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PERCEIVED COSTS AND BENEFITS OF BUYING AND USING A SUBSIDIZED COMPOST CONTAINER*

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ABSTRACT

Since April 1982 the city of Zeist in the Netherlands offers subsidized compost containers to its citizens. After about one and a half year 504 households that have a garden near their house have purchased the container. Households that have purchased the container (1), households that have not purchased the container but that compost vegetable, fruit and garden waste in another way (2), and households that haven't bought the container and that do not compost are compared on a number of aspects: sociodemographic characteristics, ecology-consciousness, and on the perceived costs and benefits of buying and using the compost container. The results show that the groups differ largely on the selected aspects. Some conclusions are drawn, and recommendations are made for the design of information campaigns accompanying subsidization programs and, in general, for the design of programs aimed at reducing the amount of waste for disposal.

INTRODUCTION

About 50% of domestic waste in the Netherlands consists of vegetable, fruit and garden waste (VFG-waste). Households in the Netherlands do not have a garbage disposal in or near the kitchen sink (contrary to the situation in the US, where a garbage disposal is a fairly common provision).

Therefore, VFG-waste in the Netherlands is usually disposed of with the rest of the waste. Composting of the VFG-waste by households would have advantages both for society at large, less waste has to be disposed of, and for the households involved, compost may serve many ends. It can be applied in the garden as:

- an improver of the soil structure (moist and fertilizer buffer),
- a cover to prevent the growth of weeds,

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- a source of warmth to stimulate the sprouting of certain vegetation,
- a cover to protect the soil against cold and wind erosion,
- a biological odour filter.

These, and other uses of compost are discribed by Van de Langerijt [1].

Composting can take different forms. In its simplest, a pile is made of the VFG-waste and reversed (turned) at set time intervals to keep sufficient oxygen in the material. Depending on a number of conditions, (e.g., compostability, temperature, humidity) the compost will be ready for use after a period from a few weeks to a few months. In practice, composting at home is accomplished on a pile, in a pit, in a frame made of wire netting or branches, or in a container made of wood or plastic. Most of the devices are home-made at a low cost. Some, particularly plastic containers, are offered by do-it-yourself supermarkets, specialized garden centers or mail-order firms. Retail prices range from about 60 to 150 Dutch guilders ($ 20 - $ 50).

Since the second part of the seventies several municipalities in the Netherlands offer compost containers to their citizens at a price lower than the official retail price. Some results of these subsidization programs will be presented.

In December 1978, the city of Monnickendam (a small harbour town, with about 2920 households that have a garden near their house) started offering subsidized compost containers. Until the end of 1981 a container of South-African make, brand name Composa, was offered. Retail price of this container was about 95 Dutch guilders (about $ 32)*. The selling price (retail price less the subsidy) was 70 to 75 Dutch guilders ($ 23 to $ 25). At the end of 1981 the sale of the Composa container stopped and a new container of British make, brand name Compostabin, was offered. Retail and selling prices of this container were about equal to the Composa container. Until January 1982, a total of 380 compost containers was sold. This resulted in a penetration of 13% within about three years [2].

April 1981, the city of Castricum (a small commuters' town with about 7100 households having a garden near the house) started offering subsidized compost containers. The container, brand name Compostabin, was offered for 50 Dutch guilders (about $ 17). Until October 1981, a total of 750 compost containers was sold. This resulted in a penetration of 12% within half a year [3].

October 1984, the city of Almere (a newly built town in one of the polders) started a program to reduce the amount of domestic waste for disposal. Part of the program was to offer subsidized compost containers in a

* The presented prices are the prices during the program, i.e., not indexed.

selected neighborhood. The container, brand name VAM, normally retailed at about 115 Dutch guilders ($ 35), was sold for 50 Dutch guilders ($ 17). A special aspect of the program was that the container could be returned within a year with a full cash refund if its performance was below expectations. Nine months after the start of the program about 20 to 25% of the households in the target neighborhood had purchased the subsidized container [3].

April 20, 1982 the city of Zeist (a middle large town of relative affluence) started offering subsidized compost containers. The present study is based on consumer research performed in Zeist.

