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Environmental Technology

Valorization in recycling actions: an experience with women in a mini-market

Valorização nas ações de reciclagem: uma experiência com mulheres em um minimercado

Luana Pereira de França[I], **Liliane Duran Lopes**[I], **Loreni Teresinha Brandalise**[I], **Geysler Rogis Flor Bertolini**[I]

[I] Universidade Estadual do Oeste do Paraná - Unioeste, PR, Brazil

ABSTRACT

This study seeks to assess whether women, customers of a mini-market in São José das Palmeiras/PR, value sustainability actions related to recycling and separation of solid waste. To this end, a quasi-experimental research was conducted, whose purpose was to monitor the change in perception of the target audience of the research before and after the intervention. The quasi-experiment was developed in three moments. It was observed that most women consumers do not value sustainability actions, but after the intervention, there was an increase of women who started to separate the waste in their homes.

Keywords: Sustainability; Environmental education; Women; Small business

RESUMO

Este estudo busca avaliar se as mulheres, clientes de um minimercado de São José das Palmeiras/PR, valorizam ações de sustentabilidade relacionadas à reciclagem e a separação dos resíduos sólidos. Para tanto, foi realizada uma pesquisa quase experimental, cuja finalidade foi acompanhar a alteração de percepção do público-alvo da pesquisa antes e após intervenção. O quase experimento foi desenvolvido em três momentos. Observou-se que a maioria das consumidoras não valorizam ações de sustentabilidade, porém após a intervenção, constatou-se um acréscimo de mulheres que passaram a separar os resíduos em suas residências.

Palavras-chave: Sustentabilidade; Educação Ambiental; Mulheres; Pequena Empresa

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1 INTRODUCTION

The processes arising from the Industrial Revolution, in addition to promoting an acceleration in the production of goods and services, also contributed to the worsening of other problems in society, among them are environmental problems and waste disposal. The boom in technologies caused by this revolution represents one of the fundamental factors related to environmental imbalances (FERNANDES, 2012; CRUZ; TRINDADE, 2021).

It is worth noting that it was from this historical period that solid waste began to have importance, however, it was only in the 1970s that the issue began to have environmental value and became the focus of major world events such as the Stockholm Conference in 1972 and ECO 92, held in Rio de Janeiro (WILSON, 2007).

In this vein, solid waste, popularly known as garbage, over time has ceased to have a depreciative connotation and is being more valued. Naime and Garcia (2004) and Bauman (2018) add that besides the social and environmental issues involved, there is the economic aspect linked to sustainability and waste management.

It is emphasized that the selective collection and recycling of waste are strands of the National Solid Waste Policy (PNRS) of Brazil (ARANTES; PEREIRA, 2021). The authors Buque and Ribeiro (2015), in a study on selective collection in the city of Maputo, Mozambique, state that 60% of the waste generated has the potential to be reused, provided they are properly separated and collected for further reuse or recycling, which saves the use of natural resources, as well as reduces environmental impacts and those related to human health. In this perspective, landfill investments are replaced by incentives for social inclusion and employment.

When it comes to the approach related to the solid waste management policy, Medeiros and Macedo (2006) bring the importance of public management, the collectors and the population in general for this policy to work. However, it is necessary that society, government and companies care more for the environment and seek an efficient solid waste management plan (BERNARDO AND RAMOS, 2016).

It was also verified, as a consequence of PNRS, an increase in selective collection and a decrease in inadequate waste disposal, in addition to the propensity for shared management (OLIVEIRA *et al*., 2016). It is noteworthy that solid waste management in Brazil is still a field that faces difficulties, mainly due to lack of interest and lack of environmental awareness of society (PERSICH; SILVEIRA, 2011). There is still no expressive social engagement aimed at environmental management (SILVA *et al*., 2016). Therefore, the main factor to be worked is the awareness of people (PERSICH; SILVEIRA, 2011).

According to data from the Brazilian Association of Public Cleaning and Special Waste Companies (ABRELPE), in a recent survey released by this association, the Panorama of Solid Waste in Brazil 2017 (ABRELPE, 2017), revealed that 75% of Brazilians do not separate their waste in their homes, and that more than half of the population showed not knowing that aluminum, paper and PET are recyclable materials.

The grocery stores are the second largest segment in the number of small businesses in the country, with approximately 416,000 establishments, accounting for 6% of Brazilian GDP and 35% of sales in the supermarket sector. These small businesses have annual sales of up to R$4 million (IBGE, 2010).

This is of great importance for cities, because it is a great action coming from a mini-market, which can generate a great surprise and incentive for the rest of the businesses. For Gerber (1990), the owner should view the small business not as a tool for self-support, but as an innovative idea that can generate money, and the development is a clear form of the business, it is the way in which the company can achieve success, even depending on the owner's leadership.

