

ZERO WASTE TOOLKIT

For school staff,
teachers, students,
parents, trainers



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1. Project Summary

1.1 ZERO WASTE PROJECT

The "ZERO WASTE" project focuses on the pressing issue of food waste, a problem that has significant societal, environmental, and global implications.

In the context of the European Union's commitment to environmental protection and climate change mitigation, the project focuses on minimizing risks to the climate, human health, and biodiversity.

The European Green Deal's objective is to make Europe the world's first climate-neutral continent by developing cleaner energy sources and green technologies.

Food waste is a central concern in this project. It encompasses the disposal of food at various stages, from the food industry to the end consumer. This wasteful practice leads to two major problems:

- Societal deprivation, as a substantial number of people go hungry while tons of food are discarded daily.
- Global environmental pollution due to dumped food.

Approximately one-third of food intended for human consumption (1.3 billion tons) ends up in landfills annually, accompanied by the waste of energy, water, and chemicals used in production and disposal processes.

Food waste contributes significantly to greenhouse gas emissions and global warming, accounting for about 8% of global greenhouse gas emissions.

The project recognizes the importance of education and awareness, particularly among younger generations, in resolving this issue. The project's major goal is to produce training materials for teachers that inform them about the financial, social, and environmental costs of food waste and the most effective strategies for reducing it.

The objective of the project is to empower instructors to apply this information in their classrooms, promoting student awareness and behavioral change.

The project's ultimate goal is for teachers, students, and their families to serve as ambassadors for a new way of living that is founded in a circular economy, responsible daily food use, and the elimination of food waste, guided by the maxim **"use wisely, reduce, recycle."**

“ZERO WASTE” project’s partners focused on:

- Covering the school on the secondary level of education needs for actions for proper food management and reduction of food waste
- Introduce the problem of food waste
- Raise of awareness for food waste
- Education of the target groups in order to be the transmitters for a new way of life based on the proper management of the daily food consumption and the elimination of food waste with the motto ‘use wisely, reduce, recycle’.
- Prevention of food waste and protect environment

PARTICIPANTS

In order to meet the project’s objectives, the following number of participants took part in the Project activities:

- **European Report**

Bulgaria: 25 students - 15 teachers

Cyprus: 16 students - 30 teachers

Greece: 27 students - 16 teachers

Italy: 26 students - 15 teachers

Spain: 27 students - 15 teachers

Romania: 15 students - 15 teachers

Turkey: 90 students - 28 teachers

- **Piloting PR2**

Bulgaria: 18 students - 14 teachers - 23 parents

Cyprus: 25 students - 16 teachers - 40 parents

Greece: 26 students - 15 teachers - 40 parents

Italy: 40 students - 19 teachers - 50 parents

Spain: 23 teachers - 3 parents

Romania: 52 students - 42 teachers - 63 parents

Turkey: 61 students - 26 teachers - 32 parents

- **Piloting PR3**

Bulgaria: 18 students - 14 teachers - 23 parents

Cyprus: 22 students - 4 teachers - 11 parents

Greece: 22 students - 5 teachers - 10 parents

Italy: 40 students - 19 teachers - 50 parents

Spain: 6 teachers - 78 students - 3 parents

Romania: 41 students - 42 teachers - 25 parents

Turkey: 61 students - 26 teachers - 32 parents

ACTIVITIES & METHODOLOGY

Research and analysis of current school needs in food management.

Collection of good practices from across Europe.

Development of training materials for educating teachers based on research findings. Promotion and support of gaming and related activities through piloting actions in participating schools.

1.2 PROJECT RESULTS

ZERO WASTE has implemented the following Project Results:

PR1: THE REPORT

European synthesis report on the needs and challenges of food waste management in school education.

The Report deals with a field research based on a structured questionnaire with the objective of collecting data from the main target groups of the project: secondary school teachers and students.

PR1 - results:

- Understanding and self-awareness of critical thinking in the field of environment and food waste.
- Enhancement of professional pedagogical skills through shared experience within the project community.
- Ability to demonstrate student learning outcomes from game-based learning methodologies.

PR2: TRAINING MATERIALS, PILOT PROJECTS AND POLICY RECOMMENDATIONS

This project result is based on the development of the didactic material for the teacher training course and on the development/adaptation of the learning management system on which the training course is based.