In Zeist, about 13650 households have a garden near their house. Two types of containers were offered. The retail price of the Composa container was 89 Dutch guilders (about $ 30). The selling price was 65 guilders (about $ 22). The Composa container is made of durable plastic, barrel shaped, and has a content of 250 L. From September 1983 until the moment the research reported here was performed VAM compost containers were sold. The retail price of this container was 109 Dutch guilders (about $ 36). It is also barrel shaped, made of durable plastic, with a content of 240 L. The selling price is 85 Dutch guilders ($ 28).

Based on the experience in Monnickendam and Castricum it was expected that a penetration of the compost containers of about 12 to 13% would be reached within a reasonable period of time. Until October 1983, i.e. one and a half years after the start of the program, 504 compost containers were sold. This results in a penetration of less than 4%. The cumulative sale figures from April 1982 until October 1983 are presented in Fig. 1. Since the purchase date of 14 compost containers was unknown, only 490 containers are represented in the figure.

The graph shows that more than 80% of the total number of compost containers sold, was sold within eight months after the start of the program. Selling the remaining 20% took another 10 months. The graph has a dip at August 9, 1982. This is not surprising. In the Netherlands July is a traditional holiday month. Also, in July and a large part of August 1982 no information about the program was provided by the municipality (contrary to the practice during the rest of the program).

A social scientific research project was initiated to study the differences in Zeist between households with a garden near the house that had purchased a subsidized compost container and households that had not purchased a container. This was to locate factors that may have caused the poor penetration of the compost containers offered and to provide information on the perceived costs and benefits of buying and using compost containers [4]. The main emphasis of this paper is on the second goal.

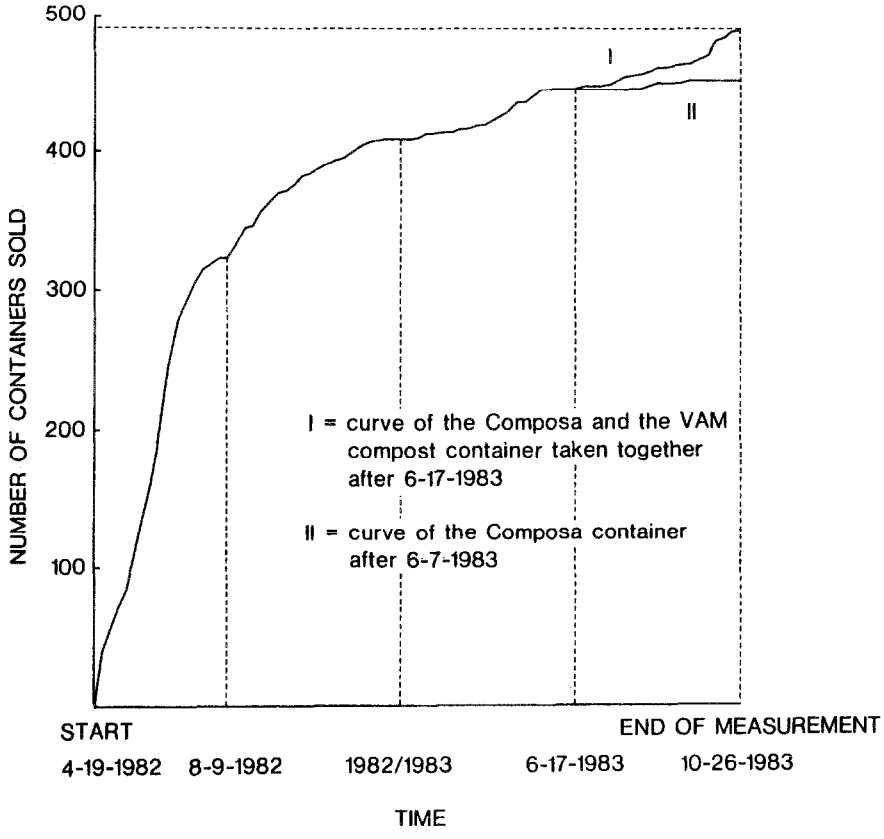

Fig.1. Graph showing the cumulative number of subsidized compost containers sold in Zeist until 10-26-1983.

