Chapter 13
Participatory Planning in Organic Solid Waste Management: A Backcasting Approach

Roberta Sisto, Edgardo Sica, Mariarosaria Lombardi and Maurizio Prosperi

Abstract The valorisation of the organic fraction of municipal solid waste (OFMSW) represents a relevant matter for local governments that may result in significant economic and environmental benefits. In particular, defining the most cost-effective and environmentally friendly OFMSW management strategy should be based upon the active involvement of local stakeholders in order to allow policymakers to take into account all possible environmental, social, technological, and financial OFMSW-related problems. In this framework the present chapter aims at outlining a long-term management plan for OFMSW in the case of the south-eastern Italian municipality of Foggia. To this end we have employed an adapted participatory backcasting experiment based upon a double-step procedure. By means of a focus group with experts on OFMSW management issues at the municipal level, we firstly identified the desired end point and the relative expected obstacles and opportunities. These were then discussed during a workshop organised with a group of local stakeholders, who identified and proposed all possible actions to be carried out in the short, medium, and long term to reach the identified end point. Such a participatory approach should contribute to reducing the bounded rationality and the subjectivity affecting decision-making processes as well as to broaden the knowledge base and to achieve a greater transparency in the definition of OFMSW management strategies.

Keywords Waste management · Participatory approach · Long-Term strategy

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13.1 Introduction

In recent years municipal solid waste management systems have received a great deal of attention from public opinion and policymakers due to the serious consequences that improper solid waste management can pose to human health and the environment. Indeed, uncontrolled or inappropriate waste handling can cause many problems in terms of water and soil pollution, as well as in terms of increased levels of greenhouse gas emissions, which contribute to climate change (Smith et al. 2015). In general terms municipal solid waste (MSW) represents the waste generated from households, institutions, and commercial activities (such as offices, schools, hotels, restaurants, hospitals, etc.) and includes food, garden waste, paper, plastic, textile, metal, and glass. Although its composition can change according to a number of factors (e.g., population density, economic well-being, seasonality), the organic fraction of municipal solid waste (OFMSW), resulting from food residues and garden waste, represents the highest proportion. OFMSW can reach up to 70% of the MSW composition, and its uncontrolled decomposition can cause contamination of the natural environment (Albanna 2013). Macias-Corral et al. (2008) report that the decomposition of one metric ton of OFMSW can release up to 110 m^3 of carbon dioxide (CO_2) and up to 140 m^3 of methane (CH_4). By contrast, OFMSW valorisation can result in relevant environmental benefits in terms of reduced greenhouse gas emissions and decreased leachate quantities. Moreover, from a life-cycle perspective, OFMSW can produce valuable compost, renewable energy, and biomaterials, depending on the processing method.

In this context finding an effective strategy for dealing with OFMSW represents a relevant challenge for local governments, which are commonly in charge of providing waste management services to their citizens. Indeed, to achieve an environmentally friendly and cost-effective OFMSW management strategy, able to respond to the needs of local communities', local policymakers have to take into account a number of environmental, social, technological, and financial factors in their decisions concerning collection services, disposal infrastructure, waste valorisation, and recycling programmes. The identification of the most appropriate OFMSW management strategy should, therefore, be based on the involvement of all stakeholders (Patel et al. 2007), preferably through a 'participatory approach'. These 'social experiments' involve bringing stakeholders together so that they can discuss specific issues, become informed about them, and arrive at a strategy for taking action (Webler and Tuler 2002). More specifically, our work is based on the hypothesis that stakeholders are usually keen, though sometimes reluctant, to express their opinions and to discuss them openly. Hence, they need a structured technique that is able to foster their participation, stimulate the interaction, and provide a coherent and effective synthesis of the process, leading to a robust strategy, which could represent consistent support for public decision makers. Therefore, the present chapter aims at defining a long-term management plan of OFMSW in the case of the south-eastern Italian municipality of Foggia by using an adapted participatory backcasting experiment (Sisto et al. 2015).

The structure of the chapter is as follows. Section 13.2 explores the definition, characteristics, and legislative framework of OFMSW. Section 13.3 discusses the participatory backcasting tool. Section 13.4 deals with the case study. Finally, Sect. 13.5 ends with some concluding remarks.