Moreover, it deals with the joint development of the training resources for the students together with the teachers and the piloting of both materials.

The training course provides teachers with skills that enabled them to incorporate the concept of food waste and food waste management knowledge and transfer it to their students.

PR2 - results

The main result of PR2 is the elaboration of a 4 Modules training/learning curriculum, which is developed as follows:

- Module 1
Introduction to food waste
- Module 2
Causes and Stages of Food Waste
- Module 3
Consequences of Food Waste
- Module 4
Ways to reduce food waste in daily life / Proper food waste management

PR3 - GAME ON FOOD WASTE MANAGEMENT

This PR has developed a serious game with the aim to introduce young people to the correct management of food waste through the gamification method. Players had the opportunity to face different scenarios in order to develop the best possible strategies for the management of food waste.

PR3 - results

- The first result is the production of a game tutorial that describes the game framework, objectives, rules, challenges and some tips.
- The innovative teaching material was developed and used in order that students/teachers acquire new competencies.
- The game may be used as:
 1. self-training;
 2. Teaching tool;
 3. Self-assessment of food waste management competencies.

PR4 . TOOLKIT

The Toolkit for school staff, teachers, students, parents and trainers serves a dual purpose:

It ensures the availability and sustainability of the project results.

It ensures the highest possible level of transferability of the material tools and methodologies developed under the project.

PR4- results

This document elaborates on the outcomes of this Project Result.

2. TOOLKIT

This TOOLKIT is meant to provide information and instruments for school staff, teachers, students, parents, trainers interested in continuing to pursue the Project objectives

2.1 PRI - SYNTHESIS REPORT

The Synthesis Report collects information and data concerning the 'Food waste issue' and the 'Management of food waste in education' in each of the participating countries (Spain, Cyprus, Greece, Italy, Romania, Bulgaria and Turkey).

BULGARIA - RESULTS FROM DESK AND FIELD RESEARCHERS

Research Methodology The defined target group was students (25) and teachers (15) in School Education, totaling 40 respondents. Balkan Bridge's experts within the field of research methodologies along with the engaged technicians have developed a questionnaire designed by the online tool Google Form.

Main results from the Field Research

- It could be concluded that approximately half of the teachers were already introduced to the topic of Food Waste Management and the other half, were not.
- According to teachers their pedagogical expertise suggests that gaining knowledge through interactive approaches such as gamified solutions, workshops and video training is more effective.
- The majority of the respondents have not participated in trainings/related activities to the Food Waste Management.
- Majority of the sample has agreed on the following strategies as the most efficient to reduce /avoid food waste their your country/community:
 - 1.Organise training courses about Food Waste Management (for both teachers and students)
 - 2.Organise workshops / conferences / debates, World Cafes on Food Waste Management
- The students show preference of gaining knowledge throughout interactive approaches such as gamified solutions, workshops and video.
- Regarding the frequency of food waste the most common answer of the students appear to be "Once a month".

CYPRUS - RESULTS FROM DESK AND FIELD RESEARCHERS

Research Methodology 46 participants completed the questionnaire and provided us with their understanding and their personal experiences regarding food waste and food waste management; 30 of the participants were teachers and 16 were students, between 12-15 years old. For the research, a structured questionnaire was translated in Greek language, and electronically distributed to both teachers and students, using Google Forms.

Main results from the Field Research

- 76,5% of the teachers (26 teachers) declare knowledge on food waste management, while only 4 of them stated that they do not have the knowledge..
- According to teachers their pedagogical expertise suggests that gaining knowledge through interactive approaches such as gamified solutions, workshops and video training is more effective.
- Importantly to note is that a minor proportion of teachers has ever taken part in any training/activity related to food waste management
- Majority of the sample has agreed on the following strategies as the most efficient to reduce /avoid food waste their your country/community:
 1. Organize extracurricular activities as an ideal mean of reducing food waste (for both teachers and students)
 2. Organize workshops / conferences / debates, World Cafes on Food Waste Management
- Similar to teachers' choice, the highest percentage of students expressed preference in attending educational programs to learn more about food waste management, followed by the use of games.
- 6 out of 16 students reported that they waste food twice a month.

