years) of people living in remote and distant areas and in the countryside is lower than those living in urban areas. Moreover, the results also show that the number of schooling years (10.4 years) of people who are aware of the damaging effect of plastic bags is higher than that (7.5 years) of those who are not aware of this issue (with Levene's test result smaller than 5%). Secondly, the access to information and propagation in the countryside is limited. Therefore, analyzing the relation between educational levels of people in different regions is necessary.

Results of the analysis show that the difference in educational levels is statistically significant at 5%. People living in central and urban areas have the number of schooling years higher than that of those living far away from the center. These results help explain the percentage of perception of

Table 5: Number of schooling years of respondents

Indicator	Average	Region 1	Region 2	Region 3	Region 4
Mean value*	9.1	11.1	9	8.2	8.2
Standard deviation	3.5	3.5	2.8	3.3	3.3

Source: Survey data, 2010.

* Krusal Wallis test result is smaller than significant level of 5%.

the damaging effect of plastic bags on the environment between different geographical areas in Cần Thơ city.

Another important thing relating to the behavior towards the use of plastic bags is how would the people handle them after they were used? Results of the survey of 401 households in four regions in Cần Thơ City show that up to 39.1% of households get rid of garbage (including plastic bags) via daily litter collector. Particularly, more than 39% of the surveyed households still have the habit of burning rubbish, especially in Phong Điền, Cái Răng, Thới Lai, and Cờ Đỏ districts. Ways of waste disposal are shown in the following table.

Table 6: Ways of waste disposal (%)

Way	Average	Region 1	Region 2	Region 3	Region 4
Carrying to waste dumping area	1	0	1.6	2.1	0.8
Throwing out in the street	1.2	0.9	1.6	1	1.5
Throwing into ponds or lakes	16.5	1.9	7.8	12.4	35.3
Burying	3	2.8	3.1	3.1	3
Burning	39.2	6.5	59.4	49.5	48.1
Via collector	39.1	87.9	26.6	30.9	11.3

Source: Survey data, 2010.

The households that burn rubbish mainly live in the countryside where there is not yet waste disposal service. They handle garbage by burning or throwing them into a common grounds and even throwing them into canals or rivers. Clearly, the fact that the rather high percentage of households handle garbage in an unreasonable way would do harm to the environment and public health, especially when it takes a very long time for plastic bags to decompose. Such a way of handling garbage may originate from the limited knowledge. The results of the survey show that up to 45% of local residents do not know how long it takes plastic bags to decompose. Only 16.7% of them say it takes about 1-10 years for plastic bags to decompose.

In general, more than half of the surveyed households are aware of the damaging effect of plastic bags on the environment with different degrees of perception. This depends on educational levels and geographical factors. The issue of waste disposal (including plastic bags after being used) has become a problem of great concern because people still have the habit of burning garbage or throwing them into canals and rivers.

c. Channels of information and perception of damage from plastic bags:

The above analyses show that geographical location (residential area) has effects on perception of damage to the environment caused by plastic bags. Difference in residents' perception is explained by their access to source of information and efficiency of propagation.

Results of the survey among 401 households of their access to information about damage from plastic bags are presented in the Figure 1. From 401 households, we get 566 answers stating that they get information from mass media (36% from

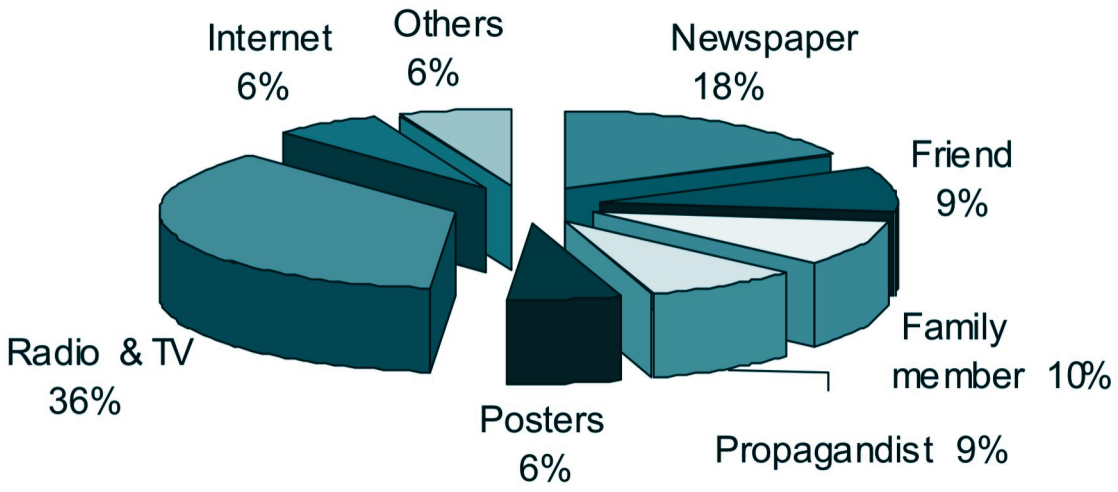

Figure 1: Residents' access to channels of information

Source: Survey data, 2010.

radio and TV, and 18% from newspapers), along with family members and propagandists.

Moreover, the survey shows that mass media are appreciated by respondents and considered as important sources of information about damage to the environment caused by plastic bags while propagation and poster are considered as less important. Apparently, such analyses of access to channels of information about environmental issues in general and damage from the plastic bags in particular are helpful to environmental activists and agencies when disseminating information among residents.

Besides bad effects on the environment, plastic bags as rubbish also impinge on the public health and urban landscape. From interviews of 401 households, 1,152 answers give assessment of degrees of bad effects from plastic bags as shown in Table 7.

Table 7: Effects of plastic bad and perception of these effects

Effect	Opinion (%)	Average*					Kruskal-Wallis test
		General	Region 1	Region 2	Region 3	Region 4	
On the environment	32	3.67	3.96	3.65	3.57	3.5	0.001
On public health	25.5	3.46	3.87	3.39	3.26	3.15	0
On landscape	26.8	3.72	3.86	3.81	3.45	3.7	0.016
Waste of resources	14.7	2.89	3.03	2.73	2.89	2.72	0.562
Others	1	3.4	4.5	4	0	1	0.034

Source: Survey data, 2010.

Notes: * 1: Totally unimportant -> 5: Extremely important

Although most respondents are aware of damage to the environment and public health caused by plastic bags, respondents from different districts have different opinions about degrees of damage. Generally, urban residents have higher perception of such damage in comparison with rural ones. Results of tests for such differences

provide environmental activists and agencies with useful data needed for their future plans to enhance the public perception of damage from plastic bags.

4. Conclusion

Results of the survey among 401 households in different districts of Cần Thơ of situation and use of plastic bags allow us to reach the following conclusions:

Firstly, using plastic shopping bags has become a common habit. In addition, residents also use plastic bags for rubbish, which increase the pollution because it takes a very long time for plastic bags to degrade.

Secondly, percentage of respondents who are aware of damage caused by plastic bags to the environment is limited. Differences in respondents' perception is determined by education, geographical conditions and propaganda. It is worth noting that ways of handling waste, including the plastic bag, of various groups of residents cause pollution because they dump their rubbish in rivers and canals; or burn it.

Thirdly, residents can get information about damage to the environment, public health and landscape caused by plastic bags from various channels, such as radio and TV, the press, family members, friends and colleagues. Posters, however, have not become a popular source of information.

In short, the survey shows that two important factors that decide perception and assessment of damage caused by plastic bags are education and geographical location■

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