



Sociological survey in a municipality with a high level separate collection programme in an area of historic unpopularity



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ABSTRACT

Behaviours, opinions and knowledge of citizens on MSW and separate collection were investigated in the city of Mercato San Severino (about 22,000 people), in the Campania region of Southern Italy that is an area suffering from a serious solid waste emergency that has lasted over 17 years due to the absence of treatment facilities. The image of heaps of rubbish in the streets of Naples and other nearby cities is only one side of the coin. Mercato San Severino has adopted an effective kerbside collection system since 2001 and a pay-as-you-throw program during 2005, guaranteeing more than the minimum level of recycling required by the Italian legislation. Structured questionnaires were administered to a sample of 500 people in 2010. Chi-square tests of independence were applied to state whether the differences were statistically significant (5%). About 90% of the sample stated that the success of the separate collection program was due to either the citizens and local authority or only the local authority, highlighting the leading role of the local authority and confirming that trust is the key to any social program success. The registered level of knowledge was better than that of nearby university students and citizens. The higher the education level, the greater the level of knowledge was.

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1. Introduction

Diverse studies have shown that knowledge about environmental issues affects behaviour (Guagnano et al., 1995; Chan, 1998; Corraliza and Berenguer, 2000; Steedman, 2005; Gunton and Williams, 2007) suggesting that greater awareness and/or understanding of environmental issues leads to a greater level of action in the form of pro-environmental behaviour (De Feo and Williams, 2013). This is also true for the municipal solid waste (MSW) management sector and specifically for the participation in separate collection programs (De Feo and De Gisi, 2010a). Since separate collection is at the early stages of MSW management, it affects all the subsequent phases (Cossu and Masi, 2013). A separate collection program is based on several rules that the citizen has to follow. If he (she) does not have the correct instructional information, it is impossible to correctly participate in the program (Alexander et al., 2009). Thus it is important to investigate the knowledge of the citizens involved in separate collection programs. Knowing their opinions is analogously important because from it we can

obtain information useful to change for the better their behaviours by means of educational programs (McKenzie-Mohr, 2000).

Education has a vital role in waste management especially for those areas of historic unpopularity in terms of waste emergency (Martin et al., 2006). The Campania region of south Italy is an area suffering from a serious solid waste emergency that has lasted over 17 years due to the absence of MSW treatment facilities as described in details by De Feo and De Gisi (2010a,b) and De Feo et al. (2013). However, the image of heaps of rubbish in the streets of Naples (the capital of Campania) and other nearby cities, impressively documented by the international press, is only one side of the coin. In fact, the municipality of Mercato San Severino, a city of about 22,000 people in the province of Salerno around 50 km far from Naples (under the same regional administration), has adopted an effective kerbside collection system since 2001, guaranteeing more than the minimum level of recycling required by the Italian legislation. Moreover, the city 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) and it is one of the few municipalities doing this in Southern Italy. Thus, the municipality under study has to be considered as a “needle in a haystack”. It is important to point out that the adoption of the PAYT program was strongly supported and promoted by the Mayor of Mercato San Severino whose popularity in

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Italy is strongly linked to the significant success of the separate collection program in an area of historic unpopularity. The Mercato San Severino waste management system has gradually become a model to be imitated by other cities in the Region because it always allowed both to effectively collect waste and to pay the waste fee with a cutting-edge system.

The principal aim of this work was to investigate (by means of a structured questionnaire) the behaviours, opinions and level of knowledge of citizens in a municipality with a high level separate collection programme in an area suffering from a serious solid waste emergency exploring the influence of personal attributes such as age, level of education and occupation.

2. Materials and methods

2.1. Characteristics of the study area

The questionnaires were administered during 2010 in the city of Mercato San Severino in the province of Salerno, in the Campania region of Southern Italy. The population of Mercato San Severino was 21,590 inhabitants (derived from the databases of the Italian National Institute of Statistics, Istat) that corresponds to a population density of 714.7 inhabitants/km² since its area is 30.21 km². The city has one principal centre (named “Mercato San Severino”) and twenty-one geographical districts. In terms of altitude, the maximum is 957 m above sea level (asl), the median is 520.5 m asl, and the minimum is 84 m asl. The municipal roads have a length of 48.8 km (corresponding to 1.61 km/km² and 2.26 km/1000 inhabitants).