13.2 Definition and Characteristics of the Organic Fraction of Municipal Solid Waste (OFMSW)

In the European Union (EU), the concept of waste has evolved over time from material to be disposed of to a resource to be valorised. In this context some important goals about waste management have been integrated into the EU environmental policy through a very extensive and complex set of laws. In this chapter we refer only to the most relevant and recent regulations, such as the European Commission's *Roadmap to a Resource Efficient Europe* (European Commission 2011), the EU *Waste Framework Directive* (EU 2008), and the former *Landfill Directive* (EU 1999), which has driven in large part the Italian legislation in this sector. All the above regulatory tools promote a range of waste management targets and broader goals until 2020 (European Environmental Agency 2013).

The Italian definition of waste (which largely corresponds to the EU legislation) is included in the *Environmental Act* Legislative Decree no. 152 of 3 April 2006, as a replacement of Legislative Decree no. 22 of 5 February 1997 (the so-called *Ronchi Decree*). The latter (which ratified Directives 91/156/EEC and 91/689/EEC) has for almost a decade represented the basis for the Italian legislation on waste management by defining producers' duties and producing a number of implementation documents that represent the relative operating tools (DG Internal Policies of the Union Policy 2006, Presidente della Repubblica 1997, 2006).

The fourth part (art. 183) of the *Environment Act* defines waste, in compliance with the definition of the *Waste Framework Directive* 2008/98/EC, as follows: 'Any substance or object which the holder disposes of or intends or is required to dispose of'. The above definition is still founded upon the word *dispose*, as already happened in the *Ronchi Decree*. However, compared to the latter, the Legislative Decree of 2006 introduced a novelty in the model of integrated waste management, that is, the *time criterion*. In other words, it establishes the moment when the discipline of waste management must be applied, namely 'until the end of the recovery operations' (art. 181). As for the *Ronchi Decree*, waste is classified according to its origin (as urban or special) and considering its dangerousness (as dangerous or not). Art. no. 178 of Legislative Decree no. 152/2006 states that waste management is a public interest activity, and consequently, it must be managed in a rational and sustainable way. This is to ensure high-level protection of the environment as well as human health by means of efficiently using material and ensuring that the consumption of renewable and non-renewable resources (as well as its impact) does not exceed the 'carrying capacity' of the environment

(Presidente della Repubblica 2006; Reichel et al. 2013). Accordingly, the concept of integrated waste management includes all activities aimed at managing the whole supply chain of municipal waste, from production to final disposal or return within the consumption cycle through recycling. Waste, therefore, must be recovered or disposed of without causing any harm to human beings or the environment. Specifically, it should not pose any risk to water, air, soil, fauna, or flora; cause problems through noise or odours; or damage the landscape or places of special interest, protected in accordance with the current legislation (Bovino 2014). In order to comply with the above roles, waste management should occur according to the following hierarchy: reduce, reuse, recycle, recover energy, and dispose (Fig. 13.1).

Some years later, by ratifying *Waste Framework Directive* 2008/98/EC, Legislative Decree no. 205/2010 amended and integrated some parts of the former decree, establishing the priority through which any waste typology should be managed. In this framework specific attention was given to OFMSW (Ciceri 2012), which is defined in Art. 183 of Legislative Decree 205/2010 as 'biodegradable waste from gardens and parks, food and kitchen waste from households, restaurants, catering and retail premises and similar waste from food industry, differentially collected' (Presidente della Repubblica 2010). Such definition deals with OFMSW by separate collection, providing for upstream separation by the user. The effect is a relevant reduction of landfill disposal and, as a result, a significant improvement of the quality of the environment.

In Italy, OFMSW has constantly increased over recent years; according to the most recent data, it represented the main commodity fraction collected separately (about 43% of the total amount of urban solid waste) in 2014 (ISPRA 2015). Its degradation can cause a significant environmental impact due to odour emissions, methane release into the atmosphere, leachate into the soil, and consequent increases in relative restoration costs. For this reason it is crucial to avoid any

