



Boosting school awareness of FOOd Loss BAFoS

R1. FoodWaste Transnational research

Transnational Reports R1



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INDEX

INTRODUCTION	3
BEST PRACTICES	4
GREECE	4
NETHERLANDS	5
SPAIN	6
IRELAND	7
ITALY	7
CONCLUSIONS	8
Focus Group and Interviews	10
GREECE	10
IRELAND	11
NETHERLANDS (SOML)	12
NETHERLANDS (ATERMON)	13
SPAIN	13
ITALY	14
CONCLUSIONS	15



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INTRODUCTION

The BAFOS project (Boosting School Awareness about Food Loss), aims to engage students in discussions about food loss and waste and to develop an adventure game about food waste in the Minecraft Education collection. The project is in line with the objective of improving knowledge in STEM fields in order to prepare the European population to become responsible and engaged citizens, able to face the complex challenges of society.

The objectives of the BAFOS project are as follows:

- Raise awareness among target groups on the importance of preventing food waste and loss.
- Create ready-to-use guidelines for avoiding food waste.
- Develop a digital environment suitable for school use.
- Use Minecraft to make the school experience more engaging for students.
- -Shift teaching methods from a teacher-centred to a student-centred approach.
- Encourage individuals to reduce daily food waste levels.

These objectives will be achieved through two main outcomes: Outcome 1 involves transnational research on food waste and Outcome 2 focuses on creating food waste adventures in Minecraft.

Outcome 1 comprises three activities: defining the methodology (A1), conducting analysis at school level (A2) and conducting analysis at partner level (A3).

The methodology for the desk research included the creation of a template for the collection of best practices, teaching materials for teachers and students on food waste and the food supply chain, and guidelines for data collection within and outside schools. The partners conducted the desk research using different tools such as online resources, websites, e-books, national, European and international projects and studies related to food waste.

The national desk research was instrumental in identifying and selecting two relevant good practices. These practices involve collaboration between schools/institutes and food companies, but also innovative activities carried out by both parties. To ensure the comparability of the information collected, partners were provided with a template for the collection of best practices and teaching materials on evidence-based learning (EBL), food waste and data collection methods.

Partners reviewed and compiled the template provided, collecting materials such as training programmes, teaching methods, project results, research papers, websites, audio-visual content, e-books and other relevant resources related to the objective of Outcome 1. The report also outlines the collection of good practices and teaching materials on evidence-based learning (EBL), food waste and data collection methods. This project has been funded with support from the European Commission. This document reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



The report also outlines the collection of good practices and success stories. Best practices are defined as examples of success in reducing food waste and loss along the supply chain and at various stages of food processing in partner countries. Selection criteria for best practices include implementation in the partner country, relationship to food waste and loss in the food sector, effectiveness and success, ease of learning and implementation, replicability and adaptability.

Success stories are defined as positive results achieved in reducing food waste or loss. After selecting two relevant best practices, partners were asked to fill in a form with the required information.

This report provides an overview of the objectives of the BAFoS project, the methodology for the desk research and the collection of best practices and success stories. The results of the research phase, including the 12 good practices collected from the schools and partners, will serve as the basis for the development of the content of the Minecraft collection.

BEST PRACTICES

GREECE

Sustainable Food Movement in Greece (SFMinGR)

- -SFMinGR is a Social Enterprise aiming to tackle food waste and promote sustainability in the Greek Culinary Arts

 Industry.
- -It educates and trains Chefs, F&B Managers, and Restaurateurs in adopting sustainable cooking methods and fighting food waste.
- -SFMinGR promotes sustainability in the Culinary Arts Industry through education and food waste awareness in school education.
- -It has a blog about food waste and offers educational services that can be easily adapted to school and vocational education.

Boroume - "Saving food - saving life"

-Boroume is a non-profit organization working to reduce food waste and fight malnutrition in Greece.



- -They save food from various sources and offer it to charities helping people facing food insecurity.
- -Boroume has programs to increase awareness about food waste, educate school children, reduce waste on the field and at farmers' markets, and inform potential food donors.
- They have a Certification Scheme for companies and organizations in the food supply chain to reduce food waste.
- Boroume collaborates with companies and implements targeted CSR programs to address nutritional needs.