GREECE - RESULTS FROM DESK AND FIELD RESEARCHERS

Research Methodology: The field research through the distribution of the questionnaire to 27 students and 16 teachers in Secondary Education. For the research, a structured questionnaire was translated in Greek language, and electronically distributed to both teachers and students, using Google Forms.

Main results from the Field Research

- It could be concluded that approximately the majority of the teachers were already introduced to the topic of Food Waste Management. .
- The vast majority of the teachers in Secondary Education (94%) wastes food more than twice per month
- The majority of the respondents have not participated in trainings/related activities to the Food Waste Management.
- Majority of the sample has agreed on the following strategies as the most efficient to reduce /avoid food waste their your country/community:
 3. Organize extracurricular activities and workshops / conferences / debates or World Cafes on Food Waste Management
 4. Organise serious games
- Majority of the students (21 students) that completed the questionnaire stated that they are familiar with the food waste management concept
- The majority of the students in Secondary Education (59%) wastes food more than twice per month

ITALY - RESULTS FROM DESK AND FIELD RESEARCHERS

Research Methodology primary data were collected through questionnaires directed at the primary target group of the project; secondary data were obtained through internal (within the organization) and external (outside the organization) sources.

Main results from the Field Research

- It could be concluded that approximately the majority of the teachers were already introduced to the topic of Food Waste Management. .
- The vast majority of the teachers in Secondary Education wastes food more than twice per month
- Almost the 100% of the teachers interviewed replied that they had never participated in any training / activity related to food waste management.
- Majority of the sample has agreed on the following strategies as the most efficient to reduce /avoid food waste their your country/community:
- Organize training courses on Food Waste Management (for teachers and students),
- Organize workshops / conferences / debates, World Cafes where we talk about food waste
- 70% of students declared in the survey that they are familiar with the concept of food waste management
- The majority of the students in Secondary Education wastes food more than once per month
- Students stated that the preferred way to learn more about food waste is through
- Games / App, Laboratories a small percentage also mentioned
- Lessons in school and workshops

SPAIN - RESULTS FROM DESK AND FIELD RESEARCHERS

Research Methodology

The questionnaire has been filled in by a total of 42 respondents: 15 teachers and 27 pupils in secondary education, all residing in Spain. The field research has been conducted (primary sources) using the online questionnaire which has been spread among different high schools.

Main results from the Field Research

- It could be concluded that approximately the large majority of the teachers were already introduced to the topic of Food Waste Management. .
- The vast majority of the teachers in Secondary Education wastes food at least once a month
- The majority of the respondents have not participated in trainings/related activities to the Food Waste Management.
- Majority of the sample has agreed on the following strategies as the most efficient to reduce /avoid food waste their your country/community:
 1. Training sessions/ Workshopsconferences / debates or World Cafes on Food Waste Management
 2. extracurricular activities and serious games
- Majority of the students that completed the questionnaire stated that they are familiar with the food waste management concept
- The majority of the students in Secondary Education wastes food more than once per month

ROMANIA - RESULTS FROM DESK AND FIELD RESEARCHERS

Research Methodology The structured questionnaire was applied to 25 students and 15 teachers belonging to our high school. The students participating in the survey are aged 14-19, they come from both rural and urban areas and they study in classes whose profile is different.

Main results from the Field Research

- According to the answers provided, most teachers (87%) believe they have a good understanding of food waste management.
- The vast majority of the teachers in Secondary Education wastes food more than twice per month
- Most of the teachers taking part in the survey have not attended any activity/training sessions related to Food waste management
- Majority of the sample has agreed on the following strategies as the most efficient to reduce /avoid food waste their your country/community:
 1. Organize of training courses about Food Waste Management
 2. Organize extracurricular activitie
- Nearly two thirds of the students taking part in the survey are familiar with the issue of food waste management.
- Students also prefer videos as a means to develop their knowledge in food waste management
- Unlike teachers, the majority of students states that they throw away food once a month

TURKEY - RESULTS FROM DESK AND FIELD RESEARCHERS

Research Methodology The survey with teachers was applied in May and June 2022, with the participation of 28 teachers and 90 students from mostly secondary schools in Türkiye. The number of schools responding to the questionnaires is 12.