For Meyer and Froehlich (2018), it is important that people acquire and build knowledge regarding sustainability, because the environment and people are the most precious assets of the planet, and thus it becomes necessary to practice actions that reduce or cancel the impacts caused in nature and society.

Thus, considering the large volume of solid waste that is produced daily, as well as due to the important role played by the whole society in the processes of production and consumption of products, and final disposal of waste, this study aims to assess

whether the customers of a mini-market in the city of São José das Palmeiras/PR value sustainability actions related to recycling, which will serve as a model and incentive for initiatives related to selective collection and environmental awareness of other organizations and the local society as a whole.

2 THEORETICAL REVIEW

This section will address the characterization of solid waste, the National Policy on Solid Waste and Recycling; Recycling and environmental education; mini-markets, and selective collection, which underpins this study in question.

2.1 Characterizing Solid Waste

The Brazilian Association for Technical Standards (ABNT) in 1987 already had a definition for solid waste:

[...] waste in solid and semi-solid states, resulting from community activities, from: industrial, domestic, health services, commercial, agricultural, services and sweeping. Moreover, considered as solid waste are the sludges from water treatment systems, those generated in pollution control equipment and installations, as well as certain liquids, whose characteristics make it unfeasible to discharge them into the public sewage system or body of water, or require technical and economically unfeasible solutions given the best technology.

Similar to ABNT, Law No. 12.305 (Brazil, 2010), regulated by Decree 7.404 of December 23, 2010, which provides for the PNRS in Brazil, brings the following definition for solid waste

[...] a material, substance, object or discarded good resulting from human activities in society, to whose final destination is proceeded, proposed to proceed or is obliged to proceed, in solid or semisolid states, as well as gases contained in containers and liquids whose particularities make it unfeasible to launch them into the public

sewage system or into bodies of water, or require for this purpose solutions that are technically or economically unfeasible in view of the best available technology.

Mesacasa and Da Cunha (2019) explains that solid waste consists of all the substrates that are discarded by both individuals and companies, regardless of the activity performed. Thus, it is noteworthy that waste generation is present in all stages of manufacture of a given product.

This perspective demonstrates the importance of companies and the involvement of the entire society in waste management (CARVALHO, 2020), thus, we have that the citizen represents one of the main connections of the waste management system and assumes an essential role for the success of reverse logistics and recycling practices.

2.2 National Solid Waste Policy and Recycling

In Brazil, on August 2, 2010, after 21 years of discussion in the National Congress, the law No. 12,305 was sanctioned (BRASIL, 2010), establishing the National Solid Waste Policy (PNRS), which is considered a revolution regarding national environmental policies. This policy established a deadline of 2020 for the country to have all structure in place to give an adequate end to any solid waste. However, for this to happen, participation in the political, economic, environmental, cultural, and social areas is of great importance, because this policy institutes shared responsibility and everyone needs to do their part.

As for the PNRS objectives (CELESTINO; MONTAÑO, 2022), the main principles related to waste management and recycling are listed below

(a) environmentally adequate final destination of waste;

b) non-generation, reduction, reuse, recycling and treatment of solid waste;

c) encouragement of the adoption of sustainable production and consumption practices;

d) incentive to the recycling industry, considering the generation of employment and income;

e) integrated management of solid residues;

f) regularity, continuity, functionality and universalization of the provisioning of public services of urban cleaning and management of solid residues;

g) integration of collectors of reusable and recyclable materials in actions involving shared responsibility for the life cycle of products

h) incentives to the development of environmental and business management systems aimed at the improvement of productive processes and the reuse of solid residues, including recovery and energy use;

i) encouragement of environmental labeling and sustainable consumption.

We highlight the issue of shared responsibility for the product life cycle provided for in the PNRS (BRAZIL, 2010), which is defined in subsection XVII of art. 3 as:

> Set of individualized and chained attributions of manufacturers, importers, distributors and traders, of consumers and of the holders of public services for urban cleaning and solid waste management, to minimize the volume of solid waste and rejects generated, as well as to reduce the impacts caused to human health and environmental quality arising from the life cycle of products, under this Law;

Foster, Roberto and Igari (2016), express that waste generation is large, and that most of it is destined for landfills, which is the main destination in the world, followed by recycling processes, dumping in dumps and composting. These means of waste disposal are agents of several environmental impacts.

The most up-to-date data on solid waste in Brazil is from the Brazilian Association of Companies for Public Cleaning and Special Waste (ABRELPE, 2017), which was founded in 1976 by a group of businessmen who were pioneers in the activities of collection and transport of solid waste. The association is currently the representative of the International Solid Waste Association (ISWA) in Brazil and was nominated to be the headquarters of the Regional Secretariat for South America of the International Partnership for Waste Management Development with Local Authorities (IPLA), a

program recognized and maintained by the United Nations (UN) through the United Nations Commission for Regional Development (UNCRD).