Perceived costs and benefits, ecology-consciousness and sociodemographics

Buying a compost container can be conceived as the adoption of an innovation. An innovation is a product, service or idea that is perceived by an adoption unit (a person or group) as being new [5].

Innovations can not be defined by their objective characteristics but are devided into groups on the basis of the consequences that their adoption has for the adoption unit [6].

Several kinds of innovations can be distinguished:

a. continuous innovations: these have only limited consequences for existing behavior patterns of adoption units;
b. dynamic continuous innovations: these have considerable consequences for existing behavior patterns of adoption units;
c. discontinuous innovations: these refer to the adoption of completely new behavior patterns.

For households that already compost their VFG-waste, buying the subsidized compost container constitutes the adoption of a purchase-related innovation. No new behavior patterns have to be learned; existing behavior patterns have to be adapted somewhat. For these households buying a subsidized compost container is the adoption of a continuous or dynamic continuous innovation. The consequences of the innovation that matter here are the consequences of buying the container. For households that do not compostate their VFG-waste, buying the subsidized compost container constitutes the adoption of a purchase and behavior-related innovation [7]. These households have to buy the container and have to start composting their VFG-waste. Buying the subsidized compost container is the adoption of a discontinuous innovation. The consequences that matter for this group are the consequences of composting and the consequences of buying the container. The distinction between the two groups of households is important from the viewpoint of market segmentation. Different strategies may be used to reach households for which an innovation is continuous and to reach households for which an innovation is discontinuous. In the continuation of this study, the two groups of households will be treated separately.

What are the consequences of the adoption of an innovation? After a review of the attitude literature in social psychology and marketing, Verhallen and Pieters [8] conclude that individuals seem to be placing consequences of behavior on a limited number of dimensions. The main dimensions are: (1) costs versus benefits; (2) personal versus collective; and (3) now versus later (time-dimension). When deciding to perform or not to perform a certain behavior, individuals weigh the perceived costs and benefits of a personal and collective nature that are borne now or later in time. On the basis of the cost-benefit evaluation, individuals form an intention to perform or not to perform the behavior. If certain conditions are met [9], the intention to perform a certain behavior will be followed by the actual performance of the behavior. Clearly, as was noted before, the objective characteristics are not crucial in the decision to adopt an innovation but the perceived consequences. Pieters and Verhallen [10] studied the costs and benefits that participants in a source separation project perceived. The results of their study showed that some of the personal costs and benefits of participating changed dramatically in the course of time (the experienced/-perceived physical and mental effort: having to carry the waste, having to think when participating). The perceived collective benefit (the benefit of source separation for the environment) remained stable. A close analysis of the perceived consequences of behavior may provide starting-points for campaigns aimed at involving individuals in behavior that effectively reduces the amount of waste disposed of. Here, this approach was adopted.

Composting at home helps reduce the amount of waste for disposal and, therefore, it can be viewed as a form of ecology-conscious behavior. Ecology-consciousness can be defined as 'the general collection of opinions about the preservation, management and deterioration of the natural and artifical environment, and the related behavioral dispositions' [11].

Studies show that individuals that differ in source separating behavior also differ in ecology-consciousness [12]. For this reason ecology-consciousness was included in this study too. It is expected that households that compost their VGF-waste will differ in ecology-consciousness from households that do not compost their VFG-waste. No differences are expected between households that compost with the subsidized compost container, and households that compost with the help of another device.

Studies on the adoption of innovations reveal that early adopters often differ from later or non-adopters in sociodemographic characteristics. Sociodemographic characteristics correlated most with early adoption are education, literacy, income, and level of living. Also, occupational status seems to be positively related to consumer innovation [13]. Selected sociodemographic characteristics of households were included in this study. In the following section the research method will be described.

METHOD

In order to analyse the differences between households that have and households that have not bought the subsidized compost container a survey research project was carried out.

Sampling

From the total population of households in Zeist that have a garden near their house two samples were drawn. From the 504 households that had bought a subsidized compost container prior to the start of the survey research project (October 26, 1983), 200 households were randomly chosen (sample 1). In Zeist, 13650 households have a garden near their house, so 13146 households had not bought a subsidized container prior to start of the project. From this group, 584 households were randomly chosen (sample 2).