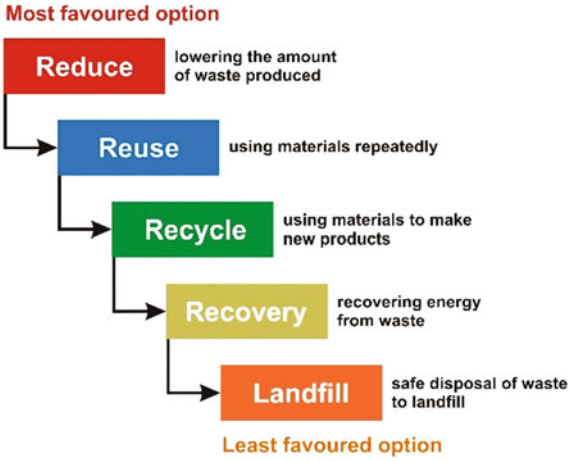

Fig. 13.1 Waste management hierarchy (*Source* SPI 2016)

possible contamination with other product fractions, directing the organic fraction flows to dedicated disposal systems (ISPRA 2015). Indeed, it is worth noting that Directive 99/31/EC (which was ratified in Italy by means of Legislative Decree no. 36/2003) established that by 2016 the biodegradable waste for disposal in landfills must be only 35% of the total biodegradable urban waste produced in 1995 (EU 1999; Presidente della Repubblica 2003; Placentino et al. 2013).

The set of legislative and technical management factors, together with the disposal requirements for OFMSW, has brought economic operators to identify appropriate technologies and facilities in order to treat/dispose of it. Indeed, OFMSW is the most polluting part of all urban waste yet, at the same time, the most valuable fraction since, when properly valorised, it may be used to produce green energy and organic matter for soil, thus improving its fertility. In this context, due to its high humidity, the technologies used for this purpose are aerobic and anaerobic digestion, which are based on biological processes (Atrigna et al. 2010). Such processes last, respectively, 90 and 40 days for obtaining the final product. The aerobic digestion plant leads to the production of compost (soil amendment), while the anaerobic one produces biogas (biofuels for heat and electricity generation and/or for the automotive sector) and digestate (soil amendment) (Vismara et al. 2010). Both technologies allow meeting the targets established by the *Ronchi Decree* in the framework of waste-integrated management in order to prevent waste production and promote the recovery of materials and energy.

13.3 A Tool for Involving Local Stakeholders in Decision-Making About Long-Term Issues

As highlighted in the introduction, this study is based on the literature on participatory approaches, proving the effectiveness of participatory tools in managing long-term, complex socio-technical issues (such as environmental ones) across various world settings (Giordano et al. 2005; Antunes et al. 2006; Lopolito et al. 2011; Sisto et al. 2015).

In addition, moving from a single decision maker to a multiple decision maker setting increases the complexity of the analysis. The decision maker requires a high-quality strategy definition to understand the problem and its complexities. To this aim participatory approaches can help to include multiple perspectives in the decision-making process.

Given the complexity of bioeconomic issues, the development of a bio-based industry is a long-term project. This characteristic makes the bio-based industry and the bioeconomy at large, surrounded by major uncertainties, both economic and social in nature.

In general, participatory tools refer to the involvement in planning and decision making of those involved in, affected by, knowledgeable of, or having relevant expertise in or experience of the issue at stake. Furthermore, the analysis takes into

account the conflicts amongst different interest groups that have diverse objectives, criteria, expectations, and so on. This increases the legitimacy of decisions taken, which can save time in the long run due to lower resistance amongst stakeholders (Thrupp et al. 1994). A helpful tool in decision-making is the development of scenarios.

In particular, scenarios can be used to analyse a large number of uncertain future environmental and socioeconomic challenges (Priess and Hauck 2014). In addition, as highlighted by Hagemann et al. (2016), they can support the establishment of policy frameworks and the decision making of policymakers who want to take into account a long-term perspective. There are several types of scenarios. Börjeson et al. (2006), for instance, distinguish three scenario categories: *predictive*, *explorative*, and *normative*.

13.3.1 Participatory Backcasting

Backcasting falls under normative scenarios. It aims to describe desired goals or futures and to analyse how they could be achieved. Since the publication of a seminal article on backcasting by John B. Robinson in 1982, backcasting studies have evolved in significant ways. Attention has especially focussed on areas of environmental and resources policy. Indeed, the whole question of sustainability has been addressed in terms of backcasting (e.g., Dreborg 1996).

Although backcasting was not intended to be a bottom-up participatory method, it has been adapted and is increasingly often used as a participatory method, which makes it possible to include local community and stakeholders' knowledge in the process (Carlsson-Kanyama et al. 2008; Kok et al. 2011; Svenfelt et al. 2011). In a participatory backcasting exercise, participants typically describe their desired end conditions and then work backwards towards milestones and policy actions that are needed to achieve that future (Salter et al. 2010).