Although the PNRS is already in its eighth year, the system still presents challenges to be overcome in all regions of Brazil, including the financial difficulty to implement the most expensive actions of the policy (increase the use and recovery of discarded materials and end the practices of inadequate disposal) (ABRELPE, 2017).

Federal Law 12,305, referring to PNRS, contains important tools for the country's advancement in relation to the main environmental, social, and economic problems arising from the inadequate management of solid waste. Recycling is among the priority actions to be practiced. Among the instruments provided by this policy, one can mention the technical and financial cooperation between the private initiative and the government, environmental education, and scientific and technological research (BRAZIL, 2010). In this sense, it fits the participation of the university and the mini-market as a component of the private sector.

2.3 Selective Collection

ABRELPE (2017) warns that in 2016, 3,331 Brazilian municipalities inadequately disposed of waste: they sent more than 29.7 million tons of waste, corresponding to 41.6% of the waste collected in 2016, to lixões or controlled landfills, which have neither structures nor imperative systems for the protection of the environment against damage and degradation (SILVA *et al*., 2022).

Still in this sense, although there is a record of increased coverage in the collection of waste generated, selective collection, which is a strand of the PNRS, has not advanced in the same proportion of the overall rates of solid waste collection. Data from ABRELPE (2017) show that only 69.6% of Brazilian cities have registered selective collection actions.

When analyzing the studies already published on solid waste management, it is observed that most of them focused on municipal waste management. This action may

be linked to the need that PNRS has to disseminate the initiatives developed in municipalities to create an information system for other municipalities interested in preparing solid waste management plans (CEZAR *et al*., 2016).

This fact is confirmed because, according to Godoy (2013) and Silva *et al.* (2022), although it is a shared responsibility of all, it is the municipalities that have the greatest participation and responsibility in the management of municipal solid waste.

In a survey conducted with 15 municipalities in Paraná, which make up the 17th region of the Paraná State Plan for Integrated Solid Waste Management, Ferreira (2018) found that in 2010 only four municipalities in the region had some system of selective collection implemented, and in 2016 it increased to 12, which demonstrates a growth of 200% in this item. Another relevant point that shows the evolution in solid waste management is regarding open air dumps, which reduced from 12 to 3 in the period from 2010 to 2016 in this region.

Bicalho and Pereira (2017) corroborate that the PNRS presumes shared responsibility, in which everyone has responsibilities in the life cycle of waste, which makes notorious the importance of effective participation of the entire community for an effective SUW management.

Initially, it is necessary to change habits, not to be carried away by the desires and marketing of consumption, but by the needs, to reduce consumption and also reduce the increase in the disposal of products (BARTOLOMEU, 2011).

The municipality of São José das Palmeiras/PR, where the company that is the object of this work is located, is part of the 30.04% of cities that do not have selective waste collection implemented and is also included among the 3,331 Brazilian municipalities that inadequately dispose of waste, sending it to dumps or landfills (ABRELPE, 2017).

Thus, the reuse of solid waste is essential because it reduces the pollution of the environment, water, air and soil, and increases the life of landfills, since it minimizes the amount of waste to be deposited (SOARES; RODRIGUES; GONÇALVES, 2016).

2.4 Recycling and Environmental Education

Recycling is the result of a series of activities whereby materials that would otherwise become waste are diverted, separated, and processed to be used as raw materials in the manufacture of new products (DOS SANTOS *et al.,* 2022).

Recycling is to fight waste, to guarantee the future, to reinvent. That is, it is used to designate the reuse of materials benefited as raw material for a new product (LACERDA, 2013).

Given this, one realizes that recycling is essential for the environment, because it is where we live, and it is where natural resources are taken from, for the most diverse purposes. However, even with all technological development, major environmental problems are still caused, mainly due to the inadequate disposal of solid waste. Recycling appears, then, as a tool to alleviate such problems. (SAUERESSIG; SELLITTO; KADEL, 2021).

For Pinto and Coelho (2009), recycling can generate a number of important social benefits. Mainly by increasing ecological awareness in the community, awakening citizens to changes in attitudes in favor of the environment.

In addition, recycling also generates direct benefits in the local economy because, besides generating jobs, it also contributes to the adaptation of resources in the local economy (SAUERESSIG; SELLITTO; KADEL, 2021).

According to the research conducted to verify an effective means of dissemination, it was realized that the internet is a great ally, it can take great information to thousands of people at the same time. For Kotler and Keller (2006, p.15): “Companies can operate a new and powerful sales and information channel, the Internet, obtaining an extended geographical reach to publicize and promote their business and products worldwide”.

