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## **INSTITUTIONAL CONCERN FOR CURBING FOOD WASTE. A DISPLAY OF SOME INITIATIVES**

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### **ABSTRACT**

Initiatives to curb food waste are varied and have grown in recent years. However, there is a lack of institutional interest in measuring the results of these initiatives. We extend the existing research in this field by examining the degree of institutional concern about this issue and analyzing several initiatives to determine whether their results have been measured and to explore their effectiveness, from the social marketing view. To this end, we conducted 15 interviews with persons responsible for launching this type of initiative from different areas (civil society, administration, retailers, hospitality, and academia). The main findings suggest: first, that there is concern about food waste problem at the institutional level, although, sometimes, public administrations hinder others to curb food waste; second, it is not always easy to measure the extent of food waste, which complicates the measurement of the effectiveness of some preventive communication initiatives; and third, there is a need for institutional collaboration to develop a database that will inspire the design of future initiatives.

### **Keywords:**

Food waste initiatives, Effectiveness and success factors, Social Marketing, Interviews, Qualitative study.

**Research Line:** Sostenibilidad y Responsabilidad Social

# **INSTITUTIONAL CONCERN FOR CURBING FOOD WASTE. A DISPLAY OF SOME INITIATIVES**

## **1. INTRODUCTION**

International institutions are interested in tackling the food waste problem. Thus, the 12<sup>th</sup> of the United Nations Sustainable Developments Goals (SDG), on responsible consumption and production, collects this issue. Thus, the United Nations collaborates with governments to develop policies that help reduce food waste. Approximately one third of world food production is wasted every year (FAO, 2020). One of the main initiatives to prevent food waste has been the creation of a database containing information from academic publications and reports that will allow a more detailed analysis of the problem and the proposal of solutions (FAO, 2021). This information is essential to the development of effective policies and the design of initiatives and campaigns to help reduce the problem of food waste.

In 2019, food waste emerged as a motor theme in the literature (Schöggel et al., 2020). Bräutigam et al. (2014) recognized that food waste calculation methods used in the European Union do not reflect the true scope of the problem. They recommended that each European country supplement these data with national surveys that present more accurate results. Giordano et al. (2020) also agreed with this idea, suggesting that verification of the accuracy of food waste measures is key to reducing waste. Therefore, systematic research on food waste throughout the supply chain is necessary to develop proper mitigation strategies and monitor their progress (Bräutigam et al., 2014). So, we found the Derqui et al. (2018) and Lagorio's et al. (2018) studies, that carried out waste audits in some schools' canteens in order to raise awareness and to know the causes that generate it, but they did not follow up the student's behavior after the initiative. In this line, food waste-related literature also underlines the need to improve the measurement of these initiatives' effectiveness (Kim et al., 2020).

Furthermore, in the last decades, initiatives aimed at curbing food waste have been numerous and varied, but it is not clear that their results have been consistently measured. In the social marketing literature, we found works suggesting a need to identify the best combination of communication channels to increase the effectiveness of initiatives to raise environmental consciousness, as all such initiatives have strengths and limitations (Dijkstra et al., 2005; Liao, 2020; Soma et al., 2021; Zamri et al., 2020). However, no evaluation or comparison of the effectiveness of these communication channels exists for the field of consumer food waste (Stöckli et al., 2018). As Stöckli et al. (2018) and Young et al. (2017) pointed out, there is little evidence on the effectiveness of food waste reduction initiatives because their developers did not evaluate them or implement a standardized evaluation system.

In this context, further research on the effectiveness of these approaches is needed to help design future initiatives. With this study, we aim to advance this field by reporting about food waste initiatives implemented by agents from areas such as civil society, administration, food industry, retailers, hospitality, and academia. We conducted 15 interviews to inquire about their vision regarding the food waste problem and, to explore about the type of initiatives developed to alleviate food waste and what methods, if any, were used to measure their effectiveness.

Our findings are expected to contribute to literature on the food waste initiatives in the following ways: first, exploring what is the institutional vision on food waste; second, showing an important variety of initiatives against food waste developed across one country; third, pointing out the main barriers exposed by institutions to measure the impact of their initiatives against waste; and fourth, providing information to guide institutions in the design of future successful food-waste initiatives.

The remainder of this paper is structured as follows: The next section presents a literature review on food waste initiatives and some ways to measure their effectiveness following the

social marketing focus. Next, the qualitative study is explained in the methodology section by providing details of study procedures, participants, and main findings. Finally, based on our results, the discussion, main conclusions, and recommendations are presented.

## **2. LITERATURE REVIEW**

### **2.1 Food waste initiatives and their effectiveness**

The highest percentage of food waste is found in the distribution and consumption stages (FAO, 2021). These stages are also where miscellaneous food waste reduction initiatives have proliferated (Aschemann-Witzel et al., 2017; Gruber et al., 2016; Kim et al., 2020).

It should be noted that in the literature on initiatives undertaken in the area of food waste, the most common objectives seek to motivate consumers to reuse and share leftovers (Morone et al., 2018), recycle leftovers via separation and composting (Huang et al., 2018), and consume less food (Kim et al., 2020; Young et al., 2018). Although the desired outcome would be to consume only what is necessary, this set of behaviors is the least studied in the literature (Kim et al., 2020).

Among the works that analyze various initiatives or campaigns to reduce food waste, we highlight two. One presented a multiple case study to identify key characteristics and success factors of supply chain initiatives (Aschemann-Witzel et al., 2017); the other focused on household food waste reduction, incorporating consumer views on food waste initiatives (Kim et al., 2020).