There are two main characteristics that most backcasting methods have in common. The first is their normative nature, and the second is their 'working backwards from a particular desired future end point' (Robinson 2003, p. 842). This often translates into methods that at least include a first step, during which desirable images of the future are developed, and a second step, during which these images are analysed by working backwards (Höjer and Mattsson 2000).

The result is typically a number of actions fulfilling possible futures (scenarios) that present a solution to a societal problem, with a discussion of which changes would be needed in order to reach these future images. In other words, the aim of a backcasting exercise is to encourage searches for new paths along which development can take place (Höjer and Mattson 2000).

13.4 The Case Study

13.4.1 Description

Looking at national data from ISPRA (2015), the total amount of OFMSW in Italy recovered in composting and anaerobic digestion plants in 2014 amounted to approximately 4.9 million tons. More specifically, 4.4 million tons were delivered to composting facilities, while 454,000 tons were treated in anaerobic digestion plants. The organic fraction of the recycling was 83% of the total waste delivered to composting plants and 52% of that directed to anaerobic digestion. In the same year the per capita value of valorised OFMSW at the national level was equal to 80 kg/inhabitant, recording very different levels in the three major geographic areas: 124 kg/inhabitant in the north, 59 kg/inhabitant in the centre, and 34 kg/inhabitant in the south.

However, such a picture does not provide a faithful representation of the OFMSW collection since the reduced number of plants in the central and southern regions implies that large amounts of waste move to the northern Italian areas. At the moment there are 279 composting plants (179 in the north, 44 in the centre, and 56 in the south), while the anaerobic digestion plants for biogas production amount to 29 (26 in the north and 3 in the south). There are also 20 plants that combine the anaerobic and aerobic processes, mostly located in the northern part of the country. These systems are increasingly spreading, and in 2014, they treated a total of almost 928,000 tons of waste.

In this framework our investigation focuses specifically on the case of Foggia, an Italian municipality of approximately 150,000 inhabitants in the south-eastern region of Apulia (Fig. 13.2).

This municipality represents a very interesting case study because the management and utilisation of OFMSW is a desirable policy target. On the one hand, this purpose could represent a potential way to revitalise the local economy; on the other, it is a chance to cope with the energy objectives of the European Commission, which aims at a substantial reduction in overall dependence on petroleum feedstocks in the next decade. Despite this, until 2014, the dominant collection system in the municipality was an undifferentiated waste collection system; only at the end of 2015 did the local government begin to experiment with a separate collection system, starting in some peripheral residential areas. In such pilot neighbourhoods the old waste containers were replaced by smaller and differently coloured bins (black for general waste, brown for organic waste, green for glass, yellow for plastic and aluminium, and white for paper). Bins were provided with a lock whose key was delivered to any household. Presently the local government is going to expand the above separate collection system to the whole city, although the experiment has not been particularly successful thus far, and the installation and the use of the new bins is being opposed by some citizens.

Fig. 13.2 Location of the case study (*Source* Our elaboration 2016)

13.4.2 Application of the Participatory Backcasting Methodology

The study was conducted in the winter of 2016 by adopting an adapted participatory backcasting approach in a country (Italy) with little tradition of these types of participatory methods. Two main aspects were considered. First, as the duration of a workshop is a critical variable affecting the participation rate, the workshop length was limited to half a day. The structure of the proposed participatory approach aimed at increasing the participation and engagement by parties that otherwise might be badly represented or have no role in long-term strategy definition. Second, in order to maximise stakeholders' involvement, the methodology combined the workshop with questionnaires. This modified backcasting approach guaranteed that the same stakeholders would participate in the strategy definition (Sisto et al. 2015).

13.4.2.1 Stakeholders' Engagement

Involving a representative sample of the whole population was not the objective. Rather, the aim was to involve people committed to the management of OFMSW at the municipal level. In line with the literature (van Asselt and Rijkens-Klomp 2002; Quist and Vergragt 2006; Kok et al. 2011), we engaged one representative person from each of the five groups of local stakeholders (Table 13.1):