NETHERLANDS

Brave New Food

- -Brave New Food is a startup platform for food innovation that connects startups and leading food corporations, retailers, and investors.
- -Their mission is to accelerate the transition to a healthier and more sustainable food system.
- -They host Open Calls for food solutions and organize matchmaking events for collaborations.
- -Brave New Food focuses on sustainable and waste-reducing innovations in the food industry.
- -Their platform is user-friendly, transferable, and feasible for global use.

Samen tegen Voedselverspilling (Together against Food Waste)

- -Samen tegen Voedselverspilling aims to reduce food waste in the Netherlands and become a frontrunner in the world.
- -They work with consumers and companies to prevent, reduce, and valorize food waste.
- -The foundation collaborates with stakeholders from the entire food chain and sets up a monitoring system.
- -Samen tegen Voedselverspilling conducts national consumer campaigns and provides information on their website.

Red de Krommies (Save the Krommies)

- -Red de Krommies engages students in learning about discarded fruit and vegetables and the causes of food waste.
- -It provides a free teaching package developed in collaboration with Utrecht University.



- -Students learn about the supply chain, consumer preferences, and develop problem-solving skills.
- -The learning package is accessible to a wide audience and can be adapted for different grades.
- -Red de Krommies promotes active citizenship and responsible consumption in a playful way.

Kok in de klas (Cook in the class)

- -Kok in de klas is a lesson program that covers themes related to taste, health, food production, and consumer skills.
- -Students reflect on their own behavior and attitudes toward consumption, health, and sustainability.
- -The program includes free lessons and additional features for enhancing the learning experience.
- -It helps students understand the stages of the food production and supply chain, and encourages reflection and independent learning.
- -Kok in de klas is successful in schools and serves as an example of experiential learning.

SPAIN

Programa Escoles Verdes

- -A program for schools in Catalonia focused on food waste awareness and reduction.
- -Aims to educate students about the amount of food wasted and the importance of not wasting food.
- -Teaching units cover topics such as breakfast, school canteen, action in the village, recipe contest, and advertising wedges.
- -Schools part of the Green Schools network promote education for sustainability and have an environmental committee.
- -Encourages small local actions to reduce food waste and develop sustainable habits.

Menjadors escolars més sans i sostenibles

- -Initiative by Barcelona City Council and the Barcelona Public Health Agency.
- -Promotes balanced, healthy, and sustainable school menus with less red or processed meat and more vegetable protein.



- -Emphasizes the use of local and seasonal products, olive oil, wholegrain products, and healthier dessert options.
- -Provides advice and training to schools for implementing the project.
- -Aims to improve the health and well-being of students and promote sustainable food practices.

IRELAND

Glanmore Foods

- -Provides meals to disadvantaged schools, acknowledging the importance of school lunches for students from dysfunctional homes.
- -Offers organic and healthier food options, including plant-based burgers, protein-based biscuits, and sugar-free yogurts.
- -Uses 100% biodegradable packaging and aims to minimize food waste.
- -Improves attendance and overall health of students.
- -Focuses on providing nutritious and familiar food choices during challenging times.

Fresh Today Catering

- -Delivers hot, healthy school lunches with zero waste utensils to DEIS schools (disadvantaged schools).
- -Involves students and families in the meal selection process.
- -Improves health and well-being of students with hot, nutritious meals.
- -Uses specialized utensils that are 100% reusable.
- -Helps schools transition to providing warm meal options and reduces food waste.

ITALY

Elior Italy Spa

-Part of Elior Group, a global leader in contract catering and support services.



- -Commits to providing meals that are good for health, the planet, and affordable for everyone
- -Implements AI tools to predict meal demand and avoid food waste.
- -Uses AI solution (Winnow Solutions) to track and reduce food waste.
- -Promotes diverse and balanced diets and educates students about sustainable eating habits.

Italian Green Schools Network

- -Project started in 1996 to promote sustainability in schools in Lombardy.
- -Involves 355 schools and focuses on environmental protection and food waste reduction.
- -Encourages active participation of schools, the population, and institutions.
- -Aims to spread knowledge about sustainability and engage students in protecting the environment.
- -Fosters attitudes and actions towards sustainability in the school community.

