

# Introduction of the nudging method in penitentiary facilities in Italy in view of food waste reduction: Preliminary data

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## Abstract

The aim of this study was to analyze different aspects of food waste in the specific context of prisons by introducing the *nudging method*, thanks to the collaboration of District House and Prison of Larino (Italy) involving staff and guests of the penitentiary structure, providing them with the knowledge of the topic and encouraging them to propose creative and effective solutions to prevent and reduce food waste. The study involved n. 50 participants out of total of about 200 prisoners. Data were collected using n.3 questionnaires related to the knowledge of food waste food, the second related to the origin of consumed and food waste and the third collected the participants' proposals how to reduce food waste. The results show that effects of *nudging* has awakened the prisoners' conscience about the social, ethical and economic importance of reducing food waste and a proactive attitude in providing proposals for the reduction of food waste. The most wasted food is bread (35%), pasta (27%) and fresh fruit (20%), provided by the administration because they are considered of inferior quality or prepared and cooked badly. The overwhelming majority (96%) of the participants showed sensitivity about the ethical and economic reasons behind the fight against food waste, making themselves available to contribute to its reduction and suggesting some initiatives. The data collected from the questionnaires related to the causes of waste indicate the need to implement actions aimed at the correct conservation of food and the promotion of good hygiene practices.

## Introduction

The most recent estimates of the phenomenon of food waste in the European Union show that 70% of food waste derives from the domestic environment, catering services and sales to wholesale and retail, the production and processing sectors contributing the remaining 30% (FUSIONS, 2016; Parfitt *et al.*, 2010; Galanakis *et al.*, 2016).

In the agro-food supply chain, food waste at the domestic level is definitely the most problematic both in terms of quantitative estimation and in terms of actions for its reduction. Frequently, foods that are still suitable for consumption end up directly in solid urban waste. The variability of the extent of food waste can be influenced by a numerous factor related to consumer behavior. An extract from FAO document entitled "Beauty (and taste!) are on the inside" provides these exact words: *Should we choose the apple oval, opaque or perfectly shiny and rounded? One of these would surely make a more beautiful Instagram photo than the other, but in the end, both would be just as good and would satisfy your hunger* (FAO, 2018).

The goal of reducing food waste through the recovery of food surpluses has led to the issuance of guidelines and the promulgation of rules against food waste with the promotion of numerous awareness campaigns, aimed at the population on how to reduce food waste in the domestic environment.

Recently, initiatives have been promoted in the school environment, to develop knowledge, skills and attitudes that allow individual growth, together with a sense of individual responsibility and awareness of the right to food and duties related to food, its safety and sustainable development.

Recently the Ministry of Health in collaboration with *National Institute for Insurance against Accidents at Work* (INAIL), has promoted a pilot study "Causes of Food Waste and Corrective Interventions" (2016-2018) with the aim of collecting data in order to identify lifestyle and explore motivations and behaviors that lead to food waste, based on the assumption that people's attitudes and individual behavior can influence the amount of food wasted.

The methodological approach of the project refers to the concept of *nudging* (gentle push), a psycho-behavioral approach aimed at encouraging a correct behavior, that does not result as an authoritarian imposition, but as a choice of the individual himself, stimulated to participate in the proposed objective. Furthermore, Ministry of Health in 2018 April 16<sup>th</sup>, has

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published the "Guidelines to management bodies of school canteens, business, hospital, social and community, in order to prevent and reduce the food waste connected to administration of food."

The purpose of this study was to analyze the different aspects of food waste in the specific context of a prison institute, involving staff and guests of the structure, with an approach based on the *nudging method*.

## Materials and Methods

After sharing methodology and timing with the Direction of the District House and Reclusion of Larino, province of Campobasso (Italy) the study involved n. 50 participants out of a total of about 200 prisoners, about fifteen follow the ethnic diet. Participants were given information on the issue of food waste, stimulating them to awareness, collaboration and to propose creative and effective solutions to reduce/eliminate food waste.

The following aspects were considered: i) acquisition of useful data for the project; ii) information and training meetings on the topic of food waste, in order to motivate and involve the group; iii) preparation of questionnaires for the collection of data on the types of food possibly wasted (waste and / or food surplus) and possible motivations;

iv) analysis and identification of corrective measures. Preliminary data were acquired by the administration of the institute, while the others were collected through n.3 questionnaires. The first questionnaire was administered after phase the sensitization on relate of food waste; in subsequent times the other two questionnaires were administered at the same time. The person who administered the questionnaires had no influence in filling out the questionnaires by the participants.

