



PR4: Course/ Curriculum Task 4.1 Curriculum development & specifications

Project 2021-1-EL01-
KA220-VET-000033247



Co-funded by
the European Union



horecapartners 



Output factsheet:

Funding Programme	Erasmus+ Programme of the European Union
Funding NA	EL01 Greek State Scholarship's Foundation (IKY)
Project full title	Advancing MuNicipal Circlular Economy – ADVANCE
Field	Vocational Education and Training
Project Number	2021-1-EL01-KA220-VET-000033247
Project Duration	24 months
Project Start Date	28-02-2022
Project End Date:	27-02-2024

Output details:

Output title: PR4: ADVANCE Course

Task Title: Task 4.1. Curriculum development & specifications

Output leader: NTUA

Task leader: NTUA

Document Control

Document version	Date	Rationale
V0.1	20/12/2022	First draft
V0.2	29/12/2022	Final

Disclaimer

This project has been funded with support from the European Commission. The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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Abbreviations

Abbreviation	Definition
EC	European Commission
EU	European Union
FW	Food Waste
HORECA	Hotel, restaurant, café accommodation and food service activities
MSW	Municipal solid waste
OER	Open Education Resource
SDG	Sustainable Development Goals
SMEs	Small and medium enterprises
VET	Vocational Education and Training

Executive summary

The ADVANCE Course is a curriculum broken down into certain learning modules and teaching units, covering areas of the whole spectrum of food waste (FW) generation and management, properly structured for the defined target groups. Its key objectives are to raise awareness on the legislative concerns associated with separate selection of FW from households and HORECA businesses, to reinforce the sharing and transfer of best practices on food waste management with a focus on selective collection, to improve local and regional cooperation between waste management companies/local authorities in charge of municipal waste collection and HORECA managers and staff, and to develop a sustainable and economically viable collection system.

This document presents the curriculum (Task 4.1) of the course to be developed under the project. The curriculum has been designed by NTUA in collaboration with the project partners and is primarily targeted at municipal and HORECA employees.

The first teaching module is an introductory chapter that focuses on some general aspects of food waste. The second module is dedicated to food waste generation in the HORECA sector and what are the strategies to prevent and reduce it. Finally, the third module is addressed to municipal employees and aims to inform them about the management of food waste by municipalities.

1 Introduction

ADVANCE is an EU co-funded project, which is funded by the Erasmus+ programme under the Action “KA220-VET - Cooperation partnerships in vocational education and training” (Agreement no. Project 2021-1-EL01-KA220-VET-000033247).

The main objectives of the ADVANCE project are, as follows:

- To assess the current food waste management practices in selected municipalities and SMEs in the HORECA sector and compare the assessment results with the best practices in the relevant fields
- To develop a concrete set of Circularity Indicators that will be used to describe both the current and the future description – monitoring of food waste management
- To assess the gap between the baseline assessment and the requirements posed by the EU Circular Economy Action Plan using the Circularity Indicators
- To develop two Roadmaps for municipalities and HORECA SMEs and a step-by-step methodology to implement the EU Circular Economy Action Plan requirements regarding food waste
- To prepare all the above as training/educational materials and implement training courses in selected municipalities and SMEs in the HORECA sector
- To develop an Open Education Resource online platform which will include & host all the above.

In this direction, ADVANCE will produce the following results:

- Baseline assessment (**PR1**) of the current waste food waste management practices in Municipalities and HORECA SMEs – the baseline assessment will also include benchmarking to existing best practices in EU.
- Gap Analysis methodology and tool (**PR2**) between current and required, according to the EU targets, waste management practices relevant to food waste. The main outcome of the Gap Analysis will be the Circularity Gap Indicators that could be used in other cases too. These indicators concern both the municipalities involved and the HORECA SMEs that will participate in the program.
- Development of Roadmaps (**PR3**) – The Roadmaps will be developed in two different types, one for Municipalities and one for HORECA SMEs. A special part of the roadmaps will be to demonstrate how Industry 4.0 can help municipalities and SMEs to achieve better food waste management and advance food waste prevention. The roadmaps will help to design and development of a step-by-step methodological framework for implementing the food waste targets.
- ADVANCE Course (**PR4**) – Creation of a training material broken down into certain learning modules for waste management adapted to the needs of target groups
- Open Education Resource (OER) (**PR5**) – An Online Platform, which will include and host interactively all the above.