Main results from the Field Research

- It could be concluded that more than half of the teachers were already introduced to the topic of Food Waste Management. .
- The majority of the teachers in Secondary Education wastes food more than once or twice per month
- Only 11% of the teachers who responded in the survey previously took part in training activities before.
- Majority of the sample has agreed on the following strategies as the most efficient to reduce /avoid food waste their your country/community:
 1. Take part in extracurricular activities on this topic
 2. Organise workshops / conferences / debates, World Cafes on Food Waste
- Half of the students know about food management.
- Majority of responders indicate that they waste food once a month

GENERAL CONCLUSIONS FROM PR1

Education for Action: Respondents stressed the importance of educational programs for both teachers and students, viewing them as crucial tools to combat food waste (FW).

Practical Solutions: Practical approaches like conscious shopping, responsible cooking, and efficient food preservation were highly favored by respondents, seen as effective ways to reduce food waste.

Interactive Engagement: Interactive methods such as workshops, games, and online platforms, particularly videos, were found to be engaging for teaching about food waste, especially among younger generations.

Integrated Curriculum: Integrating food waste awareness into school curricula was seen as a long-term strategy to ensure future generations prioritize responsible food consumption and waste management.

Lear more about the Synthesis Report here (for partners):
[**synthesis_report_final.pdf**](#)

2.2 PR2 - Zero Waste training material

This PR is based on the development of training material which is published in the form of PDFs, videos etc. on the Platform Zero Waste Hub. This PR results include:

FOUR SHORT COURSES:

- FW concepts and distinctions
- Causes and stages of FW
- Impact of FW on society, the environment, and the economy
- Practical ways to reduce food waste in daily life.

RESOURCES

- Structured lesson plans in PDF format.
- Ability to personalise learning with annotations and supplementary file uploads.
- Interactive elements like videos and quizzes.
- Progress tracking with user grade reports.
- Course certificates for successful course completion.
- Teaching resources available in English, Bulgarian, Greek, Italian, Romanian, Spanish, and Turkish.

Check our Platform at this link:

[**https://zero-waste-hub.eu/login/index.php**](https://zero-waste-hub.eu/login/index.php)

RESULTS FROM PR2 PILOTING ACTIVITIES

The implementation of the pilot test of PR2 and PR3, took place in the period of time between June and September 2023. The target group to be reached to test this result involved a minimum of 15 teachers, 20 students and 40 parents per country.

LICEUL TEORETIC MARIN PREDĂ - TURNU MAGURELE (RO):

- PR2 Pilot Test:
 - 42 teachers, 52 students, and 63 parents were involved.
 - 8 face-to-face sessions were conducted.
- Feedback highlighted the need for optimization of the e-learning platform and improvements in the game's functionality.

INNOHIVE/DOT2DOT (GR):

- PR2 Pilot Test:
 - 25 students, 15 teachers, and 40 parents were involved.
 - 4 in-person and 1 online piloting session took place.
- Feedback emphasized the need for improvements in game graphics, instructions, and language translation.

Gestión Estratégica e Innovación (ES):

- PR2 Pilot Test: 23 teachers and 3 parents were involved.
- Feedback highlighted positive reception and suggestions for content streamlining and grammar review.

BALKAN BRIDGE (BG):

- PR2 Test:
 - 14 teachers, 18 students, and 23 parents were involved in each.
 - 3 pilot testing sessions were conducted for both.
- Feedback from teachers, parents, and students was generally positive, with some suggestions for improving the Serious Game's graphics.

PETIT PAS APS (IT):

- PR2 Pilot Test:
 - 15 teachers, 24 students, and 40 parents were involved.
 - 2 piloting sessions were conducted.
- Feedback included technical issues with quizzes and certificates, and minor suggestions for PR3.

GED:

- PR2 Test:
 - 26 teachers, 61 students, and 32 parents were involved in each.
 - 2 pilot testing sessions were conducted for both.
- Feedback included positive responses to engaging content and suggestions for improving visual appeal and difficulty consistency.

CSI CENTER FOR SOCIAL INNOVATION LTD:

- PR2 Pilot Test:
 - 25 students, 16 teachers, and 40 parents were involved.
 - 2 in-person sessions were conducted.
- Feedback included suggestions for improving the game's graphics and user experience.