### Questionnaire formulation

The first questionnaire was aimed at detecting the degree of knowledge of the food waste phenomenon by the participants and personal information; the second was composed of 11 questions for three different topics related to food received from home, food purchased, and food provided by the Penitentiary Administrative, questions are described in Table 1. The third questionnaire collected the participants' proposals on how to reduce food waste. Data are presented as percentage of reply.

## Results and Discussion

The food supplied by the prison administration is provided by a company awarded a national tender notice, according to a purchase specification. The bread is delivered daily, fruit and vegetables twice a week, while fish, meats, cheeses are delivered at longer intervals and stored in the fridge and in the kitchen freezers. Two prisoners are employed to prepare meals and one kitchen assistant, while three are assigned to the distribution of meals to the prisoners' cells. Moreover, the detainees can receive food from their families, during periodic visits, but they can also buy them privately. In

these last two cases can store food in refrigerators and freezers allocated in the various sections of the penitentiary and use camping stoves to cook them. From the analysis of the collected data, from the first questionnaire, it emerged that the interviewed guests (n.50) of the District House and Prison are composed of male persons, aged between 20 and 60 years, of average cultural level and secondary education. The majority (76%) have Italian citizenship. Information on food waste was mostly acquired through television and 96% said they would like to go further into this topic but do not know how. The results showed that the 92% of respondents to the questionnaire received food from home (every 15-30 days), mostly cured meats, fresh and aged cheeses, cooked vegetables and products in oil. Moreover 98% buy weekly, in order, fresh meat, pasta, rice, seasonal fruit, dried fruit, fresh cheeses and fresh sausages.

The most wasted food is bread (35%), pasta (27%) and fresh fruit (20%), in partic-

ular those provided by the administration because they are considered of inferior quality or prepared and cooked badly. Much less is the waste of food received from home and/or purchased, prevalent for emotional and economic reasons. However, even for these foods have emerged critical aspects of how they are stored and used.

The data showed that 98% of those who receive food from home consume it all and 2% produce some surplus; 87% of those who buy food consume it all, while 13% produce leftovers of food, whereas 67% do not always eat meals provided by the administration. Only 8% of the prisoners declare to consume the entire meal provided. Great majority declares that them is sorry to throw food, whereas 14 % of the prisoners is not sorry to throw food received from Penitentiary Administrative. More than half of those interviewed became available to follow suggestions to avoid wasting (Figure 1).

The main reasons for food waste indi-

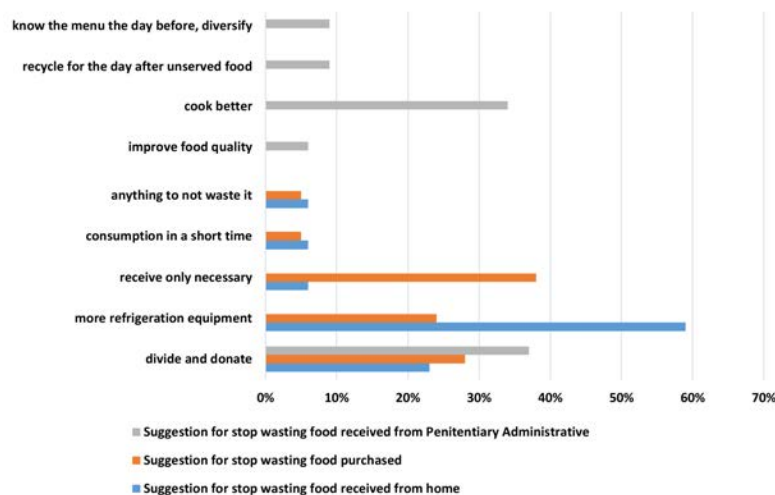


Figure 1. Origin of consumed food and food waste.

Table 1. Survey questions (topics).

1. FOOD RECEIVED FROM HOME	2. FOOD PURCHASED	3. FOOD PROVIDED BY THE PENITENTIARY ADMINISTRATIVE
1.1. Get food from home?	2.1. Do you buy food?	3.1. Eat the foods that the administration provides you?
1.2. How often?	2.2. If you buy it, how often?	3.2. Which food provided by the Penitentiary Administrative, you consume?
1.3. Which food receive from home?	2.3. Which foods you buy?	3.3. The food you receive from Penitentiary Administrative consume all?
1.4. The food you receive from home consume all?	2.4. Consume all foods that you buy?	3.4. Which foods you consume provided by the Penitentiary Administrative?
1.5. If YES, for what reason?	2.5. If YES, for what reason?	3.5. Consume all foods provided by the Penitentiary Administrative?
1.6. If NO, for what reason?	2.6. If NO, for what reason?	3.6. If NO, for what reason?
1.7. If no, what food is advanced?	2.7. If no, what food is advanced?	3.7. If no, what food is advanced?
1.8. What do you do with food surplus?	2.8. What do you do with food surplus?	3.8. What do you do with food surplus?
1.9. Can you estimate the amount food waste?	2.9. Can you estimate the amount food waste?	3.9. You're sorry to throw the food?
1.10. You're sorry to throw the food that comes to you from home?	2.10. You're sorry to throw the food that you buy?	3.10. You are available to follow suggestions to avoid wasting?
1.11. You are available to follow suggestions to avoid wasting the food you receive from home?	2.11. You are available to follow suggestions to avoid wasting the food purchased?	

