Consideration of an effective method toward a sustainable reuse system through the investigation of promoting reusable bottles applied EXPO Eco-money as an incentive

Shotaro Matsuno¹, Tsuneo Takeuchi¹

1. Graduate school of Environmental Studies, Nagoya University, Nagoya, Japan

Abstract: “Reuse” is the measure which should be applied prior to “Recycle” to realize environmentally sound material-cycle society. In fact, although “Recycle” has been carried out actively, “Reuse” has not been performed very much in Japan. To promote using reusable containers as the next step of Nagoya’s measures to achieve major waste reduction; a feasibility investigation and social experiment were performed to clarify the problems with the system of reuse and the direction in which to fix it. Utilizing EXPO Eco-money as an incentive for consumers to reuse bottles was a major characteristic of our plan. As a result, only 5% of sold bottles were returned because there were very few kinds of item and stations for collecting bottles. Also, Eco-money was not operated effectively as an incentive in this social experiment. However, according to the attitude survey, since citizens do not have negative opinions about the idea and the structure of reuse, it is considered that raising returning rates is possible if a reuse system with fewer burdens for consumers can be established. In addition, it is clear that efforts of companies which include both makers and distributors are indispensable, and moreover, social support such as tax privilege and assistance for promoting reusable bottles is necessary.

Keywords: Environmentally sound material-cycle society, Reusable bottles, Reuse, Eco-money

1. BACKGROUND AND PURPOSE

In Fundamental Law for Establishing a Sound Material-Cycle Society, 3R is specified as means to realize environmentally sound material-cycle society. Reducing waste is specified in Article 5, and Reusing cyclical resources and the order of measures of the recycling which reduce, reuse and recycle are specified are provided in Article 7 of this law. In Japan, the action of 3R has been accomplished with the enforcement of The Containers and Packaging Recycling Law, but when it is taken a general survey, it is found that the actual conditions are mostly recycling, and in the present conditions, the action of the reuse is not carried out very much. The actions of the reuse in which they had the priority over recycling originally should have been taken are one step behind, and the time of the large quantities recycling came. By the way, in Nagoya city, it was a struggle toward waste treatment after Nagoya city’s “declaration of a state of emergency for waste” of February, 1999. A separation kind increased to 16 kinds, and the considerably drastic measures that the waste which was not separated properly left behind were carried out with the complete enforcement of The Containers and Packaging Recycling Law in August, 2000. It was succeeded in reducing more than 25% of the quantity of waste as a result of various measures several years later. At current situation in Nagoya city, in order to reduce waste and to be effectively utilized the further resources, reuse should be wrestled more seriously than recycle which has been done so far. It is no exaggeration to say that “reuse” is an important measure to the next step.

We aimed at reusing of drink container as one of the policies of the next step in Nagoya that achieved a large amount of waste reduction for the past several years and performed the feasibility investigation, the design (a model utilizing the EXPO Eco-money which was succeeded at Aichi EXPO as an incentive for consumers purchasing reusable bottles) of the proof model, and this study was aimed at clarifying direction for fixation of the reuse bottle in Nagoya and finding problems.

There are some existing studies for promoting reusable bottles and containers. Ecological Life and Culture Organization carried out the project of constructing reuse system of 900ml brown bottles in South Kyushu.[2] In this investigation, 5 yen was paid back to consumers when they returned bottles to liquor shops as an incentive. Glass Bottle Recycling Promoter Association carried out the project of establishing a delivery system of reusable bottles.[3] In this investigation, the field of social experiment was not in open market but in closed market.

The novelty of this project was applying both open market like supermarkets and EXPO Eco-money as an incentive for consumers.

2. METHOD

Takeuchi laboratory in Nagoya University undertook a project commissioned by Ministry of Economy, Trade and Industry. Takeuchi laboratory subcontracted the proof experiment in (3) of this project to Chubu Recycle Citizens’ Organization (NPO).

The total processes of this project were as follows.

(1) Feasibility investigation: Review of earlier works, attitude survey to the citizens to clarify articles with reusable bottle to intend for, collection methods, and incentive effects of Eco-money for the reuse;

(2) Planning the proof model: Examining the realistic method for promoting to use reusable bottles that utilized Eco-money;

Corresponding author: S. Matsuno, shotarosep@hotmail.com
(3) Proof experiment: Carrying out the proof experiment with cooperative stores based on a proof model;
(4) Hearing investigation: To grasp producers’ consciousness for reusable bottles based on the result of the proof experiment;
(5) Consideration of the direction and problems about the reuse system of drink containers which it could be fixed the most in Nagoya;

Specifically, within above mentioned, Takeuchi laboratory was in charge in feasibility investigation (including attitude survey), planning the proof model and hearing investigation, while Chubu Recycle Citizens’ Organization was in charge in proof experiment.

In addition, Takeuchi laboratory set up the feasibility investigation committee which consisted of the well-informed people such as the an enterprise, NGO, local government and so on in collaboration with Chubu Recycle Citizens’ Organization. Validity of the policy and the methods of this project was examined in this committee.

