

The “Cr-EAT-Ive Schools Feasibility Study”: Aiming to Reduce Food Waste by Implementing Relevant Actions including the Completion of Food Waste Diaries by Kindergarten Families

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Abstract

Cr-EAT-ive Schools Feasibility Study is a research-based innovative project which aims to reduce food waste. In order to conduct the study, a pilot action was implemented to public and private Kindergarten, which involved headmasters, teachers, parents and canteen staff. The key-aspect of this pilot action was the parents' volunteering two-week completion of diaries which record the food waste per family. This paper highlights this exact part of the pilot action and, subsequently, of the whole study, because its results consist the first Greek Food Waste data per household level with children.

Keywords: food waste reduction, Cr-EAT-ive Schools Feasibility Study, Greek Kindergarten

1. Literature Review

In recent years, food management has been a matter of particular interest. The quantities of food that end up in waste every day have been increasing to more than 40% per month for each household (Food and Agriculture Organization of the United Nations [FAO], 2011; European Food Banks Federation [EFBF], n.d.). A number of studies (Cappellini & Parsons, 2013) suggests that children could be influencing the amount of food and drink waste generated in the home. Parents sometimes cite children being ‘fussy’ and leaving unfinished meals on their plates as a reason for throwing food away. Moreover, qualitative evidence suggests that some families regularly buy more than is needed in order to provide a wide selection of food for the children, even if it means that some of it will inevitably be wasted; others intentionally cook more than may be needed, so that second chance is always available (Betz, Buchli, Gobel, & Muller, 2015). However, the waste compositional analysis found no evidence of a relationship between presence of children and overall levels of avoidable food and drink waste when controlling for the number of occupants in a household and home composting. This is consistent with the analysis showing that there was no difference in waste levels between same size households with and without children for three- and four-people households. However, taking into account lower calorific needs of younger children and therefore lower amounts of food required to meet their needs, it seems that there is some scope for reducing waste levels for families with children below that of all-adult households of a similar size (Waste and Resources Action Programme [WRAP], 2014). Based on the WRAP Report the average family in the UK with children throws away 7.3 kg of food of which 4.7kg (63.8%) is avoidable (WRAP, 2008). A number of factors can influence the fact that families appear to generate a higher level of food waste, of which some are behavioural, like lack of knowledge about prevention measures, lack of food planning, inappropriate storage and packaging conditions, misinterpretation of confusion over labels (Aschemann-Witzel, de Hooge, Amani, Bech-Larsen & Oostindjer, 2015).

The selection of the specific age group is the optimum one, as the project is focusing to reduce food waste through behavioural change of families with children and Early childhood – younger than 6 years of age – has been described as a period when development occurs at a rate faster than at any other (Shonkoff & Phillips, 2000; Egert, Fukkink, & Eckhardt, 2018) and is a critical time in children’s lives for learning how early experiences condition long-term biases for certain behaviours (Faith & Kral, 2009; Eckhardt & Egert, 2018). Moreover, food waste at household is also related with eating behaviours (children do not usually eat the food that they do not like; children do not eat plate accompaniments like salads, rice). The adoption of less wasteful behaviours at this age ensures to a certain degree that it will be continued through adulthood, as eating behaviours children practice early in life affect their health and nutrition, and may continue to shape food attitudes and eating patterns through adulthood (Lynch, 2012). Additionally, teachers play a very important role in establishing eating behaviours (eating behaviours refers to food preferences, patterns of food acceptance and rejection, and the types and amounts of food a person eats) and as teachers become role models by engaging with children at meal-time and sitting down and eating with them. Observing teachers eating and enjoying a variety of foods makes these foods more appealing to children (Eliassen, 2011; Scaglioni, De Cosmi, Ciappolino, Parazzini, Brambilla & Agostoni, 2018). Teachers could be a great means to motivate children not to throw away the food on their plates, to learn to eat food with leftover recipes and consequently learn the actual value of food and the meaningfulness to reduce food waste (Diab, 2015). The aforementioned facts lead to the conclusion that a project that focuses on the collaboration of teachers, preschool children and their parents and canteen cooks aiming to enable behaviour change towards food wastage through innovative educational tools and activities, could be a successful initiative to reduce food waste.

