

Innovation for Sustainable Development by Educating the Local Community. The Case of an Italian Project of Food Waste Prevention

Sabrina Bonomi^{1(✉)}, Sara Moggi², and Francesca Ricciardi²

¹ eCampus University, Novedrate, Italy
sabrina.bonomi@uniecampus.it

² University of Verona, Verona, Italy
{sara.moggi, francesca.ricciardi}@univr.it

Abstract. Service oriented perspectives represent an opportunity of innovation and an answer to current challenges for social welfare, sustainable development and everyday life. The prevention of food waste requires new networked and collaborating competences, in the light of the increasing inefficiencies of modern economic growth models and the improvement of new paradigms for sustainable development. This research presents the case of a project that, while addressing food waste at the level of several organizations throughout the supply chain, implemented a recovering process to reduce food impairment. The project (R.e.b.u.s.) applies the efficiency system originally developed for school and university canteens to other food donors. In order to support this project, a far-reaching educational program for sustainable development was started in schools, universities and through public events. By educating the local community and enhancing processes that drive a change in behaviour, this initiative proved essential for the successful prevention of food waste.

Keywords: Value co-creation · Sustainability education · Italy · Sustainable development · Food waste

1 Introduction

The increasing attention on sustainable development contrasts with the inefficiencies of modern economic growth models, driving the development of new paradigms of services to improve the quality of life and cost efficiency.

Several studies have examined inefficiency in resource use, in particular considering the for-profit point of view and analysing tools and managerial approaches for a more sustainable production. Despite the wide literature on these issues, little is known about food waste prevention, related strategies, instruments and levers to gain an effective implementation. The main streams of research consider measures to prevent food waste by leveraging consumer's behaviour, production and supply chain management.

Our study enlarges the literature on food waste prevention by studying education for sustainable development (ESD) as a valuable way to address this problem. A well-designed educational initiative, in fact, allows strengthening and integrating the

competences of the parties that may be involved for value co-creation. The service science approach suggests taking advantage of the network of stakeholders in order to build a shared vision on the expected performance of a given service, and to design a new service system based on stakeholders' cooperation [1, 2]. The literature on service science often refers to educational services as particularly suitable to address this challenge [1].

Education can be seen as a very stimulating issue for service science studies and projects [3]. For this reason, in this paper we ask whether education can be a useful way to build a new perspective in order to create a more efficient eco-system for the food value chain. To this aim, we present the R.e.b.u.s. project, and focus on its educational initiatives, which are aimed to increase the awareness on food waste in the local community, starting in childhood. The core of R.e.b.u.s. activities, indeed, is to identify food waste in the area of Verona (Northern Italy) and to implement the process to reduce food waste through a network of several coordinated actors. Through the efficiency system developed by a non-profit organisation (NPO) supervising the project, and enabled by ICT, the food, instead of being wasted, can be shared with people affected by food poverty. The project was developed thanks to the network created by this supervising organization. With the aim to prevent food waste, R.e.b.u.s. is also promoting a far-reaching educational programme aimed to increase the awareness on waste. This programme embraces several initiatives involving local authorities and the local education system, engaging a wide number of subjects like teachers, students and managers. Our analysis of this case of ESD contributes to the literature by highlighting the role of service science to address food waste prevention and environmental sustainability, and provides insights to support similar initiatives.

The remainder of this study is structured as follows. In the next section, a brief overview of the European Union's recommendations, Italian legislation and local authorities' initiatives are described and then commented in the light of the service science approach. The methodology section lists the main steps carried out during this path of research, underlining the main features of the data collection phase and data analysis. The case study description concerns the origins, aims and peculiarities of the R.e.b.u.s. project, paying particular attention to the numerous educational aspects of the initiative. Finally, the conclusions of this research are presented.