2.3 PR3 - Zero Waste Serious Game

2.3.1 GAME CONTENTS

The serious game is based on the elaboration of different scenarios in which participants have to play (answering questions) to find the best possible management strategies for food waste.

The game comprises the following scenarios:

1. Office
2. Outdoor
3. Supply Chain
4. Home
5. Restaurant
6. School
7. Farm
8. Supermarket

The game helps to discover the social, financial, and environmental benefits of food waste reduction. It is suitable for both classrooms and organisations like environmental NGOs, this engaging tool transforms learning into an adventure.

PLAY THE GAME HERE!

<https://play.unity.com/mg/other/zero-waste>

2.3.2 Collection of feedback

During the implantation of the game it was possible to collect the following feedback from participants in each country.

Lear more about the National pilots here (for partners): **[national pilot tests summative report.pdf](#)**

FEEDBACK FROM TEACHERS:

- Check out this video [here!](#)



FEEDBACK FROM STUDENTS (1)

Feedbacks

Bulgaria

STUDENT 1

'Thanks to the project I have started to question the food waste issue on a global level.'

STUDENT 2

'I think that everyone should try to reduce their daily food waste as there are so many starving people around the world'

STUDENT 3

'Every day you can do something good for the leftovers'

Feedbacks

Cyprus

STUDENT 1

I learned that food is valuable and that food waste comes with a cost to all resources, energy and people around the food production and transportation.

STUDENT 2

New generation must create a new culture around sustainability and food waste in order to face the environmental and social problems of today's

STUDENT 3

We need to start changing our everyday choices, firstly in our homes and then influence our governments for a greener future.

STUDENT 4

Food waste is a complicated topic which needs to be discussed more in schools of Cyprus.

FEEDBACK FROM STUDENTS (2)

Feedbacks

Greece

STUDENT 1

I learned that food waste management is very important if we want to avoid environmental issues

STUDENT 2

I realized how radical changes should be made in the way of thinking of the average Greek and European, in order to deal with the problem of food waste and for the proper management of waste.

STUDENT 3

I learned that food is valuable and that food waste is related to climate change.

Feedbacks

Italy

STUDENT 1

"Thanks to the activity I have learned that many habits that seem normal to us are actually harmful to the environment"

STUDENT 2

"I've learned that it's very easy to waste and most of the time we don't realize we're doing it"

STUDENT 3

"Sharing food is also a form of food waste management"

FEEDBACK FROM STUDENTS (3)

Feedbacks

Romania

STUDENT 1

The activities I took part in taught me that it is very important to plan any menu in order to avoid food waste; I have generally improved my Knowledge regarding food loss

STUDENT 2

The educational game convinced me to look more carefully at the expiry date and consume first the products that are about to expire. It also challenged me to be creative with leftovers.

STUDENT 3

The game taught me to make a shopping list before I go to the supermarket. I learnt to choose smaller portions when I go a restaurant or a canteen so that I am not forced to throw food away if I can't finish it.

Feedbacks

Spain

STUDENT 1

"Well, I found it a very interesting game, in fact I liked it a lot. Now I will save more on food and I will look for NGOs to donate food. I would recommend it since you will learn about how to manage the use of things."

STUDENT 2

It's very interesting, it makes you aware of this very current issue. I have realized that we are usually unaware of how lucky we are and don't realize it. Yes, I would recommend it, it's a game that is unlike any other I've played and that's why I think I would recommend it