CONCLUSIONS

As part of the first outcome of the Bafos project, called "Food waste transnational research", all partners (Effebi Association, ADACI, SOML, ATERMON, ACOFESAL, DWEC and the Themistoklis school) conducted an in-depth field and on-site research to identify and select two best practices and success stories each, considered relevant to the project's objectives.

The 12 best practices chosen by the seven partners focused mainly on collaboration between schools/institutions and companies operating in the food sector, with the aim of reducing food waste and raising awareness on the topic.

To summarise some of the main conclusions drawn from the best practices, we can say that in order to combat food waste, it is important to promote sustainable food movements and programmes, which play a key role in educating chefs, restaurateurs and schools to make more sustainable food choices and avoid food waste. Indeed, in all partners' best practices, it is emphasised that educating young children in schools is the starting point when addressing issues such as sustainability and food waste.

School canteens play a fundamental role not only in feeding children, but also in educating them to choose healthier and more ecological options. This is why the so-called 'Green Schools Network' was created in Spain and Italy, comprising participating schools across the country that wish to reduce their environmental footprint by offering healthier and more sustainable meals to children. As a result, their canteens have This project has been funded with support from the European Commission. This document reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



reduced the amount of red meat and processed foods, adopting menus that include whole grain products, vegetable proteins, local and seasonal fruits and vegetables, as well as promoting the use of olive oil for seasoning and cooking.

A major problem arises in disadvantaged schools, whose students often come from dysfunctional families where eating junk food or unhealthy meals is the norm. For these children, food and food waste reduction education in schools and canteens is even more relevant, and having such programmes in these schools and offering healthier and more sustainable meals to children from disadvantaged backgrounds must be a priority.

The issue of food waste and sustainability is also addressed in schools across Europe through specific educational programmes that offer free educational packages, including interactive activities and games. In this way, through experiential lessons, children can learn more about all stages of production and the supply chain.

Focus Group and Interviews

The field research phase involved conducting interviews and focus groups at the national level. These case studies gathered information on effective teaching practices and to help students understand food waste and the food supply chain. The research methodology included the creation of interview and focus group templates, teaching materials for teachers and students, and data collection tools.

The collective transnational interview results played a crucial role in achieving the first project outcome. The interviews enabled the consortium to gather relevant information on students' and teachers' knowledge and perspectives on food loss and food waste. In addition, the interviews were intended to serve as a means of project dissemination, impact and sustainability, enabling the consortium to engage with teachers, educators and other stakeholders for further involvement.

By conducting interviews and establishing connections with key stakeholders, the consortium created a network of experts who can support the development of the project and exploit its results.



GREECE

The report focuses on Greece's food waste situation and field research conducted by the Themistoklis organization. According to the United Nations' Food Waste Index Report, Greece ranks highest globally in terms of food waste, wasting almost double the average amount worldwide. The report suggests that this data can guide the development of a national strategy on food waste prevention and enable comparisons with other countries.

The field research methodology employed by Themistoklis aimed to identify innovative ideas and initiatives from the private and public sectors addressing food waste. The research yielded two suggestions from the private sector and the personal awareness of the founders.

Interviews were conducted with professionals in the food industry who demonstrated a personal interest in saving food and implemented practices to minimize waste. The interviewees expressed a common belief that excessive purchasing and spending, coupled with a lack of proper education and governmental intervention, contribute to food waste in Greece. They highlighted the importance of reducing food shortages for economic, environmental, ethical, and health reasons. Suggestions included promoting recycling, implementing educational programs on food waste, and imposing heavy fines on those who waste food.

The interviews and best practices identified several reasons why food waste is a problem, such as financial losses, strain on natural resources, and environmental harm. The report offers ten recommendations to combat food waste, including adopting a healthier and sustainable diet, buying only what is needed, proper food storage, understanding food labeling, sharing extra food, utilizing leftovers, finding uses for food waste, increasing education on the topic, changing attitudes toward food, and imposing fines for excessive food waste.

Overall, the report sheds light on Greece's high food waste levels and presents valuable insights from field research, interviews, and best practices. The recommendations provide a foundation for addressing the issue and promoting more responsible food consumption practices.