Aschemann-Witzel et al. (2017) suggested that existing initiatives should inspire future ones. They categorized food waste initiatives, throughout the supply chain, into three types of activities: first, *information and capacity-building*, which encourage consumer motivation and ability to avoid food waste; second, *redistribution*, in which foods otherwise wasted in the supply chain are instead retained, raising awareness of supply chain deficiencies; and third,

*retail and supply chain alteration*, developed by retailers or other agents involved in the food industry, which raise consumer awareness and modify their food choice behavior. A more recent type of initiative proposed that supermarkets develop green marketing strategies to avoid wasting short-lived products. The study suggested categorizing items bearing the manufacturer's and retailer's brand, assigning the best place for these products, encouraging their sale with the help of support staff in the establishment, setting a dynamic price, and taking special care in the promotions for these products (Gustavo et al., 2021).

Kim et al. (2020), following a consumer-oriented approach, reviewing published food waste campaigns and showing the relevance of applying social marketing and the co-design process to the creation of household food waste reduction initiatives. They analyzed different initiatives focusing on three topics: first, the selection of a food waste reduction behavior (reduce, reuse, recycle); second, the selection of a campaign strategy (information-education, provision of infrastructure to reduce organic food waste, and the involvement of consumers in identifying the most engaging campaign strategy); and third, the selection of target foods (fruit and vegetables, meat and fish, bakery products, etc.). These researchers underlined the need to improve the measurement of these initiatives' effectiveness. Thus, our study aims to address this gap by providing factors that ensure successful initiatives, as we discuss in next section.

## **2.2 Key Characteristics of Successful Food Waste Initiatives**

In general, an initiative is effective when it achieves its set goals. Regarding initiatives aimed at reducing food waste, we can affirm that these are effective when, first, they have reached their target audience and, second, they have generated the desired effects. The desired effects are two-fold: generating knowledge and awareness about the waste problem and its consequences; and, primarily, converting consumer behaviors into those that reduce waste. Nevertheless, it is difficult to find documentation on the results of food waste initiatives that

have been successful—or even publicity about the achievement of their objectives—which makes it difficult to determine their effectiveness and to learn from them. Aschemann-Witzel et al. (2015, p. 6471) noted that “*it ought to be possible to provide stakeholders with more accurate estimates about the relative effectiveness of different actions that address the issue of food waste,*” and argued that these types of studies are under-represented. To solve this problem, the field of social marketing could shed some light. The cornerstone of social marketing is to influence individuals’ behavior, which is the reason why initiatives aimed at curbing waste can be truly effective (Andreasen, 2002; White et al., 2019; Zamri et al., 2020).

In this context, there are numerous social marketing initiatives that provide a wide range of data and report positive results (Andreasen, 2002). Indeed, some researchers advise using other successful initiatives as an example when designing an initiative aimed at reducing consumer food waste (Aschemann-Witzel et al., 2017; Kim et al., 2020; Liao, 2020).

In this context, we found studies that offer some key points for the success of initiatives or campaigns that aim to curb food waste. Thus, Aschemann-Witzel et al. (2017) highlighted that, in the design of food waste initiatives, it is important to pay attention to three factors to encourage consumers to reduce leftovers: first, collaborating with the right partners to set up and maintain their actions; second, selecting the right time to launch the initiative (e.g., taking advantage of the fact that society is especially sensitive to the problem of waste); and third, ensuring the appropriateness of the involved competencies on which the initiative has been created. Recently, Kim et al. (2020) claimed that the active participation of consumers in the design of food waste initiatives aimed at reusing and recycling food makes these initiatives more effective.

Further, Dijkstra et al. (2005) showed that multimedia initiatives can be as effective in communication as TV and print-only campaigns. Key and Czaplewski (2017), following an

integrated marketing communications approach, noted that a multichannel and multiaudience approach to creating a more effective message and choosing a more effective channel produces synergies that increase the potential to influence decision making.

In positioning food waste awareness initiatives as a useful marketing strategy for companies or institutions seeking to reduce food waste, Liao (2020) recommended the best combination of media channels to increase engagement and encourage the appropriate research to increase future initiatives success. Zamri et al. (2020) found that all methods used to deliver food waste reduction programs (e.g., mass media, social media) have strengths and limitations but play a crucial role in informing and educating consumers. Moreover, Stöckli et al. (2018) agreed on the extensive use of various media to increase the likelihood of reaching a large population (nonpersonal and personal communication channels). These authors pointed out that initiatives that consist of only informational interventions are ineffective. Initiatives should be complemented by prompts and commitments to be more successful. Along these lines, Soma et al. (2021) tested three types of interventions in food waste initiatives: informational only, community engagement plus information, and gamification plus information. They found that the information and game initiatives were the most effective at increasing awareness of food waste, and that prompting was also important in information-based activities, contributing to consumers' motivation and ability to reduce wasting behavior (Lee et al., 2020).

In sum, within the context of social marketing and with the aim of designing an initiative that reduces consumer food waste effectively, we have indicated some drivers of the success of these initiatives. These factors refer mainly to the participants in the design of the initiatives (collaborators, consumers), to the combination of the most appropriate communication media (mass media, social networks, brochures, workshops, etc.), and to the most effective type of intervention in consumer behavior. In addition, when launching the initiative's communication

campaign, the design of the message, the person who transmits it, and the campaign duration are important aspects to consider.