2 Food Waste and Education for Sustainable Development

The studies on sustainable development strongly highlight the importance to satisfy both our, and the future generation's, needs [4]. As environmental, social and economic implications, the unsustainable use of resources and waste generation [5] enhance the priority of waste management from the final disposal of waste to actions that can prevent waste production [6].

The production of food waste impacts society from the agricultural to the manufacturing processes and from the household to the supply chain. Although food waste concerns are linked with a wide range of political, social and economic structures, the individual consumer demand has a power that, over time, can influence these structures,

driving the change to a more sustainable production, consumption and disposal [7]. In light of this, consumers are identified as subjects to educate regarding sustainable practices in order to prevent the surplus of food and food waste. By definition [8], “food losses or waste are the masses of food lost or wasted in the part of food chains leading to edible products going to human consumption”.

As presented by the Papargyropoulou et al.’s model [4], it is important to gather our efforts on food waste reduction, considering the waste hierarchy framework that presents levels in which the food, because of its nutritional properties, still has an economic and social value [9]. Moving from this model, our study adds a new item on the prevention dimension (Table 1), depicting how prevention of food waste can be promoted and made more efficient through a far-reaching program on education, involving the local community, non-profit organizations, elementary schools, higher education and local authorities.

Table 1. The food waste hierarchy, adapted from Papargyropoulou et al. [4].

Area of intervention	Actions
Prevention	Avoid surplus food generation throughout food production and consumption; Prevent avoidable food waste generation throughout the food supply chain and education
Re-use	Re-use food for human consumption through redistribution networks and food banks
Recycle	Recycle food waste into animal feed or via composting
Recovery	Treat unavoidable food waste and recover energy
Disposal	Dispose unavoidable food waste into engineered landfills with landfill gas utilization systems in place.

Because the first step is to recognise the individual behaviour as part of a collective change, education aims to increase the awareness of the citizens’ actions. As underlined by Redman and Redman [10], education plays a pivotal role in creating long-term changes [11, 12]. In this sense, the Education for Sustainable Development (ESD) can provide helpful tools to foster the change involving all the educational levels into a process of behaviour change. UNESCO declares that ESD “should be of a quality that provides the values, knowledge, skills, and competencies for sustainable living and participation in society” [13]. Under this perspective, it also becomes crucial to recognise the importance of ESD since childhood, considering children as young citizens [14] and educating them about sustainable citizenship regarding everyday life, including food consumption [15]. Furthermore, the introduction of sustainable development dimensions into the higher education programmes and projects would encourage the holistic handling of sustainable development issues; promote the development of ethical behaviours; motivate people to play their role in preserving natural resources, in the way they consume goods; foster building among participants on sustainability courses and projects; create awareness on sustainable development [16, 17]; and help managers of tomorrow to be more sensitive to sustainability issues [18].

3 The Analysis of the Legislative Context

The European Union (EU) has promoted several dispositions on food waste in all life stages [19] through an integrated product policy [20], resource efficiency initiative [21] and bio-economy support [22]. In particular the EU [21] explained its concerns on unsustainable European consumption—in which the food and drink value chain causes 17 % of greenhouse gas emissions and uses 28 % of the material resources—referring to the importance of a common effort for food waste reduction. In the milestones for 2020, the EU declared “incentives to healthier and more sustainable food production and consumption will be widespread and will have driven a 20 % reduction in the food chain’s resource inputs. Disposal of edible food waste should have been halved in the EU”. Furthermore, the EU stated “action to reduce food waste is the introduction of targeted awareness-raising, information campaigns and education programmes” [23].

The Italian government, through the Law n.155/2003, named the Law of the Good Samaritan, considers non-profit organisations that collect and distribute food to the poor as equal to the final consumer, based on the individual responsibility of the organisations that spontaneously decide to involve themselves in this activity. Before this law, these charities had to provide guarantees for the food donated (preservation of the food, transport, storage and use of the food) even after the delivery to the non-profit organisations. This imposition discouraged potential donors. On one hand, non-profit organisations have to manage the health and security of the food donated, from the harvesting to the delivery to the consumer, by deploying technical procedures and adequate equipment. On the other hand, donors have to be formally recognised as food business operators and be subjected to the national legislation on food safety, granting that the food donated is perfectly edible.