3. ANALYSIS OF THE RESULT OF THE ATTITUDE SURVEY TO THE CITIZENS ABOUT REUSABLE CONTAINERS AND THE REUSE SYSTEM

3.1. Method

As a part of the feasibility investigation, Takeuchi laboratory carried out an attitude survey to Nagoya citizens to grasp their consciousness of environmental problem and issues of waste, receptiveness of reusable bottles, and recognition degree of Eco-money.

4,000 people were picked up from the list of voters of nine wards (Chikusa, Showa, Meito, Midori, Minami, Nakagawa, Naka, Nishi, Higashi) in Nagoya city and it was applied random systematic sampling. For 4,000 people whom we picked up by the above method, we sent questionnaires and collected them by mail after approximately two weeks. We sent questionnaires at the beginning of October, 2006 and collected it at the end of October.

3.2. Analysis of the attitude survey

In this survey, we got answers from 1,394 people (percentage of replies was 34.8%). About a basic attribute, more than fifty years old held the majority and women made up 60%. About the occupation, office workers and housewives made up about 50% of the total.

We got the results of questions about reusable bottles as the following. About 65% of the respondents recognized reusable bottles, and more than half of the respondents could distinguish between reusable bottles and one-way bottles (but it is thought that recognizability and discrimination only for small reusable bottles (without beer bottles and 1.8l bottles) will go low). In addition, the point that reusable bottles can be superior to one way bottles in terms of environment-friendliness, is recognized by citizens. Moreover, it was clear that citizens’ feeling of burdens such as the trouble if they returned reusable bottles and kept them was not so high. As an appropriate condition to choose reusable bottles, it became clear that it was necessary to develop devices for reusable bottles identification such as clarification of the indication and enhancement of the collection channel.

About the action of the Eco-money, less than half of people knew it, and only 20% of people participated in the action practically. Though the action of the Eco-money had not become widespread so much to citizens, it was clear that more than half recognized that the action could be effective for environmental protection.

It is as follows when we compile these findings.

(1) Nagoya citizens recognized reusable bottles so much comparatively, and also they knew that reusable bottles were superior to one-way bottles for environmental protection if being used appropriately. In addition, feeling of burden for returning and safekeeping of reusable bottles was not so high.

Fig. 1 shows the correlation between trying to reduce waste and burden for returning bottles. The more citizens tried to reduce waste, the more citizens did not have feeling of burden for returning bottles ($\chi^2(1) = 10.8$, $p<.01$).

Fig. 2 shows the correlation between trying to reduce waste and willingness for selecting reusable bottles. The more citizens try to reduce waste, the more citizens have willingness to select reusable bottles ($\chi^2(1) = 33.0$, $p<.01$).
(2) Though Nagoya citizens recognized reusable bottles and effects of using reusable bottles well, the improvement of the collection channel and the more easy identification ways of reusable bottle are necessary for choosing items with reusable bottles with willingness.

(3) Though Nagoya citizens’ degree of recognizing and participating in the action of Eco-money was not so high, they understood that Eco-money could become the effective means for environmental protection.

3.3. Implications from the result of the attitude survey
Based on the questionnaire’s result, we can get the implications about the reuse system as below.

(1) Supermarkets and convenience stores are the most suitable places for collecting reusable bottles. For distinguishing reusable bottles from one-way bottles, Nagoya citizens thought that it was the best to display the reusable mark.

(2) The more citizens segregate waste and reduce waste, the more citizens accept reusable bottles and the system of the reuse which utilized Eco-money. It can be thought that the person who always tries to keep waste reduction and to segregate waste eagerly expects the effect of reusable bottles not for throwaway bottles from a point of view of saving resources. (We can find significant correlation.)

(3) Contrary to our expectation, the difference of opinion and evaluation for reusable bottles by age groups cannot be found. (We can not find significant correlation.)

(4) It is found that citizens evaluate that reusable bottles are better for saving resources and protecting environment, and they expect them very much. However, citizens’ evaluation for bottles itself is not always high in terms of reasons why bottles are heavy and could be easy to break.

(5) The appreciation for the structure of the reuse which was adopted in this proof experiment was not always high because there were few bases of collecting reusable bottles and few points of Eco-money in which the person who participated in this experiment could get.

(6) It is the most effective to appeal for using reusable bottles to housewives who have the highest awareness to reduce waste.

(7) Nagoya city has a basis for taking root of reusable bottles because citizens have highly concerned with issues on environmental problems.

4. RESULT OF THE PROOF EXPERIMENT

4.1. Implementation term of the proof experiment
(1) The sale period of the items with the Eco-money was from October 1 to December 31, 2006.

(2) The terms of issuing Eco-money and collecting reusable bottles was from October 1, 2006 to January 31, 2007.

4.2. Target items
We intended for all items with R-marked bottle except beer bottles and 1.8l (1-sho) bottles as the target. Meanwhile, the target items were mainly Japanese sake and shochu because items with reusable bottles to sell in cooperative supermarkets were only alcoholic drinks.