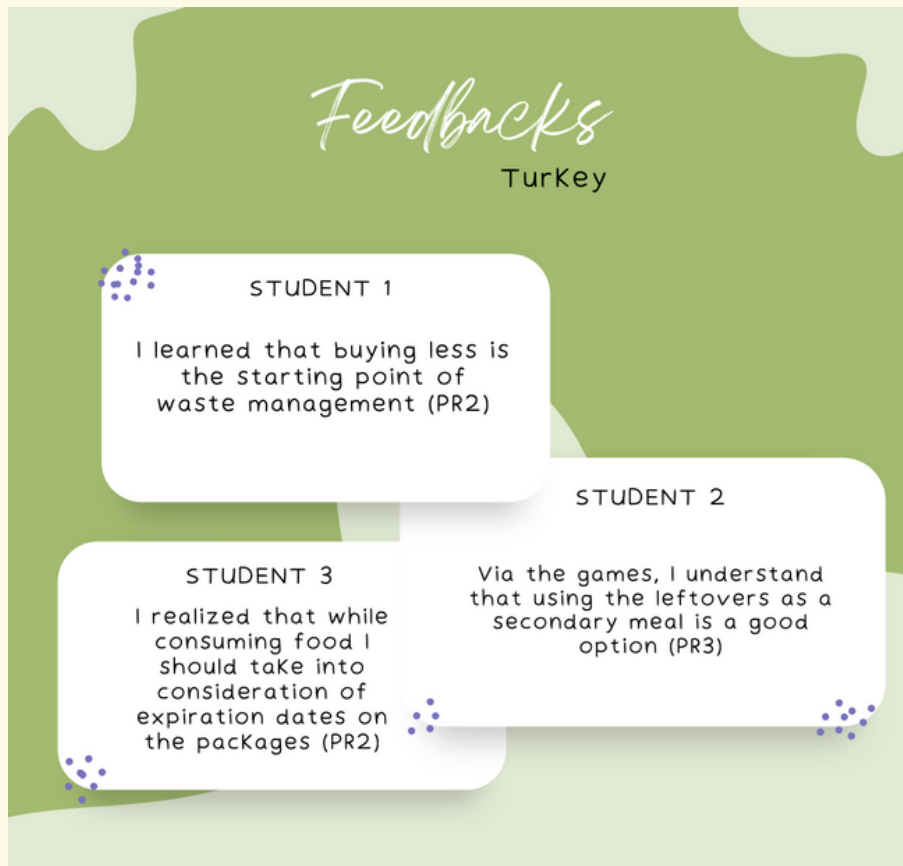
STUDENT 3

The main idea that I have come up with is to be able to contact some organizations to be able to store food. Yes, since it is quite good to make people aware even if they already know about this issue. The only improvement I would put would be that it could be used on the mobile.

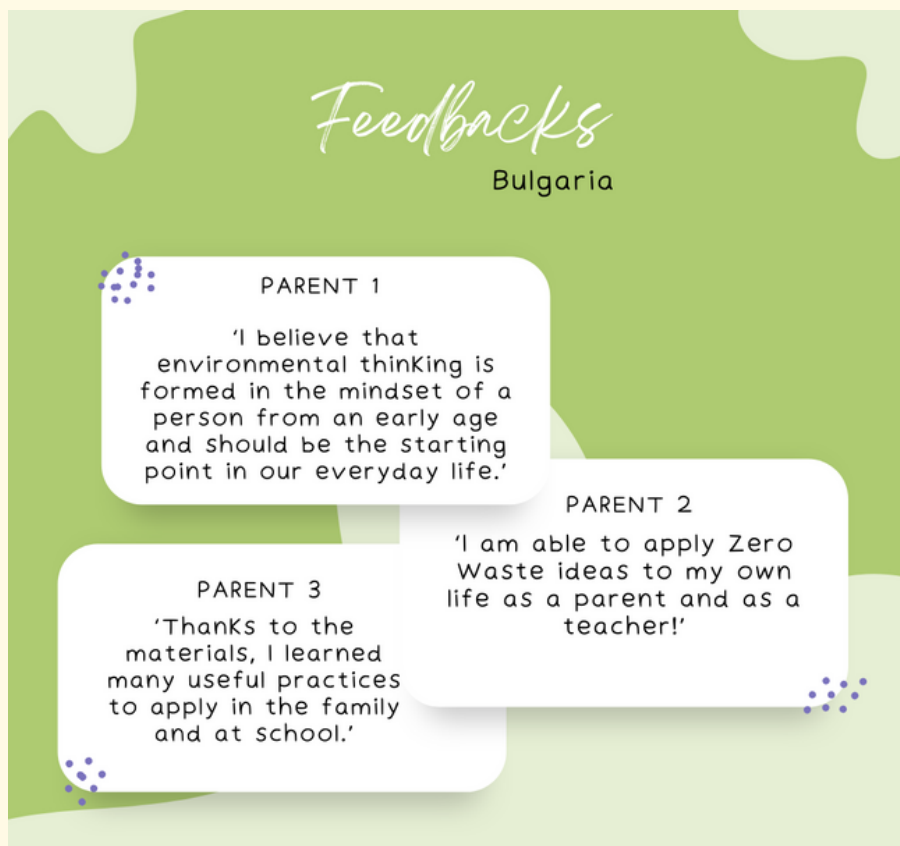
STUDENT 4

Yes I liked it, but the farm one is a bit complicated. Now I understand a little more about recycling on the farm. Yes, because it helps you to see things in a different way, and the questions are a little simpler.