The economic and financial crisis has increased the number of people affected by poverty and social distress. The Veneto region dedicated the Law 11/2011 to tackling these problems through the redistribution of the surplus food. The aim of this law is to pursue specific actions: (1) to increase the quality of life of individuals and families in hardship situations; (2) to raise a nutritional culture; (3) to establish partnership networks between food companies, catering services and NPOs that redistribute still-edible food to people affected by food poverty; and (4) to develop IT systems to ease the food waste reduction and food redistribution between donors and non-profit beneficiaries. The Regulation n. 196/2012 formalised the constitution of a working group aimed at identifying local needs and strategies for food redistribution.

This group was composed of delegates from several NPOs involved in the management of food waste, such as the Italian Red Cross and Caritas. In light of the Regional Law, this group has worked on two fronts in order (1) to ensure and implement the amount of food for beneficiaries and (2) to rationalise and monitor the process of collection and (re) distribution of food in order to avoid an unequal distribution or production of waste. The regional working group was responsible for implementing the three phases of the programme: to develop a digital platform to coordinate donors and beneficiaries; to define common criterions of access to the programme; and to coordinate social marketing events, working inclusion and educational programmes.

Finally, regarding the local context of Verona, thanks to the evidences presented by R.e.b.u.s., local authorities have decided to reward the large retail (e.g., supermarkets) and catering (e.g., canteens) organisations that have a virtuous behaviour in the social, local context. If these organisations contribute to the prevention of food waste, redistributing food and meals produced, local authorities have approved a reduction (up to 80 %) on the payment of the local tax on the production of solid waste (TIA: Tariffa d'Igiene Ambientale). Through these organisations, all unsold products and undistributed, and edible, meals will be donated to non-profit organisations, helping disadvantaged populations in the local community.

4 The Lens of Service Science

The service science approach suggests leveraging the network of stakeholders in order to build a shared view on the expected performance of a certain service, and to consistently design a new service system and a roadmap for innovating services based on stakeholders' cooperation. Organizational inertia and resistance to change are taken into account to make the strategic choices between radical or incremental service innovations and periodically adjust the program [1, 2]. Looking through the lens of service science, the value realization from the R.e.b.u.s. project was dependent on a collaborative organizational dynamic, a purpose-built technical infrastructure and a data rich source for research and for the educational program. According to Lusch et al. [24], one of the primary reasons why people engage in co-production is for pure enjoyment—the psychic (experiential) benefits, coming from activities like education or learning a new skill. Looking at the cooperation among local authorities, enterprises and NPOs, coordinated by an association of social promotion that has the role of service integration, facilitated through an ICT tool, that involves numerous citizens (for example as consumers, beneficiaries or voluntaries), education can be a useful service to build a new perspective in order to create an eco-system more efficient in solving problems of food waste.

5 Methodology

The analysis on this case study was carried out by a participant observer directly involved in the project, who collected data from numerous sources, such as surveys, semi-structured interviews with the key-informants in the educational project and internal and external documentation.

The researchers employed the case study methodology to a particular initiative. This methodology helps researchers to understand a unique context and a complex phenomenon set within its real-world context [25]. The analysis of this case study was carried out longitudinally from 2008 to 2014 through a participant observation research conducted by one of the authors who was directly involved in the project, and by other two researchers involved as non-participant observers and interviewers. Participant observation constitutes a research strategy that “simultaneously combines document analysis, interviewing of respondents and informants, direct participation and observation, and introspection” [26]. In this sense, in our study, a wide range of sources were

available directly from the field of research, such as internal documents regarding the strategic decisions, the long and short plans on the use of resources and the reports provided to the several stakeholders involved in the project.