Data collection

Early November 1983, a questionnaire was sent to the 784 households that were selected. The questionnaire was accompanied by a letter explaining the research project, and a pre-stamped return envelope. The data collection procedure was designed according to the rules proposed by Dillman. [14]. Seven days after sending the questionnaire a reminder card was sent. Households that

hadn't responded within three weeks were sent a second questionnaire, again with a letter and a pre-stamped return envelope.

Questionnaire

The questionnaire contained 75 closed-end questions. Seventeen questions on the perceived costs and benefits of composting in general and five specific questions on the perceived costs and benefits of buying and using the subsidized compost container were included. The questions on perceived costs and benefits were all accompanied by 7-point scales ranging from 'totally disagree' to 'totally agree'. The questionnaire also contained four questions on sociodemographic characteristics (professional and educational level of the head of the household, number of members of the household, and size of the garden) and eight questions that measured ecology-consciousness.

RESULTS

Of the 784 questionnaires sent, 17 were returned undelivered for various reasons (non-existing addresses, households that had moved); 442 were returned within six weeks after sending (gross response 57.6%); 57 questionnaires could not be analysed because of incomplete responses or too many errors. The further analyses are based on the remaining 385 questionnaires (net response 50.2%).

Of the 385 questionnaires, 135 were of households that had bought the subsidized compost container (termed 'Buyers' or 'group 1'). The remaining 250 questionnaires were of households that hadn't bought the container. On the basis of specific questions in the questionnaire this group could be divided into two subgroups. Of the 250 questionnaires 99 (39.6%) were of households that hadn't bought the container but that composted their VFG-waste with the help of another device (labelled 'Non-buyers composters' or 'group 2'). Of the 250 questionnaires 143 (57,2%) were of households that hadn't bought the subsidized container and that didn't compost (labelled 'Non-buyers non-composters' or 'group 3'). Eight questionnaires were of households that had composted in the past but, for certain reasons, had stopped. These 8 questionnaires will not be analysed here.

The relative proportions of group 2 and group 3 in the sample of households that hadn't bought the subsidized container were unexpected.
If the responding of households to the mail questionnaire was not differential (relatively more group 2 households than group 3 households responding), one may conclude that of the total population of households in Zeist that hadn't bought the subsidized container, about 39% composted their VFG-waste with

another device. This percentage is very high. To control if responding to the questionnaire had not been differential, 44 households that hadn't bought the subsidized container and that hadn't returned the questionnaire were interviewed by telephone. In the telephone interview the households were asked if they composted their VFG-waste and 17 said that they did (39%). This validates the conclusion on the basis of the mail questionnaire that about 39% of the households in Zeist compost their VFG-waste. Households that hadn't purchased the subsidized compost container but that composted with another device were asked about the nature of the device: 39% indicated that they used a pile, 16% used an pit, 14% used a homemade wire netting. Also, 14% used a home-made barrel, and 14% used a container of another brand than the brands offered by the city of Zeist. The remaining 5% used a different device.

Differences in sociodemographic characteristics and ecology-consciousness.

To compare the three groups on ecology-consciousness, a scale that measured the concept was constructed.

Ecology-consciousness:

Scales that measure ecology-consciousness or a related concept have been developed. The scales measure somewhat different aspects of the general concept ecology-consciousness. Items from two scales that have been used in research in the Netherlands [12, 15] were selected so as to cover as complete as possible the general concept of ecology-consciousness. Also, items from a scale developed by Bloch [16] to measure the importance of an issue were selected. The resulting scale to measure ecology-consciousness contained eight items that were all accompanied by seven alternatives, ranging from 'totally disagree' to 'totally agree' with a mid-point labelled 'neither disagree, nor agree'*. A reliability analysis was performed to study whether the eight items all measured (aspects of) the same underlying concept. The Cronbach's alpha that resulted from this analysis was 0.74, a value considered sufficient to proceed with scale construction**. The alpha value could not be increased by deleting one or more items in the scale. The scores of all the respondents on the eight questions were counted (after reverse coding the negatively worded items) and devided by eight. This resulted in a score for every respondent that ranged between 1, i.e., very low ecology-consciousness, and 7, i.e., very high ecology-consciousness.