2. Objectives of “Cr-EAT-ive Schools Feasibility Study”

This Cr-EAT-ive Schools feasibility study was developed as an idea under the EU Fusions project (<http://www.eu-fusions.org/uploads/deliverables/WP4%20report%20Jan%202014.pdf>). The objective of FUSIONS WP4 ‘feasibility studies’ is “to identify solutions throughout the food chain to reduce food waste and to test via feasibility studies social innovative measures to prevent and reduce food waste using a multi-stakeholder approach across all stages of the food chain. Therefore, Cr-EAT-ive Schools aimed to minimize food wastage by changing the behaviour of families and their children. Additionally, Cr-EAT-ive schools aimed to raise awareness amongst children on the importance of food waste minimization and change their behaviour towards food, and waste, at an early age with the help of their teachers through the implementation of innovative games and educational activities. Finally, a stronger collaboration between school administrators, teachers and parents was planned, something that we considered crucial for the effective implementation of school behaviour change programs, as parents and teachers have key role in establishing nutritional and environmentally friendly behaviours. Food service employees contributed to the goal of the project by maintaining less wasteful habits in their kitchen and also by helping teachers implement several activities.

3. Methods

The methodology of the project implementation was designed by taking into consideration the concepts of social innovation and impact, transferability and involvement of all relevant stakeholders (children, parents, teachers, heads of the schools, canteen staff). All the participants were informed in advance of the purposes of the study, children had the right to withdraw in any time and were guaranteed anonymity and confidentiality.

3.1. Four Stages of “Cr-EAT-ive Schools Feasibility Study” implementation

The Cr-EAT-ive Schools feasibility study was implemented in four stages. Stage 1 involved Kindergarten Heads and teachers in a collaboration for creating innovative pedagogical material along with seminar guides. Stage 2 included seminars and meetings with parents whose children attend kindergartens and kindergartens’ food services employees. At this stage these target groups were informed about food waste and took some advice for its reduction. At the Stage 3 families completed a Food Waste Diary (FWD), in which they measured the amount of food wasted in two weeks before and after their information on the guidelines for food reduction. Diaries generally aim at keeping notes or opinions around actions and everyday life. They are completed solely by their author, with special permission required for a third person’s involvement. In this study, diaries function as information protocols with two main objectives. On the one hand, they disclose data which is necessary for the shaping of the activities of the food waste management program, while on the other record the change observed in the households (Janssens, Bos, Rosmalen, Wichers & Riese, 2018). This was the main pilot action, which included a Cooking Week event for all participants. Finally, stage 4 was dedicated to the dissemination of the data reports derived from the pilot action. A basic method for this was to translate to English all games and playful activities designed at Stage 1, along with the relevant online updates.

Stage 1

- **Task 1.1:** Collection of relevant material about ideas for games compatible to preschool children based on typical behaviors and habits of this age group. Collaboration with preschool teachers to investigate the inclusion "food wastage issues" in the curriculum and in the educational procedure and programs.
- **Task 1.2:** Design a series of innovative games with their manuals (arts and crafts, memory games, competition and quizzes) based on know-how gained from the previous task and distribution to all kindergarten classes.
- **Task 1.3:** Development of pedagogical Guide for teachers about methods to include "food wastage issues" in the curriculum and in the educational procedure and programs and educational methods to implement games and useful teaching/practical material to support the games.
- **Task 1.4:** Training seminars for teachers to demonstrate the use of the pedagogical guide and games

Stage 2

- **Task 2.1:** Guidelines on food waste reduction containing general advice on storage, food preservation and portioning food sizes.
- **Task 2.2:** Guidelines on food waste reduction at kindergartens with practical information about food wastage issues in general, ideal packaging and storage conditions and advice on shopping and meal planning, leftover usage, and other innovations for using purchased food more efficiently.
- **Task 2.3:** Evening Seminars to parents to learn about food wastage issues in general, ways to reduce food wastage and by this way to save money.
- **Task 2.4:** Workshops addressed to kindergartens canteen staff to learn about food wastage issues in general, ideal packaging and storage conditions and innovative logistical solutions to better estimate portioning food size, including also a list with leftover recipes.