The data collection is further enriched by a number of semi-structured interviews and surveys with the key-informants involved in the project, such as teachers, managers and beneficiaries. The analysis of the numerous data collected was based on an interpretative approach [27] in the labelling phase on the educational aims of the R.e.b.u.s. project.

6 Case Study Analysis: R.E.B.U.S. and the Innovative Process

6.1 Origins of the Project and Current Scenario

The main idea for the R.e.b.u.s. project came from a group of people who observed a negative educational impact from the amount of food wasted inside the canteens of Verona's schools. Looking into the process, these people discovered that the local government spent public funds in three ways: buying food for school canteens, for garbage disposal and buying food, through charities, for poor people.

Consequently, it was created a partnership among the local government, companies that supply meals and manage waste, and non-profit organisations feeding people affected by food poverty in order to reuse the surplus of meals and to give it to the poor people. After doing an environmental analysis, it was shaped the process of food waste reduction, guaranteeing the hygienic and fiscal standards level. In light of the increasing complexity of the process and the number of subjects involved, a NPO, an association of social promotion, was introduced to supervise the entire process and to promote public meetings to discuss the results of this good practice, share knowledge on food waste reductions and educate citizens on their consumption behaviour.

Formally, the so-called R.e.b.u.s. project (it is an acronym that means *Recupero Eccedenze Beni Utilizzabili Solidalmente*, *eng. trad.* Re-use of goods in surplus, usable for charities) was started up at the end of 2008. Thanks to the local authorities' support and the local network created among public organisations, companies, and NPOs, it is possible to re-use unsold and/or unused goods that have a reduced market value, but that still have an intrinsic value, so can be perfectly used. Moreover, the donors involved could request a reduction on their taxes paid on solid waste. The goods transfer, consisting of mainly food, came from companies' donations to NPOs involved in the social assistance for people in marginal and uncomfortable situations. Regarding the educational aspects of the project, the programme called 'R.e.b.u.s. Informs' was started up in 2010. This specific programme considered several topics, such as waste reduction, correct nutrition, respect for the environment, subsidiarity and was addressed to children, students and citizens. Nowadays, the project is fully operational in the Verona area. Additionally, the supervisor supports other local networks in northern Italy, such as Vicenza, Padua, Rovigo, Bergamo and Mantua.

Focusing on the Verona area, in 2014, about 1,430 tons worth of food was reused, which is an increase of about 32 % compared with 2013; the economic value of the recovered food is about 1,800,000 euro. The companies involved in the project as donors of their surplus food, are fruit and vegetable markets; farms; the companies that manage the scholastic,

academic and hospital canteens; pharmacies; supermarkets; organisations of agricultural producers; and some occasional donors. The public organisations involved are the local government of Verona, the Province of Verona, the local health authority, the prefecture and an important role is also played by the municipal organisation responsible for waste logistic management. There are more than 70 NPOs involved, assisting over 60,000 people in situations of marginality or disadvantage. Thanks to the R.e.b.u.s. project, charities involved can save funds otherwise spent buying food, receiving about 80 % of their meals from donors and, in some cases, 100 %. The money saved through the project helps feed more subjects and develops additional social actions. Furthermore, with all of the vegetables and fruits as part of the food donations, the people attending the charities' canteens also receive highly nutritious, balanced meals.

6.2 Peculiarities of R.E.B.U.S

For non-profit organisations, the distribution of food to people in disadvantaged situations is a usual practice [28, 29]. For example there is a similar project in Ferrara city; network isn't alike neither supervised by a local NPO but rather by an external consultant: it has been recovered 555 t in 10 years. It is true that Ferrara is smaller than Verona, but results are very smaller. There are also other projects, based on different logic (charity) but made by well-structured organizations; they miss the involvement of Public Administration so results are proportionally minor (295 t in 2012, but in 28 Italian cities). In Brescia's city, instead, there is a cooperative organization that works in very similar way to Verona's case and similar is also its result (300 t in 2012) [30].

