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Article

Domestic Separation and Collection of Municipal Solid Waste: Opinion and Awareness of Citizens and Workers

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Abstract: The state of the art on Municipal Solid Waste (MSW) management is based on the domestic separation of materials produced. After domestic separation, the resident has to transfer the separated materials to the MSW manager through the hands of collection workers. It is exactly at this stage that an end-use product changes its status and property becomes waste. This paper analyzes and compares the opinions and awareness of citizens and kerbside collection workers on this subject by means of two structured questionnaires in the city of Mercato San Severino (about 22,000 people), in Southern Italy.

Keywords: awareness; resident; MSW; opinion; questionnaire; separate collection; worker

1. Introduction

Modern society is becoming a “waste society” rather than a well-to-do society: the waste that people produce litters our streets and is not always in the bins. As stated in De Feo and Napoli (2005) [1], about 600 million tons of Municipal Solid Waste (MSW) per year, corresponding to a daily production of 1.6 kg per capita, are produced in the countries of the OECD (Organization for Economic Cooperation and Development). The generation intensity is continuously growing in these countries, with the highest values in the richest countries, testifying an indivisible link between the levels of affluence and quantity of waste produced. Waste could be considered the final product of a special production chain: wealth, consumption, waste. The wealthier the society, the greater the

consumption; the greater the consumption, the more waste produced. By 2020, we could be generating 45% more waste than we did in 1995 [1].

Figure 1. Schematic life cycle of waste generation [1].

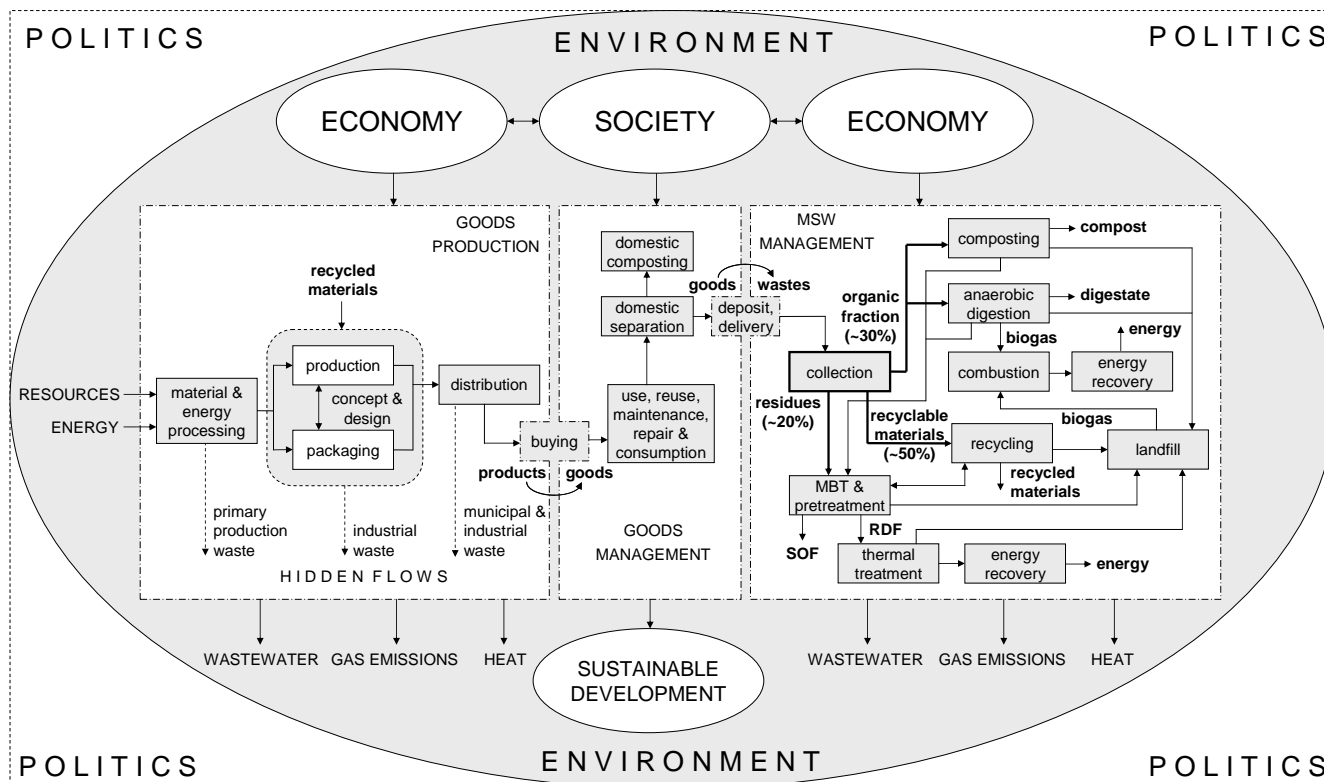


Figure 1 proposes the schematic life cycle of waste generation. The scheme is composed of three sections: (1) firstly, the attention is focused on how and which wastes are generated in the production of goods; (2) secondly, the scheme describes the citizens’ management of goods purchased; (3) finally, the scheme represents units, connections, and products of a MSW management system.

According to Ayres and Simonis (1994) [2], the first part of the proposed scheme for life cycle waste generation could be referred to as “industrial metabolism”. Between economy goods management and society goods management, there is the buying phase, which is the gate to “society metabolism” [3]. A purchased product can be used, reused, maintained, repaired and, finally, consumed, depending on its nature and composition. All the material produced can be usefully separated at home in three fractions: organic fraction (putrescibles), recyclable materials (recyclables) and residues (rest-waste fraction [4,5]). In rural areas, the organic fraction (food scraps, yard trimmings) can be conveniently used to produce homemade compost for the garden (backyard composting). The domestic separation of end-use goods obliges the user to reflect on his consumption model, daily behavior and personnel power as a consumer.

After the domestic separation phase, the resident has to transfer the separated materials to the MSW manager through the hands of collection workers. It is exactly at this stage that an end-use product changes its status and property becoming a waste. Its nature and composition remains the same. Changing the nature, the responsibility passes from the resident/user/consumer/waste producer to the waste manager. This transfer can be performed in several ways corresponding to the various waste

collection models. With the collection phase, the several collection fractions enter into the MSW management system, which requires a holistic approach, encompassing a life cycle understanding of products and services. This in turn requires different specialisms to be involved in the investigation and analysis of an integrated waste management system [6].

All over the world, communities have designed various forms of payment methods for solid waste collection services: trash bag, sticker or can/cart [7]. Usually, environmental taxes are determined nationally and waste disposal programs are worked out by each municipality [8]. In general, if recyclers pay consumers for recyclable items and pay higher prices for items with higher value, consumers would be willing to pay more up-front for products designed to be recyclable [9].

One of the crucial elements of a successful MSW policy is that the competent Local Authority (municipality, district, province, *etc.*) has to be able to link the environment to the economy, reinforcing that they are not mutually exclusive. In this sense, MSW has to be seen as a resource [10]. Moreover, it is essential to investigate social factors affecting the public's behavior during their implementation [11,12].

In the light of the theoretical analysis performed, the principal aim of this paper is to analyze and compare the opinions and awareness of citizens and kerbside collection workers on domestic separation and collection of MSW by means of two structured questionnaires in the city of Mercato San Severino (about 22,000 people), in Campania Region, in Southern Italy. It is important to point out that the Campania Region is an area suffering from a serious solid waste emergency that has lasted over 16 years [13,14]. It is the culmination of a process of the insufficient implementation of European waste legislation for which Italy has repeatedly been condemned by the European Court of Justice. In particular, the images of heaps of rubbish in the streets of Naples and other nearby cities were impressively documented by the international press [14]. On the contrary, the municipality of Mercato San Severino has adopted an effective kerbside collection system since 2001, guaranteeing more than the minimum level of recycling required by the Italian legislation. Moreover, as explained afterwards, the municipality of Mercato San Severino adopted a pay-as-you-throw program (PAYT) during 2005 (citizens are charged for the collection of MSW based on the amount they throw away). At the same time, a MSW separated collection center was realized. It was called an "environmental center".

The specific objectives of the research were the following:

1. critically evaluate the public opinion of citizens between the different areas, type of buildings, and social characteristics of the respondents (age, sex, marital status, occupation, education level);
2. identify and explain any differences of awareness between the different areas, type of buildings, and social characteristics of the respondents;
3. examine and evaluate the main shortcomings and suggested improvements of the separate collection system according to the respondents;
4. evaluate what citizens think about the waste collection workers;
5. evaluate what collection workers think about the citizens;
6. examine and evaluate the main shortcomings and suggested improvements of the separate collection system according to the collection workers.