This document presents the curriculum (Task 4.1) of the course to be developed under the project. The curriculum has been designed in collaboration with the project partners and is primarily targeted at municipal and HoReCa employees.

Course Overview

The course aims to provide educational material regarding food waste and food waste management primarily to HORECA and municipal employees.

The first teaching module is an introductory chapter that focuses on some general aspects of food waste. In particular, it presents the main reasons that food loss and waste emerge across the food supply chain and what are the implications of the issue. In addition, this section presents the current EU and national policies regarding food waste, explains the food waste management hierarchy and highlights the challenges of addressing the problem.

The second module is dedicated to food waste generation in the HORECA sector and what are the strategies to prevent and reduce it. Specifically, this chapter explains how food waste is generated during the different stages of operation of a HORECA company and what are the advantages and barriers for a company in the sector to follow a zero-waste strategy. Furthermore, it presents guidelines for measuring and monitoring food waste and strategies that HORECA companies can follow to prevent and reduce food waste.

The third module is addressed to municipal employees and aims to inform them about the management of food waste by municipalities. In this direction, the third chapter discusses the issues of measurement, identification and monitoring of waste by municipalities, the separate collection and separate treatment of waste. It also presents initiatives that a municipality can take to prevent the generation of food waste such as food banks and charities. Finally, this chapter explains how a municipality can inform residents through awareness and educational campaigns.

Learning objectives

The main objectives of the course are:

- To raise the awareness of the problem of food waste especially among food service and municipality employees
- To train the employees in these two sectors in the identification, measurement and monitoring of food waste
- To present guidelines and best practices for the prevention of food waste
- To present a series of strategies aimed at sustainable management of food waste

Who should attend

The main target groups of the course are the employees of the HORECA sector as well as people working in the municipalities and local authorities related to waste management. The

course can have a wider audience, as it can be attended by professionals related to waste management and environmental issues (consultants, trainers, non-profit organization members, researchers, etc.). Last, the course can also be useful to households that want to get informed about food waste.

Structure

Teaching Module 1: Food waste

- Unit 1.1: Food loss and waste across the food supply chain (FSC)
- Unit 1.2: The problem of food waste
- Unit 1.3: EU and national policies regarding food waste
- Unit 1.4: Food waste management hierarchy
- Unit 1.5: The challenge of addressing food waste

Teaching Module 2: Food waste in the HORECA sector

- Unit 2.1: Pre-kitchen waste, Kitchen waste, Post kitchen waste
- Unit 2.2: Benefits & Barriers of adopting a zero-waste strategy
- Unit 2.3: Guidelines on how to measure and monitor food waste
- Unit 2.4: Strategies to prevent and reduce avoidable food waste
- Unit 2.5: Strategies to manage unavoidable food waste

Teaching Module 3: Food waste management at municipal level

- Unit 3.1: Waste stream identification, measurement and monitoring
- Unit 3.2: Separate collection systems for separate treatment purposes
- Unit 3.3: Food banks - donation
- Unit 3.4: Educational & Awareness campaigns
- Unit 3.5: Other methods to prevent/reduce food waste

Resources

- Up to 150 ppt slides to be presented online.
- Training manual to contain up to 130-160 pages of texts, including graphs, tables, sources for further reading, etc.

Languages

Dutch, Croatian, English, Greek, Serbian

2 Curriculum details

Module 1. Food Waste

Description

Module 1 aims to provide background knowledge of food waste problem. In this direction, the main definitions regarding food waste and food loss across the food supply chain are presented, the environmental, economic and social impacts of the problem are discussed, the EU and national legislative policies and the food waste management hierarchy are examined, and the main challenges are considered.

Resources

- Up to 50 ppt slides to be presented online.
- Training manual to contain up to 30-50 pages of texts, including graphs, tables, sources for further reading, etc.