Regarding this last aspect, it seems that the effectiveness of social marketing messages depends on making the communication clear and attractive for the target and transmitting it in an effective way. Olmedo et al. (2020) indicated that delivering a message that is properly framed in the initiative topic and the cultural context is as important as choosing the right transmitter. Septianto et al. (2020) suggested developing a message with a high emotional component that includes an expression of gratitude to help consumers change their behavior. Gimenez et al. (2020) stated that, to influence consumer behavior, a message should capture attention and be easily remembered, and thus should be creative, novel, and emotional. However, the effectiveness of the message also depends on the credibility of the sources through which it reaches its audience. Along this line, Olmedo et al. (2020) underlined that if the source is a celebrity, then it is more fitting if they are personally engaged with the subject matter. Gimenez et al. (2020) proposed that the message source should be an expert when the message is positive and emotional. They pointed out that some celebrities (influencers) should not be considered as experts.

Finally, regarding initiative duration, Sampei and Aoyagi-Usui (2009) suggested that longer coverage in the mass media was necessary for more effective communication about climate change. Moreover, as previously mentioned, Aschemann-Witzel et al. (2017) highlighted the importance of selecting an appropriate time to launch the initiative as a key success factor to encouraging consumers to reduce leftovers. This is especially relevant when several social causes, targeting young people mainly through social media, are ongoing at the same time, because the communication efforts could be less productive (Engelhardt-Furlow, 2011).



As indicated above, the literature on the characteristics of initiatives aimed at motivating more responsible consumer behavior is varied. However, work is still needed to analyze the effectiveness of initiatives that try to curb food waste. With this study, we try to address this gap. Next, we present the methodology followed in this study, which consisted of conducting a series of interviews.

### **3. METHODOLOGY**

In the following, we describe the qualitative study. We conducted 15 in-depth interviews with food experts from different institutional settings (civil society, administration, industry, retail, hospitality, and academia), of a region of Spain, to explore what has been done to date in terms of food waste initiatives and their effectiveness. It is worth noting that no agent, from the food production stage, agreed to participate in this research, so the information obtained from this activity was obtained mainly from the industry and retail.

The interviews provide relevant qualitative information about consumer beliefs, perceptions, and experiences (Fernqvist et al., 2015). Thus, because we want to understand the perceptions that institutions have regarding communication initiatives on food waste and their impact on consumer behavior, a qualitative research approach seemed the most appropriate.

#### **3.1. Interviews**

##### Participants and procedure

The interviews were required to help us to understand, first, whether concerns exist about the food waste problem at the institutional level and, second, to what extent communication initiatives on food waste are effective. Thus, we developed a semi-structured interview that contained 12 open-ended questions.

All interviews were conducted face to face and were audio-recorded (after interviewees provided consent) and transcribed by the researchers. Interviews lasted between 30 and 45 minutes and were held between February and June 2019. To protect the anonymity of the participants, we do not disclose the names of the institutions involved in this study, but instead provide a list of institutions coded by areas, interviewees' positions, and dates of the interviews (Table 1).

Each interview recording was listened to and independently transcribed by four researchers. Following Strauss and Corbin's (1998) recommendations, the researchers coded the data and looked for emerging issues related to general and specific topics. Regarding the general topics, participants expressed their understanding of the food waste problem, its causes, and main culprits along the food supply chain, and suggested solutions to the problem and who should be involved in this task. In relation to the specific topics, participants gave their opinion about the level of young people's awareness and sensibilities about food waste, the initiatives developed by their institutions to educate and raise consumer awareness of the problem, and how to measure and improve campaign effectiveness.

[Insert here Table 1]

### **3.2. Findings from interviews**

#### Food waste problem from the institutional perspective

In our study, firstly, we asked our interviewees about the importance that institutions give to the food waste problem today, and the answers were diverse. The civil society, the administration and the industry agreed that, the problem of food waste has gained interest, lately (e.g.: *"Our institutions have shown public interest in this problem but they need to be effective..."* CS3; *"Yes, it is more important now. There are many initiatives and people are more aware"* A1; and *"I consider that it has an adequate importance, another thing is that*

*everyone contributes the correct figures. The figures should be reviewed and updated” I1).*

However, the hospitality and the retail sectors showed a more critical view. Thus, while some believed that institutions wanted to work to curb food waste by developing different initiatives together (HS1, R2 and R3), others pointed out that institutions hinder rather than help in food waste management (HS2 and R1) and, that recycling was more important for institutions than food waste (R4). Following this line, the academy urges administrations to do more to achieve zero waste (Ac2) and to provide the necessary means so that other agents can curb food waste (Ac1).

Secondly, interviewees were asked about the question of who should be involved in the task of eliminating the problem of food waste, and three of them agreed that all agents from the food supply chain should be involved since it affects the whole society (*“All sectors must be involved in solving the problem”* CS2; *“Each one must do what they can in their small environment”* HS1; *“All society. It has to be transversal”* R3). Consequently, the responsibility falls on the different levels of the supply chain to a greater or lesser extent, in line with the results of previous works (Devin and Richards, 2018; Derqui et al., 2016; Giroto et al., 2015).

#### Initiatives to curb food waste developed by different institutions

In this section, we describe some of the main initiatives that interviewees discussed, as well as their objective, target, and measure of effectiveness (Table 2).

When we explore what has been done so far regarding food waste reduction initiatives and their effectiveness measures, we can say that concern about the problem at an institutional level is confirmed by the diversity of initiatives carried out to curb this problem (Table 2). However, as Table 2 shows, the institutions do not care about monitoring the results of most of their initiatives, and when they do, it is in an irregular and imprecise way (number of attendees and participants, observation, due to its impact on the media, communication, etc.). Some

interviewees recognized that it would be convenient to carry out an impact study after the development of the initiatives, but at the institutional level, this is not always easy, especially when there exists collaboration with other agents. Here are some results that prove it:

In the case of the initiative “Zaragoza does not throw out food,” *“the results were measured through its impact on the nets and the different local media, as well as the success of attendance. People call a lot, but since it is an initiative that does not have any entity behind it, they cannot follow up. The perception is that it raised consciences”* (CS1).