Thus, this action was carried out to encourage the use of recycling and waste separation through the Internet. A mini market page was created on Facebook, where

all the information and actions were posted, as a way to encourage the population to do the same.

In addition, this action of separating solid waste was publicized on the city's community radio station, Nativa FM 105.09, as a way to encourage the population to start separating the garbage. The steps on how to separate recyclable waste from organic waste were presented via voiceover, since there is already a project for the implementation of a selective collection system in the city.

3 METHOD

To achieve the proposed objectives, a quasi-experiment was conducted in a small company, a mini-market in São José das Palmeiras/PR. According to authors Campbell and Stanley (1963), this type of study differs from a traditional experiment due to the absence of two conditions characteristic of experimental research: formal and full control of variables and randomly selected groups.

This quasi-experiment consisted in monitoring the perception of the target audience regarding the implementation of a sustainability action by the mini-market, whose results were verified through the application of a questionnaire before and after the intervention.

Thus, this research was developed in three stages, as shown in Table 1.

Table 1 – Stages of the quasi-experimental study

Stage 1	Stage 2	Stage 3
Profile survey of mini-market customers	Implementation of a sustainable action	Feasibility assessment of the implemented action

Source: Prepared by the authors

Considering that the mini-market in question has 60 registered customers and that most of them are represented by women, this research was directed to know the perception of this group regarding the feasibility of an environmental action to be implemented in the establishment.

Thus, this phase aimed to raise the profile of the clients of the mini-market, especially regarding the appreciation of sustainable practices related to the production and consumption of products, as well as the final destination of waste.

To this end, the research instrument used was a semi-structured questionnaire with customers (women only) of a mini-market in São José das Palmeiras/PR. The questionnaires were applied in February in the establishment itself. All women who entered this store were approached to answer the survey, which resulted in a sample of 51 respondents.

These questionnaires aimed to analyze the consumer profile of the minimarket in reference to verify the perception and value of these consumers in relation to the products purchased (Evaluate whether the minimarket customers value recycling actions). According to Cervo and Bervian (1996, p. 138), "the questionnaire is the most used way to collect data, because it makes it possible to measure more accurately what is desired".

The questionnaire used in the research contemplated 12 questions and was adapted from the model proposed by Bertolini, Rojo, & Lezana (2012), whose instrument was developed to identify what is valued in green products by consumers. From the collected data, the analysis was performed by descriptive statistics, through tables and graphs, as a way to assist in the interpretation of the research results.

The second stage of this research consists of the implementation of a sustainable action in the minimarket, namely: recycling and guidance on how to do it. The commercial establishment in question started the separation of the discarded residues from its activities, segregating the recyclable items from the organic ones, and produced a pamphlet aiming at raising awareness about recycling, which material started to be delivered to the mini-market's customers in physical media and was also published on its Facebook social network page; in addition, the action was also advertised by the city's community radio station, free of charge.

The pamphlet was developed exclusively for this purpose by this research group with the help of a free online platform, Canvas, and was made available in a virtual environment for the minimarket to apply and print.

After a period of two months of practice of the actions planned in the second stage, the last phase consisted in evaluating the viability of the action implemented by the minimarket: to analyze whether there was any impact on the perception of these customers regarding the sustainable practice implemented by the establishment. To this end, the same questionnaire was applied again to the store's customers in May. At this point, 42 participants were obtained in this research universe. Finally, an interview was held with the city's environmental agent.

4 RESULTS AND DISCUSSION

This section will present the main results of the surveys conducted with customers of the mini-market that is the focus of this study and of the interview conducted with a representative of the municipality of São José das Palmeiras, and for didactic reasons, these results will be subdivided into three sections as follows: results of the first questionnaire, results of the second questionnaire and positioning of the municipality.

Regarding the profile of the minimarket's customers, it should be noted that the research was conducted only with female consumers of this commercial establishment.

4.1 Results of the first questionnaire

In this step, all female customers who were in the store during the research period were approached, and 51 questionnaires were answered. Of these customers, only two were not residents of São José da Palmeiras, which represents 2% of the total, one of them lives in Luz Marina, and the other lives in São Clemente, the latter emphasizing that she stays in the city lot because her daughters live there.

The predominant profile of the clients who participated in the survey is composed of women over 50 years old (49%), with 29% between 35 and 49 years old, 14% up to 24 years old, and 8% between 25 and 34 years old.

Table 2 also shows that the interviewed consumers have a high school education (approximately 51%) and family income of more than one to five minimum wages (MW).