2. Material and Methods

2.1. Characteristics of the Study Area

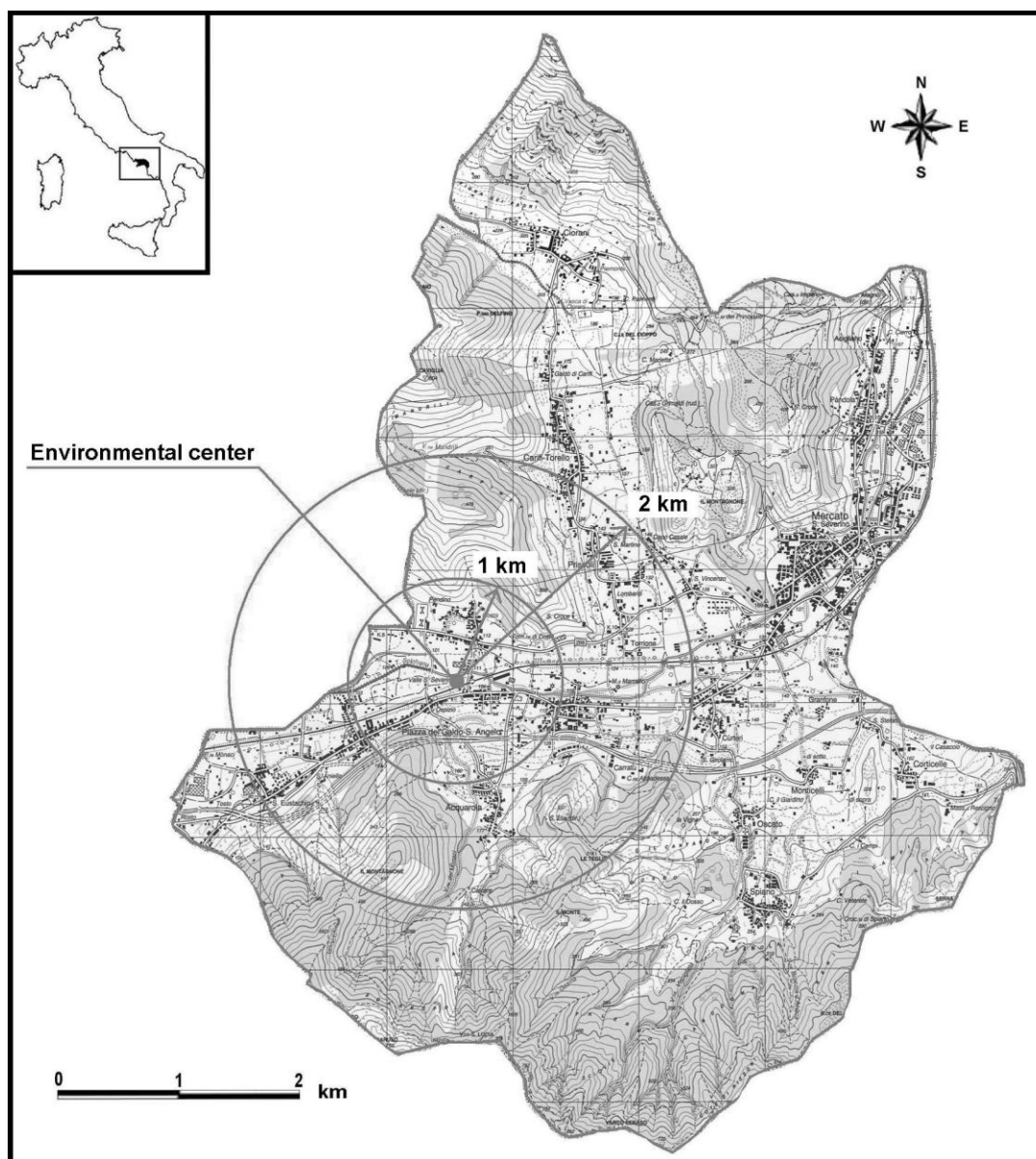
The questionnaires were administered in the city of Mercato San Severino in the District of Salerno, Campania Region, in Southern Italy (Figure 2). The following are the principal data on Mercato San Severino: 21,385 inhabitants (01/01/2009, Italian National Institute of Statistics), 41.0 km², 517 inhabitants/km² population density.

The areas under study are schematically shown in Figure 2. The city was divided into three areas. The first area is one kilometer from the environmental center. It contains the environmental center as well as an urban wastewater treatment plant corresponding to an equivalent population (PE) of approximately 170,000 inhabitants. It is medium densely populated and urbanized, with the presence of people with peasant origins, as well as high- and low-rise buildings (especially blocks of flats and cottages). The second area is between one and two kilometers from the environmental center. It is low densely populated and urbanized, with the presence of high- and low-rise buildings (especially detached houses and block of flats). Finally, the third area is over two kilometers from the environmental center. It includes the center of the municipality which is more densely populated, more urbanized, with the presence of modern high- and low-rise buildings (especially blocks of flats and detached houses).

MSW is collected by means of a separate kerbside collection system in the city of Mercato San Severino. In particular, MSW is separated in the following components: putrescibles for composting, paper and cardboard, glass, aluminium and other metals, plastic, non-recycling residues for RDF production, bulk refuses and Waste Electrical and Electronic (WEEE), used clothing and, finally, hazardous MSW. Each MSW component is directly collected near the home of every resident except for bulk refuse and WEEE which are collected on demand. The householder that does not separate MSW has to pay the maximum amount corresponding to the total surface area of his home and the number of household members. Whereas, if the householder separates MSW and disposes of the various materials near his home, putting them in the corresponding bag with the relative label, respecting the schedule, he (or she) receives a discount proportional to the amount of recyclables. In particular, the collection worker with an optical reader scans the bar code relating to the householder/customer as well as the particular recyclable. Moreover, the householder can increase the amount of the discount by directly delivering the recyclables to the environmental center where they are weighed.

The recycling rate averaged less than 38% in 2001 and up to around 62.5% in 2008. The Italian legislation was based on a minimum level of recycling of 25% to reach and exceed no later than March 2001, 35% no later than March 2003, extended until to December 2006, 40% no later than December 2007, 50% no later than December 2009 and finally, 60% to overtake no later than December 2011. Thus, the municipality of Mercato San Severino has to be considered as a “needle in a haystack” because it has always respected the rules in terms of the minimum percentage of separate collection and especially because it is one of the few municipalities adopting the PAYT system in Southern Italy.

Figure 2. Localization of the municipality of Mercato San Severino, where the questionnaires were administered during 2009 (District of Salerno, Campania Region, Southern Italy).



2.2. Questionnaires

The questionnaire submitted to the citizens consisted of five parts, with 20 questions ($Q_{c,i}$) as shown in Table 1. The first part of the questionnaire contains “Preliminary questions”, with the day of the interview, the place of the interview and the type of building where the household members was interviewed as well as the personal details such as age, sex, marital status, level of occupation and education. The second part (questions $Q_{c,1}$ – $Q_{c,6}$) were questions to verify the opinion of the sample population on the adopted separate collection program (“Opinion”). The third part (questions $Q_{c,7}$ – $Q_{c,10}$) was aimed at verifying the citizens environmental knowledge (“Awareness”). The fourth part (questions $Q_{c,11}$ – $Q_{c,18}$) were questions to analyze the principal problems of the separate collection

program as well as the suggested improvements. Finally, the fifth part (questions $Q_{c,19}$ – $Q_{c,20}$) was aimed at evaluating the citizens relationship with the collection workers (“Relationship with workers”).

Table 1. The questionnaire submitted to the citizens (English translation and adaptation).

Section	No.	Question	Answers
Preliminary questions		Day of the interview	
		Place of the interview	
		Type of building	Block of flats, Detached house, Cottage
		Age group	14–18, 19–30, 31–50, 51–65, >65
		Sex	Male, Female
		Marital status	Married, Single
		Level of education	Nothing, Primary school, Middle school, High school, Degree
	Occupation	Student, Housewife, Manual worker, Office worker, Professional, Retired, Unemployed, Other	
Opinion	Q _{c,1}	Do you separate MSW? (If the answer is “No” go to question Q ₆)	Always, Often, Sometimes, Never
	Q _{c,2}	Why do you separate MSW?	It is useful, I’m obliged, All people do, I do not know
	Q _{c,3}	Is the separate collection a challenging task?	Much, Enough, Not much, For nothing
	Q _{c,4}	How often do you encounter difficulties in separating MSW?	Always, Often, Sometimes, Never
	Q _{c,5}	What is the principal difficulty that you encounter?	Understand in what bag to put the waste, Find a safe place to leave the bag in the street, Breakage of bag for putrescibles, Other
	Q _{c,6}	Why you do not separate MSW?	It is useless, It is too demanding, I do not have time, Nobody separates waste
Awareness	Q _{c,7}	Do you know that there is an environmental center in Mercato San Severino?	Yes, No, I’m not interested
	Q _{c,8}	What is the average daily production of MSW per capita in your municipality?	10 g, 100 g, 1 kg, 10 kg, I do not know
	Q _{c,9}	What is compost?	A special container for MSW collection and transport, A particular chemical compound deriving from waste, A rich black soil obtained by the decomposition of food waste and brown waste, I do not know
	Q _{c,10}	What does RDF mean?	Recycling Domestic Facility, Refuse Derived Fuel, Reuse Domestic Facility, I do not know
Problems and improvements	Q _{c,11}	What is the main problem you encounter in transferring waste to the street?	The collection hours are too rigid, Waste remains too long in the street, Breakage of the bags due to strays, Atmospheric phenomenon, Other
	Q _{c,12}	How do you think this problem can be solved?	

Table 1. Cont.

Section	No.	Question	Answers
	Q _{c,13}	Are you willing to adopt two new 50 liter containers for both rest-waste and recyclables?	Only for recyclables, Only for rest-waste, For both of them, No
	Q _{c,14}	If the answer to the previous question is “yes”, why?	
	Q _{c,15}	If the answer to the question Q ₁₃ is “no”, why?	They take up further space, It is a further waste of time, Increasing of difficulties, Other
	Q _{c,16}	Are you worried about the presence of bags hanging up in the street?	Yes, No, It makes no odds to me
	Q _{c,17}	Do you have the perforated container for handling putrescibles?	Yes, No, I do not remember, I do not know what this container is
	Q _{c,18}	How do you deposit putrescibles in the street?	Mater-Bi bag* in the container, Normal bag in the container, Only in Mater-Bi bag*, Only in normal bag, Directly in the container without any bag
Relationship with workers	Q _{c,19}	How do you rate the work of the kerbside collection workers?	Excellent, Good, Sufficient, Poor, Very poor
	Q _{c,20}	If the answer to the previous question is “Poor” or “Very poor”, what is the main problem that you encounter?	They skip some shifts, They are not scrupulous in handling materials, They are ill-mannered towards our recommendations, Other

* Mater-Bi bags are certified biodegradable and compostable in accordance with international regulations (EN13432, ASTM 6400).

The citizens questionnaires were administered by means of anonymous door to door interviews (doorstepping) conducted by an undergraduate student of the Faculty of Engineering of the University of Salerno by means of two sides of A4 in order to get through the questions quickly and not take up too much time. The interviewer (showing an identity document) approached people by saying who he was and his organization, emphasizing that he was not selling anything. Moreover, he showed people his survey, explaining that it was short and hopefully not put them off answering questions. Finally, he explained that the questionnaire was anonymous and what happened to their views and where the information was going.

The questionnaire submitted to the collection workers consisted of four parts, with 14 questions (Q_{w,j}) as shown in Table 2. The first part of the questionnaire contains “Preliminary questions” with the day of the interview and the place of the interview. The second part (questions Q_{w,1}–Q_{w,5}) was aimed at evaluating the workers’ relationship with the citizens (“Relationship with citizens”). The third part (questions Q_{w,6}–Q_{w,9}) were questions to analyze the principal problems of the separate collection program. Finally, the fourth part (questions Q_{w,10}–Q_{w,14}) were questions to analyze suggested improvements.

Table 2. The questionnaire submitted to the collection workers (English translation and adaptation).