Regarding the set of conferences on “Food Utilization”: *“The good reception of these conferences was the main measurement indicator, but the organizers did not assess their impact on the attendees”* (CS2).

In the case of some retailers’ initiatives: *“We spread this on social networks. On our website. We also disclose it in corporate social responsibility forums, but our communication policy is not very extensive. We do not measure the effectiveness of our actions in any way”* (R1); *“These initiatives achieve goals because they prevent products from being thrown away. The foundation measures results, but I can’t say how”* (R2); *“We measured engagement in social nets. It is more difficult to know if the customer has gotten the message. We intend to change their behavior, we do not know yet... and we do not know what impact it has had. We do in the collaborator”* (R3). The retailers’ perception was that *“these initiatives were very well received by the public since they could buy food at a cheaper price”* (R4).

Initiatives from the Administration in collaboration with other institutions like, “Code of Good Food Practices” (SC2 and A2) and “Organize, organizing... less food waste we are generating” (A2), and the “information and training activities for employers” (I1, I2) in the food industry, with the aims of curbing food waste in a coordinated way, raising awareness about a responsible

food handing management and, training employees in the prevention of food waste respectively, did not measure outcomes.

Only, the national initiative “Food is not thrown away. Zero Waste” addressed to primary and secondary students at schools, made the effort “*to measure the amount of food wasted each day in a school’s canteen for a week. At the end, they prepared a brief report with the data obtained and shared it with their colleagues from other schools*” (CS3). In this context, from the public administration also is fostered “*that school's canteens offer seasonal and local food*” (A1). And, in the University there is interest in developing a collective catering initiative involving universities, hospitals and schools: “*It will begin as a pilot experience in the Veterinary Faculty. The idea consists of weighing all the food that comes in, what is eaten and what comes out*” (Ac2).

Therefore, we actually find that only one initiative quantifies the amount of food waste, over a few weeks, in some schools, although there is no follow-up on whether or not it has influenced student behavior. So, it seems that one of the barriers to measure the impact of an initiative, once it has ended, is the difficulty of monitoring its impact, not only, on consumer behavior, but also, on other agents from the food supply chain. Others barriers mentioned by interviewees were the backing of an organization and the obstacles that the administration itself puts up for other agents in the chain: “*the lack of an entity that supports and commits to such initiative*” (CS1); “*the obstacles that the administration places on the restoration in order to fight more effectively against food waste*” (HS2); “*The institutions themselves put obstacles in your way (bureaucratic costs, paperwork, insurance, etc.), when it comes to a social, voluntary initiative... they make it more and more difficult for you*” (CS3).

**[Insert here Table 2]**

In addition, the interviewees were asked to propose initiatives that would help curb food waste. We highlight those that focus on the distribution and consumption stages. At the retail stage, five interviewees made the following proposals: an improvement in stock planning and the logistics process, offering smaller packages for products, offers of products that are closed to expiration, and donations (*“The distribution is aware of the costs: donations, Apps to place what they are not going to sell”* CS2 and R1; *“Invest in team training in the treatment of products; Improve cold systems and logistics; suitable furniture to keep the cold, automated provisioning systems,...”* R3; *“An exact planning of what the supermarket will sell each day”* R1; *“Educate cooks in the use of 99.9% of the product”* HS1; *“Provide Tupperwares so that they take home what they have not consumed”* HS2). And, in the consumption stage, three interviewees suggested the need to report on the value of food, the effort and cost of its production, and the volumes of food we throw away at home (*“People are not aware of the effort and the people behind a food”* HS1; *“It would be necessary to speak more publicly about that, to give visibility to the amount of food that is thrown away at home”* R1; *“In the news you hear little about the food thrown away in Spain, nothing to do with plastics, recycling or the greenhouse effect. But ask at home how much food is thrown away and they don't know”* R4).

Moreover, most of the interviewees agreed on the importance of education, at all levels, to raise awareness and educate about the value of food and the cost of its waste: *“Educational entities have a very important role in transmitting information and showing good practices”* (CS1); *“The university is a good place because they are more willing to learn”* (CS2); *“There must be a clear commitment from the Department of Education...”* (S3); *“The way to raise awareness is by educating... from the base... so that children understand what it costs to produce any food”* (HS1); *Schools are fundamental... the General Directorates of Consumption...”* (R3); *“Initiatives from schools...”* (R2); *“Education, explaining to children that an apple is not born in the hypermarket...”* (R4); *“Raise awareness from everyone who has responsibility, for*

*example, teachers*” (Ac1); *“The school...It is evident that it should be part of the curriculum”* (Ac2).

Further, with the intention of increasing the effectiveness of the message of this type of initiative, the interviewees made some improvement proposals. Thus, two interviewees urged acting by making the food waste problem more tangible, directing a closer message and appealing to consumers' emotions: *“Landing the figures on something real is a way to get there. It is something too abstract to be aware of”* and *“initiatives not only discursive but also active”* (CS1); *“You have to do visual campaigns that create that shock but that directly affect them, their close environment (for example, open a fish and see the plastic, but not a malnourished child from Africa who catches them further away). You have to bring it to your street, to your house... to the nearby environment”* (Ac1).