Table 2 – Profile of the clients

	Family income					
Education	**Up to 1 Minimum Wage**	**%**	**Above 1 to 5 Minimum Wage**	**%**	**Total**	**%**
Elementary School	6	11,76%	10	19,61%	16	31,37%
High School	15	29,41%	11	21,57%	26	50,98%
Higher Education	2	3,92%	5	9,80%	7	13,73%
Post-graduation	1	1,96%	1	1,96%	2	3,92%
Total	24	47,06%	27	52,94%	51	100,00%

Source: Prepared by the authors

Most of those questioned at the time of purchase do not value if the manufacturer has environmental actions (about 55%). While only six people informed that they value the manufacturer's environmental actions, approximately 12% of the respondents, among them, according to Table 3, two have elementary school education and four have high school education. These six answers had representatives from all age groups considered in this research.

Table 3 – Appreciates the manufacturer's environmental actions versus education

Education	**Not**	**%**	**Does not check this characteristic**	**%**	**Yes**	**%**	**Total**	**%**
Elementary School	8	15,69	6	11,76	2	3,92	16	31,37
High School	13	25,49	9	17,65	4	7,84	26	50,98
Higher Education	5	9,80	2	3,92	0	0,00	7	13,73
Post-graduation	2	3,92	0	0,00	0	0,00	2	3,92
Total	28	54,90	17	33,33	6	11,76	51	100,00

Source: Prepared by the authors

According to Table 4, it is interesting to note that these six consumers who answered that they value the manufacturer's environmental actions, do not value or do not consider the fact that the product or the packaging is produced with recyclable

material. It is noteworthy that none of the respondents valued whether the product or the packaging had a recyclable origin.

Table 4 – Values of environmental actions and products made with recyclable materials

	The manufacturer that has environmental actions is valued							
Adds value to product packaging made with recycled material	**Not**	**%**	**Does not check this characteristic**	**%**	**Yes**	**%**	**Total**	**%**
Not	20	39,22	11	21,57	4	7,84	35	68,63
Does not check this characteristic	8	15,69	6	11,76	2	3,92	16	31,37
Total	28	54,90	17	33,33	6	11,76	51	100,00

Source: Prepared by the authors

And when asked whether they value recycling and/or reuse of waste, even if they do not value or do not check this feature in the product at the time of purchase, then consumers said they value recycling and/or reuse of waste, which represents about 20% of the total. See Table 5.

Table 5 – Values recycling/reuse versus products made with recyclable materials

	Value products/packaging made from recyclable material					
Values recycling/ reuse	**Not**	**%**	**Does not check this characteristic**	**%**	**Total**	**%**
Not	17	33,33	7	13,73	24	47,06
Never thought of that before	10	19,61	7	13,73	17	33,33
Yes	8	15,69	2	3,92	10	19,61
Total	35	68,63	16	31,37	51	100,00

Source: Prepared by the authors

Also according to Table 5, it appears that although almost half of the participating public does not value recycling and/or reuse of waste, approximately one-third of these

consumers said they had never thought about it before, which indicates a great potential to be worked on in the process of environmental awareness.

Although ten people have answered that they value recycling and/or reuse of waste, only two people informed that they separate organic waste from recyclable waste; the others, more than 96% of this sample, do not separate their waste. See Table 6.

Table 6 – Values recycling/reuse of waste versus separates recyclable waste from organic waste

	Separate the recyclable waste from the organic waste					
Values recycling/reuse	**Not**	**%**	**Yes**	**%**	**Total**	**%**
Not	24	47,06	0	0,00	24	47,06
Never thought of that before	17	33,33	0	0,00	17	33,33
Yes	8	15,69	2	3,92	10	19,61
Total	49	96,08	2	3,92	51	100,00

Source: Prepared by the authors

Of those two people who separate garbage, one is between 35 and 49 years old and the other is over 50 years old, both have a middle level education and family income of more than one to five minimum wages.

In relation to the proportion of people who separate garbage (only 4%) and in relation to those who do not (96%). Moreover, even though the same amount of consumers (2) do some recycling action in their homes and separate garbage, the crossing of data, as shown in Table 7, allows us to conclude that only one person does both actions, which also indicates that the other respondent who segregates organic waste from recyclable waste does not recognize this action as recycling.

Table 7 – Do you do any recycling at home versus separating garbage

	Do any recycling action at home					
Separate the garbage	**Not**	**%**	**Yes**	**%**	**Total**	**%**
Not	48	94,117647	1	1,9607843	49	96,078431
Yes	1	1,96	1	1,96	2	3,92
Total	49	96,08	2	3,92	51	100,00

Source: Prepared by the authors

As to the recycling actions performed by consumers, one of them informed that she makes plant pots out of PET bottles, the other answered that she makes toys out of materials that would be thrown away, and both reuse egg shells, used coffee powder and used mate tea weed to fertilize their plants.