Section	No.	Question	Answers
Preliminary questions		Day of the interview	
		Place of the interview	
Relationship with citizens	Q _{w,1}	Have you verified an increase in the level of participation of citizens toward the separate collection program since 2001 until now?	Yes, No, I do not know
	Q _{w,2}	Do you receive complaints from citizens during your work?	Always, Often, Sometimes, Never
	Q _{w,3}	If the answer to the previous question is “yes”, what kind of complaints?	Related to your work, Related to the separate collection system, Against local authority, Other
	Q _{w,4}	How do you rate the quality of the relationship with the citizens?	Excellent, Good, Sufficient, Poor, Very poor
	Q _{w,5}	If the answer to the previous question is “Poor” or “Very poor”, what is the main problem that you encounter?	They are ill-mannered towards our recommendations, They do not respect the schedule, They put a label for a material on a bag related to another material, They incorrectly deposit putrescibles in the street, Other
Problems	Q _{w,6}	What is the main problem you encounter in collecting recyclables?	There is no label on the bag, Wrong label, The bags do not contain recyclables, They hang the bag in a remote area, Other
	Q _{w,7}	What is the main problem you encounter in collecting putrescibles?	Only in Mater-Bi bag*, Only in normal bag, Directly in the container without any bag, Normal bag in the container, Other
	Q _{w,8}	When you collect putrescibles, do you take the container or the Mater-Bi bag* directly out of the container?	The container, The Mater-Bi bag*
	Q _{w,9}	What is the main problem you encounter in collecting rest waste?	It is contained in normal bag, They hang the bag in a remote area, The bag is too heavy, The bag contains recyclables and/or putrescibles, Other
Improvements	Q _{w,10}	Do you think that adopting a new 50 liter container for rest-waste is a good idea?	Yes, No, I do not know
	Q _{w,11}	What is the reason of your reply to the previous question?	
	Q _{w,12}	And if the same container is used for recyclables, as well?	Yes, No, I do not know
	Q _{w,13}	What is the reason of your reply to the previous question?	
	Q _{w,14}	Do you have some suggestions to improve the quality of the separate collection program?	

* Mater-Bi bags are certified biodegradable and compostable in accordance with international regulations (EN13432, ASTM 6400).

The workers' questionnaires were administered by means of anonymous interviews conducted by the same undergraduate student by means of one side of A4. The interview technique was the same adopted for the household members. The interviews were taken in the street where the workers were operating or directly inside the environmental center.

2.3. Construction of the Samples of People and Workers to Interview

Only inhabitants not less than 14 years old were considered in this study. This number was equal to 18,251 (01/01/2009, Italian National Institute of Statistics). A sample of 221 people was interviewed (corresponding to a confidence level of 95% and a confidence interval of 6.55%). Therefore, a 1.2% sample of the population was adopted. The sample was casually extracted depending on the household components the interviewer found at home in the three investigated areas. In relation to the collection workers, sixteen were interviewed corresponding to about the 75% of them.

2.4. Reported Characteristics of the Household Member Respondents and Investigated Areas

During the doorstepping activity, 366 attempts were performed obtaining 120 successes (opened doors), corresponding to 32.8%. While, 221 household members were interviewed obtaining a rate of 1.84 respondents/number of opened doors. In particular, 48.0% of opened doors were in blocks of flats, 29.4% in detached houses and, finally, 22.6% in cottages. The average age of the respondents was 41.2 years. The respondents were 51.6% male and 48.4% female. The percentage of married respondents was 56.1%. A sort of education level (EL) can be calculated for each area by summing the values obtained multiplying the years of study of each educational qualification by the corresponding percentages of respondents. In particular, as reported in De Feo *et al.* (2005) [15] and De Feo and De Gisi (2010) [14], the following age durations were adopted: 0 years for people that had no education, 5 years of study for people having a primary school level, 8 years for people with a middle school level, 13 years for people having a high school education and finally, 18 years for those with a university degree. The EL of the total sample was 11.8 years of study. In terms of occupation, the following was the composition of the sample: 31.2% students, 12.7% housewife, 7.2% manual workers, 10.0% office workers, 10.0% professional, 10.0% retired, 7.2% unemployed and, finally, 11.8% other occupations (teachers, business-men and managers).

One kilometer from the environmental center, during the doorstepping activity, 85 attempts were performed obtaining 27 successes (opened doors), corresponding to 31.8%. While, 58 household members were interviewed obtaining a rate of 2.15 respondents/number of opened doors. In particular, 53.4% of opened doors were in blocks of flats, 36.2% in cottages and, finally, 10.3% in detached houses. The average age of the respondents was 37.6 years. The respondents were 55.2% male and 44.8% female. The percentage of married respondents was 50.0%. The EL was 11.0 years of study. In terms of occupation, the following was the composition: 36.2% students, 12.1% housewives, 17.2% manual workers, 5.2% office workers, 10.3% professionals, 3.4% retired, 8.6% unemployed and, finally, 6.9% other occupations.

In the area between one and two kilometers from the environmental center, during the doorstepping activity, 138 attempts were performed obtaining 44 successes (opened doors), corresponding to 31.9%. While, 68 household members were interviewed obtaining a rate of 1.55 respondents/number of

opened doors. In particular, 50.0% of opened doors were in detached houses, 32.4% in blocks of flats and, finally, 17.6% in cottages. The average age of the respondents was 44.8 years. The respondents were 51.5% male and 48.5% female. The percentage of married respondents was 61.8%. The EL was 12.8 years of study. In terms of occupation the following was the composition: 19.1% students, 7.4% housewives, 5.9% workers, 16.2% office workers, 11.8% professionals, 11.8% retired, 7.4% unemployed and, finally, 16.2% other occupations.

In the area over two kilometers from the environmental center, during the doorstepping activity, 143 attempts were performed obtaining 49 successes (opened doors), corresponding to 34.3%. While, 95 household members were interviewed obtaining a rate of 1.94 respondents/number of opened doors. In particular, 55.8% of opened doors were in blocks of flats, 26.3% in detached houses and, finally, 17.9% in cottages. The average age of the respondents was 40.9 years. The respondents were 49.5% male and 50.5% female. The percentage of married respondents was 55.8%. The EL was 11.6 years of study. In terms of occupation the following was the composition: 36.8% students, 16.8% housewives, 2.1% workers, 8.4% office workers, 5.3% professionals, 12.6% retired, 6.3% unemployed and, finally, 11.6% other occupations.

3. Results and Discussion

3.1. Citizens' Opinion

In this section the results relating to the “opinion” questions are presented and discussed. In particular, differences among the areas, types of building, and social characteristics of the respondents are emphasized. The opinion of the citizens was collected by means of the questions $Q_{c,1}$ – $Q_{c,6}$. Table 3 proposes the results of the application of a chi-square test of independence on the “opinion” questions in order to state whether the differences are statistically significant.

With $Q_{c,1}$, the following question was asked to the people interviewed: “Do you separate MSW?”. Only 2.3% of people declared that they never separate MSW. On the contrary, 81.9%, 10.0% and 5.9% were the percentage of people doing separate collection always, often and sometimes, respectively. The frequency of participation to the separate collection program was related to the distance from the environmental center. As a matter of fact, 84.5%, 91.2% and 96.8% were the percentages of people practicing always or often the separate collection in the circular area of 1 km from the environmental center, 1–2 km from the center and over 2 km, respectively. It is worth noting that, the farthest area from the center matches with the center of the city. The frequency of participation was greater in the isolated houses rather than the block of flats. In fact, 95.5% of people in detached houses and cottages did separate collection always or often, compared with 87.7% of household members in blocks of flats. This result agrees with the findings of Alexander *et al.* (2009) [16] who found this issue in the logistical problems of high-rise accommodation. A constant frequency of participation (always) was greater in the first working age group (31–50) with 90.8%, while it diminished in the second working age group (51–65), with 83.3%, and in the retired, with 85.2%. It was lower in the youngest groups with 61.9% for 14–18 and 76.7% for 19–30. 87.9% of women always did the separate collection compared with 76.3% of men. As stated in De Feo and De Gisi (2010) [14], in a traditional society like that in Southern Italy, this finding could be read as the result of the particular role exerted by the housewife category. Analogously, a constant participation was greater in the married category (87.9%)

rather than the singles. The motivation could be very simple: in a home where there are more people, it is easier to follow the separate collection program because the efforts can be divided among the several household members. Not considering the four people with no education level, the percentage of people who constantly followed (always) the separate collection program increased with education level (70.6% for primary, 73.4% for middle, 85.1% for high and 89.8% for degree). In terms of occupation categories, “other” performed the best, with all of the respondents always doing the separate collection. The result is quite interesting if we consider that the category was composed of teachers, business-men and managers. In fact, if it is normal that a teacher declares to constantly separate MSW, it is quite strange that business-men and managers have enough time to separate waste. Probably this is not the case, but in general it has been documented that respondents tend to exaggerate their waste management behaviors especially when these are perceived to be ethically sound [17-20]. On the contrary, only 62.5% of manual workers declared to always separate waste. This result has to be read along with the fact that the percentage of women (87.9%) always separating MSW is greater than men (76.3%), because the reason could be the same. In fact, it is unusual in Southern Italy to see a male manual worker putting waste in the street because this is considered to be a woman’s job. Finally, as shown in Table 3, with reference to question Q_{c,1}, the differences were not statistically significant for all the considered keys.

Table 3. Results of a chi-square test of independence on the “opinion” questions.

Question	χ^2 test	Key						
		Distance	Type of building	Age	Sex	Marital status	Level of education	Occupation
Q _{c,1}	Degrees of freedom	6	6	12	3	3	12	21
	p	0.1749	0.4735	0.2837	0.1294	0.0753	0.4108	0.1042
	χ^2	8.9766	5.5659	14.2719	5.6603	6.8965	12.4433	29.4221
Q _{c,2}	Degrees of freedom	6	6	12	3	3	12	21
	p	0.0502	0.8387	0.0380*	0.1400	0.2080	0.1504	0.0846
	χ^2	12.5829	2.7571	21.9537	5.4781	4.5482	16.9779	30.3811
Q _{c,3}	Degrees of freedom	6	6	12	3	3	12	21
	p	0.0018**	0.2283	0.3176	0.3089	0.3834	0.1206	0.0127
	χ^2	20.9954	8.1361	13.7400	3.5934	3.0538	17.8408	38.0593
Q _{c,4}	Degrees of freedom	6	6	12	3	3	12	21
	p	0.0051**	0.0831	0.1373	0.7578	0.5993	0.000001**	0.3310
	χ^2	18.5181	11.1767	17.3377	1.1801	1.8724	51.6923	23.2458
Q _{c,5}	Degrees of freedom	6	6	12	3	3	12	21
	p	0.0007**	0.0644	0.7672	0.1061	0.0775	0.5874	0.1938
	χ^2	23.1848	11.8911	8.2263	6.1157	6.8295	10.3255	26.3387
Average value of p		0.0465	0.3376	0.3088	0.2884	0.2687	0.2538	0.1453

* Significant at the 5% level ($p < 0.05$). ** Significant at the 1% level ($p < 0.01$).