* A copy of the scale items can be obtained upon request from the author.

** Cronbach's alpha can range from 0 to 1. An alpha of 0 indicates that all items in the scale measure completely different concepts.
A value of 1 indicates that the items all measure exactly the same concept.

The mean score of the Buyers (group 1) on the ecology-consciousness scale was 4.5. The mean scores of the Non-buyers composters (group 2) and the Non-buyers non-composters (group 3) were, respectively, 4.3 and 3.9.

Sociodemographics

The three groups of households were also asked to indicate the educational and professional level of the head of the household, the number of members of the household and the size of the garden near the house (in square meters). First, some percentages will be presented. The educational level ranged from 'finished primary school' (1) to 'graduated from university' (8). The response of the three groups of households showed that about 33% of group 1, the Buyers, graduated from university, compared to 20% of group 2, Non-buyers composters, and 8% of group 3, Non-buyers non-composters.
The professional level ranged from 'unskilled labour' (1) to 'highly skilled labour' (6). The responses indicated that 62% of group 1 held a skilled or very skilled occupation, compared to 45% of group 2 and 39% of group 3.
The mean number of members of the household was 3.2 in group 1, 3.1. in group 2 and 2.9 in group 3. The mean size of the garden of group 1, the buyers, was 302.8 square meters. The mean size of the garden of group 2, Non-buyers compostaters, and group 3, Non-buyers non compostaters, was, respectively, 421.8 and 120.2 square meters.

The three groups of households (1, 2 and 3) were compared on sociodemographics and ecology-consciousness with a statistical technique called multiple discriminant analysis. Here, the stepwise procedure of the technique was chosen. The discriminant criterion was Wilks' Lambda*. Since the focus of this study was on the differences between group 1, and group 2 and 3, two separate discriminant analyses were performed. In these analyses group 1 acted as the reference group. It was studied on what characteristics,

* Multiple Discriminant Analysis can be conceived as a variant of regression analysis. The main difference between the techniques is that the dependent variable in the discriminant analysis is of a nominal measurement level (different groups) and not of a ratio level, as in regression analysis. The aim of multiple discriminant analysis is to find variables that are able to discriminate between two or more groups. The more the groups differ on a certain characteristic (variable) the better that characteristic can discriminate between the two groups. Multiple discriminant analysis is performed in two fases. In the first fase the characteristics that can discriminate between the groups are analysed and assigned a weight between 0 (no discrimination) and 1 (perfect discrimination). In the second fase of the analysis, it is determined how well all the selected characteristics taken together can actually allocate members of a specified group to that group. This is expressed in the 'percentage correctly classified.' In the stepwise procedure only those characteristics are analysed that satisfy certain minimum requirements. Consquently, stepwise multiple discriminant analysis results in an 'optimal' solution.

respectively, group 2 and group 3 differed from group 1. The results of the multiple discriminant analysis for group 1 and 2 are presented in Table 1.

TABLE 1

Multiple discriminant analysis with background characteristics to differentiate between households that compost with the subsidized container (1) and households that compost with another device (2).

description	SCDFC[a)]
- professional level	.91
- size of the garden	-.81
Wilk's Lambda	.90
canonical correlation	.31

a) SCDFC is an abbrevation of standardized canonical discriminant function coefficient. The SCDFC is the weight of a certain characteristic/variable in the analysis.

Only two of the four background characteristics were included in the analysis by the stepwise procedure: professional level and size of the garden. On the basis of these two characteristics a total of 68% of the households could be correctly classified. A test to study if this percentage deviated significantly from the percentage that could have been obtained by coincidence resulted in a Z-value of 2.99. This Z-value is statistically significant, meaning that the two characteristics included in the stepwise procedure discriminate to a large extent between group 1, Buyers, and group 2, Non-buyers composters.

A stepwise multiple discriminant analysis was also performed to study the differences in sociodemographics between group 1 and group 3. The results are presented in Table 2. On the basis of the discriminant analysis, 69% of the households could be correctly classified. A test performed to study if this percentage deviated significantly from the percentage that could have been obtained on the basis of coincidence resulted in a Z- value of 6.00. This Z-value is statistically significant.