Stage 3

Task 3.1: Pilot actions where parents measure their food waste for two weeks through a food waste diary before and after their information about food waste reduction advices at home.

Task 3.2: Evaluation of all the provided data from parents during the pilot action and incorporation to the final Report

Task 3.3: Cooking Week event for children, their parents and teachers; including activities and crafts with main ingredients fruits and vegetables not consumed because of their "ugly" appearance or because they were surplus

Stage 4

Design of a Follow up plan with all guidelines translated into English and disseminated through FUSIONS and ANATOLIKI website. Official Letters will be sent (by email) to all Municipal kindergartens of Region of Central Macedonia (38 Municipalities) informing them about the project and also containing links with the online GUIDES.

3.2. Preparation of the Pilot Action

A key-preparation sub-stage was the information letters sent by the group to the Kindergarten parents via the Heads of the Kindergartens. In these letters, the parents were invited to participate to the program. They were also informed about the informative activities which was to be implemented and the timeline of the program. After this phase, a Welcoming Parents event took place where the parents were informed analytically about their participation and the completion of the FWDs.

3.3. Methodology of the Pilot Action

The pilot action took place in five Kindergartens, two private and three public. Its main aim was to actually record the food that families with preschool children throw away at home.

The initial proposal was to select five families per kindergarten. The target-sample was chosen to be a small enough to be easy to reach. These Pilot Families were invited to record their food waste through a FWD for two weeks. The FWDs included 4 different tables, for each meal (breakfast, lunch dinner, other), for seven days, where parents invited to record types of foods thrown away, when and why. The first week took place at the beginning of the program, after the families were informed about the program and the implementation method, during a welcoming to parents' event. After the completion of the first week, they were invited to a seminar where a food waste prevention guide at home was presented to them and were asked to read it and implement it at home while at the same time filling in a new diary for a whole week. At the end of the pilot action and after the completion of the second FWD, pilot parents participated in phone interviews based on a questionnaire. The interviews purpose was to identify the consumer behavior of participants around this issue and to evaluate the pilot and the tools produced. The families were asked to record the food waste per week for 10 food groups; dairy and eggs, pastries, fresh fruits, fresh vegetables, cooked meals, nuts, beverages, pasta, meat and fish, peels-bones-roots. They also had to choose the reason of each food disposal; too busy to eat it, forgotten in the fridge, it went bad, cooked-prepared-served too much, past expiration date, personal preference, accidents, not edible (peels, roots, etc.).

In addition, participants were asked to choose from a number of incentives that encourage them to reduce food waste. These incentives were; to teach my children proper and healthy consumer behavior, to eat healthy, to not feel guilty, to be organized, to save money, to lack of food and hunger issues in other countries, to protect the environment. The participants were able to place their comments on the structure and the content of the action and to reflect upon their behavior change towards food waste during the research procedure. Finally, the amount of food waste was calculated based on the following method. The descriptive amounts of food waste (e.g. half plate, the whole bowl, one piece etc.) provided by parents through FWD meals converted to actual amounts in kg based on several sites which convert recipes ingredients to metric measures (The Metric Kitchen, n.d.). However, those sites do not contain all types of conversions. At those cases the conversion was made empirically. The amounts of food waste are correlated with a cost based on the prices of the "Price Observer" of the Ministry of Development (<http://e-prices.gr/search>). The amounts and costs were summarized for a week and they were cross multiplied to quantify the monthly and annual amount.