With Q_{c,2}, the following question was asked to the people interviewed: “Why do you separate MSW?” Obviously, the aim of the question was to investigate the motivation of people in doing separate collection. 86.1% of the sample declared that they separate MSW because it is useful. The second option was “I’m obliged” with 9.7%, followed by “All people do it” with 3.2% and, finally, “I don’t know” with only 0.9%. Also for this question, the center of the city showed the greatest pro-environmentalist attitude with 89.5% of people believing it useful to separate MSW, compared to 85.5% and 81.8% in the first and in the second areas, respectively. In terms of the type of building, cottage was the best option with 89.8% of people believing it useful to do the separate collection,

followed by 85.3% for blocks of flats and 84.3% for detached houses. Thus, there was not a great difference among the three considered sub-keys. The slight difference in favor of cottages could be explained by citing a presumable greater propensity in favor of recycling for people living in the countryside. As shown in Table 3, the results of a chi-square test of independence suggested a significant association between the age of respondents and their answers to the question $Q_{c,2}$ ($p < 0.05$). In particular, the youngest age group expressed the greatest pro-environmental attitude with 95.0% of them believing it useful to separate MSW. On the contrary, the pro-environmentalism of the oldest age group fell to 63.0% with 29.3% of them believing to do the separate collection because they are obliged. In general, it can be stated that if a person does not understand the matter of something, he (or she) could retain it as an obligation to do that thing. In relation to “sex”, there was no difference, while in terms of marital status, 91.5% of singles believed it useful to separate waste, compared to 82.0% of married couples. 13.1% of married couples retained it an obligation to do separate collection. In this sense, singles expressed a more “free” behavior. The percentage of people believing separate collection useful increased with the education level. However, the maximum was obtained for those with a high school diploma, while for those with a degree registered the same percentage as those with only a primary school education. In particular, the following were the percentages: 50.0% for “nothing”, 76.5% for “primary”, 90.2% for “middle”, 90.6% for “high” and, finally, 79.6% for “degree”. It is worth nothing that, primary and degree level education, also registered a comparable percentage of people who retained it as an obligation to do the separate collection: 17.6% for primary and 16.3% for degree. The highlighted attitude is not strange because De Feo and De Gisi [14], in a nearby area, found that a high education level does not necessarily involve a high level of environmental awareness and/or more propensity to accept MSW facilities. In terms of occupation, the sub-key “other” continues to be the best pro-environmental category, with 96.2% choosing “It’s useful”. “Manual worker” also continues to be the worst category, with 60.0%. In general, it can be argued that “a manual worker has to work” and for him (or her) it could be nonsense to reflect on the fact if doing separate collection is useful or not.

With $Q_{c,3}$, the following question was asked to the people interviewed: “Is the separate collection a challenging task?”. For the majority of people, separate collection was not a challenging task. As a matter of fact, only 5.6% of them retained it more challenging, and 26.9% quite challenging. In terms of the areas, the third area, *i.e.*, over two kilometers from the environmental center matched with the center of the city, continued to show the best attitude with 8.0% of the people not believing separate collection challenging. The worst attitude was expressed by people living in the intermediate area with one out of two believing separate MSW challenging. As shown in Table 3, the results of a chi-square test of independence suggested a significant association between the distance from the environmental center and the respondents’ answers to the question $Q_{c,3}$ ($p < 0.01$). About three quarters of the people living in a block of flats (74.5%) retained separate collection not challenging to do. While, the same percentage dropped to 60.9% for isolated houses. The percentage of people finding separate collection more or quite challenging increased with age: 30.0% for the 14–18 age group, 25.4% for the 19–30 age group, 27.0% for the 31–50 age group, 38.3% for the 51–65 age group and, finally, 51.9% for the 65+ age group. Thus, more than one out of two of the oldest age group retained separate collection a challenging task. The obtained result can be explained in terms of the physical effort required to separate and especially to take MSW out of the home. 37.8% of men found the separate collection

challenging, compared with 26.7% of women. The difference (11.2%) is in terms of the constant participant to the separate collection program (11.5%). Thus, the motivation of the registered difference could be similar. No differences were found between married and single people. While, the higher the level of education, the lower the declared challenging level was, except for those with a degree: 75.0% for nothing, 52.9% for primary, 36.1% for middle, 20.0% for high and 38.8% for degree. Two occupation categories found separate collection a challenging task: professionals with 65.0% and manual workers with 60.0%. Moreover, 40.0% of retired people founding separate collection a challenging task - not a negligible percentage compared with the average value equal to 32.4% (it can be obviously attributed to the age). On the contrary, the occupation category declaring a low level of challenge was housewives with 17.9%, 23.1% for other and, finally, 25.4% for students. The results obtained for the housewives strengthen what has been stated about the particular role played by housewives in the traditional society of Southern Italy.

With $Q_{c,4}$, the following question was asked to the people interviewed: “How often do you encounter difficulties in separating MSW?”. All in all, more than three quarters of the people (75.9%) at least sometimes encountered difficulties in separating MSW. As shown in Table 3, the results of a chi-square test of independence suggested a significant association between the distance from the environmental center and the respondents’ answers to the question $Q_{c,4}$ ($p < 0.01$). In particular, the best declared behavior was registered for the center of the city, with 35.8% of people never encountering difficulties, compared with 21.8% in the nearest area to the environmental center (the first area) and only 9.1% for the intermediate area (the second area). An analogous situation was found for people living in a block of flats, with 29.4%, compared with people living in isolated houses, with 18.9%. Both in the center of the city and the block of flats, a greater circulation of information could be a possible interpretation of the phenomenon. In this sense, a sort of “center effect” or “condominium effect” can be introduced. People in the second working age group (51–65) were those with the lowest declared frequency of difficulties encountered, with 71.2%. While, on the contrary, the youngest age group reported the highest percentage with 85.0%. No differences were found between men and women. While, married couples were slightly better than singles: 73.0% for married and 79.8% for single. In terms of education level, the situation was exactly the same as registered for the challenging level. In fact, the higher the education level, the lower the frequency of difficulties encountered, except for those with a degree: 100.0% for nothing, 82.4% for primary, 78.7% for meddle, 72.9% for high and 73.5% for degree. Moreover, as shown in Table 3, the results of a chi-square test of independence suggested a significant association between the level of education and the respondents’ answers to the question $Q_{c,4}$ ($p < 0.01$). The occupation category that more frequently declared encountering difficulties were the same as the previous question: 93.8% retired, 86.7% manual worker and 80% professional. Analogously, housewives were the best category, with only 57.1% declaring to encounter difficulties at least sometimes. This is another confirmation of the particular role played by housewives.

With $Q_{c,5}$, the following question was asked to the people interviewed: “What is the main difficulty that you encounter?”. Breakage of the bag for putrescibles was the main difficulty encountered for 31.0% of the people, followed by other difficulties for 27.8%. Understand in what bag to put the waste for 25.5% and, finally, find a safe place where to leave the bag in the street for the remaining 16.7% of people. Both in the first and third area, the preferred option was “other”

with 27.3% and 38.9%, respectively. While, in the second area, the most cited difficulties were understand in what bag to put the waste and breakage of the bag for putrescibles both with 33.3%. In particular, as shown in Table 3, the results of a chi-square test of independence suggested a significant association between the distance from the environmental center and the respondents' answers to the question $Q_{c,5}$ ($p < 0.01$). "Other" was the most cited difficulty by people living in a block of flats with 32.4%. While, understand in what bag to put the waste was the preferred option in detached houses. Finally, breakage of the bag for putrescibles was the principal difficulty for 38.8% of people living in cottages. In terms of age, the most interesting thing is that the percentage of alternative answers ("other") increased with age: 20.0% for 14–18, 23.7% for 19–30, 27.0% for 31–50, 31.9% for 51–65 and, finally, 37.0% for 65+. On average, this percentage increases by 4.3% passing from one category to another. This result can be interpreted in the light of the fact that age is synonymous of experience and thus a greater number of known alternative options. In this sense, the sub-keys where the "other" option prevails could be considered as more informed (e.g., center of the city, block of flats, older groups, *etc.*). In terms of sex, "other" was the preferred option for males with 27.0%, while breakage of the bag for putrescibles was the first option for females with 37.1%. In terms of civil status, "other" was the main difficulty encountered by married couples with 33.6%, while understand in what bag to put the waste was the preferred option for single people (30.9%). Again, in terms of education level, people with a primary school education or a degree shared a similar opinion. In fact, 41.2% of the sub-key primary and 36.7% of the sub-key degree opted for "other" difficulties. While, the people with other education levels all opted for the breakage of the bag for putrescibles. Finally, in terms of occupation, the most "alternative" categories were: housewives with 50.0% indicating "other", retired with 36.4% and office workers with 31.8%. Also in this case, the role of housewives was clearly highlighted.

With $Q_{c,6}$, the following question was asked to the people who declared to not separate MSW: "What is the main difficulty that you encounter?". Since they were only five out of 221 (2.3%) there is no sense doing a detailed analysis in terms of the keys and sub-keys. Lack of time was the most cited barrier.

3.2. Citizens' Awareness

In this section, the results relating to the "awareness" questions are presented and discussed. In particular, the differences among the areas, types of building, and social characteristics of the respondents are emphasized. The awareness of the citizens was collected by means of the questions $Q_{c,7}$ – $Q_{c,10}$. In particular, question n. 7 relates to local knowledge, while the other three questions are related to general knowledge about MSW production and management. Table 4 proposes the results of the application of a chi-square test of independence on the "awareness" questions in order to state whether the differences are statistically significant.