The duration of the initiatives was also discussed, highlighting that they should not be sporadic. It was also commented on the need to insist on the message to enhance its impact: *“That the initiatives are not sporadic... Keep insisting”* (CS3); *“In order to be more aware, we must insist, especially with young people”* (A1); *“Little is heard in the news about the food that is thrown away in this country...”* (R4).

Regarding the best channel to transmit the message, an interviewee proposed *“the school as the main channel of the message, since through it, the message reaches the families as well”* (R3). And, another suggested as the best transmitter to *“look for convinced kids who pass on these values to their peers...”* because they see everything that comes from above as *“old”* and *“academic”*, and it generates rejection. It has to be between equals” (Ac2)

Finally, as aforementioned, educational institutions have a relevant role in the task of raising awareness against waste. But also, cooperation and commitment between the different other institutions were considered essential for initiatives aimed at curbing waste to have more

impact. Thus, interviewees considered important the role of institutions such as: Public Administrations (CS1, A1, R2), the processing industry (A2), large companies (HS2), General Directorate of Consumption (R3); Restaurants and cafes (HS1, Ac1); social agents, neighborhood communities, sports clubs (Ac2, CS2), as promoters of this type of initiative.

#### **4. DISCUSSION AND DIRECTIONS FOR EFFECTIVENESS IMPROVEMENT**

As the literature on food waste points out, there is a lack of measurement of the effectiveness of initiatives aimed at curbing food waste (Stöckli et al., 2018; Young et al., 2017), and this is confirmed by our research. Governments and institutions, promoting this type of initiative, should develop a systematic way of measuring and controlling the results for each type of initiative, based on its objectives, target audience, and expected outcomes. In Spain, concern about the problem of food waste is pronounced, and the initiatives developed to curb it are numerous and varied. The promoting institutions in different areas do not systematically monitor the results of these initiatives. Sometimes, the number of attendees to the workshop/conference and the impact of the initiative on the mass media are the only indicators that are taken into account to measure success. Other times, institutions do not even bother to know their initiatives' impact. Our interviewees recognize that it is not always easy to assess whether consumer behavior has changed after the initiative, but they also point out that the lack of institutional support and the obstacles that some administrations place on some agents complicate this task even more. They were aware of these barriers and showed interest in seeking immediate solutions. In this sense, a joint collaboration of all agents throughout the entire food waste chain would be convenient.

These results show that much more can still be done about the problem of food waste, at the institutional level. Only if they took the same interest that they have in the problem of recycling plastics, paper and glass, it would be a step forward. As in these cases, the amount of organic



waste that a society generates each year could also be measured, so that we would be more aware of our behavior.

Within the context of social marketing, and with the aim of contributing to these institutions, our findings allow us to propose some key tips for designing future successful food waste initiatives. For it, we have considered four factors of the success of initiatives that the literature suggests: participants in the design, communication channels, type of intervention in consumer behavior and the initiative's communication campaign.

First, regarding the participants involved in the initiative's design, our interviewees suggest collaboration between different agents for the design and implementation of initiatives against food waste (administration-retailers, civil society-administration, educational institutions-retailers, etc.). The need for coordinated and joint action between several agents is the most recommended proposal. Second, the main communication channels proposed by our participants were the educational ones but, also, those related to the consumer's leisure and entertainment atmosphere such as: sports clubs, restaurants, community of neighbors, etc. Third, the best way to intervene in consumer behavior, according to our interviewees, is through education about the importance of avoiding food waste, through information on the consequences of waste, which is one of the three types of interventions tested by Soma et al. (2021). And fourth, regarding the initiative's communication campaign, we gather some points focused on how the message should be addressed, who would be the best disseminator of the information and the campaign duration.

According to our results, messages to consumers to curb food waste should address issues closer to them. Some of our interviewees pointed out the need to make the food waste problem more tangible, directing a closer message and appealing to consumers' emotions (Gimenez et al.,

2020). More active than discursive messages are suggested in this study, which is in line with the White's et al. (2019) work.

Regarding the best transmitter of this kind of information, if we think of an initiative addressed to students, perhaps young people would prefer people like them as emitters, as one interviewee suggests. Also, depending on the seriousness of the message you want to convey, a food expert could be more effective than a famous person (Giménez et al., 2020). Our interviewees suggest any agent in the supply chain as transmitters, informing and raising awareness from any point in the chain, although special emphasis is placed on educational institutions as the main awareness-makers.

Finally, for an initiative aimed at curbing food waste to be most effective, it should be implemented frequently rather than sporadically. And the message must be insistently remembered. This result is in line with the Sampei and Aoyagi-Usui's (2009) work, which stressed that media must persist in exposing the problem of waste for a longer time, so that the message remains in consumers' mind and communication is more effective.

## **5. CONCLUSIONS**

This research has tried to shed light on the institutional vision on food waste, in Spain, by means of 15 interviews with experts in this type of initiative from different areas of action (civil society, administrations, retailers, hospitality, academia), and on the lack of effectiveness measures of initiatives on food waste.

Our findings contribute to literature on the food waste initiatives exploring the institutional vision on this problem. At this respect, the concern about the food waste problem at the institutional level is serious, as demonstrated by the high number of initiatives developed so far. However, some agents emphasize that there is still much to be done, since the Administration's intentions are positive, but this institution does not always facilitate the food

waste management to other agents in the supply chain. Therefore, the problem of food waste must be addressed more seriously in institutions, as they do with the problem of plastic waste, paper waste, etc. In other words, there must be a greater commitment between the institutions and unity in order to develop more effective joint initiatives.