Table 13.1 Local OFMSW stakeholders

Stakeholders	Role
Municipal bodies	Integrate EU and national legislation into Foggia municipality laws
	Provide effective campaign models
Local public sector—local authorities, community wardens, agro-energy working groups, researchers, environmentalists	Coordinate joint work within and across local authorities for consistent approaches, share best practice, and maximise value for money
	Provide a holistic environmental approach, not just waste benefits Influence local communities, local government, and business sector
Residents and communities, school, university	Act as communication channels and engage with other residents to change their behaviour
Manufacturers and retailers	Address food waste issues in manufacturing and retail
	Prioritise socially and environmentally responsible investments
	Assess and follow environmental best practices
Disposal/treatment contractors (AMIU Puglia)	Provide local, cost-effective, and environmentally sound treatment facilities
	Provide accurate data and regular performance updates

Source Adapted from Lamb and Fountain (2010)

- Policymakers
- The public sector (e.g., local authorities, community wardens, schools, hospitals)
- Residents and communities
- Manufacturers and retailers
- Disposal/treatment contractors.

13.4.2.2 The Preliminary Focus Group with Experts

In order to uncover the final end point, obstacles, and opportunities affecting the management of food waste and its utilisation in the municipality of Foggia a focus group with experts on municipal OFMSW management was organised two weeks before the workshop with the stakeholders. The workshop aimed at identifying the desired end point of the strategy and the expected obstacles and opportunities. This procedure can be considered as a means not only to shorten the participatory workshop but also to engage a significant number of stakeholders.

The workshop was organised in a neutral environment, with the involvement of five experts, coordinated by one facilitator. The role of the facilitator was to balance the dialogue amongst the participants, avoiding excess leadership by just a few

members and helping the group to reach a good degree of consensus about the key concepts they discussed during the meeting.

First, a brief introduction to the research topic and the relevance of a participatory approach to building a long-term strategy was given. Following this the first focus question was: 'Regarding the area of Foggia, what kind of OFMSW management do you imagine for the future of this territory in the next twenty years, that is, in 2035?'. This open question enabled us to collect information about the experts' expectations and needs regarding the future of the area in which they work and live.

Consequently, the participants were asked to vote for one of three alternative future end points for the year 2035:

- Compost production
- Biogas and digestate production
- Production of bioproducts (i.e., products of organic origin with high added value).

Admittedly, these three options are not necessarily the only ways of defining the future of OFMSW management for the investigated area. They were based on knowledge that the authors had gained in previous research experiences (e.g., in the STAR* AgroEnergy EU Project) and meetings with experts on food waste management.

Answers were ranked to determine the end point that would be used in the workshop. The selected end point was *production of biogas and digestate*.

The same procedure was adopted to identify the most relevant opportunities and obstacles. We submitted a list of generally relevant influence factors derived from a bioeconomy literature analysis (Costello and Finnell 1998; Roos et al. 1999; Rosch and Kaltschmitt 1999; IEA 2003; McCormick and Kaberger 2007; Snakin et al. 2010; van Vliet and Kok 2015; Sisto et al. 2015), fostering (creating opportunities for) and obstructing (creating obstacles in the way of) the development of the bioeconomy, starting from OFMSW management. Participants were asked to rank, according to relevance, seven opportunities and seven obstacles. In addition, they could add obstacles and opportunities that they thought were missing from the list.

The most voted obstacles were as follow:

- Regulation barriers
- Excessive bureaucracy
- Lack of political clearness
- Credit access
- Social acceptance of industrial OFMSW transformation plants
- Poor institutional support
- Weak legislative coordination at different institutional levels.

The selected opportunities were as follow:

- Abundance of OFMSW
- EU public funding

- Technical-scientific support from research institutes and universities
- Growth of environmental concerns with attention to green solutions
- Use of digestate according to a circular economic scheme
- Demand for thermal energy for domestic and industrial use
- Priority of EU policies towards biofuels.

The results of this round were elaborated to define the structure of the backcasting workshop.

At the end of the focus group, participants were asked to fill in a short questionnaire about their perception of the agreeableness of the meeting.

13.4.2.3 The Backcasting Workshop

Some weeks later, at the beginning of February 2016, we organised a workshop with the OFMSW stakeholders of the municipality of Foggia. The seven participants sat around a table with a facilitator who guided the discussion and a collaborator who took notes about the atmosphere and interactions amongst the participants (Fig. 13.3).

First, participants were given an explanation of the backcasting approach. Then, they were asked to imagine travelling ahead in time to the year 2035 and to visualise the situation of Foggia municipality's waste management, where life is much less resource demanding and more sustainable than now. This was a way to introduce the most adequate atmosphere to present the expert focus group's results of the desired end point and the most relevant obstacles and opportunities. The participants introduced themselves and described their main concerns with respect to OFMSW management in the Foggia municipality. Then, they plotted the obstacles and opportunities selected in the previous focus group on a timeline (present 2016–future 2035).