On the other hand, R.e.b.u.s. gives the possibility to the participants of the inclusion in a process that contrasts the opportunistic behaviours, guarantees administrative and fiscal fulfilments, transparency and legality, prosecutes nutritional education, environmental and health prevention, achieving economic, social and environmental sustainability, thanks to a win-win logic [30, 31], and a value co-creation. R.e.b.u.s. is derived from the co-design of a shared strategy of service science that aims both to solve problems and to answer the requests coming from the local community. Service science is defined as the study of the configurations of people, technology and the connections of internal and external services of sharing information (e.g., language, laws, measures and methods) to create systematic service innovation. Procedures, processes and norms are standardised, shared in all network members through ICT tools, which eases the replication of the model and its diffusion [2].

The aim of R.e.b.u.s. is twofold: on one hand, it tries to prevent food from ending up in landfills through the solidary re-use of food; on the other hand, it promotes a lifestyle careful to rationally use natural resources for sustainable development and increases subsidiarity for the local community [32], improving citizens', especially children's, education. The educational initiatives cover several topics: to observe and avoid the supply chain waste, to reduce domestic waste, to correct nutritional habits, improve public health and to respect the environment by waste prevention (art.3, Law Decree n.22/1997)—and not only through recycling, recovery and disposal—as sustainable development requires [33]. In particular, R.e.b.u.s. Informs focuses on 'food security', that means the possibility to guarantee to everybody "the physical, social and

economic access to sufficient, safe and nutritious food that meets their needs and preferences, so as to enable him to lead an active and healthy life” [34]. For both these objectives, the project demonstrates the importance of education for sustainable development at the local community level [10–12]. Indeed, food waste education drives consumer behaviour and becomes pivotal in fostering change through targeted educational programmes and shared information. With the aim to create virtuous circles in surplus management, these programmes show citizens and enterprises a number of best practices on waste reduction, recovery, reuse and recycling. Educating citizens to play their role in society permits the use of the unsold or unutilized products till the end of their life cycle, thus reducing the presence of recyclable materials into landfills, CO₂ emissions, methane and greenhouse gases [4].

6.3 Issues on Education for Food Waste Prevention

The key to service science is a focus on all aspect of the service as a system of interacting parts that include people, technology, and business. The review of the existing situation and challenges in this study helps focus the paper on the obstacles and the inter-organizational dynamics observed in the implementation of food waste prevention. The need for cultural changes, in the entire community but also in relationships among different organizations and at intra-organizational levels, could be performed creating a stakeholders’ network correlated to educational services.

Because R.e.b.u.s. involves several subjects, several organisations (public, profit and NPOs) and also private subjects (e.g. aided by associations, voluntaries, employees, citizens, and teachers), the educational programme R.e.b.u.s. Informs has manifold applications. Analysing the project’s different stakeholders, different kinds of people to involve in the project’s educational program were found. The educational activities can be summarised in three main frames:

1. tutorial: educational and training courses and activities, based on Regulation CE n. 1234/2007 e, Executive Regulation UE n. 534/2011 and on specific procedures, such as sanitary, fiscal, corporate and social responsibility to support donors and beneficiaries in their specific tasks on the reuse of surplus, improving their efficiency and their inter- and intra-organisational relationships; it started in 2009 when the supervisor association opened a specific office for the project. The tutorial programme has been expounded every year in three different steps. First, general aspects of R.e.b.u.s. are discussed during a meeting at the beginning of the year. In this meeting, the non-profit organisations involved as beneficiaries to the project review standard procedures, define future developments and exchange best practices. Second, employees and volunteers of new organisations included into the project are trained in the field, i.e., ‘learning by doing’. Finally, ad hoc training is usually organised to answer specific requests or educational needs.
2. Education: lessons within focused programmes for students of primary and secondary schools and for undergraduate students. The educational project in the schools aims to increase teacher and student awareness of the R.e.b.u.s. project and other related issues through the use of slide, video, debate and group game. Topics considered during the