IRELAND

The report focuses on Ireland's food waste situation and the field research conducted to identify innovative ideas and initiatives addressing food consumption and waste. Current estimates suggest that Ireland generates approximately 1.2 million tonnes of food waste per year, with particular concern regarding post-consumer waste. Potatoes contribute to almost 40% of food loss or waste at the primary production level in the country.

Food waste is prioritized in Ireland's National Waste Prevention Programme, the Climate Action Plan, and the Waste Action Plan for a Circular Economy. The goal is to achieve a 50% reduction in food waste, and under the revised Waste Framework Directive, food waste reporting will become mandatory. This reporting aims to monitor food waste sources and support prevention efforts, especially regarding edible food waste.



The field research methodology in Ireland focused on finding transformative ideas and initiatives in the private and public sectors, emphasizing food consumption and waste. The interviews involved professionals from the food industry, both in the public and private sectors, who shared a common belief in the need for improved education, governmental intervention, and involvement of food charities and recycling organizations.

The interviewed professionals stressed the importance of exploring new ways to transform the food business, utilizing emerging technologies to redistribute leftover food to those in need. They highlighted environmental, ethical, and health reasons for changing attitudes towards food consumption and waste. Recommendations included food recycling, composting, education on food waste in curricula, imposing fines for indiscriminate waste, raising environmental awareness, and promoting behavior change through effective education and media intervention.

The report concludes with several best practices for individuals to fight food waste, such as buying only what is needed, cooking sufficient amounts, properly storing and using leftovers, sharing excess food, considering the quality of food beyond appearance, imposing fines on major offenders, and promoting education on the topic.

Overall, the report provides insights into Ireland's food waste situation, the importance of prevention measures, and the recommendations for individuals and policymakers to address this pressing issue. The findings highlight the need for collaboration between various sectors and the adoption of sustainable practices to minimize food waste in Ireland.

NETHERLANDS (SOML)

The report focuses on food waste in the Netherlands and includes field research conducted to identify reasons for food waste and innovative ideas in the private and public sectors. Food waste by consumers in the Netherlands contributes to greenhouse gas emissions and land use, with meat, dairy, sauces/fats, vegetables, fruit, and bread being significant contributors. Avoiding meat waste is especially important due to its high climate impact.

Preventing food waste through mindful shopping, cooking to preference, and proper storage not only reduces environmental impact but also saves approximately €120 per person annually. Field research conducted by SOML involved interviews with students, revealing common food waste patterns such as wasting fruits, vegetables, and bread from home due to excessive buying. Students expressed the need for awareness and education on food waste, penalties for companies that waste food, and global production of more sustainable food.



The report emphasizes that food waste is a global problem with financial, resource depletion, and environmental consequences. It highlights the importance of teaching about food waste in schools and adopting sustainable consumption practices. Recommendations for fighting food waste include lifestyle changes, buying only what is needed, understanding the food chain, supporting local and seasonal products, and imposing fines on excessive food waste.

Additionally, the report mentions the collective transnational results of focus groups, which aimed to gather information on reducing food waste in the supply chain during production and distribution stages. The objectives included acquiring feedback from supply chain representatives, fostering sensitivity towards food waste reduction, involving stakeholders, sharing best practices, and promoting innovation.

The target groups for the focus groups included participants representing the food sector's supply chain, with at least five participants from each of the four partner organizations involved in the activity. Online or inperson sessions were conducted, with the involvement of associated partners to facilitate discussion and collaboration throughout the project.

Overall, the report provides insights into food waste in the Netherlands, highlights the importance of education and awareness, and suggests practical measures to tackle this issue. It emphasizes the need for collective efforts and collaboration among stakeholders in the food industry to effectively reduce food waste throughout the supply chain.

NETHERLANDS (ATERMON)

The report focuses on the efforts made by the Netherlands, particularly by small and medium-sized enterprises (SMEs), to reduce their environmental impact and combat food waste. The European Commission recognizes that SMEs contribute significantly to environmental impact, and it is a priority for the EU to support them in their sustainability endeavors. However, SMEs lack the resources and structure to address this issue effectively, necessitating the integration of sustainability into their management roles and access to monitoring tools.