Subsequently, the participants were provided three Post-its, on which they wrote down three possible actions aimed at mitigating/removing the obstacles or taking

Fig. 13.3 The stakeholders' workshop

advantage of the opportunities. This was an individual task that they completed in 10 min.

Finally, the participants briefly discussed each action and put them on the timeline drawn on a chart, starting from the present (2016) and continuing up to 2035. Several actions were redundant, and some were slightly modified, according to the comments and suggestions emerging during the discussion. In all cases a very high degree of consensus was obtained, and every action was approved by all participants.

These actions were put on the timeline (Fig. 13.4). If the participants thought that an action could deal with more than one opportunity or obstacle, they drew lines between them to show relationships. At the end of this step, a volunteer presented the group's results.

Finally, at the end of the workshop, an evaluation questionnaire was delivered to all participants in order to receive feedback on the process. On this questionnaire, which all the stakeholders completed anonymously, they were asked to express their opinion of the results of the workshop and the adopted methodology. This was done to measure the degree of consensus on the final choice, which could affect how well stakeholders support the final decision in the future and may reflect how well members believe their opinions are taken into account by their leaders and policymakers (Miller and Monge 1986).

In total the duration of the workshop was about two hours, and all participants expressed a positive opinion about the exchange of knowledge they had with the others. The results of the workshops and the details of the feedback are presented and discussed in the next section.

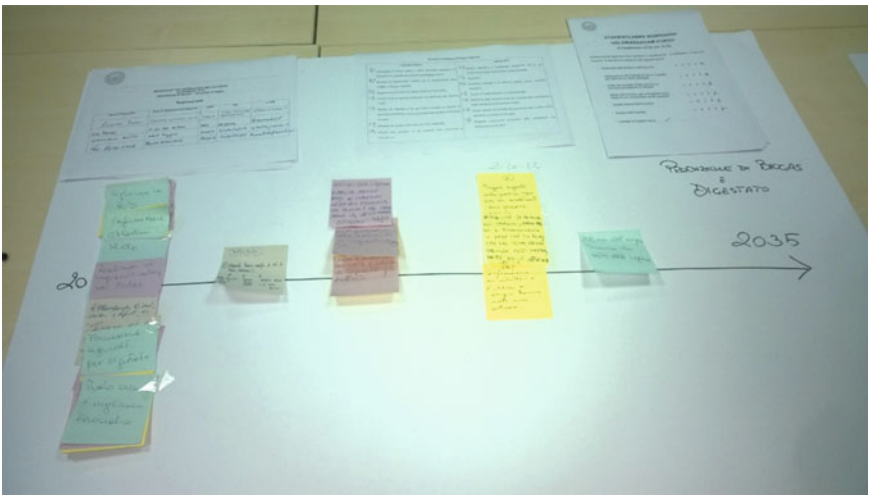

Fig. 13.4 Actions identified by the stakeholders during the backcasting workshop

13.5 Results

The proposed actions, approved by the participants during the discussion, are mostly concentrated at the beginning of the timeline as a consequence of the participants' awareness that several constraints are obstructing the developmental path and that opportunities could especially be captured in the mid- and long terms.

As follows, the main actions that emerged during the discussion are briefly described.

- Actions to be done in the short term:
  - (S-1) The differentiated waste collection should be improved, preferably through a door-to-door collection, whereby it would be possible to identify the people violating the correct disposal rules.
  - (S-2) The use of digestate deriving from anaerobic digestion processing of food waste should be encouraged for agronomic purposes. Targeted demonstrations and training actions should address farmers in their transition from the use of chemical fertilisers to digestate. In fact, at the moment, farmers are still not aware of the fertilising properties of organic matter, especially for large-field application (e.g., wheat, open-air tomato crops).
  - (S-3) The municipal waste agency should undertake a relevant investment to substitute obsolete waste bins with more efficient ones, taking into account the different types of users (e.g., household or restaurant/cafeteria) and different types of waste.
  - (S-4) Education campaigns should be targeted at local citizens, aimed at raising the awareness of the relevance of energy savings and a circular economy.
  - (S-5) Fines to citizens responsible for incorrect waste separation should be enforced. This is expected to promote the awareness of citizens regarding the relevance of waste separation, as well as possibly improve the quality of collected waste.
  - (S-6) Public–private partnerships should be promoted in order to take advantage of financial support for the promotion of innovative technologies for food waste collection and treatment.
- Actions to be done in the midterm:
  - (M-1) Information and communication campaigns targeted at local communities affected by the creation of food waste conversion plants. In particular, local communities should be made aware that the waste they produce can be converted into an economic resource only if: (a) the waste collection is properly disposed of (i.e., the waste is not contaminated by high polluting substances) and (b) most of the products and by-products obtained through the anaerobic conversion process are used by local users (e.g., electric and heating energy, digestate). In practice, visiting tours of farmers' associations