4. Results of the pilot action regarding the Food Waste Diaries (FWDs)

The main results which came from the project are that the most common reason of Disposal was that respondents cooked, served and prepared too much food (48% of the 510 of the total answers given through FWD – Figure 1). Parents mostly feel guilty about throwing away food. Some mothers prefer to eat their children's leftovers rather than throw it away (phone interview). All the other reasons, which are presented in the following figure, seem to have the same degree of importance (Figure 2). During the two-week measurements (29 parents the first week, 5 less families the second week) the total amount of food waste recorded by parents is approximately 132 kg. If we gather all the food thrown away from all parents for the two weeks, the biggest percentage of food group thrown away is pastries (Figure 3). In addition, it was found that after the families in the kindergartens had been informed about the food waste reduction measure (through seminars and the guidelines), the participating families (that is those who completed the pre and post FWD) managed to reduce their food waste by nearly half. There was a 27kg reduction, which, all things being equal, equates to a 1417kg saving a year. This is a financial saving of €114.49 a week and €5970.00 a year for all the kindergartens combined. The data from the FWD were also used to estimate the average amount of food waste each individual household. During the second week of the food waste diaries, a household wasted an average of 2kg (the equivalent of €5.91), this equates to 97kg a year (the equivalent of €308.59). There was a 1kg reduction, which, all things being equal, equates to a 80kg saving a year. Therefore, the kindergarten households on average saved € 6.40 a week, which could, all things being equal equate to €334.00 a year. This is a huge yearly saving for a household.

5. Future Needs and Conclusion

A main conclusion of the study is that information on food waste can lead to the adoption of new shopping and food planning habits, along with a money saving incentive. People also consider environment and feel guilty about poor countries' lack of food and this works positively for reducing food waste. The data mined for the research revealed that when a family decides to try waste less food, it can obtain it by changing its habits and save about € 300 per year along with about 100kg less food waste (also yearly). Similar programs in the world have been able to implement and greatly reduce food waste. Food: Too Good to Waste (FTGTW) campaign in United States consists of an implementation guide and toolkit that aim to reduce wasteful household food management practices. A Food: Too Good to Waste campaign provides the tools in the toolkit to families and individuals to help them keep food out of landfills and more money in their pockets (Environmental Protection Agency [EPA], n.d.). At the end of the procedure, after the completion of the data mining and presentation, the group commented that parents should participate in greater numbers in the pilot action.

In order to obtain this, a future researcher should point to the benefits of the procedure on financial and everyday life contexts. It has been also highlighted that a closer supervision to parents' participation is required, in order to better inform the parents about food waste and the procedure of completing the FWDs itself. Nevertheless, the research resulted to the first Greek Food Waste data per household level with children.

6. Figures

Figure 1.