4.3. The place which this experiment was held and bases of collection
Target items were sold in three large-sized supermarkets where they had car parking in Higashi ward and Chikusa ward, Nagoya. Reusable bottles were collected in recycling stations (places where resources for recycling and reusing were recovered) which NPO Chubu Recycle Citizens’ Organization held in these supermarkets. The collection frequency was almost 2-4 times in a month.

4.4. Method of giving Eco-money
(1) Mounts for saving Eco-money and point seals were made up for exclusive use of this proof experiment.

(2) Eco-money was given both in time when customers purchased target items with reusable bottles and in time when they returned them. (We gave Eco-money when the both aspects of pro-environmental behavior, that were consumers chose items with reusable bottles and when they returned bottles.)

(3) Eco-money was given depending on the number of purchasing and the number of returning reusable bottles.

(4) Regarding the Eco-money, when customers purchased items, we put point seals on the target items preliminary, and customers tore off point seals and put them on the mount for exclusive use of this proof experiment. Furthermore, when customers returned reusable bottles, we made an exclusive point stamp and stamped it on exclusive mounts in recycling stations.

(5) Customers could exchange the saved Eco-money to eco goods in EXPO Eco-money center in Kanayama or in the outreaches of Eco-money center which was opened in December 2006. or January 2007.

4.5. Result
Sales figure of target items with reusable bottles during the proof experiment period was 1,987 in total as described in table 1.

In addition, the number of issued Eco-money (the number of reusable bottles which were returned) was only 97 in total as described in table 2. Furthermore, the number of the issued Eco-money was 218 points as described in table 3.

Table 1. The sales number of target items during the experimental period [4]. p.54

<table>
<thead>
<tr>
<th>Supermarkets</th>
<th>Kinds of target items</th>
<th>Sales figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>18</td>
<td>402</td>
</tr>
<tr>
<td>B</td>
<td>44</td>
<td>751※</td>
</tr>
<tr>
<td>C</td>
<td>18</td>
<td>834</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1,987</td>
</tr>
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※ Estimated figure
5. RESULT OF HEARING INVESTIGATION TO COMPANIES RELATED TO REUSABLE BOTTLES

We came in for interviews for two drink makers, two breweries, and one bottle dealer with face-to-face communication in Aichi or Mie prefectures at the beginning of February, 2007.

It became clear that the situations at which items using bottles as containers were severely decreasing in comparison to that of other containers. It was also confirmed that the more products companies (drink makers) produced, the more conditions they recede from using reusable bottles in these interviews.

The problems proved from hearing investigation are as follows.

Firstly, the problem of distribution is given. Even if makers would use reusable bottles positively no matter how much, there is the situation that it is hard to use if there are no such demands and requests.

Secondly, the problem of the collection and the transportation is given. A distribution system about 1-sho bottles functions comparatively well even now, but there is the situation which is not so for small bottles. This situation originates in a transportation system of products in shipping and in collecting. 1-sho bottles go through within plastic boxes, but a large number of small bottles are shipped in cardboard boxes mainly as items for domestic consumption. Bottles themselves are damaged at the time of collection, so they cannot be reused unless plastic boxes are not used. Moreover, there is a problem that transport efficiency becomes bad. For making a reuse system operate more efficiently, fundamental preparations such as preparing exclusive plastic boxes for small bottles are necessary.

Thirdly, there is a problem of lack of social support on using reusable bottles. For promoting using reusable bottles, giving incentives and support such as tax privilege, are essential for companies.

6. CONCLUSION

As it was mentioned above, the rate of the number of collecting reusable bottles in this proof experiment did not reach 10% of the sales figure because of the design problems in which there were few target items and bases of collection in this proof experiment, the experimental period was so short compared with the term of consumption of target items (mainly, sake and shochu), and it was thought that Eco-money did not become an enough incentives for consumers to return bottles. According to the attitude survey to the Nagoya citizens, it became clear that the feeling of burden for returning and safekeeping of reusable bottles was not so high, reusable bottles were recognized with a certain degree, and the degree of recognition of effects of Eco-money and the willingness of participating in it were comparatively high. It might be indicated that it was difficult to connect high consciousness to practical actions according to the result of this proof experiment. However, it was suggested that the citizen had the opinion which was positive for the system and the idea of reusing, the action itself of the Eco-money according to the result of the attitude survey, so it could be thought that it might be possible to raise the returning rate of reusable bottles if we could overcome obstacles such as the lack of the bases of collecting reusable bottles and the places for exchanging Eco-money (this was pointed out from the participant of this proof experiment). In addition, though it was essential that drink makers and distributors themselves were
requested to make efforts to promote using reusable bottles obviously, social support including tax privilege for companies and development of laws to promote to use them were necessary at the same time. (The present stipulations of The Containers and Packaging Recycling Law do not give an incentive to promote reusable bottles to companies. [5, 6]) Based on these situations, sustainable reusing system could be established only after citizens’ and companies’ efforts and actions and social support were engaged firmly.

ANNOTATION
This paper is the report of “To promote to use reusable containers applied EXPO Eco-money (The project of promoting reusing for saving energy in areas)” which Takeuchi laboratory carried out as an undertaking project from Ministry of Economy, Trade and Industry in 2006.

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