Another contribution has been the description of an important variety of initiatives against food waste developed by different agents (civil society, industry, hospitality, retailers, academia) and with different types of interventions. The informative and awareness-raising initiatives both in primary and secondary schools and in supermarkets stand out; but also, initiatives designed to inform, raise awareness and try to curb food waste, aimed at the industry, hospitality and retailers.

Our study also contributes to literature pointing out the main barriers exposed by institutions to measure the impact of their initiatives against waste. In this sense, our research has shown that different agents do not usually measure the results of their initiatives. They are aware of the problem and of the need to address it as soon as possible, but, for it, they would first need to overcome the main barrier to measure the impact of the initiative, once it has ended, which is the difficulty of monitoring its impact on consumer behavior. This would allow them to know whether the resources invested in these initiatives have been fruitful and to develop future, more successful initiatives. Moreover, others barriers mentioned by interviewees were the backing of an organization and the obstacles that the administration itself puts up for other agents in the chain. These barriers reflect the lack of a greater commitment of the administration that is transmitted to the rest of the institutions in such a way that a joint action of all of them against waste is coordinated. This would be the most effective way to start the fight against waste.

Finally, our findings also contribute providing information to guide institutions in the design of future successful food-waste initiatives. For it, we have followed the perspective of social

marketing. And so, some key tips have been offered to design initiatives that generate a more responsible consumer behavior towards food. So, we provide interesting information to agents from the food supply chain, guiding institutions in the design of future initiatives to curb waste, and researchers concerned with food waste and the design of effective communication initiatives.

## **6. LIMITATIONS AND FUTURE LINES OF RESEARCH**

This study has several limitations. It explores the perception of food waste reduction-oriented initiatives to provide suggestions to monitor effectiveness. Nevertheless, it would be beneficial for future research to study a real-life initiative and its effectiveness. For example, further investigations could focus on a case study. Research could also explore the impact of the message provider, in terms of public or private institution, on the effectiveness of food waste reduction campaigns.

## **7. REFERENCES**

- Andreasen, A. R. 2002. Marketing social marketing in the social change marketplace. *Journal of Public Policy and Marketing*, 21 (1), 3-13. <https://doi.org/10.1509/jppm.21.1.3.17602>
- Aschemann-Witzel, J., de Hooge, I. E., Rohm, H., Normann, A., Bossle, J. B., Grønhøj, A., Oostindjer, M. 2017. Key characteristics and success factors of supply chain initiatives tackling consumer-related food waste e A multiple case study. *Journal of Cleaner Production*, 155, 33-45. <http://dx.doi.org/10.1016/j.jclepro.2016.11.173>
- Aschemann-Witzel, J., de Hooge, I., Amani, P., Bech-Larsen, T., Oostindjer, M. 2015. Consumer-Related Food Waste: Causes and potential for action. *Sustainability*, 7, 6457-6477. <https://doi.org/10.3390/su7066457>

- Bräutigam, K-R., Jörisen, J., Priefer, C. 2014. The extent of food waste generation across EU-27: Different calculation methods and the reliability of their results. *Waste Management & Research*, 32 (8) 683-694, <https://doi.org/10.1177/0734242X14545374>.
- Derqui, B.; Fayos, T., Fernandez, V. 2016. Towards a More Sustainable Food Supply Chain: Opening up Invisible Waste in Food Service. *Sustainability*, 8 (7), 693; <https://doi.org/103390/su8070693>.
- Devin, B., Richards, C. 2018. Food Waste, Power, and Corporate Social Responsibility in the Australian Food Supply Chain. *Journal of Business Ethics*, 150, 199–210.
- Dijkstra, M., Buijtel, H. E.J.J.M., van Raaij, W. F. 2005. Separate and joint effects of medium type on consumer responses: a comparison of television, print, and the Internet. *Journal of Business Research*, 58, 377-386, [http://dx.doi.org/10.1016/S0148-2963\(03\)00105-X](http://dx.doi.org/10.1016/S0148-2963(03)00105-X)
- Engelhardt-Furlow, N. 2011. Find us on Facebook: How Cause Marketing has Embraced Social Media. *Journal of Marketing Development and Competitiveness*, 5 (6), 61-64.
- EU FLW. 2016. EU Platform on Food Losses and Food Waste. [https://ec.europa.eu/food/safety/food\\_waste/eu\\_actions/eu-platform\\_en](https://ec.europa.eu/food/safety/food_waste/eu_actions/eu-platform_en). Consulted in March 2021.
- FAO Food and Agriculture Organization of the United Nations. 2020. *Stop Food Loss and Waste. For the People. For the Planet*. [www.fao.org/international-day-awareness-food-loss-waste/](http://www.fao.org/international-day-awareness-food-loss-waste/). Consulted in March 2021.
- FAO Food and Agriculture Organization of the United Nation. 2021. *Food Loss and Waste Database. Take an in-depth look at what food is being lost and wasted, and where*. <http://www.fao.org/platform-food-loss-waste/flw-data/en/>. Consulted in March 2021.