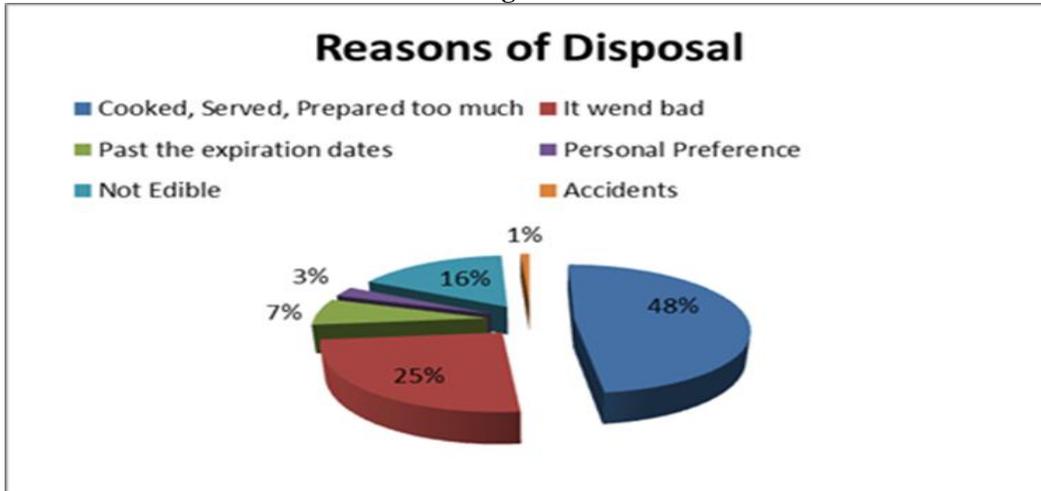


Figure 2

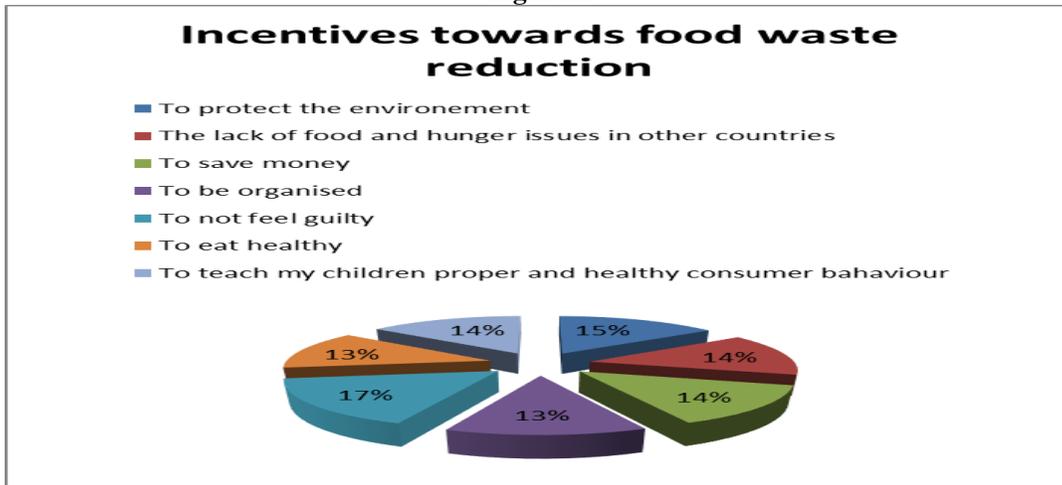
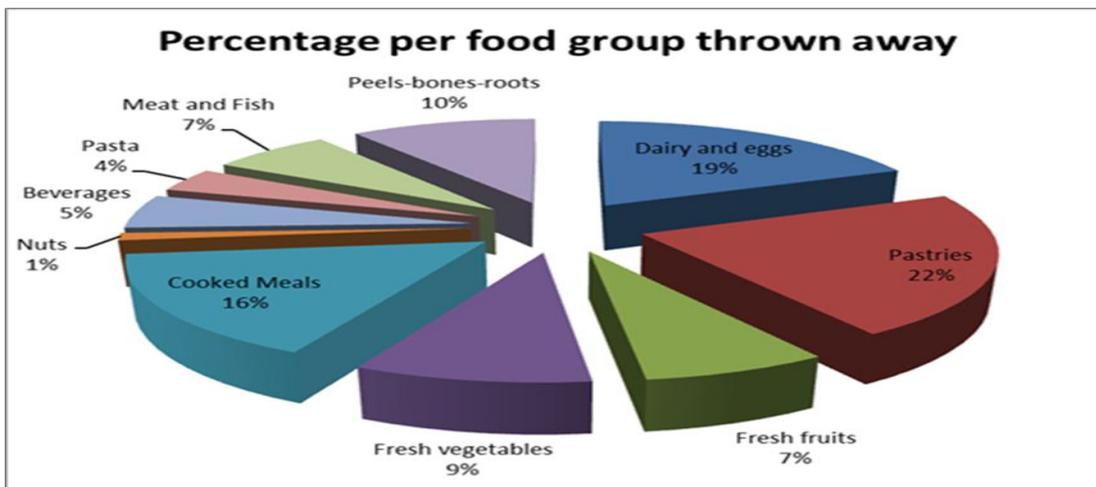


Figure 3



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