cated by the interviewers are represented in Figure 2. The high percentage of responses is linked to the non-knowledge of the methods of food preservation (36%), in particular those provided by the administration because considered of inferior quality or cooked badly (30%). Other reasons indicated are related to the lack of refrigeration equipment.

The results obtained from the proposals to reduce food waste (Figure 3) show that the higher percentage is related to the need for more refrigeration equipment (59%) for food received from home, better cooking of food supplied by the administration (35%), purchase only necessary (38%), donate food (37%). Other proposals concern consumption in a short time, improve food quality, know the menu the day before and recycle for the day after unserved food.

The food received from home has a strong emotional value, they are considered tastier also because some of them are not available among those provided by the prison administration, so the surplus ones are given to the prison cell mates and only rarely are wasted because of the difficulty of storing them.

Only 13% of the participants reported that part of the food they bought was wasted, mostly pasta, meat, fruit and vegetables in season, because they were too much, but above all because of the difficulty of storing properly. Also, in this case food waste is minimal for economic and affective reasons. As regards the food provided by the administration, food surpluses are produced in 32% of cases, especially in the case of bread (35%), pasta (27%) and fresh fruit (20%), also fish (19%), meat (14%) and vegetables (14%). The reasons are due to the fact that not all the foods tasty because they are often cooked badly.

Nevertheless, on the occasion of presentation of the data on food waste detected and subsequent administration of the questionnaire of proposals for the reduction of food waste, they have shown a proactive attitude in providing solutions, in particular for the reduction of waste deriving from food provided from administration, making themselves available to contribute to its reduction and suggesting some initiatives including: donate uneaten foods; improve the quality of the products supplied by the administration and cook them better; optimize the daily menu based on the actual need; favor the kitchen of the reuse. Other suggestions indicate the difficulties of proper conservation due to the lack of refrigeration and storage equipment, food preparation and handling methods for the limited knowledge of good hygiene practices and cooking.

Considering that numerous researches indicate that domestic food waste has increased in recent years (in the EU between 2004 and 2010), more recent data suggest that, with specific corrective actions, we could move towards reducing them. Strategies include raising awareness through information, education, waste measurement and logistics improvement in according to Gunders and Bloom (2017).

Respecting food, giving it the right value in a cultural sense, even before the economic, is a key aspect if you want to win the battle. In Italy, from the literature data, it emerges that a significant share of food waste is attributable to the behaviour of individuals and communities. Hence the need to provide information to promote correct individual and collective behaviours that can at the same time aim to stem the specific phenomenon of waste but also to prioritize health protection. The methods of

detection and analysis of food waste increasingly require a detailed knowledge of the contexts, as well as the factors that generate it, both to try to quantify the phenomenon, and to implement targeted actions to counteract it. The aim is to identify and correct improper practices, which cause food waste, through the promotion of adequate information, training and awareness raising activities (Milicevic *et al.*, 2016; Good Hygiene Manual of Good Procedures for Charitable Organizations).

The active involvement of the staff of the District House and prisoners offers the opportunity to create an experience within a place they lived (lifelong learning methodology). The consumption of food is one of the principal concerns within institutional environments such as prisons. This is because it is necessary to feed people, but also because, as humans, we have a symbolic relationship to food (Goderis, 2006).