- Fernqvist, F., Olsson, A., Spendrup, S. 2015. What's in it for me? Food packaging and consumer responses, a focus group study. *British Food Journal*, 117 (3), 1122-1135 <https://doi.org/10.1108/BFJ-08-2013-0224>.
- Giménez García-Conde, M., Marín, L., Ruiz De Maya, S. 2020. Effective Social Marketing to Improve Parental Intentions Giving More Fruits and Vegetables to Children. *Sustainability*, 12(19), 7968. <http://dx.doi.org/10.3390/su12197968>.
- Giordano, C., Falasconi, L., Cicatiello, C., Pancino, B. 2020. The role of food waste hierarchy in addressing policy and research: A comparative analysis. *Journal of Cleaner Production*, 252, 119617, <https://doi.org/10.1016/j.jclepro.2019.119617>.
- Giroto, F., Alibardi, L., Cossu, R. 2015. Food waste generation and industrial uses: A review. *Waste Management*, 45, 32–41.
- Gruber, V., Holweg, C., Teller, C. 2016. What a Waste! Exploring the Human Reality of Food Waste from the Store Manager's Perspective. *Journal of Public Policy & Marketing*, 35 (1), 3-25, <https://doi.org/10.1509/jppm.14.095>.
- Gustavo Jr, J. U., Trento, L. R., de Souza, M., Pereira, G. M., de Sousa Jabbour, A. B. L., Ndubisi, N. O., Zvirtes, L. 2021. Green marketing in supermarkets: Conventional and digitized marketing alternatives to reduce waste. *Journal of Cleaner Production*, 296, 126531, <https://doi.org/10.1016/j.jclepro.2021.126531>.
- Huang, Y.Y., Tamas, P.A., Harder, M.K. 2018. Information with a smile - Does it increase recycling? *Journal of Cleaner Production*, 178, 947-953. <https://doi.org/10.1016/j.jclepro.2018.01.006>.

- Key, T. M., Czaplewski, A. J. 2017. Upstream social marketing strategy: An integrated marketing communications approach. *Business Horizons*, 60, 325-333. <https://doi.org/10.1016/j.bushor.2017.01.006>.
- Kim, J., Rundle-Thiele, S., Knox, K., Burke, K., Bogomolova, S. 2020. Consumer perspectives on household food waste reduction campaigns. *Journal of Cleaner Production*, 243, 118608. <https://doi.org/10.1016/j.jclepro.2019.118608>.
- Koivupuro, H.-K., Hartikainen, H., Silvennoinen, K., Katajajuuri, J.-M., Heikintalo, N., Reinikainen, A., et al. 2019. Influence of socio-demographical, behavioural and attitudinal factors on the amount of avoidable food waste generated in Finnish households. *International Journal of Consumer Studies*, 36 (2), 183-191. <https://doi.org/10.1111/j.1470-6431.2011.01080.x>.
- Lagorio, A.; Pinto, R. y Golini, R. 2018. Food waste reduction in school canteens: Evidence from an Italian case. *Journal of Cleaner Production*, 199, pp. 77-84.
- Lee, E. J., Choi, H., Han, J., Kim, D. H., Ko, E., Kim, K. H. 2020. How to “Nudge” your consumers toward sustainable fashion consumption: An fMRI investigation. *Journal of Business Research*, 117, 642-651, <https://doi.org/10.1016/j.jbusres.2019.09.050>.
- Liao, C-H. 2020. Investigating the Key Success Factors of Social Marketing in Promoting Environmental Consciousness: A Dematel-Based Approach. *International Journal of Marketing Studies*, 12 (2). <https://doi.org/10.5539/ijms.v12n2p1>.
- Mondéjar-Jiménez, A., Ferrari, G., Secondi, L. 2016. From the table to waste: An exploratory study on behaviour towards food waste of Spanish and Italian youths. *Journal of Cleaner Production*, 138, pp. 8-18. <http://dx.doi.org/10.1016/j.jclepro.2016.06.018>.

- Morone, P., Falcone, P.M., Imbert, E., Morone, A. 2018. Does food sharing lead to food waste reduction? An experimental analysis to assess challenges and opportunities of a new consumption model. *Journal of Cleaner Production*, 185, 749-760. <https://doi.org/10.1016/j.jclepro.2018.01.208>.
- Olmedo, A., Milner-Gulland, E. J., Challender, D. W., Cugnière, L., Dao, H. T. T., Nguyen, L. B., Veríssimo, D. 2020. A scoping review of celebrity endorsement in environmental campaigns and evidence for its effectiveness. *Conservation Science and Practice*, 2(10), 261. <https://doi.org/10.1111/csp2.26>.
- Sampei, Y., Aoyagi-Usui, M. 2009. Mass-media coverage, its influence on public awareness of climate-change issues, and implications for Japan's national campaign to reduce greenhouse gas emissions. *Global Environmental Change*, 19, 203-212. <https://doi.org/10.1016/j.gloenvcha.2008.10.005>.
- Schöggel, J-P., Stumpf, L., Baumgartner, R. J. 2020. The narrative of sustainability and circular economy - A longitudinal review of two decades of research. *Resources, Conservation & Recycling*, 163, 105073. <https://doi.org/10.1016/j.resconrec.2020.105073>.
- Septianto, F., Kemper, J. A., Northey, G. 2020. Thanks, but no thanks: The influence of gratitude on consumer awareness of food waste. *Journal of Cleaner Production*, 258. <https://doi.org/10.1016/j.jclepro.2020.120591>.
- Soma, T., Li, B., Maclaren, V. 2021. An evaluation of a consumer food waste awareness campaign using the motivation opportunity ability framework. *Resources, Conservation & Recycling*, 168, <https://doi.org/10.1016/j.resconrec.2020.105313>.
- Stöckli, S., Niklaus, E., Dorn, M., 2018. Call for testing interventions to prevent consumer food waste. *Resources, Conservation & Recycling* 136, 445-462. <https://doi.org/10.1016/j.resconrec.2018.03.029>.