Still along this line, according to Table 8, 37 respondents (72.55%) reported that they have a vegetable garden at home, however, only two of them recognized that they do some recycling action at home, which suggests that they do not recognize the action of reusing food scraps as a recycling action.

Table 8 − Do any recycling action at home versus having a vegetable garden at home

	You have a vegetable garden at home					
Recycle	**Not**	**%**	**Yes**	**%**	**Total**	**%**
Not	12	23,53	37	72,55	49	96,08
Yes	0	0,00	2	3,92	2	3,92
Total	14	27,45	37	72,55	51	100,00

Source: Prepared by the authors

Regarding the recycling actions carried out in the city, the answers were unanimous: none of them are aware of any activity for this purpose.

4.2 Results of the second questionnaire

In this third stage of the research, after the awareness raising action at the mini-market, all female customers who were in the store during the research period were also approached to answer the first consumer value perception questionnaire concerning recycling, which resulted in a total of 42 participants, all residents of São José da Palmeiras.

The predominant profile of the consumers participating in the study, as shown in Table 9, is composed of women over 50 years old (50%), with elementary school education (approximately 52%) and family income of up to one minimum wage (SM).

Table 9 – Profile of customers

	Family income					
Education	**Up to 1 Minimum Wage**	**%**	**Above 1 to 5 Minimum Wage**	**%**	**Total**	**%**
Elementary School	10	23,81	12	28,57	22	52,38
High School	11	26,19	5	11,90	16	38,10
Higher Education	1	2,38	2	4,76	3	7,14
Post-graduation	0	0,00	1	2,38	1	2,38
Total	22	52,38	20	47,62	42	100,00

Source: Prepared by the authors

Half of those questioned at the time of purchases do not value if the manufacturer has environmental actions, and 33% do not check this characteristic. While only seven people informed that they value the manufacturer's environmental actions, approximately 17% of the respondents, among them, according to Table 10, three have elementary school education and, as in the first stage, four have high school education. These seven responses had representatives from all age groups considered in this research.

Table 10 – Appreciates the manufacturer's environmental actions versus schooling

	Value of the manufacturer has environmental actions							
Education	**Not**	**%**	**Does not check this characteristic**	**%**	**Yes**	**%**	**Total**	**%**
Elementary School	10	23,81	9	21,43	3	7,14	22	52,38
High School	8	19,05	4	9,52	4	9,52	16	38,10
Higher Education	2	4,76	1	2,38	0	0,00	3	7,14
Post-graduation	1	2,38	0	0,00	0	0,00	1	2,38
Total	21	50,00	14	33,33	7	16,67	42	100,00

Source: Prepared by the authors

As shown in Table 11, it is interesting to note that, as in the previous step, none of the seven consumers who answered that they value the manufacturer's environmental actions value the fact that the product or the packaging is made of recyclable material.

Table 11 – Values environmental actions versus products made with recyclable materials

	The manufacturer that has environmental actions is valued							
Adds value to product packaging made with recycled material	**Not**	**%**	**Does not check this characteristic**	**%**	**Yes**	**%**	**Total**	**%**
Not	9	21,43	9	21,43	5	11,90	23	54,76
Does not check this characteristic	12	28,57	4	9,52	2	4,76	18	42,86
Not	0	0,00	1	2,38	0	0,00	1	2,38
Total	21	50,00	14	33,33	7	16,67	42	100,00

Source: Prepared by the authors

And unlike the previous answers, in which none of the participants said they value products/packaging made from recyclable material, according to Table 12, at this stage a positive answer was recorded for this question, which represents a little over 2%. However, the answer seems contradictory, since that person who answered that he/she values products/packaging made with recyclable materials, does not value recycling and/or reuse of waste.

Table 12 – Values recycling/reuse versus products made with recyclable materials

	Value products/packaging made from recyclable material							
Values recycling/ reuse	**Not**	**%**	**do not check this characteristic**	**%**	**Yes**	**%**	**Total**	**%**
Not	5	11,90	3	7,14	1	2,38	9	21,43
Never thought of that before	6	14,29	9	21,43	0	0,00	15	35,71
Yes	12	28,57	6	14,29	0	0,00	18	42,86
Total	23	54,76	18	42,86	1	2,38	42	100,00

Source: Prepared by the authors

Still, according to Table 12, it can be seen that the percentage of people who value recycling/reusing waste rose from 20% to approximately 43%. However, the participation of consumers who have never thought about it before still represents more than a third.

There was also a significant increase in the number of people who separate recyclable waste from organic waste, from two to fourteen. Still, it can be seen that not all people who separate garbage think recycling or reusing waste is important, as only six people (about 15%) value both. See Table 13.

