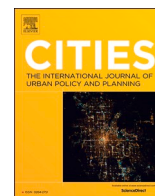


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Sustainable Community Movement Organisations and household food waste: The missing link in urban food policies?

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ABSTRACT

Household food waste reduction is an important component of the EU action for waste management, and one of the subgoals of SDG 12. So far, policy actions have focused more on communication campaigns and food donations, and less on the link with sustainable production. Despite the growing number of publications, existing literature has not assessed the waste reduction potential of alternative food networks on the consumer side. Our preliminary study addresses this gap by conducting a pilot food waste quantification study on a sample of 24 households that adhere to community-supported agriculture or the alternative food networks in a municipality of Northern Italy. Given the small sample size, the external validity of these results needs to be tested in future studies. Nevertheless, preliminary results suggest that policymakers should consider the role of alternative food networks in the strategy to achieve SDG 12.3. This will require a revision of the approach currently being practiced in the sector, especially at the urban level.

1. Introduction

Food policy councils and urban food agendas became powerful tools towards "more sustainable food systems" (Schiff, 2008). As cities are places where health and income inequalities are more concentrated and visible (Bedore, 2010), urban food system can be the mirror of such issues if not correctly addressed and governed. Many cities have already their food councils or agendas (Roberts & Scharf, 2002; Moragues-Faus & Morgan, 2015; IPES-Food, 2017), but the political discourse underpinning their narrative is not always clear (Sonnino, 2016), incurring in the risk to be referred to as "technical", or rather being depoliticized (Swyngedouw, 2011).

In recent years, food waste reduction entered in the national and urban food policy agendas, both as an issue of waste management and related to sustainable food system. A sort of *depoliticization* has been recorded in the food waste discourse (Giordano et al., 2020), with the recurrence of standardized set of measures that are classified as "technical"- namely food donation, awareness raising campaigns, solutions based on technology approaches (Babbitt, 2020).

A consistent number of studies have analysed the behaviours of individual consumers and households, focusing on shopping habits, food management practices and motivations, among them (Refsgaard and Magnussen (2009), Qusted et al. (2013), Farr-Wharton et al. (2014), Graham-Rowe et al. (2014), Porpino et al. (2015), Aschemann-Witzel, De Hooge, Amani, Bech-Larsen, & Oostindjer, 2015; Aschemann-Witzel, Giménez, & Ares, 2018, Schanes et al. (2018), van Geffen et al. (2020)). Despite the increasing scientific literature on the topic, the household food waste debate reveals an important limitation: it ignores alternative practices in food production and consumption, such as the food waste reduction potential of consumers who adhere to Sustainable Community Movement Organisations (SCMOs) or other Alternative Food Networks (AFNs). The goal of this study is to start filling the knowledge gap via an exploratory research (Reiter, 2017).

By targeting a group of SCMOs members, the present study assesses actual quantities of food waste and detects their drivers. The main research hypothesis (*membership hypothesis*) is that, due to the alleged characteristics of SCMOs and their pledge to support sustainability practices, household waste production by members of SCMOs could be

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lower than average household food waste. Since we focus only on a limited number of households in one Italian municipality (Pavia), we acknowledge the fully exploratory nature of our contribution.

2. Material and methods

The current study has been run in the municipality of Pavia and its results will be compared to the national study on household food waste, titled REDUCE (Giordano et al., 2019) and its preliminary study, run on a single Municipality with a small sample size (Giordano et al., 2018). The households were selected through snowball method starting from an Ethical Purchasing Group (EPG) which is one relevant example of SCMOs (Forno & Graziano, 2014; Graziano & Forno, 2012). The total number of participants is $N = 24$ for questionnaires and diaries and $N = 23$ for the WCA.

In this study, only the edible fraction of food waste is reported for comparative purpose with the national study (Giordano et al., 2019). The survey, composed of three methods of quantification, was carried out between September and December 2019 in the municipality of Pavia, located in the North of Italy (Lombardy Region). It was composed first of a weekly WCA of respondents' garbage (Giordano et al., 2018); second, a weekly diary survey based on the REDUCE protocol (see more info on Giordano et al., 2019); third, an on-line questionnaire. Further info on the methodological protocol can be found in Giordano et al. (2018, 2019).

2.1. Data analysis

For the data entry and analysis, the same methodological protocol of REDUCE was applied (see Giordano et al., 2019). For the statistical analysis, two different samples were created: one including all the 23 households who delivered their garbage for the WCA at least once, and one including the 11 households who delivered it in all the three days.

As a last step, food waste quantities in the two groups of 11 and 23 households were compared to food waste quantities in the sample ($N = 12$) of the preliminary study of the REDUCE project (Giordano et al., 2018), and in a subset of households residing in Lombardy ($N = 25$) from the sample of the main REDUCE project (Giordano et al., 2019). Also, in this case, we present the results of both Wilcoxon rank-sum tests and t -tests.

3. Results and discussions

3.1. Average food waste and its determinants

Of the families responding to the questionnaire ($N = 24$), seven declare that they buy food mainly through EPG (Solidarity Purchase Groups), two at the local producers' market, three at local food shops, and the remaining twelve mainly at the supermarket, although they all adhere to different degree to EPGs. The seven families doing shopping mostly through EPG are also within those who delivered their garbage three times per week, showing a possible higher commitment to the survey.

The weekly average and median quantity of *edible* waste per household are 573.6 g and 575.0 g, respectively, for the entire sample ($N = 23$). Most of the waste (61.9% on average) is avoidable. Coherently with existing literature (Quested et al., 2013; Koivupuro et al., 2012; Silvennoinen et al., 2014; Parizeau et al., 2015; Setti et al., 2016; Giordano et al., 2019), higher income, larger households, and households with children (under 18-year-olds) are variables related to higher waste values (Table 1).