Aim

- Introduce the trainee to the food waste problem and its implications
- Introduce the trainee to the hierarchy of food waste management
- Present the main food waste management options
- Inform on the current policies on food waste targets and management
- Give an overview of the challenges surrounding the food waste problem

Units

- 1.1 Food loss and waste across the food supply chain (FSC)
- 1.2 The problem of food waste
- 1.3 EU and national policies regarding food waste
- 1.4 Food waste management hierarchy
- 1.5 The challenge of addressing food waste

Learning Outcomes

- To understand the food waste problem and its implications
- To be familiar with the policies of food waste management
- To be familiar with the principles and the main challenges of food waste management

Self-assessment

5 questions per unit in the form of a multiple choice/True-False quiz

Suggested literature (indicative)

Bagherzadeh, M., M. Inamura and H. Jeong (2014). Food Waste Along the Food Chain, OECD Food, Agriculture and Fisheries Papers, No. 71, OECD Publishing, Paris.

<http://dx.doi.org/10.1787/5jxrcmftzj36-en>

- Blakeney, M. (2019). Food loss and food waste: Causes and solutions. Food Loss and Food Waste: Causes and Solutions. Edward Elgar Publishing Ltd, pp. 204.
<https://doi.org/10.4337/9781788975391>
- FUSIONS (2016). Estimates of European food waste levels. FUSIONS Reducing food waste through social innovation Stockholm. <https://www.eu-fusions.org/phocadownload/Publications/Estimates%20of%20European%20food%20waste%20levels.pdf>
- Galanakis, C. M. (2020). Food Waste Recovery: Processing Technologies, Industrial Techniques, and Applications. Elsevier, pp. 538. <https://doi.org/10.1016/B978-0-12-820563-1.00033-0>
- Närvänen, E., Mesiranta, N., Mattila, M., & Heikkinen, A. (2019). Food waste management: Solving the wicked problem. Springer International Publishing, pp. 455.
<https://doi.org/10.1007/978-3-030-20561-4>
- UNECE (2020). Simply Measuring - Quantifying Food Loss & Waste: UNECE food loss and waste measuring methodology for fresh produce supply chains, Geneva.
<https://unece.org/sites/default/files/2021-04/FoodLossMeasuringMethodology.pdf>
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https://wwfint.awsassets.panda.org/downloads/wwf_uk_driven_to_waste_the_global_impact_of_food_loss_and_waste_on_farms.pdf

Unit 1.1 Food loss and waste across the food supply chain (FSC)

Description

Unit 1.1 aims to provide background knowledge of food losses and wastes across the stages of food supply chain. In this direction, the main definitions regarding food waste and food loss across the food supply chain are presented, while the main similarities and differences between the two definitions are explained. The text is supplemented with examples and infographics that will assist the educational process.

Resources

- Up to 10 ppt slides to be presented online.

- Training manual to contain 15-20 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Introduce the definitions of food loss, food waste and food supply chain
- Highlight the similarities and differences between these definitions
- Explain which food losses and wastes are avoidable or/and unavoidable

Subunits

- 1.1.1 Definitions
- 1.1.2 Food Supply Chain
- 1.1.3 Food Loss
- 1.1.4 Food Waste
- 1.1.5 Avoidable and unavoidable food wastage
- 1.1.6 Understanding food loss and waste

Learning Outcomes

- To understand the main definitions and their differences
- To realize the food supply chain, its stages and where the food losses and wastes occur

Self-assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

Cattaneo, Andrea, et al. 'Reducing Food Loss and Waste: Five Challenges for Policy and Research'. Food Policy, volume 98, January 2021, p. 101974. ScienceDirect, <https://doi.org/10.1016/j.foodpol.2020.101974>.

Food and Agriculture Organization of the United Nations (FAO). Global Initiative on Food Loss and Waste Reduction. 2015, p. 8, <https://www.fao.org/3/i4068e/i4068e.pdf>.

Hoehn, Daniel, et al. 'A Critical Review on Food Loss and Waste Quantification Approaches: Is There a Need to Develop Alternatives beyond the Currently Widespread Pathways?' Resources, Conservation and Recycling, volume 188, January 2023, p. 106671. ScienceDirect, <https://doi.org/10.1016/j.resconrec.2022.106671>.

Spang, Edward S., κ.ά. 'Food Loss and Waste: Measurement, Drivers, and Solutions'. Annual Review of Environment and Resources, volume 44, issue. 1, October 2019, p. 117–56. DOI.org (Crossref), <https://doi.org/10.1146/annurev-environ-101718-033228>.