The field research conducted in the Netherlands confirms the government's commitment to achieving Sustainable Development Goal Target 12.3, which aims to halve per capita food waste by 2030. The research indicates a reduction in food waste over the years, with an average of 123 kilograms per capita in 2018 (excluding household data). Bread, dairy, fruits, and vegetables remain the most discarded products by consumers, but there has been a noticeable reduction in their wastage. The study also reveals that potatoes, vegetables, and fruits contribute the most to supermarket food waste.

The Dutch government actively collaborates with various stakeholders across the food supply chain, including companies, research organizations, and non-governmental organizations, to combat food waste. Financial This project has been funded with support from the European Commission. This document reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



support is provided to companies through a voucher scheme launched by the Ministry of Agriculture, Nature and Food Quality, allowing them to receive tailored advice and innovative solutions to reduce food waste in their operations.

Focus groups were conducted virtually due to space limitations, and participants were recruited from the wider supply chain sector through various platforms and existing contacts. Interviewees defined food waste and highlighted the consumer as the weakest link in the food chain, contributing to a significant portion of waste. Research conducted by Wageningen University and Research Centre indicates that 1/3 of what is produced is wasted, with household waste accounting for 47 kilograms per person per year.

The top 10 most wasted products in the Netherlands, excluding drinks, include milk and dairy products, bread, vegetables (excluding potatoes), fruit, sauces, oils and fats, potatoes, meat and meat products, pasta and rice, cake and biscuits, and cheese. While households are responsible for a portion of food waste, supermarkets, restaurants, and production chains also contribute significantly.

The report emphasizes the importance of addressing food waste as a necessity, with companies and individuals working together to reduce waste. Several initiatives and companies in the Netherlands are already making progress in this area. Overall, the report highlights the need for continued collaboration and awareness to effectively tackle food waste and create a more sustainable food system.

SPAIN

The report focuses on Spain's efforts to tackle food waste and implement measures for its prevention and reduction. Andalusia is identified as the most wasteful region, with 10.37% avoidable waste of the total food purchased by weight. Spain ranks as the 7th country for food waste in Europe, with consumers underestimating their food waste percentage at 4% while the actual figure is 18%. Public schools contribute 1.9% of food waste in the country. Catalonia introduced a pioneering law in Europe that requires bars and restaurants to provide packaging for leftover food, aiming to combat the 260,000 tons of food wasted in Catalonia annually.

Household interventions are crucial for achieving significant food waste reduction, offering environmental, economic, and social benefits. Research indicates that consumers in Spain have positive attitudes towards food waste prevention, and their habits align with recommended practices for reducing waste.

Spain pledged to reduce food waste by half by 2030, following the adoption of the UN Sustainable Development Goals. However, in 2018, Spanish households discarded 1,339 million kilograms/liters of food and drink, representing an 8.9% increase compared to the previous year. The rise in temperatures during spring and summer was attributed to this increase in waste. The Ministry of Agriculture, Fisheries and Food (MAP) highlights that food waste contributes to greenhouse gas emissions and urges action to combat the climate crisis.



To address food waste, the Council of Ministers approved the Draft Law for the Prevention of Food Losses and Waste, which will undergo parliamentary processing. The focus group conducted by Acofesal included participants from the organization, its associated partners (CECE and The Catalan Public Health Agency), and experts from relevant sectors. They identified harvesting, distribution, and households as the sectors where food is most wasted. The suggested actions to reduce waste include redirecting food waste from compost to animal feed and biodiesel, educating children to prevent waste, promoting a more nutritious diet, purchasing local ingredients, monitoring stock expiration dates, and balancing costs with the impact of food losses and waste.

The government is responsible for developing a strategic plan for food loss and waste prevention and reduction, involving multiple ministries. A sanctioning system has been established, making it a serious offense to lack a prevention plan, with fines ranging from €2,001 to €60,000 for non-compliance or recidivism within a two-year period. The aim is to create a comprehensive policy framework and enforce accountability in addressing food waste.