FEEDBACK FROM STUDENTS (4)



FEEDBACK FROM PARENTS (1)



FEEDBACK FROM PARENTS (2)

Feedbacks

Cyprus

PARENT 1

The educational material will be used in order to create a new culture around proper food management in my family. (PR2)

PARENT 2

Firstly we, as parents, must adopt habits around food waste management and good practices in order to educate and motivate our children (PR2)

PARENT 3

There are so many ways to reduce our food waste. Even with the simplest step of FiFo. (PR3)

Feedbacks

Greece

PARENT 1

The educational material will help me a lot to develop a new culture of proper food waste management and influence my family. (PR2)

PARENT 2

I learned various ways to reduce food waste. Starting with the simplest things, like organizing our meals, I will try to implement all waste reduction practices. (PR3)

PARENT 3

The basic values/habits acquired by a child come primarily from the family environment. Therefore, when a parent adopts such habits and attitudes, it is easier for children to follow. (PR2)

FEEDBACK FROM PARENTS (3)

Feedbacks

Italy

PARENT 1

"This material gave me resources that I didn't have to better manage food to avoid waste and help my children do the same"

PARENT 2

"These contents allowed me to better understand the impact that food waste has on an environmental and economic level, information that I believe is necessary to pass on to younger people too"

PARENT 3

"This online game proves to be very useful in learning to manage waste better and waste food less. If everyone could follow the small tricks that can be found in the game there would be a great social change in everyone's daily habits."

Feedbacks

Spain

PARENT 1

'The 'ZERO WASTE' project has been a transformative experience for our family. We've gained a deep understanding of the environmental and social consequences of food waste.'

PARENT 2

'The provided educational materials are a treasure trove of ideas and practices that have the power to create a positive change in our lives.'

PARENT 3

'I can now engage in informed discussions with my children and collectively implement actions at home to minimize waste. The project's educational resources have provided me with valuable tools to manage our food resources efficiently and reduce waste.'

FEEDBACK FROM PARENTS (4)

Feedbacks

Romania

PARENT 1

The activities that my child was involved in, as part of Zero Waste project, increased both his Knowledge and mine about food waste. He has discovered many ways to reduce food waste. (PR 2)

PARENT 2

I was so delighted to see that there still are people preoccupied with preserving our natural resources and they have designed such effective activities to teach our children how to develop a healthy life style and a responsible attitude towards food. (PR 3)

PARENT 3

Great idea to use digital games to teach our Kids serious things - they seem to react so much better when today's technology is involved (PR 3).

Feedbacks

Turkey

PARENT 1

I can approach the subject of food waste with my children in a more informed manner, engaging in discussions and collectively exploring actions we can take at home, starting with our daily routines, to make a positive impact. (PR2)

PARENT 2

It provided me with valuable tools I previously lacked to effectively manage food, reducing waste, and imparting these skills to my children. (PR2)

PARENT 3

This newfound Knowledge will empower me to collaboratively make informed choices with my children in managing our food resources efficiently and minimizing waste. (PR2)

2.4 POLICY BRIEFS

The Project results into Policy Recommendations and Policy Briefs.

The Policy Recommendations have been written in light of the findings of the Impact Assessment (PR1.A2), which detail the financial and non-financial benefits, as well as the qualitative advantages and disadvantages, of appropriate educational efforts, as well as the analysis of comments made during pilot testing.

Guidelines and suggestions for teaching about food waste management in schools have been provided to:

1. current and future K-12 educators, instructional designers, and administrators;
2. non-formal educators; and
3. educational authorities and policymakers.

Each partner country, as well as the European Union as a whole, had a Policy Brief written for them that details the deficiencies in their current food waste management education programs.

Join us in the quest for a sustainable future!

Check us out on:



[@Zero Waste Project](#)



[@zerowaste_projecteu](#)



[Zero Waste EU Project](#)



<https://zero-waste-project.eu/>