With $Q_{c,7}$, the following question was asked to the people interviewed: "Do you know that in Mercato San Severino there is an environmental center?" 85.1% of people knew of the existence of the environmental center. The main percentage of people informed was obviously that of the nearest to the environmental center, with about 90.0%. No difference was found in terms of the type of building. Considering the key "age", people in the two working age groups were the more informed with 90.8%

and 91.7% for 31–50 and 51–65, respectively. On the contrary, the youngest and the oldest age groups where the least informed about the presence of the environmental center with 76.2% and 77.8% for 14–18 and 65+, respectively. No difference was found in terms of sex, while, 88.7% of married couples were well informed compared to 80.4% of singles. This difference can be explained as the result of the exchanging of information in the family that constitutes a sort of surplus information effect compared to singles. The percentage of correct local information increased with the education level: 75.0 for nothing, 76.5% for primary, 81.3% for middle, 87.4% for high and, finally, 89.8% for degree. The greatest improvement was obtained passing from middle to high school with 6.1%, compared with 3.7% of average improvements. In terms of occupation categories, all of the office workers were perfectly aware about the presence of the environmental center, while the least informed were the retired (corresponding to the oldest age group) with 72.8% and students (corresponding to the youngest age group) with 74.0%. Again, the performance of housewives was good with 92.9%. Moreover, as shown in Table 4, the results of a chi-square test of independence suggested a significant association between the occupation and the respondents' answers to the question Q_{c,7} ($p < 0.05$).

Table 4. Results of a chi-square test of independence on the “awareness” questions.

Question	χ^2 test	Key						
		Distance	Type of building	Age	Sex	Marital status	Level of education	Occupation
Q _{c,7}	Degrees of freedom	4	4	8	2	2	8	14
	p	0.0669	0.6784	0.3366	0.3872	0.2232	0.4758	0.0397*
	χ^2	8.7792	2.3130	9.0676	1.8975	2.9994	7.5770	24.5149
Q _{c,8}	Degrees of freedom	8	8	16	4	4	16	28
	p	0.3450	0.9203	0.0016*	0.3403	0.2811	0.0121*	0.1658
	χ^2	8.9685	3.2124	37.9065	4.5194	5.0608	31.3505	35.1408
Q _{c,9}	Degrees of freedom	6	6	12	3	3	12	21
	p	0.2352	0.1278	0.0570	0.8318	0.4339	0.0026*	0.0220*
	χ^2	8.0398	9.9251	20.5705	0.8735	2.7376	30.2063	35.9849
Q _{c,10}	Degrees of freedom	6	6	12	3	3	12	21
	p	0.0064*	0.4452	0.3209	0.6425	0.0934	0.0043*	0.0245*
	χ^2	17.9160	5.8062	13.6899	1.6751	6.4079	28.7583	35.5529
Average value of p		0.1634	0.5430	0.1790	0.5504	0.2579	0.1237	0.0630

* Significant at the 5% level ($p < 0.05$). ** Significant at the 1% level ($p < 0.01$).

With Q_{c,8}, the following question was asked to the people interviewed: “What is the average daily production of MSW per capita in your municipality?” All in all, only 37.1% of people correctly answered the question, with an identical percentage preferring to answer “I do not know”. The same question was asked to the people of Nocera Inferiore, in the same District of Salerno, by De Feo and De Gisi [14], obtaining 56.9% of correct answers. This result is quite surprising because the city of Mercato San Severino manifested a greater pro-recycling attitude than Nocera Inferiore, but, in general, doing something does not necessarily involve a detailed understanding of what you are doing. Moreover, comparing the social characteristics of the two samples, the sample of Mercato San Severino presents a considerably greater percentage of students (36.8%) than Nocera Inferiore (22.0%).

In any case, the average age of the two samples was comparable: 41.2% for Mercato San Severino and 43.7% for Nocera Inferiore. In terms of distance from the environmental center, the best results were obtained for the first (43.1%) and third (41.1%) areas. Thus, the least informed were the people in the intermediate area (26.5%). In order to emphasize the positive effect exerted by the circulation of information existing both around the environmental center and city center, a sort of “center effect” can be evoked for the awareness, analogously to the phenomenon observed in terms of the opinions and attitudes. In terms of the type of building, no significant difference was observed and, thus, in this case the extension of the “condominium effect” to the awareness is not possible, at least for this question. In relation to the key “age” only the sub-key 19–30 passed the barrier of 50.0% registering a good 53.3%. On the contrary, only 4.8% of the youngest age group and 22.2% of the oldest age group gave the correct answer, confirming the tendency stated by De Feo and De Gisi (2010) [14]. Moreover, as shown in Table 4, the results of a chi-square test of independence suggested a significant association between the age of respondents and their answers to the question $Q_{c,8}$ ($p < 0.01$). No significant difference was found between males and females, while singles (41.2%) were better than married couples (33.9%). In terms of education level, only people with a degree passed the barrier of 50.0% (51.0%). On the contrary, the least informed were those with no educational level (25.0%) and people with a middle school education (23.4%). In particular, as shown in Table 4, the results of a chi-square test of independence suggested a significant association between the educational level and the respondents’ answers to the question $Q_{c,8}$ ($p < 0.05$). In terms of occupation, only two categories exceeded 50%: unemployed with 68.9% and professional with 54.6%. On the contrary, the least informed were the retired with 13.6% in accordance to the findings of De Feo and De Gisi (2010) [14].

With $Q_{c,9}$, the following question was asked to the people interviewed: “What is compost?”. All in all, 51.1% of the people correctly answered the question compared with only 33.8% registered by De Feo and De Gisi (2010) [14] in Nocera Superiore. This result could be explained by the more agricultural attitude of Mercato San Severino. In accordance to the “center effect”, the percentage of correct answers was greater in the first (53.4%) and third (52.6%) areas and lower in the intermediate area (47.1%), while in terms of building type, the percentage was higher where it was possible to practice backyard composting: 55.0% in isolated houses and 47.3% in blocks of flats. In terms of age, the youngest (33.3%) and the oldest (40.7%) age groups continued to be the least informed, coherently with the analogous findings of De Feo and De Gisi (2010) [14] for the same question. No difference was found both in terms of sex and civil status. While, as shown in Table 4, the results of a chi-square test of independence suggested a significant association between the level of education and the respondents’ answers to the question $Q_{c,9}$ ($p < 0.01$). As a matter of fact, the percentages of correct answers strictly increased with the education level: 0.0% for nothing, 29.4% for primary, 37.5% for middle, 58.6% for high and, finally, 67.3% for degree. The best improvement was registered passing from people with no education to people with a primary school education, obviously with 29.4%, compared to an average improvement between the several levels of 16.8%. As shown in Table 4, the results of a chi-square test of independence suggested a significant association between the occupation and the respondents’ answers to the question $Q_{c,9}$ ($p < 0.05$), as well. In particular, the best informed categories were other with 65.4%, and office workers and professionals both with 63.6%. On the contrary, the worst informed categories were the unemployed with 31.3% and retired with 41.0%.

With $Q_{c,10}$, the following question was asked to the people interviewed: “What does RDF mean?” All in all, 39.8% of the people correctly answered the question compared to 41.6% registered by De Feo and De Gisi (2010) [14] in Nocera Superiore. It is important to point out that the acronym “RDF” should be very famous in Campania Region, because the regional MSW management system was based on the functioning of seven RDF pressed-bales production plants (with a design capacity of more than two million tons/year) operating since 2001, but without any incinerators. This was the main matter of the dissemination of over eight million pressed-bales (around nine millions tons) scattered in several temporary disposal sites into the region [14,15,21]. Over the years, the media has highlighted this problem. However, as it is well known, the fact that something is known does not mean that the meaning of it is known. It is like taking hold of a package and ignoring its content [14]. In accordance to the “center effect”, the percentage of correct answers was significantly greater in the first (46.6%) and third (46.3%) areas and lower in the intermediate area (25.0%). In particular, as shown in Table 4, the results of a chi-square test of independence suggested a significant association between the distance from the environmental center and the respondents’ answers to the question $Q_{c,10}$ ($p < 0.01$). While, in terms of building, the percentage was higher in block of flats (43.4%) and diminished for isolated houses with 38.5% for detached houses and 34.0% for cottages. This result could be interpreted by assuming that “RDF” is not a rural subject, but is an argument of discussion in more populated areas. In terms of age, the youngest (23.8%) and the oldest (29.6%) age groups continued to be the least informed coherently with the analogous findings of De Feo and De Gisi [14] for the same question. No difference was found both in terms of sex and civil status. While, as shown in Table 4, the results of a chi-square test of independence suggested a significant association between the level of education and the respondents’ answers to the question $Q_{c,10}$ ($p < 0.01$). As a matter of fact, the percentage of correct answers strictly increased with the education level for this question: 0.0% for nothing, 11.8% for primary, 31.3% for middle, 44.8% for high and, finally, 55.1% for degree, being the only category exceeding the 50.0% barrier. The best improvement was registered passing from people with a primary school education to those with a middle school one, with 19.5%, compared to an average improvement between the several levels of 13.8%. As shown in Table 4, the results of a chi-square test of independence suggested a significant association between the occupation and the respondents’ answers to the question $Q_{c,10}$ ($p < 0.05$), as well. In particular, the best informed categories were other with 61.5% and professionals with 54.6%. On the contrary, the worst informed categories were manual workers with 25.0% and office workers and retired both with 27.3%.

The general citizens’ awareness can be evaluated combining the results of questions n. 8–10 using the procedure proposed by De Feo and De Gisi [14]. In practice, it is sufficient to take the average values of the correct answers obtained for every question and every sub-key. If the average percentage of the correct answers is less than 30%, the considered sub-key reveals a very poor level of awareness. If the average percentage is in the range 30–50%, the considered sub-key shows a poor level of awareness. If the average percentage is in the range 50–70%, the considered sub-key shows a sufficient level of awareness. Finally, if the average percentage is greater than 70%, the considered sub key shows a good level of awareness. All in all, the sample showed a poor level of awareness. In terms of distance from the environmental centers, all the areas showed a poor level but with a sort of “center effect”. As a matter of fact, the following were the obtained average level of knowledge: 47.7% for the first area, 32.8% for the second area and, finally, 46.7% for the third area. In terms of type of building,

no significant difference was found among block of flats, detached house and cottage. In fact, the average percentage of correct answers was in the range 40.7–44.1% (poor level). In relation to age, the youngest and the oldest age groups were the least informed, confirming the findings of De Feo and De Gisi [14]. In particular, the youngest age group showed a very poor level with 20.6%, while the oldest reported a poor level with 30.9%. The other three age subdivisions were in the range 45.1–49.4% (poor level). Both in terms of sex and civil status, no significant difference was found between all the sub-keys (male and female, married and single), all being in the poor level range. This result is in accordance with De Feo and De Gisi (2010) [14]. In terms of education level, people without any qualifications were in the very poor level with 8.3%, people with a primary school education were also in the very poor level with 25.5%, people with a middle or high school education were both in the poor level range with 30.7% and 47.9%, respectively. Finally, only graduates showed a sufficient level with 57.8%. The best improvement was registered both passing from nothing to primary as well as from middle to high with 17.2%, compared to an average improvement of 12.4%. De Feo and De Gisi [14], in the case of Nocera Inferiore, stated that in terms of education level, there were reduced differences of awareness among the several categories. Therefore a high educational level does not necessarily imply a high level of environmental awareness. On the contrary, in this case, a high education level implied a corresponding level of environmental knowledge. The registered difference could probably be explained due to environmental awareness being stimulated by the local conditions and in particular by the environmental policy of the local authorities. In terms of occupation, only two categories showed a sufficient level: other with 52.6% and professional with 57.6%. While the following categories were in a yellow range: unemployed (47.9%), office workers (43.9%), students (40.1%), manual workers (39.6%) and housewife (38.1%). Finally, only the retired showed a very poor level with 27.3%.