The results of the multiple discriminant analyses show that households that have bought the subsidized container (group 1) most clearly differ from the households that haven't bought the container but that compost with another device (group 2) in professional level and size of the garden. Households in group 1 have a significantly higher professional level, but a significantly smaller garden than households in group 2. The two groups do not differ

TABLE 2

Multiple discriminant analysis with background characteristics to differentiate between households that compost with the subsidized container (1) and households that do not compost (3).

description	SCDFC
- ecology-consciousness	.83
- size of the garden	.60
- number of members in the household	.22
Wilk's Lambda	.83
canonical correlation	.41

significantly in ecology-consciousness, educational level and number of members in the household. As expected, households in group 1 are significantly more ecology-conscious than households in group 3, Non-buyers non-composters. Also, they have a significantly larger garden and a somewhat larger household size.

Composting VFG-waste with a device other than the subsidized compost container mainly attracts households with a relatively large garden. Composting with the subsidized container attracts households with a smaller garden.

Differences in perceived costs and benefits

Seventeen questions on perceived costs and benefits of composting at home, and five specific questions on perceived costs and benefits of buying and using the subsidized compost container were included in the questionnaire. A stepwise multiple discriminant analysis was performed to study on which perceived costs and benefits households in group 1 differed most clearly from households in group 2. In this situation a stepwise procedure has the particular advantage that not all the twenty two perceived costs and benefits will be included in the analysis; only those that discriminate most clearly between the two groups are included. The results of the analysis are presented in Table 3.

Of the total 22 perceived costs and benefits in the questionnaire, only nine were included in the stepwise procedure. The relative weight of the first perceived cost: 'spend more money than composting differently' was very high (.71). Also, the weight of the benefit 'less mess in the garden' is high (.56). Clearly these two, a personal cost and a personal benefit, dominate the

TABLE 3

Multiple discriminant analysis with perceived costs and benefits to differentiate between households that compost with the subsidized container (1) and households that compost with another device (2).

description	SCDFC
B[1]: spend more money than composting differently	.71
B : less mess in the garden than composting differently	-.56
B : contribute to the municipal treasury	.38
C : garbage men have to carry less	.37
B : compost faster ready than when composting differently	-.36
C : help to reduce waste disposed of	-.31
C : extra fertilizer is unnecessary	-.19
C : think continuously	.14
Wilk's Lambda	.61
canonical correlation	.62

1) a 'B' signifies that this cost or benefit was formulated as a result of buying the subsidized container, A 'C' signifies that this cost or benefit was formulated as a result of composting at home (in general).

discriminant analysis. To illustrate this, some percentages are presented: 38% of the households in group 1 believe that buying and using the susidized container costs more money than composting with a different device. 74% of the households in group 2 believe this; 67% of the households in group 1 believe that by composting with the subsidized container less mess in the garden is generated; 34% of the households in group 2 believe this. On the basis of the nine costs and benefits included in the analysis, 80% of the households in group 1 and 2 could be correctly classified (the resulting Z-value, 9.18, is statistically significant). It can be concluded that households in group 1 and households in group 2 can be discriminated to a large extent on the basis of nine perceived costs and benefits.

Also a stepwise discriminant analysis was performed for group 1 and group 3. The results are presented in Table 4.

Of the total 22 perceived costs and benefits, 11 were included in the analysis. On the basis of the analysis, 89% of the households in group 1 and group 3 could be correctly classified. The test for the difference between this percentage and the percentage obtained by coincidence resulted in a Z-value of 18.00. This value is statistically significant, meaning that group 1 and group 3 can be discriminated to a large extent by eleven of the twenty two

TABLE 4

Multiple discriminant analysis with perceived costs and benefits to differentiate between households that compost with the subsidized container (1) and households that do not compost (3).

	description	SCDFC
C:	extra fertilizer is superfluous	-.35
C:	garden loses attractiveness	.32
C:	spend much money	.30
C:	municipality saves money	.25
C:	inconvenience because of vermin	.24
C:	have to adapt myself	.24
B:	less mess in the garden	.19
C:	spend much time	.17
C:	much bad smell near the house	.16
C:	think continuously	-.14
B:	contribute to the municipal treasury	.11
Wilk's Lambda		.42
canonical correlation		.76

perceived costs and benefits. A closer study of the weight of the perceived costs and benefits in Table 4 shows that the analysis is not dominated by one or more costs and benefits. The weights are relatively low (the highest being -.35) and the differences between weights are relatively small.