Table 13 – Values recycling/waste reuse versus separates recyclable waste from organic waste

	Separate the recyclable waste from the organic waste					
Values recycling/reuse	**Not**	**%**	**yes**	**%**	**Total**	**%**
Not	6	14,29	3	7,14	9	21,43
Never thought of that before	10	23,81	5	11,90	15	35,71
Yes	12	28,57	6	14,29	18	42,86
Total	28	66,67	14	33,33	42	100,00

Source: Prepared by the authors

Of these 14 participants who separate garbage, there is a predominance of people over 34 years old (almost 80% of the people who separate garbage): considering all clients, 16.67% are 50 years old or older and 9.52% are between 35 and 49 years old. See Tables 14 and 15.

Table 14 – Separates recyclable waste from organic waste versus age

	Separate the garbage					
Age	**Not**	**%**	**Yes**	**%**	**Total**	**%**
up to 24 years old	2	4,76	2	4,76	4	9,52
25 to 34 years old	1	2,38	1	2,38	2	4,76
35 to 49 years old	11	26,19	4	9,52	15	35,71
Above 50	14	33,33	7	16,67	21	50,00
Total	28	66,67	14	33,33	42	100,00

Source: Prepared by the authors

Table 15 – Separates recyclable waste from organic waste versus education

	Separate the garbage					
Education	**Not**	**%**	**Yes**	**%**	**Total**	**%**
Elementary School	14	33,33	8	19,05	22	52,38
High School	12	28,57	4	9,52	16	38,10
Higher Education	2	4,76	1	2,38	3	7,14
Post-graduation	0	0,00	1	2,38	1	2,38
Total Geral	28	66,67	14	33,33	42	100,00

Source: Prepared by the authors

In relation to the proportion of people who separate garbage (one-third) in relation to those who do not (two-thirds), which shows an increase of more than 700% in relation to the result of the first stage of the survey (only 4% separated garbage).

Although 14 people informed that they separate recyclable garbage from organic garbage, which represents one-third of the respondents, as shown in Table 16, only 9 of them said they do some recycling action in their homes, which means that a little more than 20% recognize that separating garbage is an activity related to recycling.

Table 16 – Do some recycling actions at home versus separating garbage

	Do any recycling action at home					
Separate the garbage	**Not**	**%**	**Yes**	**%**	**Total**	**%**
Not	25	59,52	3	7,14	28	66,67
Yes	8	19,05	6	14,29	14	33,33
Total	33	78,57	9	21,43	42	100,00

Source: Prepared by the authors

As for the recycling actions performed by the consumers, one of them informed that she makes plant pots with PET bottles, the other answered that she makes toys with materials that would be thrown away, and both make reuse of egg shells, coffee powder and yerba mate used to fertilize the plants.

Others said that they usually use recyclables to make household utensils, such as a pot to store nails in a PET bottle, they also use them to store water in the refrigerator and to make a stroller for the children.

Still along this line, according to Table 17, 28 respondents (two-thirds) informed that they have a vegetable garden at home, however, only 9 of them recognized that they do some recycling action at home, which suggests that part of them does not recognize the action of reusing food scraps, which is a common use for those who have a garden, as a recycling action.

Table 17 – Do any recycling action at home versus having a vegetable garden at home

	You have a vegetable garden at home					
Recycle	**Not**	**%**	**Yes**	**%**	**Total**	**%**
Not	13	30,95	20	47,62	33	78,57
Yes	4	9,52	8	19,05	9	21,43
Total	14	33,33	28	66,67	42	100,00

Source: Prepared by the authors

And regarding the recycling actions carried out in the city, according to Graph 7, we observed an evolution in the answers: 31% reported having knowledge of some recycling action in the city. This is a great advance and it is clear how this action has become known in the city of São José das Palmeiras.

Another important fact is that before the intervention, 100% of the consumers said they did not know of any recycling actions in the city, and after the action implemented by the mini-market, it was observed that about one-third of the participants in the survey reported having knowledge of some recycling action, which shows that the campaign initiated by the company may have caused this change in perception. Table 18 shows the comparison between before and after the recycling action in the city.

It can be seen that there was a significant advance in relation to the appreciation of environmental actions and perceptions of the respondents in the municipality. It is especially noteworthy that there was an increase of more than half of the respondents on the recycling action, which before did not do and now do after this action performed in the minimarket, which is of great importance.