ITALY

The report focuses on Italy's efforts to combat food waste through legislation, industry collaboration, and public awareness. Italy's Law 166/16, also known as the "legge Gadda," has created a favorable environment for companies in the agricultural, food, and beverage sectors to support the Food Bank by donating edible but unsellable food products. Donations help prolong the life cycle of products, prevent waste, and recycle surplus within companies. Organizations such as Banco Alimentare and Bringhthefood collaborate with over 1300 companies in the food and beverage industry.

Italy recognizes the importance of reducing food loss and waste in line with the UN Sustainable Development Goals, particularly SDG 2 (ending hunger and achieving food security) and SDG 12 (ensuring sustainable production and consumption patterns). The country faces challenges such as dwindling resources and agricultural land, with over one acre of agricultural land disappearing in a generation. This aggressive development model poses risks to the environment and food security.

Field research conducted through a focus group involved various sectors and national associations, including procurement and supply management, food and beverage industry, Italian farmers, and the meat industry. The research highlighted that food loss occurs at different stages of the supply chain, including agricultural production, post-harvest, processing and packaging, retail and distribution, and consumption. Economic factors such as price volatility, labor costs, infrastructure limitations, and consumer preferences contribute to unharvested or unsold food.

Companies are implementing measures to reduce food loss along the supply chain and in internal processes. Milk, beverage, and meat producers have conducted studies to minimize loss during harvest and improve



logistics and stocking. Portion control and tailored packaging for individual consumers and small families are being implemented to reduce waste.

The focus group identified several negative consequences of food waste, including environmental impact, unequal food distribution, increased inequality between rich and poor countries, economic strain on families, contribution to global warming, and reduced system efficiency. Italy has established regulatory processes, such as the Good Samaritan Law (155/2003) and the 166/2016 Law, to facilitate food surplus management and redistribution through simplified procedures, tax deductions, and subsidies for public and private donors. The Food Waste Permanent Table (FWPT) coordinates national activities to reduce food waste and promote knowledge sharing.

During the COVID-19 pandemic, Italians have shown increased sustainability and reduced domestic waste. In 2021, each Italian wasted just over half a kilo of food per week, a decrease of nearly 12% compared to 2020. The economic value of domestic waste is significant, with the waste chain costing billions of euros. The Waste Watcher observatory reports that Italians have made significant progress in reducing food waste compared to other countries.

Italy's comprehensive approach to food surplus management, regulatory support, industry collaboration, and public engagement has contributed to positive outcomes in reducing food waste.

CONCLUSIONS

Based on data collected through interviews and focus groups, several key conclusions emerge regarding Italian efforts to combat food waste.

Collaboration between sectors: The multidisciplinary approach involving procurement and stockpile management associations, the food industry, farmers and meat sector associations has fostered greater awareness and joint action to reduce food waste along the supply chain.

Laws and regulations: Italy has adopted specific laws, such as law 166/16 (Gadda law), that favour the donation and distribution of unsaleable but still edible food products for social solidarity purposes and to limit waste. These legal measures simplify donation procedures and offer tax incentives and subsidies for public and private donors.

Public awareness: Awareness of the problem of food waste has increased among the Italian population. During the COVID-19 pandemic, isolation at home and increased public awareness led to a reduction in household waste. However, it is necessary to continue educating and involving the public to promote sustainable eating habits and proper food management.

Reducing waste along the supply chain: companies are taking measures to reduce food losses at all stages of the supply chain, including agricultural production, post-harvest, processing and packaging, retailing and



distribution. Specific studies have been conducted in the dairy, beverage and meat sectors to improve harvesting, logistics and storage practices.

Environmental and economic impact: The negative consequences of food waste include environmental impact, lack of food distribution for those who cannot afford it, increased inequality between rich and poor countries, economic impact on households and contribution to global warming. Reducing food waste not only preserves the environment, but also contributes to a fairer and more efficient food system.

Italy has adopted a well-established approach towards managing food leftovers and redistributing them to those in need. Coordination through the Tavolo Permanente per lo Spreco Alimentare (FWPT) (Permanent Table on Food Waste) and the implementation of specific regulations have promoted knowledge sharing and joint action between key actors of the production system, scientific experts and society.

Despite the progress made, much work remains to be done to further reduce food waste in Italy. Continuing to raise awareness, improving supply chain management and supporting the implementation of sustainable practices are all crucial to promote a more food-sustainable future.