It is interesting that households in group 3 are more positive than households in group 1 on one important perceived benefit of composting (signified by the negative sign of the weight): while 51% of the households in group 3 believe that by composting at home no extra fertilizer has to be bought, 38% of the households in group 1 believe this. On the other important costs and benefits the differences are in the expected direction. While, e.g., 9% of the households in group 1 believe that by composting at home the garden loses attractiveness, 53% of the households in group 3 believe this. While 3% of the households in group 1 believe that composting at home in general costs much money, 12% of the households in group 3 believe this.

Households that haven't purchased the subsidized container but that compost with another device (group 2) and households that haven't purchased the subsidized container and that do not compost (group 3) could be discriminated very well from the households that have bought the container (group 1) on the basis of a relatively small set of perceived costs and benefits. Group 1 and 2 differed most clearly on a perceived cost of buying the container (spend more money than necessary) and on a perceived benefit of buying the container (less mess in the garden).

Groups 1 and 3 differed on a larger set of perceived costs and benefits. Yet, no costs and benefits claerly dominated. A number of perceived costs and benefits of composting at home were important. Notably that by composting at home no extra fertilizer is necessary and that the garden loses attractiveness. The costs and benefits that were important in the analyses were almost exclusively of a personal (not a collective) nature.

DISCUSSION

In the present study households in Zeist were compared on sociodemographics, ecology-consciousness and perceived costs and benefits of buying and using subsidized compost containers. The three groups of households considered differed on a number of characteristics. However, it should be noted that a difference in a characteristic between two groups that also differ in behavior does not indicate that the difference in the characteristic caused the difference in behavior. Differences between the groups of households analysed in this study provide insights in the costs and benefits of composting that households perceive. These insights are crucial when constructing information campaigns aimed at persuading households a) to compost their VFG-waste with or without a subsidized compost container, and b) to engage in ecology-conscious behavior in general.

Research on ecology-relevant behavior, such as energy saving and source-separation, showed that the perceived collective benefits are important determinants of behavior. For instance, Pieters and Verhallen [10] found that the collective benefit that 'source-separation leads to less waste for disposal' indirectly determined the intention to engage in source-separating behavior to a considerable extent. In the present study, households that had bought the subsidized container hardly differed from the households that hadn't bought the container in the perceived collective benefits of composting. So, information campaigns aimed only at informing households that composting has such benign effects for ecology will not be very effective. This study shows that most people already seem to know this.

However, households that had bought the subsidized container differed much from the households that had not bought the container and that didn't compost with another device in ecology-consciousness. Level of ecology-consciousness refers to the perceived importance of the goal 'ecology' . As research points out, individuals are willing to sacrifice more for important than for less important goals [10, 15].

Sacrifice in the context of buying and using a subsidized container mainly refers to, the expenditure of money, and having a less attractive, less

orderly garden. Therefore, an important aim for information campaigns that accompany compost container subsidization programs should be to increase the perceived importance of the ecology, by stimulating general ecology-consciousness. Then, households will be willing to sacrifice more in order to act ecology-conscious. Evidently, if the price of the container is too high, even a very ecology-conscious person will not buy the container. The price should be set so that households will consider it a reasonable price, given the other costs and benefits.

Information campaigns accompanying compost container subsidization programs should also stress the personal benefits of composting (with the subsidized container). Personal benefits include: producing a structure improver for the garden and having to buy fewer waste bags.

The results of the analyses also indicate that households that do not compost their VFG-waste expect more personal costs of composting in general than households that compost with the subsidized container actually experience (see Table 4).
Information campaigns that tone down the personal costs of composting, especially those related to the loss of attractiveness of the garden and the attraction of vermin, may help in persuading households that do not compost their VFG-waste to buy the subsidized compost container. Communicating the experiences of households that already use the container can make a valuable contribution.