3.3. Problems and Improvements Suggested by Citizens

In this section, the questions related to the problems and improvements suggested by the citizens are presented and discussed. In particular, differences among the areas, types of building, and social characteristics of the respondents are emphasized. Problems and improvements of the citizens were collected by means of the questions $Q_{c,11}$ – $Q_{c,18}$. Table 5 proposes the results of the application of a chi-square test of independence on the questions $Q_{c,11}$ – $Q_{c,18}$ in order to state whether the differences are statistically significant.

With $Q_{c,11}$, the following question was asked to the people interviewed: “What is the main problem you encounter in transferring waste to the street?” All the keys and sub-keys were unanimous in pointing out the breakage of the bags due to stray animals as the main problem encountered in transferring waste to the street. As a matter of fact, in many municipalities of Southern Italy, the presence of stray dogs in the street is due to the widespread lack of public kennels. As shown in Table 5, the application of a chi-square test was significant for the following four keys out of seven: type of building ($p < 0.01$), age ($p < 0.01$), marital status ($p < 0.05$) and occupation ($p < 0.05$).

Table 5. Results of a chi-square test of independence on the questions related to the problems and improvements suggested by the citizens.

Question	χ^2 test	Key						
		Distance	Type of building	Age	Sex	Marital status	Level of education	Occupation
Q _{c,11}	Degrees of freedom	10	10	20	5	5	20	35
	p	0.2231	0.0079**	0.0018*	0.5268	0.0403*	0.1089	0.0263*
	χ^2	13.0111	23.9000	43.3601	4.1590	11.6263	28.0202	52.9620
Q _{c,13}	Degrees of freedom	6	6	12	3	3	12	21
	p	0.1373	0.2566	0.3642	0.1948	0.1979	0.2870	0.2075
	χ^2	9.7120	7.7556	13.0667	4.7037	4.6671	14.2178	25.9731
Q _{c,15}	Degrees of freedom	6	6	12	3	3	12	21
	p	0.0083**	0.5353	0.2864	0.8392	0.5720	0.0237*	0.6570
	χ^2	17.2817	5.0663	14.2281	0.8430	2.0022	23.5139	17.8737
Q _{c,16}	Degrees of freedom	4	4	8	2	2	8	14
	p	0.0165*	0.3234	0.5883	0.7447	0.2103	0.2918	0.0299*
	χ^2	12.1122	4.6653	6.5278	0.5896	3.1184	9.6322	25.5011
Q _{c,17}	Degrees of freedom	6	6	12	3	3	12	21
	p	0.0242*	0.4536	0.0164*	0.1778	0.1278	0.0140*	0.3506
	χ^2	14.5296	5.7346	24.6909	4.9193	5.6888	25.1699	22.8760
Q _{c,18}	Degrees of freedom	8	8	16	4	4	16	28
	p	0.8625	0.0963	0.0180*	0.3853	0.6166	0.0130*	0.2695
	χ^2	3.9396	13.4819	29.9971	4.1559	2.6578	31.1266	32.1229
Average value of p		0.2120	0.2788	0.2125	0.4781	0.2941	0.1231	0.2568

* Significant at the 5% level ($p < 0.05$). ** Significant at the 1% level ($p < 0.01$).

With Q_{c,12}, the following question was asked to the people interviewed: “How do you think this problem can be solved?” The analysis is limited to the main problem pointed out in the previous paragraph. In the first area 64.7% suggested a solution. In particular, two were the most quoted solutions: 33.4% suggested adopting measures in order to contrast the strays, while 27.3% suggested adopting a specific container to deliver each separate MSW component. In the second area, 55.8% suggested a solution. In particular, the most quoted solutions were the same of the first area: 50.0% suggested adopting a specific container to deliver each separate MSW component, while 12.5% suggested adopting a specific container to deliver each separate MSW component. In the third area 51.9% suggested a solution. In particular, the most quoted solutions were the same as the other two areas: 35.7% suggested adopting a specific container to deliver each separate MSW component, while 17.9% suggested adopting measures in order to contrast the strays. Comparing the presented results, the first area resulted having the highest percentage of suggested solutions for the considered problem. Adopting a specific container to deliver each separate MSW component was the preferred option. In the following, the analysis is completed considering the key “type of building”. In block of flats, 67.8% suggested a solution. In particular, two solutions were quoted the most: 32.5% suggested adopting a specific container to deliver each separate MSW component, while 25.0% suggested adopting measures in order to contrast the strays. In detached houses, 52.9% suggested a solution. In particular, two solutions were quoted the most: 50.0% suggested adopting a specific container to

deliver each separate MSW component, while 16.7% suggested reducing the time between delivery and collection. Finally, in cottages, 42.1% suggested a solution. In particular, two solutions were quoted the most: 37.5% suggested adopting a specific container to deliver each separate MSW component, while 25.0% adopting measures to contrast the strays. Comparing the results presented, the percentage of suggested solutions for the considered problem diminished going from the block of flats to detached houses and cottages, confirming a greater propensity toward the discussion evoked with the “condominium effect” as well as the fact that people living in isolated houses tend to be more reserved. Obviously, the analysis of the answers could be extended to all the other keys and sub-keys, but this is not the main aim of this paper.

With $Q_{c,13}$, the following question was asked to the people interviewed: “Are you willing to adopt two new 50 liter containers for both rest-waste and recyclables?” In the light of the answers given by the people that pointed out the breakage of the bags due to strays as the main problem, this question was particularly opportune. All in all, 51.6% of the people were not willing, while 48.4% were. Thus, there was a fifty-fifty split. In this sense, a specific informative campaign could be launched in order to strengthen public opinion on the utility of the suggested solution. In more detail, 30.0% were willing for both of them, 10.4% were only willing for recyclables and, finally, 9.1% were only willing for leftover waste. In terms of the areas, the first and the second areas were willing with 56.9% and 54.4%, respectively. In contrary, 61.1% of people in the third area were not. In relation to the type of building, both block of flats and detached houses were not willing with 50.9% and 56.9%, respectively. On the contrary, 54.0% of people living in cottages were, probably because the problem of strays is more diffused in rural areas. In terms of age as well as education level, there were no particular regularities in being inclined or not toward the adoption of a specific container. On the other hand, a significant difference was found both in terms of sex and marital status. In particular, 54.6% of males and 42.1% of females were willing, respectively. The fact that the majority of women were not willing could be due to the major physical effort perceived, in particular by the housewives category, which was, in fact, the occupation category with the highest percentage of opposition (67.9%). On the contrary, the most favorable category was manual worker with 81.2% because they are used to do physical things. Finally, in terms of marital status, 44.4% of married were willing compared to 53.6% of singles. Also in this case, the difference could be due to the role played by housewives. In any case, the analysis of the motivation of the answer to the question n. 13 is the aim of the following two questions.

With $Q_{c,14}$, the following question was asked to the people interviewed: “If the answer to the previous question is “yes”, why?”. The analysis is limited to two keys: areas and types of building. Both for the two keys and for all the sub-keys, the principal motivation was greater cleanliness in the street. The people who gave a motivation were 17 out of 37 (37.8%), 14 out of 33 (51.5%) and 20 out of 37 (54.1%) for the first, second and third areas, respectively. Again, the center of the city was the most dynamic area: eight out of 17 (47.1%), six out of 14 (42.9%) and six out of 20 (30.0%) in the first, second and third areas, respectively, opted for the above cited motivation. Another characteristic of the “center phenomenon” is that it seems to widen horizons because there are more suggested motivations. In terms of type of building, the people who gave a motivation were 31 out of 52 (60.2%), 13 out of 28 (46.4%) and seven out of 27 (26.0%) for block of flats, detached houses and cottages, respectively. Again, the blocks of flats were the most dynamic type of building, confirming the presence of a “condominium effect”. The proportions opting for this motivation were 14 of 31 (46.6%),

five of 13 (38.5%) and two of seven (28.6%) in block of flats, detached houses and cottages, respectively.

With $Q_{c,15}$, the following question was asked to the people interviewed: “If the answer to question Q_{13} is “no”, why?”. Differently from the previous question, the analysis is extended to all the keys and sub-keys. The respondents manifested contrariety for the following reasons: “They take up further space” for 64.5%, “It’s a further waste of time” for 3.6%, “Increasing of difficulties” for 15.3% and, finally, “Other” for 16.2%. Taking up further space was the most cited barrier to the adoption of two new 50 liter containers for both leftover waste and recyclables for all the sub-keys, except for people with no educational level. In more detail, in terms of the areas, the additional space occupation issue was principally perceived in the first area with 84.6% and secondly in the second (51.7%) and third (62.6%) area. In particular, as shown in Table 5, the results of a chi-square test of independence suggested a significant association between the distance from the environmental center and the respondents’ answers to the question $Q_{c,15}$ ($p < 0.01$). In relation to the type of building, the percentage diminished going from the block of flats (68.5%), to detached houses (63.9%) and cottages (57.1%). This result can be simply interpreted because in a flat there is less space in comparison to isolated houses. In terms of age, the highest percentage was registered for 51–65 with 75.0%, while the lowest percentage was obtained for the youngest age group with 50.0%. No significant difference was registered for males (65.4%) and females (64.4%), while there was a certain difference between married people with 70.3% and singles with 57.5%. The latter difference could be explained by the fact that a single person probably has more free space than a married couple. In terms of education level, the highest percentage was obtained for people with a primary school education (85.7%), while the lowest was registered with people with no educational qualification (25.0%). Moreover, as shown in Table 5, the results of a chi-square test of independence suggested a significant association between the level of education and the respondents’ answers to the question $Q_{c,15}$ ($p < 0.05$). In relation to occupation, unemployed (85.6%) and retired (81.8%) were the categories which principally emphasized the limitation of space, while office workers (58.3%) and professionals (50.0%) were those who did not overemphasize this issue.