lessons are, for example, the importance of correct nutrition, the human solidarity, the food waste reduction, and environmental aspects. The program was presented in 35 classrooms in 2014. During these occasions, children demonstrated their learning ability and increased awareness on topics discussed by presenting final results, papers, drawings, compositions or posters. The teachers involved completed a survey about the experience. This survey included 38 questions about the material prepared and presented by the children, the aim of the laboratory, the expectations and the achievements of the educational course, the methods employed, the change of behaviour and the objectives reached after the end of the educational programme. In addition to schools, the educational programme was developed through several other channels, such as universities, or the ‘European week for waste reduction’, promoted by UE and Unesco; regarding this last, more than 20 groups of children participated for 2014 Verona’s edition.

3. Informational: public conferences and open debates aimed at sensitising and educating citizens on food waste and sustainable development. Sharing good practices stimulates people to change their behaviour and to join the project. The sharing of knowledge increases the network of organisations involved in the project (e.g., participants suggested new potential donors, or connections with other projects, such as ‘urban vegetable gardens’, from which the recovery and re-use of surplus fresh vegetables is possible). The programme is usually developed by public debates open to citizens and organised in partnership with institutions like universities or local authorities. The topics discussed are varied, such as the role of civil economy and its social consequences, food, waste and recovery. To spread knowledge about R.e.b.u.s., the project was also presented in scientific conferences in the European context. Data collected through surveys on the people involved in the project underlined the increasing awareness of participants regarding food waste reduction. In scholar canteens, for example, a combined effort with the municipal ecological sector, called ‘Red miles’, measured food waste before and after courses and found an average reduction of 20 % of refuses.

The data analysis also demonstrated that, from the beginning of the tutorial, 2009, and the educational programmes on food waste reduction, 2011, the project has seen a

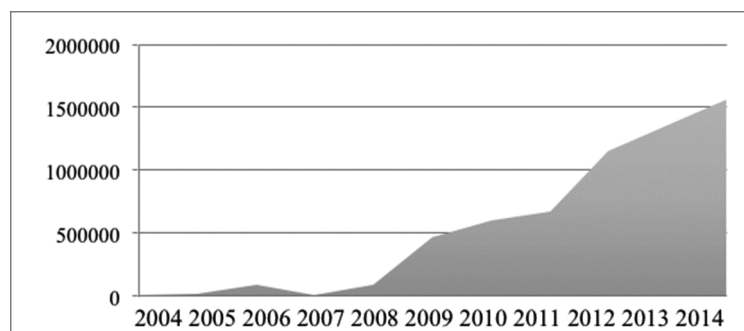


Fig. 1. The trend of recovery from 2004 to 2014

high increase in food reuse (Fig. 1). The data on recovery, in particular, show a huge increase between 2010 and 2011, after the introduction of “R.e.b.u.s. Informs”.

7 Conclusions

According to Papargyropoulou et al.’s model [4], it is necessary to consider the actions involved in food waste reductions, placing such actions at the top of the food waste hierarchy. The food, even if it is reduced or lost its commercial value, often maintains its nutritional properties and still has an economic and social value. Moving from this model, our study considers education as an additional tool to enhance food waste prevention, demonstrating this through the study of the R.e.b.u.s. case. Our study also reveals how this program can be an effective tool for change people’s behavior, about food waste prevention and sustainable development in general. In effect, as our findings show, the effectiveness of the project is also based on the development of “R.e.b.u.s. Informs”, an ESD initiative designed to improve the awareness of consumer behaviour [35] and increase the knowledge of food waste reduction by creating several educational paths through school classes, tutorial courses and meetings for the entire local community. The educational service system is a good engine for the project and, consequently, for the food waste reduction.