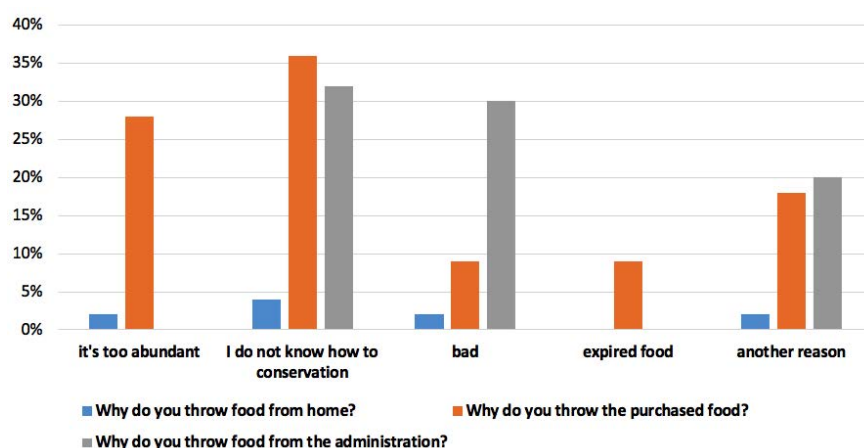


Figure 2. Causes that lead to food waste creation.

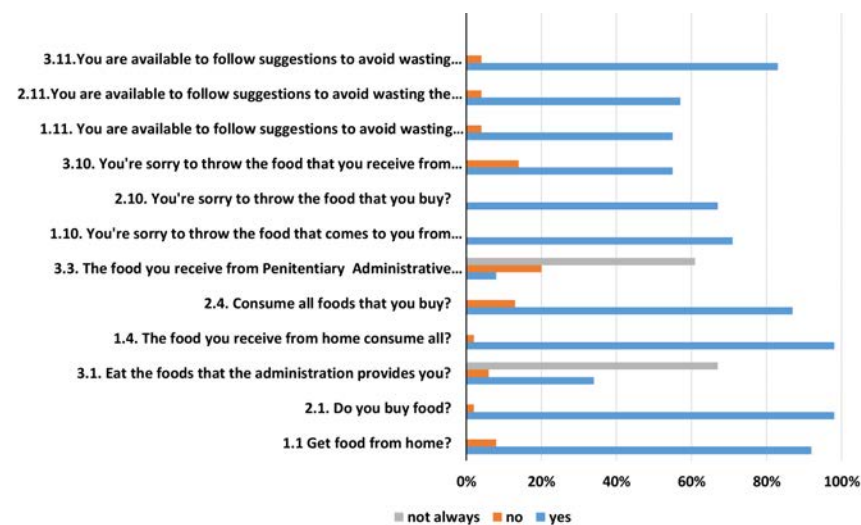


Figure 3. Respondent's proposals to avoid food waste.

## Conclusions

The results show that effects of *nudging* have awakened the prisoners' conscience about the social, ethical and economic importance of reducing food waste and a proactive attitude in providing proposals for the reduction of food waste. In conclusion the *nudging method* approach could be considered in other contexts in order to analyze the different aspects that lead to creation of food waste.

## References

- FAO, 2018. Beauty (and taste!) are on the inside. Available from: <http://www.fao.org/fao-stories/article/en/c/1100391/>
- FUSIONS Eu. Estimates of European food waste levels. March 2016. Available from: <https://www.eu-fusions.org/phocadownload/Publications/Estimates%20of%20European%20food%20waste%20levels.pdf>
- Galanakis CM, Cvejic J, Verardo V, Segura-Carretero A, 2016. Food Use for Social Innovation by Optimizing Food Waste Recovery Strategies. In: Galanakis CM. Innovation Strategies in the Food Industry. Academic Press, pp 211-236.
- Godderis R, 2006. Food for Thought: An Analysis of Power and Identity in Prison Food Narratives. Berkeley J Sociol 50: 61-75.
- Good Hygiene Manual of Good Procedures for Charitable Organizations. Available from: [http://www.salute.gov.it/imgs/C\\_17\\_pagineAree\\_1187\\_listaFile\\_itemName\\_1\\_file.pdf](http://www.salute.gov.it/imgs/C_17_pagineAree_1187_listaFile_itemName_1_file.pdf)
- Gunders D, Bloom J, 2017. Wasted: how America is losing up to 40 percent of its food from farm to fork to landfill second edition of nrdc's original 2012 report. 2017: 17-05.
- Milicevic V, Colavita G, Castrica M, Ratti S, Baldi A, Balzaretto CM, 2016. Risk assessment in the recovery of food for social solidarity's purpose: preliminary data. Ital J Food Safety 5:6187.
- Ministero della Salute, INAIL 2016. SPAIC - Cause dello spreco alimentare ed interventi correttivi
- Ministero della Salute, 2018. Linee di indirizzo rivolte agli enti gestori di mense scolastiche, aziendali, ospedaliere, sociali e di comunità, al fine di prevenire e ridurre lo spreco connesso alla somministrazione degli alimenti
- Parfitt J, Barthel M, Macnaughton S, 2010. Food waste within food supply chains: quantification and potential for change to 2050. Phil Trans R Soc B 365:3065-81.