With $Q_{c,16}$, the following question was asked to the people interviewed: “Are you worried about the presence of bags hanging in the street?”. All in all, 51.6% of respondents were worried about the presence of bags hanging in the street near houses, containing recyclables, putrescibles or rest-waste. In terms of the areas, the percentage diminished going from the first area (58.6%), to the second (50.0%) and third (48.4%). Thus, the majority of the people in the center of the city were not worried, probably because there are more controls by local policemen. In particular, as shown in Table 5, the results of a chi-square test of independence suggested a significant association between the distance from the environmental center and the respondents’ answers to the question $Q_{c,16}$ ($p < 0.05$). In relation to the type of building, the highest percentages were for cottages (56.0%) and block of flats (54.7%). On the contrary, the majority of the people living in detached houses (56.9%) were not worried. This result could be explained because in detached houses, there are greater controls and opportunities to deliver bags in a safe and clean manner. Whereas outside blocks of flats, there is greater congestion and in the rural areas where there are cottages, the issue of strays is particularly serious. In terms of age, the majority of the two youngest groups were not worried, while 51–65 was the most worried group (56.3%). No significant difference was found in terms of sex.

While in relation to marital status, the majority of married couples were worried, with 54.8% compared to 47.4% of singles. In terms of education, the percentage of worried people diminished with the education level, being 75.0% for people with no qualifications and 42.9% for graduates (the only category with a majority of people not worried). In terms of occupation, the most worried categories were office workers with 68.2% and others with 61.5%. While, the least worried were manual workers with 37.5% and professionals with 41.0%. Finally, as shown in Table 5, the results of a chi-square test of independence suggested a significant association between the respondents' occupation and their answers to the question $Q_{c,16}$ ($p < 0.01$).

With $Q_{c,17}$, the following question was asked to the people interviewed: "Do you have the perforated container for handling putrescibles?". It is important to point out that using a perforated container for the domestic handling of putrescibles has three main advantages: (1) weight reduction of putrescibles due to water evaporation in the order of 20–30% (with a consequent economic saving); (2) significant reduction of smell related issues; (3) definitive solution of the Mater-Bi bag breakage issue. All in all, 72.3% of respondents answered "Yes" to the question. In terms of the areas of subdivision, the highest percentage was obtained for the center of the city with 80.0%, compared to 60.3% near the environmental center and 73.5% in the intermediate sector. Thus, on the whole, the "city center effect" prevailed. In particular, as shown in Table 5, the results of a chi-square test of independence suggested a significant association between the distance from the environmental center and the respondents' answers to the question $Q_{c,17}$ ($p < 0.05$). While, in relation to the type of building, a "rural effect" prevailed, being people living in cottages to have the major percentage with 78.0% compared to 72.3% in detached houses and 70.8% in blocks of flats. Since the use of perforated containers relates to the household rather than any individual in the household, the results related to the characteristics (age, sex, marital status, *etc.*) of the respondents are not relevant.

With $Q_{c,18}$, the following question was asked to the people interviewed: "How do you deposit putrescibles in the street?". All in all, 53.0% of the respondents gave the correct answer ("Mater-Bi bag in the container), while others wrongly delivered putrescibles: 22.3% using only a Mater-Bi bag, 12.2% putting a normal bag in the container, 9.5% only using a normal bag and, finally, 2.7% directly putting putrescibles in the container without any bag. In terms of the areas, the people living in the intermediate sector declared adopting the correct procedure with 57.4%, followed by the first area with 51.7% and third area with 50.5%. While, in terms of the type of building, better behavior was registered in cottages with 60.0%, compared to 51.9% for blocks of flats and 49.2% for detached houses. Thus, a "rural effect" seems to be prevailing for this topic. In relation to age, significant at the 5% level was obtained, as shown for the results of a chi-square test in Table 5. In particular, the best behavior was that of the second working group (51–65) with 70.8%, while the worst was that of the oldest with only 33.3%. Retired people probably prefer to adopt an easier solution or since the Mater-Bi bag has to be deposited in several eco-points they could have some issues in recovering the special bag. As a matter of fact, they have the greatest percentage of people usually putting putrescibles in a normal bag in the container with 33.3%. In contrast, no particular difference was found between both sexes or depending on marital status. On the contrary, the percentage "correctly behaving" increased with the education level. As a matter of fact, as shown in Table 5, the chi-square test gave a significant result at the 5% level. In particular, the highest percentage was for graduates with 59.2%, while people with no qualification reported 0.0%. Finally, in relation to the occupational

categories, the best declared behavior was that of the unemployed with 68.8% and housewives with 60.7%. On the contrary, the worse was that of office workers with 36.4% and the retired with 45.5%.

3.4. Relationship of Citizens with Workers

In this section the questions related to the relationship of citizens with the workers are presented and discussed. In particular, the differences among the areas, types of building, and social characteristics of the respondents are highlighted. The evaluations of the citizens were collected by means of the questions $Q_{c,19}$ – $Q_{c,20}$. Table 6 proposes the results of the application of a chi-square test of independence on the questions $Q_{c,19}$ – $Q_{c,20}$ in order to state whether the differences are statistically significant.

Table 6. Results of a chi-square test of independence on the questions related to the relationship with workers.

Question	χ^2 test	Key						
		Distance	Type of building	Age	Sex	Marital status	Level of education	Occupation
$Q_{c,19}$	Degrees of freedom	8	8	16	4	4	16	28
	p					0.0087*		
	χ^2	0.0177*	0.2231	0.0180*	0.6959	*	0.5315	0.1092
$Q_{c,20}$	Degrees of freedom	6	6	12	3	3	12	21
	p	0.2369	0.6197	0.9144	0.5800	0.8065	0.7832	0.3470
	χ^2	8.0159	4.4227	6.0339	1.9637	0.9784	8.0252	22.9433
Average value of p		0.1273	0.4214	0.4662	0.6380	0.4076	0.6573	0.2281

* Significant at the 5% level ($p < 0.05$). ** Significant at the 1% level ($p < 0.01$).

With $Q_{c,19}$, the following question was asked to the people interviewed: “How do you rate the work of the kerbside collection workers?”. All in all, 82.4% of the respondents expressed a positive judgment. In particular, the judgment was excellent for 14.5%, good for 47.1%, sufficient for 20.8%, poor for 17.2% and, finally, very poor for 0.5%. In terms of the areas, as shown in Table 6, the results of a chi-square test of independence suggested a significant association between the distance from the environmental center and the respondents’ answers to the question $Q_{c,19}$ ($p < 0.05$). In particular, the positive judgment increased going from the first area with 69.0%, to the second and third area with 83.8% and 89.5%, respectively. Thus, a city center effect prevailed on the results. In relation to the type of building, the best result was obtained for detached houses with 87.7%, while the worst judgment was that of the people living in cottages with 74.0%. In terms of age, as shown in Table 6, the results of a chi-square test of independence suggested a significant association between the of respondents and their answers to the question $Q_{c,19}$ ($p < 0.05$). In particular, the oldest age group expressed the highest level of satisfaction with 88.9%. This result is in accordance with the findings of other authors [18,22] who found that the level of satisfaction was higher amongst the oldest age group. No significant difference was found for sex. While, as shown in Table 6, although there were a reduced difference in terms of positive judgements between married (83.9%) and single (80.4%), the

results of a chi-square test of independence suggested a significant association between the marital status and the respondents' answers to the question $Q_{c,19}$ ($p < 0.01$). In terms of education, the percentage of positive judgments increased with the education level, being 75.0% for people with no qualifications and about 86.0% for both people with a high school diploma and graduates. Finally, in terms of occupation, the most satisfied categories were the retired with 90.9% and housewives 89.3%, while the lowest were manual workers with 62.5% and the unemployed with 68.8%.

With $Q_{c,20}$, the following question was asked to the people interviewed: "If the answer to the previous question is "Poor" or "Very poor", what is the main problem that you encounter?". They were 39 out of 221 (17.6%). The following percentages were given in decreasing order: "They are not scrupulous in handling materials" with 33.3%, "They skip some shifts" for 30.8%, "They are ill-mannered to our recommendations" for 23.1%, "Other" for 12.8%. The analysis is limited to two keys: areas and types of building. In terms of the areas, 50.0% of the people in the first area worried about the fact that the workers skip some shifts, while both in the second (54.5%) and third (40.0%) areas people mainly worried about the fact that the workers are not scrupulous in handling materials. In relation to the type of building, 44.4% of those living in a block of flats were worried about the fact that the workers skip some shifts, while both people living in detached houses (37.5%) and cottages (38.5%) mainly worried about the fact that workers are not scrupulous in handling materials. Obviously, this information could be useful for the separate collection program manager in order to improve the quality of the service.

3.5. Relationship of Workers with Citizens

In this section the questions related to the relationship of the workers with the citizens are presented and discussed. The evaluations of the workers were collected by means of the questions $Q_{w,1}$ – $Q_{w,5}$.

With $Q_{w,1}$, the following question was asked to the workers interviewed: "Have you verified an increase in the level of participation of the citizens towards the separate collection program since 2001?". Three quarters of the workers declared that they had verified an increase in the level of participation of citizens since 2001 (the year when the first version of the kerbside collection program started), while the remaining 25.0%, there was a fifty-fifty split between "No" and "I don't know".

With $Q_{w,2}$, the following question was asked to the workers interviewed: "Do you receive complaints from citizens during your work?". All of the workers declared receiving complaints from the citizens. This testifies the soundness of the workers. In particular, in terms of frequency of the citizens' complaints, the following results were obtained: sometimes, 81.3%, often, 12.5% and always, 6.3%.

With $Q_{w,3}$, the following question was asked to the workers interviewed: "If the answer to the previous question is "yes", what kind of complaints?". Analyzing the answers given by the workers, it transpires that in their opinion only 25.0% of the citizens' complaints are addressed to their work. This result is not surprising considering that 82.4% of the citizens expressed a positive judgment on the quality of the workers' work ($Q_{c,19}$). In the opinion of workers, the citizens principally point their finger against local authority (37.5%). Another 25.0% of the workers suggested that the complaints of the citizens are related to defects in the separate collection system. Finally, only 12.5% of the workers suggested other reasons.

With $Q_{w,4}$, the following question was asked to the workers interviewed: “How do you rate the quality of the relationship with the citizens?”. The workers were perfectly divided fifty-fifty in their judgment. In fact, 37.5% opted for good, 12.5% for sufficient, 37.5% for poor and 12.5% for very poor. No worker retained the quality of their relationship with the citizens to be excellent. Thus, the workers were more severe than the citizens. These results could be explained because the citizens are not perfectly aware of their behavior. In general, a lot of people repeat the same behavior daily without paying any particular attention. In this sense, the introduction of behavioral changing techniques would be appropriated [16].