- Strauss A. L., Corbin J. M. 1998. *Basics of qualitative research: techniques and procedure for developing grounded theory*. 2nd ed. London: Sage.
- White, K., Habib, R., Hardisty, D. J. 2019. “How to SHIFT Consumer Behaviors to be More Sustainable: A Literature Review and Guiding Framework”. *Journal of Marketing*, 83 (3), 22-49, <https://doi.org/10.1177/0022242919825649>.
- Young, C.W., Russell, S.V., Robinson, C.A., Chintakayala, P.K. 2018. Sustainable retailing - influencing consumer behaviour on food waste. *Business Strategy and The Environment*, 27 (1), 1-15. <https://doi.org/10.1002/bse.1966>.
- Young, W., Russell, S. V., Robinson, C. A., Barkemeyer, R. 2017. Can social media be a tool for reducing consumers’ food waste? A behaviour change experiment by a UK retailer. *Resources, Conservation & Recycling*, 117, 195–203. <http://dx.doi.org/10.1016/j.resconrec.2016.10.016>.
- Zamri, G. B., Azizal N. K. A., Nakamura, S., Okada, K., Nordin, N. H., Othman, N., Akhir, F. N. MD., et al. 2020. Delivery, impact and approach of household food waste reduction campaigns. *Journal of Cleaner Production*, 246, 118969. <https://doi.org/10.1016/j.jclepro.2019.118969>.

**Table 1. List of Institutions Interviewed and Dates**

<b>Institutions by area and positions held by the interviewees</b>
<b>Civil society</b>
Head of Education for Social Development - CS1
Director of Culture and Sustainability—CS2
Delegate of a promotion and development foundation - CS3
<b>Administration</b>
Technician of Business Promotion “Dynamic Town Hall” - A1
General Director of Consumption DGA - A2
<b>Industry</b>
Manager of the Aragón Food Industries Association - I1
Head of food cluster projects - I2
<b>Retailers</b>
Head of external relations at Mercadona - R1
Head of external relations at Eroski - R2
Head of external relations and CSR at AUCHAN Retail group - R3
Head of Operations at Carrefour - R4
<b>Hospitality sector</b>
Owner of the food establishment "San Pablo Poultry " - HS1
Owner of the University Cafeteria - HS2
<b>Academia</b>
Head of the University Energy and Environment Section - Ac1
Director of the University Sports Service and Healthy Office - Ac2

**Table 2. Initiatives from Institutions**

<b>Initiative</b>	<b>Agent</b>	<b>Short Characterization</b>	<b>Target</b>	<b>Objective</b>	<b>Measure of Effectiveness (Results)</b>
<b>Civil Society, Administration, and Food Industry</b>					
“Zaragoza does not throw out food”	CS1 organized in collaboration with a city council and some food donors	Consisted of preparing a popular outdoor meal made with products that were close to expiring. This event was linked to other activities in the schools.	The whole population, but focus on young people	To raise awareness and report on the problem and its figures	Number of people attending the meal (more than 5,000). But the rest of the activities launched in the schools were not measured for their effectiveness.
“Food Utilization”	CS2	A set of monthly conferences at which an expert in this field presented his point of view through his professional experience	Mainly older people	To sensitize and encourage all actors in the food chain	Number of people attending the conference
“Food is not thrown away. Zero Waste” framed within the national strategy: “More Food Less Waste”	CS3—Schools	For a week, the students themselves made some measurement sheets of what was consumed and wasted every day in the dining room	Primary and secondary students	To raise awareness and report on the food waste problem and its figures	Students measured the amount of food eaten and thrown away each day for a week. At the end, they made a short report with the data obtained and shared it with their colleagues.
“Code of Good Food Practices”	SC2, A2 coordinated this initiative signed by	Development of a good practice guide	Companies and public institutions that could	To curb the food waste problem in a	The number of companies adhered (32)

	different companies and regional institutions		curb food waste	coordinated way	
“Organize, organizing ... less food waste ... we are generating”	A2 together with other retailers ®	Different funny activities in the supermarket	The whole population	To raise awareness about the importance of planning the shopping basket, organizing the fridge to waste less, cooking and reusing food	Results are not measured
Information and training activities for employers	I1, I2	Information and training activities for employees of the food processing industry in the prevention of food waste	Companies from the food industry	To prevent food waste	Results are not measured
<b>Retailers</b>					
Donation of food to soup kitchen, food banks	R1, R2	The regular donation of food to these agents	General consumers	To avoid food waste and costs	They usually have data that they handle internally and that they usually publish
The launch of "Ugly Fruits" campaign	R2, R4	Fruits that do not meet a set size are sold at a competitive price	General consumers	To avoid food waste and costs	Results are not measured
“Nothing is thrown away here”	R3	The recipe contest to take advantage of food	General consumers	To avoid food	Results are not measured

				waste and costs	
Stand for products about to expire	R4	They dedicate a space for these products at a lower price	General consumers	To avoid food waste and costs	Through observation, they see that every day is quickly depleting
<b>Hospitality</b>					
“Sold Out”	HS1	They work with canned food and take advantage of everything. When the product runs out, they close.	General consumers	To avoid food waste and costs	Recovery of business investment in one year
“Low prices throughout the day”	HS2	They facilitate access to the product and at the end of the day they lower the price even more to sell it.	University students	To avoid food waste and costs	Observation
<b>Academia</b>					
Food waste monitor in the university canteens	Ac2	<i>It will begin as a pilot experience in the Veterinary Faculty. The idea consists of weighing all the food that comes in, what is eaten and what comes out.</i>	University students	To raise awareness and report on the problem and its figures	Measuring and quantifying the food eaten and thrown away every day and made a food waste report