The results of this research are in line with the findings of studies by Moran et al. (2019) and by Wijk et al. (2016) who carried out their experiments in supermarkets with

product exposure as an intervention activity, which showed that interventionist activities positively influenced consumer behavior

Table 18 – Comparison between before and after the recycling action in the municipality

	Before Action	After the Action
Do you value environmental action?	55% no and 12% yes, they do.	50% no and 15% yes, they do.
Do you value if the manufacturer has environmental actions?	39.22% no and 7.84% yes, they value it.	21.43% no and 11.90% yes, they value it.
Value products/packaging made from recyclable material	33.33% no and 15.69% yes, they value.	11.90% no and 2.38% yes, they do.
Do you do any recycling action at home	94.11% no and 1.96% yes, they value it.	59.52% no and 7.14% yes, they value it.

Source: Prepared by the authors

4.3 Municipality Positioning

In this interview, it was discussed that the municipality has a solid waste plan that was created together with the management committee of Itaipu Binacional. The project was developed together with the environmental managers of the municipality, a study was conducted on the amount of waste in the city, its composition, and the place it was being destined. Thus, it was decided to carry out the selective collection proposal in the city.

According to the environmental agent, the project is already underway and is being studied. The Instituto das Águas has already donated all necessary equipment (carts/balances/luvas/EPI) for the selective collection, the municipality has also already got the car for the collection.

When asked about the planned actions, it was emphasized that actions will be carried out in schools, the environmental managers together with the teachers will develop tasks, encouraging not only the selective collection but about all environmental aspects, from tree planting, as well as the recovery of springs, healthy eating and origin of food, incentives that some are already performed in schools.

What is still missing to put the project into practice is the space, which is still a problem, they are waiting for resources to expand the shed, the current shed has 200 square meters, i.e., very small, to start all work it is necessary to expand.

Once the analysis is complete, Table 19 presents the main results found in the quasi-experimental study.

Table 19 – Main results of the quasi-experiment

Analyzed elements	Main results after the intervention
Valuing recycling/reusing actions	Approximately 40% increase
Knowledge of recycling actions in the municipality	Approximately 30% increase
Separation of recyclable from organic waste	Approximately 30% increase
Appreciation of the manufacturer's environmental actions	Approximately 15% increase

Source: Prepared by the authors

Despite the evidence that most consumers do not value sustainability actions, the research identified, as shown in Table 19, that after the intervention, there was a considerable increase in the appreciation of environmental actions by manufacturers, reuse actions, in the separation of luxury and in increasing the perception of recycling actions in the municipality.

5 CONCLUSIONS

This study evaluated that most consumers of the mini-market in the city of São José das Palmeiras/PR do not value sustainability actions related to recycling and the separation of solid waste, and when shopping they do not value if the manufacturer has environmental actions.

It was also found that although almost half of the participating public did not value recycling and/or reuse of waste, approximately one-third of these consumers said they had never thought about it before, which indicated a great potential to be worked on in the process of environmental awareness.

The action of this work aimed to provide an incentive for the initiative related to selective collection and environmental awareness. It started in the mini-market, where flyers were distributed, consequently in the second interview it was already possible to verify some small changes, which are essential.

There was also an expressive increase in the number of people who separate recyclable waste from organic waste. This is a very gratifying fact, because it shows that the action taken is having an effect, and even though a short time has passed, it is believed that many fruits will be harvested from this small action.

This action serves as a model and an incentive for initiatives related to selective collection and environmental awareness of other organizations and the local society as a whole, and shows that small companies can also develop sustainable practices and encourage their customers and the community around them to adhere to good practices.

As a suggestion for future work, it is recommended that this research be repeated in other companies, including those in other fields of activity. It is also noteworthy that it would be interesting to reproduce this quasi-experiment for a longer period of follow-up, and also to conduct empirical experimental studies with control of variables in the participating groups.

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Authorship contributions

1 – Luana Pereira de França
Mestre em Administração pela Universidade Estadual do Oeste do Paraná
http://lattes.cnpq.br/5987923947285819 • luana-pereirafranca@hotmail.com
Contribuition: Conceptualization, Supervision, Writing – review & editing

2 – Liliane Duran Lopes
Mestre em Administração pela Universidade Estadual do Oeste do Paraná
http://lattes.cnpq.br/4179518449887740 • lilliduran@gmail.com
Contribuition: Investigation, Methodology

3 – Loreni Teresinha Brandalise
Doutora em Engenharia de Produção. Docente do Mestrado Profissional em Administração da Universidade Estadual do Oeste do Paraná.
https://orcid.org/0000-0003-4359-0787 • lorenibrandalise@gmail.com
Contribuition: Formal Analysis, Methodology

4 – Geysler Rogis Flor Bertolini
Doutor em Engenharia de Produção. Docente do Doutorado em desenvolvimento Rural Sustentável, do Mestrado Profissional em Administração e do Mestrado em Contabilidade da Universidade Estadual do Oeste do Paraná
https://orcid.org/0000-0001-9424-4089 - • geysler_rogis@yahoo.com.br
Contribuition: Methodology, Writing – original draft

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