With $Q_{w,5}$, the following question was asked to the workers interviewed: “If the answer to the previous question is “Poor” or “Very poor”, what is the main problem that you encounter?”. Half of the workers replied that the citizens were ill-mannered towards their recommendations, while 37.5% of them pointed out that the citizens do not respect the schedule and, finally, the remaining 12.5% of the workers stated that the citizens incorrectly deposited putrescibles in the street. In order to solve these problems, the focus group instrument [23] could be used in order to put citizens and workers in contact as well as to facilitate a cyclic circulation of correct information and good habits.

3.6. Problems and Improvements Suggested by Workers

In this section the questions related to the problems and improvements suggested by workers are presented and discussed. The evaluations of the workers were collected by means of the questions $Q_{w,6}$ – $Q_{w,14}$.

With $Q_{w,6}$, the following question was asked to the workers interviewed: “What is the main problem you encounter in collecting recyclables?”. The main problem pointed out by the workers is that the bags do not contain recyclables (56.3%). Secondly, they stated that citizens hang the bag in a remote area (18.8%). Finally, 25.0% of the workers gave alternative answers (“other” option). The main problem could be solved by a direct notification from the workers to the householder. Moreover, a general informative campaign could also be performed. As suggested by De Feo and De Gisi (2010) [14], the following informative options are available: adverts in the local press as well as radio and TV, bill-board campaigns, district magazines and newsletters, instructional leaflets delivered to households and/or at community points (such as libraries and doctors surgeries), roadshow initiatives, public consultation meetings, door-to-door promotional campaigns, talks to schools and other community groups (e.g., senior resident center) and websites, personal contact with individual householders, focus groups.

With $Q_{w,7}$, the following question was asked to the workers interviewed: “What is the main problem you encounter in collecting putrescibles?”. The main problem pointed out by the workers is that the citizens put putrescibles in a normal bag in the container (37.5%) rather than using a Mater-Bi bag in the container. Secondly, the workers stated that the citizens only used Mater-Bi bags without any container (25.0%) or gave “other” motivations. Finally, 12.5% of them pointed out that the citizens only used normal bags without any container. These findings can be compared with the results obtained with $Q_{c,18}$, by asking the citizens how they deposit putrescibles in the street. Among those that wrongly delivered putrescibles: 47.8% using only a Mater-Bi bag, 26.1% putting a normal bag in the container, 20.3% only using a normal bag and, finally, 5.8% directly putting putrescibles in the

container without any bag. Thus, in relation to the two main options, from the comparison, it is worth noting that the percentage of people putting putrescibles in a normal bag in the container was 37.5% in the opinion of the workers and 26.1% according to the answers of the citizens. While the percentage of citizens using only Mater-Bi bags without any container were 25.0% in the opinion of workers and 47.8% according to the answers of citizens. Also in this case, a direct notification from the workers to the householder has to be adopted. Moreover, a general informative campaign could also be performed.

With Q_{w,8}, the following question was asked to the workers interviewed: “When you collect putrescibles, do you take the container or the Mater-Bi bag directly out of the container?”. The majority of workers (62.5%) declared that they take the Mater-Bi bag directly out of the container. This question was asked in order to collect information to facilitate the delivering of putrescibles by the citizens. In fact, the citizens usually fasten the container to something because they are worried about the presence of strays.

With Q_{w,9}, the following question was asked to the workers interviewed: “What is the main problem you encounter in collecting rest-waste?”. An excessive weight of the bag to collect is the main problem for 62.5% of workers. In general, the bag containing rest-waste can be too heavy if it contains recyclables and/or putrescibles. In fact, this is pointed out by 12.5% of the workers. Also in this case, a direct notification from the workers to the householder has to be adopted. Moreover, an informative campaign could be performed focussing particularly on MSW production reduction.

With Q_{w,10}, the following question was asked to the workers interviewed: “Do you think that adopting a new 50 liter container for the rest-waste is a good idea?”. The majority of the workers (56.3%) did not know what they had to reply, while the remaining part (43.8%) did not agree with the proposal.

With Q_{w,11}, the following question was asked to the workers interviewed: “What is the reason of your reply to the previous question?”. The following were the main answers given by workers contrary to the adoption of a new 50 liter container for the rest-waste: “It would be a worse solution”, “I do not understand the usefulness of the proposal”, “Our work would get worse”, “The new container would occupy too much space”.

With Q_{w,12}, the following question was asked to the workers interviewed: “And if the same container is used for recyclables too?”. The result was that the percentage of the opposing workers increased from 43.8% up to 62.5%, while the percentage of “I don’t know” diminished from 56.3% down to 31.3%. Finally, only 6.3% of the workers agreed with the proposal. It is interesting to point out that 66.7% of “I don’t know” collected for Q_{w,10} became “No”, while the remaining 33.3% of “I don’t know” did not change. Analogously, 57.1% of “No” collected for Q_{w,10} did not change, 28.6% of “No” became “I don’t know” and, finally, 14.3% of “No” changed in “Yes”.

With Q_{w,13}, the following question was asked to the workers interviewed: “What is the reason of your reply to the previous question?”. The following were the reasons of “No”: diminishing of the percentage of separate collection, not understanding the usefulness of the proposal, too much space. While, the reason of the only “Yes” was that adopting a specific container would make work easier.

With Q_{w,14}, the following question was asked to the workers interviewed: “Do you have any suggestions to improve the quality of the separate collection program?”. The following were the workers suggestions listed in order of decreasing magnitude: “More suitable vehicles

and personnel” (31.3%), “More controls and penalties” (25.0%), “Nothing” (25.0%), “More information” (6.3%), “Improve relationship with local authority” (6.3%), “Do separate collection” (6.3%). Thus, first of all the workers require an improvement of the MSW management system in terms of more suitable collecting vehicles as well as an increase in the number of personnel in order to diminish their work load. Secondly, they suggested increasing the efficacy of controls and penalties to inflict on the citizens not respecting the rules. Only a minority of them pointed out the need to increase the information for citizens. This highlights a poor belief that the citizens not respecting rules are willing to change their bad attitudes. This fact has to be considered as a prejudice to eliminate through the focus group instrument aimed at putting workers and citizens around a table together in order to discuss and overcome any barriers and prejudices.

4. Conclusions

In conclusion, coherently with the specific objectives of the research set out in the introductory section, the following outcomes based on the obtained results can be pointed out:

1. People living in the center of the city or in a block of flats manifested the greatest pro-environmentalist attitude, probably as the result of a greater circulation of information. Only the frequency of participation was greater in the isolated houses rather than the block of flats due to the logistical problems of high-rise accommodation. A constant frequency of participation was greater in the first working age group (31–50), while the youngest (14–18) expressed the greatest pro-environmental attitude believing it useful to separate MSW. On the contrary, the pro-environmentalism of the oldest age group significantly diminished due to the fact that a not negligible percentage of them retained doing the separate collection because they are obliged. The percentage of people finding the separate collection more or quite challenging increased with the age. In general, men and women showed a similar opinion, but with some exceptions due to the particular role played by the housewives category in a traditional society like that in Southern Italy. In fact, the percentage of women who constantly separate MSW was greater than men as well as the percentage of men who found the separate collection challenging was greater than women. Also in terms of civil status, married couples and singles showed a very similar opinion, but with some exceptions due to the fact that in a home where there are more people it is easier to follow the separate collection program because the efforts can be divided among the various household members. As a matter of fact, a constant participation was greater in the married category. The percentage of people who constantly adhered to the separate collection program as well as the percentage of people believing it useful increased with the education level. Moreover, the higher the education level, the less challenging it was declared as well as the lower the frequency of difficulties encountered was, except for those with a degree. Teachers, business-men, managers and housewives were the best pro-environmental categories, while retired, manual workers and professionals showed the lowest level of pro-environmentalism. Breakage of the bag for putrescibles was the main difficulty encountered by people.

2. All the areas showed an insufficient level of awareness but with better results for people living in the center of the city and closer to the environmental center. In terms of the type of building, no significant difference was found among blocks of flats, detached houses and cottages. In relation to age, the youngest and oldest age groups were the least informed. Both in terms of sex and civil status, no significant difference was found with all the sub-keys. A high education level involved a corresponding level of environmental knowledge. In terms of occupation, the best categories were teachers, businessmen, managers and professionals.
3. All the keys and sub-keys were unanimous in pointing out the breakage of the bags due to strays as the main problem encountered in transferring waste to the street. There were two main solutions suggested by the citizens: contrasting the strays and adopting a specific container to deliver each separate MSW component. There was a fifty-fifty split of the sample in relation to the adoption of a specific container. In this sense, a specific informative campaign could be launched in order to strengthen public opinion on the utility of the suggested solution. The principal motivation in agreeing to the proposal was greater cleanliness in the street. Taking up further space was the most cited barrier to the adoption of new containers.
4. All in all, 82.4% of the respondents expressed a positive judgment of the kerbside collection workers. The workers were particularly appreciated in the center of the city. Regarding the type of building, the best result was obtained for detached houses. In terms of age, the oldest age group expressed the highest level of satisfaction. No significant difference was found for both sex and marital status. While, in terms of education, the percentage of positive judgments increased with the education level. Finally, in terms of occupation, the most satisfied categories were the retired and housewives, while manual workers and the unemployed were the least satisfied. The main complaint was that the workers are not scrupulous in handling materials.
5. All of the workers declared receiving complaints from the citizens but only 25.0% of the citizens' complaints are addressed to their work. The workers were divided fifty-fifty in judging the relationship with the citizens. Thus, the workers were more severe than the citizens.
6. The main problem pointed out by the workers of the collection of recyclables is that the bags do not contain recyclables. While, the main problem pointed out by the workers in collecting putrescibles is that the citizens put putrescibles in a normal bag in the container rather than using a Mater-Bi bag. An excessive weight of the bag to collect was the main problem encountered in collecting rest-waste. These problems can be solved by a direct notification from the workers to the householders. Moreover, a general informative campaign could also be performed. The majority of the workers were not contrary to adopting a new container to manage the MSW fractions better. In order to improve the quality of the separate collection system, the workers required more suitable collecting vehicles as well as more personnel in order to reduce their work load. Secondly, they suggested increasing the efficacy of controls and penalties to inflict on the citizens not respecting the rules.

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