Beneficiaries, donors, public administrations and citizens as operant resources become the primal source of innovation, organizational knowledge, and value. The role of the supervisor is a servant-supervisor who is there to support the organizations involved in the project; it uses Information Technology (IT) in order to facilitate the service-integration function, both within the organization and across the entire value-creation network including the user, enables the ability of all entities in the value-creation network to collaborate [24]. In R.e.b.u.s. case, IT accelerates the relationships among all the organizations involved and between organizations and individuals. All can share, increase and disseminate knowledge about arguments proposed in the educational program. We could observe the implementation of a collaborative service process based on co-creation of value between educational service providers, consumers [36] and food donors.

The educational programs can foster service innovation to achieve more satisfying results in a collaborative and interactive environment. The co-creation of value can be increased by software and the coordinator’s relationships permit to access to more resources and information that stimulate to improve humans behaviour; all information is shared and all organizations are assisted in a process of competence improvement through internal training and educational programs. The organizations involved in the project, thanks to their network created through information tools by the supervisor, co-create value in food waste reduction, mutual support, education and the waste taxes reduction for the donors, creating social progress for the local community.

Further studies are needed to better understand the relationship between food waste reduction and the lifestyle change of the people involved; nevertheless, the study on the R.e.b.u.s. project demonstrates that, if people are educated and actively involved in the sustainability change, this change is possible.

References

1. Vargo, S.L., Lusch, R.F.: Service-dominant logic: continuing the evolution. *J. Acad. Mark. Sci.* **36**(1), 1–10 (2008)
2. Maglio, P.P., Spohrer, J.: Fundamentals of service science. *J. Acad. Mark. Sci.* **36**(1), 18–20 (2008)
3. Cantino, V., Devalle, A., Gandini, S., Ricciardi, F., Zerbetto, A.: Business school innovation through a service science approach: organizational and performance measurement issues. In: N6voa, H., Dr6goicea, M. (eds.) *IESS 2015*. LNBIP, vol. 201, pp. 278–288. Springer, Heidelberg (2015)
4. WCED: Our common future. World Commission on Environment and Development. Oxford University Press, Oxford, New York (1987)
5. Stern, N.: *Stern Review: The Economics of Climate Change*. HM Treasury, London (2006)
6. Papargyropoulou, E., Lozano, R., Steinberger, J.K., Wright, N., bin Ujang, Z.: The food waste hierarchy as a framework for the management of food surplus and food waste. *J. Cleaner Prod.* **76**, 106–115 (2014)
7. Heller, M.C., Keoleian, G.A.: Assessing the sustainability of the US food system: a life cycle perspective. *Agric. Syst.* **76**(3), 1007–1041 (2003)
8. Gustavsson, J., Cederberg, C., Sonesson, U., Van Otterdijk, R., Meybeck, A.: *Global food losses and food waste*. Food and Agriculture Organization of United Nations, Rome (2011)
9. European Parliament Council: Directive 2008/1/EC of the European Parliament and of the Council of 15 January Concerning Integrated Pollution Prevention and Control, Brussels (2008)
10. Redman, E., Redman, A.: Transforming sustainable food and waste behaviours by realigning domains of knowledge in our education system. *J. Cleaner Prod.* **64**, 147–157 (2014)
11. Kelder, S.H., Perry, C.L., Klepp, K.I., Lytle, L.L.: Longitudinal tracking of adolescent smoking, physical activity, and food choice behaviours. *Am. J. Public Health* **84**(7), 1121–1126 (1994)
12. Pooley, J.A., O’Connor, M.: Environmental education and attitudes: emotions and beliefs are what is needed. *Environ. Behav.* **32**(5), 711–723 (2000)
13. UNESCO: The Bonn declaration. http://www.desd.org/ESD2009_BonnDeclaration080409.pdf
14. Eriksen, K.G.: Why education for sustainability development needs early childhood education, the case of Norway. *J. Teach. Educ. Sustain.* **15**(1), 107–120 (2013)
15. Gadotti, M.: What we need to learn to save the planet. *J. Educ. Sustain. Dev.* **2**(1), 21–30 (2008)
16. Leal Filho, W.: About the role of universities and their contribution to sustainable development. *High. Educ. Policy* **24**(4), 427–438 (2011)
17. Leal Filho, W.: Teaching sustainable development at university level: current trends and future needs. *J. Baltic Sea Educ.* **9**(4), 273–284 (2010)
18. Cortese, A.D.: The critical role of higher education in creating a sustainable future. *Planning High. Educ.* **31**(3), 15–22 (2003)
19. Mirabella, N., Castellani, V., Sala, S.: Current options for the valorisation of food manufacturing waste: a review. *J. Cleaner Prod.* **65**, 28–41 (2014)
20. European Commission: Communication from the Commission to the Council and The European Parliament, Directive 2003/1/EC of 18 June, Integrated Product Policy. Building on Environmental Life-Cycle Thinking, Brussels (2003)