About 18 months after the start of the program in which subsidized compost containers were offered in Zeist, the penetration of compost containers was approximately 4%. The penetration was computed over all households that have a garden near the house. This procedure is correct if the institution offering the compost container is interested in selling as many containers as possible. In Zeist, the city government offered the subsidized compost containers. The aim of the subsidization program was to decrease the annual amount of waste for disposal. Selling compost containers to households that already compost their vegetable, fruit and garden waste with another device does not lower the amount of waste for disposal. It only changes the market shares of compost devices (and/or brands). In other words, defining the characteristics of the right target group depends on the goal of the institution offering the product/innovation.

A correct definition of the target group and realistic estimates of the expected participation in ecology-conscious behavior may guard institutions against disappointments afterwards.

REFERENCES

[1] H. van de Langerijt, Waste Management: Afvalverwerking en Compostering, Tilburg, Samenwerkingsorgaan KHT-THE, (1983).

[2] J.W.A. Lustenhouwer, F.A. Reijenga en J.C. van Weenen, Het Gebruik van Compostcontainers door Particuliere Huishoudens, Amsterdam, Interfacultaire Vakgroep Milieukunde, (1982).

[3] C. Schaffels, B. Stoop, K. Altena, J. Lako, Voorlichting, Komposteren en de Vermindering van de Hoeveelheid Huishoudelijk Afval, Groningen, Interfacultaire Vakgroep Energie en Milieukunde, (1985).

[4] R.G.M. Pieters, Het Aanschaffen van Compostcontainers in de Gemeente Zeist, Leiden, Werkgroep Energie en Milieuonderzoek, (1984).

[5] G. Zaltman and R. Stiff, Theories of Diffusion, In S. Ward and T.S. Robertson (Eds.), Consumer Behavior: Theoretical Sources, Englewood Cliffs, Prentice Hall, (1973).

[6] T.S. Robertson, Innovative Behavior and Communication, New York, Holt, Rinehart and Winston, (1971).

[7] W.F. van Raaij, Verspreiding van Energiebesparende Innovaties onder Huishoudens, In: P. Ester en F.L. Leeuw (Eds.), Energie als Maatschappelijk Probleem, Assen, Van Gorcum, (1981).

[8] Th. M.M. Verhallen and R.G.M. Pieters, Attitude Theory and Behavioral Costs, Journal of Economic Psychology, 5, (1984) 223-249.

[9] I. Ajzen and M. Fishbein, Attitude-Behavior Relations: a Theoretical Analysis and Review of Empirical Research, Psychological Bulletin, 84, (1977) 888-918.

[10] R.G.M. Pieters and Th.M.M. Verhallen, Source Separation of Domestic Waste: Perceived Costs and Benefits, Resources and Conservation, 12, (1986) 95-111.

[11] L.J.M. Schreurs en N.Y.M. Nelissen, Het Meten van Milieubesef, Nijmegen, Sociologisch Instituut der Katholieke Universiteit (1975).

[12] A. Kuylen en W.F. van Raaij, Glasinzameling in Noord-Brabant, Tilburg, Instituut voor Sociaal-Wetenschappelijk Onderzoek, (1979).

[13] J. Engel and R. Blackwell, Consumer Behavior, Chicago, Holt-Saunders, (1982).

[14] D.A. Dillman, Mail and Telephone Surveys: the Total Design Method, New York, John Wiley, (1978).

[15] F. van der Meer, Attitude en Milieugedrag, Leiden, RUL, dissertation, (1981).

[16] P.H. Bloch, Involvement beyond the Purchase Process: Conceptual Issues and Imperical Investigation, In: A. Mitchell (Ed.), Advances in Consumer Research, Ann Arbor, Association for Consumer Research, 9, (1981) 413-417.

[17] M.J. Houston and M.L. Rothschild, Conceptual and Methodological Perspectives on Involvement, In: S.C. Jain (Ed.), Research Frontiers in Marketing: Dialogues and Directions, Chicago, AMA (1978), 184-187.