3.2. Comparison with previous studies

Far beyond our expectations, our waste compositional analysis revealed very low quantities of food waste, with an average household

Table 1

Socio-demographic, shopping and perception variables influencing food waste quantity. Statistically significant differences are highlighted in bold.

Variables (group A/group B)	Group A		Group B		t-test (p-value)	Wilcoxon (p-value)
	Freq.	Mean (g)	Freq.	Mean (g)		
Household size (up to two people/more than two people)	9	270.9	14	768.1	0.004***	0.006***
Household size (up to/more than two people) (11 households ¹)	4	83.0	7	577.0	0.000***	0.008***
Age (below/above median value)	11	514.5	12	627.7	0.282	0.424
Presence of children (yes/no)	10	411.4	13	698.3	0.069*	0.063*
Presence of children (yes/no) (11 households ¹)	5	182.8	6	576.2	0.006***	0.029**
Working time (at least one person part-time/all full time)	12	539.1	11	611.2	0.357	0.902
Salary (below/above the median of €32.500)	12	419.8	11	741.3	0.045**	0.157
Food shopping (below/above the median of €300)	12	429.6	11	730.6	0.057*	0.085*
Place of shopping supermarkets/local shops and markets, EPG)	12	572.0	11	575.3	0.493	0.666
Frequency of shopping (weekly/more than once a week)	11	470.8	12	667.8	0.155	0.268
Qualitative self-assessment of waste (a little/a lot)	21	590.2	2	917.0	0.137	0.275
Declared food waste quantity (below/above 200 g)	18	593.9	5	500.2	0.347	0.709
Declared economic value of waste (below/above 10 euros)	15	464.2	8	778.6	0.058*	0.081*

Notes: Groups A and B refer to the dichotomies detailed in the variables' names. ¹ For the 11 households who delivered their garbage three times, only statistically significant differences are reported.

* Significance levels: 10%.

** Significance level: 5%.

*** Significance level: 1%.

food waste of 573.6 g per family per week against more than a kilo in all previous studies applying the same protocol (Giordano et al., 2019, 2018). The two studies based on diaries and WCA in Italy report levels of food waste that are significantly higher than in our samples regardless of the group considered (23 or 11 households) and of the statistical test used [Table 2].

Given that diaries tend to underestimate food waste compared to WCA (Giordano et al., 2018, Elimelech et al., 2019; van Herpen et al.,

Table 2

Comparison of waste quantity in the current sample (SCMO members) and in the REDUCE studies (general population).

Sample comparison	This study → Mean (std. dev)	SCMOs members	
		23 households	11 households
REDUCE studies ↓		573.57 (455.04)	397.36 (285.98)
Preliminary (N = 12)	1058.40 (832.82)	0.032**/0.066* ¹	0.021**/ 0.023** ¹
Main study (N = 25)	1176.47 (1207.53)	0.029**/ 0.024** ¹	0.043**/ 0.006*** ¹

Notes: ¹ The p-values derive from comparison between the sample in the row and the household group in the column; the first p-value is from a bi-directional t-test, the second from a Wilcoxon rank-sum test.

* Significance level: 10%.

** Significance level: 5%.

*** Significance level: 1%.

2019, van der Werf et al., 2020), our findings are even more robust.

Another caveat is that the REDUCE samples are representative of all types of people, including members of SCMOs. Our findings are thus strengthened further, as the difference between SCMO members and non-members could be even larger.

Our results confirm the *membership* hypothesis, and are particularly important with reference to the national goal of food waste reduction set for the EU member states in the framework of the EU directive 2019/1597. Further research needs to be done on the reasons and motivations for which SCMOs members waste less food. A hypothesis is that food waste may be amplified by the alienation from food production and transformation and its devaluation through low prices that characterize modern value chains. In turn, SCMO members are allegedly aware of the resources – water, land, energy, but also time – embedded in food, and are thus likely to assign it a higher value. Therefore, all actions addressed to get consumers closer to the food production process might work.

With reference to the role of cities, if our results would be confirmed by further studies, urban food policies acting against food waste should not only be focused on broad communication campaigns, technology and food donations support (Giordano et al., 2020), but they should be supportive of existing SCMOs or Alternative Food Networks, underlining their collective ‘policy entrepreneur’ role (Giambartolomei et al., 2021). For example, increasing the number of sustainable consumers via SCMOs would limit waste production and lower the costs of waste management, and the municipalities could offer information services in order to facilitate the creation of local SCMOs, without limiting their autonomy. This choice would not only result in lower average waste quantities per household but it would also benefit the environment and improve social justice within the food chain (Wekerle, 2004). A finding that could be of great benefit to municipalities in their daily struggle to promote effective policies aimed at reducing food waste. Furthermore, municipal governments should also consider more carefully the advantages of community supported agriculture (CSA) and neighbourhood shops which allow individuals and families to plan their purchasing activities in order to do them frequently and in limited amounts. This also would limit substantially food waste at the municipal level. Finally, the recognition of the relevance of such practices would also support the creation of Food Policy Councils which have proven to be a very effective tool for sustainable local food production.

CRedit authorship contribution statement

Claudia Giordano: Conceptualization; methodology; Writing – Original Draft; Writing – Review & Editing; Visualization.

Paolo Roberto Graziano: Investigation; Resources; Writing – Original Draft; Writing – Review & Editing.

Monica Lazzarini: Investigation; Resources; Writing – Review &

Editing.

Simone Piras: Formal analysis; data curation; Writing – Original Draft.

Sabrina Spaghi: Project administration; Writing – Review & Editing.

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