21. European Commission: Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, Directive 2011/1/EC of 20 September, Roadmap to Resource Efficient, Brussels (2011)
22. European Commission: Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the regions, Directive 2012/1/EC of 13 February, Innovating for Sustainable Growth. A Bio economy for Europe, Brussels (2012)
23. European Commission: Policies to encourage sustainable consumption, Technical report 061, European Communities (2010)
24. Lusch, R.F., Vargo, S.L., Wessels, G.: Toward a conceptual foundation for service science: contributions from service-dominant logic. *IBM Syst. J.* **47**(1), 5–14 (2008)
25. Yin, R.K.: Validity and generalization in future case study evaluations. *Evaluation* **19**(3), 321–332 (2013)
26. Denzin, N.K.: *The Research Act: A Theoretical Introduction to Sociological Methods*. McGraw-Hill, New York (1978)
27. Crotty, M.: *The Foundations of Social Research, Meaning and Perspective in the Research Process*. Sage, London (1998)
28. Bremner, R.H.: *Giving: Charity and Philanthropy in History*. Transaction Publishers, New Jersey (1996)
29. Poppendieck, J.: *Sweet Charity? Emergency Food and the End of Entitlement*. Penguin, London (1999)
30. Elkington, J.: Towards the suitable corporation: win-win-win business strategies for sustainable development. *Calif. Manage. Rev.* **36**(2), 90–100 (1994)
31. Adams, W.M., Aveling, R., Brockington, D., Dickson, B., Elliott, J., Hutton, J., Roe, D., Vira, B., Wolmer, W.: Biodiversity conservation and the eradication of poverty. *Science* **306**(5699), 1146–1149 (2004)
32. Porta, P.L.: Subsidiarity and new welfare. In: Bruni, L., Zamagni, S. (eds.) *Handbook on the Economics of Philanthropy, Reciprocity and Social Enterprise*, pp. 354–362. Edward Elgar, Cheltenham (2013)
33. Bonomi, S., Ricci, M., Tommasi, M.: The relationships between different organizational units for the development of an integrated strategy to reduce food waste and waste management. In: *Proceedings of SUM Second Symposium on Urban Mining*, paper 034 CISA Publisher (2014)
34. FAO: *The State of Food Insecurity in the World*. FAO, Rome (2001). <http://www.fao.org/docrep/003/y1500e/y1500e00.htm>
35. Pavlova, M.: *Technology and Vocational Education for Sustainable Development: Empowering Individuals for the Future*. Springer, Berlin (2008)
36. Dragoicea, M., Borangiu, T.: A service science knowledge environment in the cloud. In: Borangiu, T., Thomas, A., Trentesaux, D. (eds.) *Service Orientation in Holonic and Multi agent, SCI*, vol. 472, pp. 229–246. Springer, Heidelberg (2013)