MSW is collected by means of a separate kerbside collection system. MSW is separated in the following components: putrescibles for composting (three times a week), paper and cardboard (once a week), glass (twice a month), aluminium and other metals (once a week), plastic for recycling (once a week), non-recycling residues for RDF production (twice a week), bulk refuses and Waste Electrical and Electronic (WEEE), used clothing and, finally, hazardous MSW. Putrescibles and recyclables were sent out of the Campania region due to the absence of treatment facilities, whilst non-recycling residues were sent to an RDF production plant in the city of Battipaglia, in the Province of Salerno.

Each MSW component is directly collected near the home of every resident except for bulk refuse and WEEE which are collected on demand or directly delivered to a unique Environmental Centre (EC) of the city. As detailed described in [De Feo and De Gisi \(2010b\)](#), the city is composed by three main areas. The first area, containing the EC, is medium densely populated and urbanized, with high- and low-rise buildings (especially blocks of flats and cottages). The second area is between one and 2 km from the EC. 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 2 km from the Environmental Centre. It includes the centre of the city which is more densely populated, more urbanized, with the presence of modern high- and low-rise buildings (especially blocks of flats and detached houses). In general, due to its position, the EC is almost entirely used by car owners.

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 delivers the various materials near his (or her) 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 (see [Table 1](#), left). In particular, the collection worker with an optical reader scans the barcode relating to the householder/customer as well

as the particular recyclable. The householder can increase the amount of the discount by directly delivering the recyclables to the EC where they are weighed (see [Table 1](#), right). For example, citizens delivering plastics near their home obtain a discount of 0.40 €/bag (if the bag is totally filled, otherwise the worker records a volume fraction on his/her electronic device). With bags of 20 litres and a specific weight of 0.1 kg/litre, this amount corresponds to 0.20 €/kg of plastics that is 17% lesser than the discount obtained directly delivering the plastics to the EC (0.24 €/kg). [Fig. 1](#) shows the principal elements of the PAYT system of Mercato San Severino. No dispute so far has been registered with the implementation of the PAYT policy.

The recycling rate averaged less than 38% in 2001, between 50% and 55% in the period 2002–2004, 55–57% in the period 2005–2007, and between 62% and 64% in the period 2008–2010. 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 60% to overtake no later than December 2011. In general, if an Italian municipality falls short of the legislated recycling rate there is a penalty consisting in an increase of 20% of the fee for waste disposal in landfills ([Legislative Decree, 152/2006](#)). The municipality of Mercato San Severino has always respected the rules in terms of the minimum percentage of separate collection.

2.2. Questionnaire

The questionnaire was made up of two principal parts, as shown in [Table 2](#). The first part of the questionnaire contains the personal attributes such as age, sex, marital status, occupation as well as educational qualification. Other personal behaviours were investigated such as watching TV, reading newspapers, and using the Internet. The second part contains 21 questions (Q_i) related to the following social aspects: behaviour (8 questions: Q₁, Q₂, Q₃, Q₇, Q₈, Q₉, Q₁₁, Q₁₂), opinion (4 questions: Q₄, Q₅, Q₁₃, Q₁₉), specific knowledge of the separate collection system of the city under study (2 questions: Q₆, Q₁₀), general knowledge on MSW management (5 questions: Q₁₄, Q₁₅, Q₁₆, Q₁₇, Q₁₈), and finally two questions aimed at evaluating the questionnaire (Q₂₀ and Q₂₁).

Analogously to [De Feo and De Gisi \(2010a,b\)](#), the questionnaires were administered by means of anonymous street interviews conducted by two undergraduate students of the Faculty of Engineering of the University of Salerno by means of two sides A4 in order to get through the questions quickly and not take up too much time. The two interviewers (showing an identity document) approached people by saying who they were and their organization and emphasising that they were not selling anything. Moreover, they showed people their survey, explaining that it was short and hopefully not put them off answering questions. Finally, they explained that the questionnaire was anonymous and what happened to their views and where the information was going.

Since the sample of people was extracted to perfectly reproduce the population in terms of male and female percentages for each age subdivision, at the beginning, it was quite easy to find people belonging to the several age subdivisions. Going toward the end of each subdivision, it was more and more difficult to find the correct category of people. Therefore, the interviewers administered the questionnaire in places where it was easier to find people of the required age ([De Feo and De Gisi, 2010a](#)).

2.3. Construction of the sample of people to interview

As shown in [Table 3](#), the sample was extracted in order to reproduce the structure of the population of the city of Mercato San Severino in terms of male and female percentages for each

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