and local administrators to well-established plants could be organised to provide a real representation of best practices.
- (M-2) Creation of integrated platforms for the collection and treatment of food waste, to be mixed with other types of not-dangerous organic wastes, in order to create a stable feedstock suitable for anaerobic digestion.
- (M-3) Reinforcement of the role of the public university, playing a neutral role in the assessment of the public benefits and costs deriving from the activation of the full bioenergy value chain, from the collection of food waste through the conversion process until the full use of electric and thermal energy and the distribution of digestate for agronomic purposes. The university should promote scientific dissemination, as well as the creation of small-scale pilot plants, and should stimulate the public debate to emphasise the advantages of green technologies applied to food waste valorisation initiatives.
- (M-4) Substantial financial support provided by the regional government for the creation of treatment plants, as well as to support private firms for the valorisation of different types of wastes (e.g., glass, plastics, paper). The virtuous circle can be completed only if the waste is correctly differentiated and all types of waste are valorised.

- Actions to be done in the long term:
  - (L-1) Encouragement of the substitution of current sources of energy running manufacturing firms with (renewable) thermal or electric energy produced by food waste conversion plants.
  - (L-2) Definition of a long-term policy agenda aimed at both planning an integrated and comprehensive waste management strategy and promoting a sustainable development path.

At the end of the meeting, the participants were asked to express their opinion regarding the achievements of the focus group. As is shown in Table 13.2, participants expressed a very positive opinion, meaning that they were able to express themselves in a free and democratic environment.

13.6 Conclusions

Finding an effective strategy for dealing with OFMSW represents a relevant matter for local governments since OFMSW valorisation may result in significant environmental benefits in terms of reduced greenhouse gas emissions and decreased leachate quantities. However, the achievement of an environmentally friendly and cost-effective OFMSW management strategy should be based on the active involvement of all stakeholders, which would allow local policymakers to take into account the different environmental, social, technological, and financial OFMSW-related problems.

Table 13.2 Participants' opinions (n = 7)

	Counts of 'good' (score = 4)	Counts of 'excellent' (score = 5)	Mean score
Was the objective of the meeting clear?	3	4	4.57
Was the methodology adequate with respect to the strategy definition?	4	3	4.43
Do you think that the results of the meeting will provide some useful suggestions to policymakers?	4	3	4.43
Do you think that the meeting was a good opportunity to develop new relationships or to reinforce existing ones?	5	2	4.29
Was the meeting agreeable?	1	6	4.86
What is your opinion about the duration of the meeting?	4	3	4.43

Note The participants' opinions were evaluated through a Likert scale, defined as follows: 'insufficient' (1), 'sufficient' (2), 'moderately fair' (3), 'good' (4), and 'excellent' (5)

In this context the present chapter has aimed at defining a long-term management plan of OFMSW in the case of the south-eastern Italian municipality of Foggia by using an adapted participatory backcasting experiment based upon a double-step procedure.

The results of the proposed methodology are very encouraging. The participants were highly enthusiastic about the workshop. Moreover, the timeline could help policymakers to plan actions over time. This is a very important and relevant outcome, especially in areas where policymaking is negatively affected by poor governance or lack of institutional network coordination. In addition, other advantages of the proposed participatory approach could be summarised in:

- The reduction of bounded rationality and subjectivity affecting the decision-making process
- The enlargement of the knowledge base
- Greater transparency of the whole process.

However, it is important to highlight that because the results of a focus group with experts would condition the subsequent workshop, this is a very sensitive phase for both the respondents and the discussed topics because they could affect the following workshop and the quality of its results. Therefore, it is important to keep in mind a strong caveat: The quality of a decision is strongly dependent on the quality of the process that leads to it.

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