Unit 1.2 The problem of food waste

Description

This unit explains why food waste is an ongoing problem and focuses on its multilevel consequences. In particular, it provides data and statistics on the extent of the problem across the European countries and then discusses the environmental (climate change, soil degradation etc), economic (economic and externality costs, etc) and social (hunger, malnourishment etc) implications of food waste.

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 7-12 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Inform the trainee on Europe's current status regarding food waste
- Highlight the environmental, economic and social implications of food waste

Subunits

- 1.2.1 Extend of the problem in Europe
- 1.2.2 Environmental implications of food waste
- 1.2.3 Economic implications of food waste
- 1.2.4 Societal implications of food waste

Learning Outcomes

- To understand what is the current state in Europe regarding food waste
- To realize the multilevel implications of the food waste

Assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

Campoy-Muñoz, P., Cardenete, M. A., & Delgado, M. C. (2017). Economic impact assessment of food waste reduction on European countries through social accounting matrices. *Resources, Conservation and Recycling*, 122, 202–209. <https://doi.org/10.1016/j.resconrec.2017.02.010>

Papargyropoulou, E., Lozano, R., K. Steinberger, J., Wright, N., & Ujang, Z. bin. (2014). The food waste hierarchy as a framework for the management of food surplus and food waste. *Journal of Cleaner Production*, 76, 106–115. <https://doi.org/10.1016/j.jclepro.2014.04.020>

Scherhauser, S., Moates, G., Hartikainen, H., Waldron, K., & Obersteiner, G. (2018). Environmental impacts of food waste in Europe. *Waste Management*, 77, 98–113. <https://doi.org/10.1016/j.wasman.2018.04.038>

Stenmarck, Å., Jensen, C., Quedsted, T., Moates, G., Buksti, M., Cseh, B., Juul, S., Parry, A., Politano, A., & Redlingshofer, B. (2016). Estimates of European food waste levels. IVL Swedish Environmental Research Institute.

Tonini, D., Albizzati, P. F., & Astrup, T. F. (2018). Environmental impacts of food waste: Learnings and challenges from a case study on UK. *Waste Management*, 76, 744–766. <https://doi.org/10.1016/j.wasman.2018.03.032>

Unit 1.3 EU and national policies regarding food waste

Description

This unit will present the Directives of the European Parliament and the guidelines of the council in order to help the trainee understand the legal obligations related to food waste generation and management. The national policies related to the prevention of food waste are also discussed.

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 7-12 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- The scope is to educate HORECA businesses and municipalities on the legal framework regarding the food waste

Subunits

- 1.3.1 EU and new obtaining laws
- 1.3.2 EU and recycling campaigns
- 1.3.3 National policies on prevention of Food Waste

Learning Outcomes

- The trainee will get to know the law regarding food waste management in E.U.
- The trainee will understand how the legal framework affects the company or municipality he/she works for
- The trainee will be able to educate his/her employees/stuff on waste management according to EU laws

Self-assessment

5 multiple choice/True-False questions

Suggested Literature

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008L0098-20180705&from=EN>

Stankevičius, A.; Novikovas, A.; Bakaveckas, A.; Petryshyn, O. 2020. EU waste regulation in the context of the circular economy: peculiarities of interaction, *Entrepreneurship and Sustainability Issues* 8(2): 533-545. [https://doi.org/10.9770/jesi.2020.8.2\(32\)](https://doi.org/10.9770/jesi.2020.8.2(32))

Unit 1.4 Food waste management hierarchy

Description

This section looks at the concept of the food waste management hierarchy and explains which management options are preferable to others. In this direction, it explains why emphasis should be placed on preventing food waste and then discusses the management options available. The management options that will be covered are the reuse for human and animal consumption, food waste recycling, nutrients and energy recovery and landfilling. The last part of the unit deals with the current state of solid waste management in Europe.

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 7-12 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Highlight the importance of food waste prevention
- Explain the different food waste management options
- Rank the different management options according to their environmental footprint
- Inform on the current state of solid waste management in Europe

Subunits

- 1.4.1 Prevention
- 1.4.2 Re-use for human consumption
- 1.4.3 Re-use for animal feed
- 1.4.4 Recycling
- 1.4.5 Nutrients recovery
- 1.4.6 Energy Recovery
- 1.4.7 Landfilling
- 1.4.8 Current state of solid waste management in Europe

Learning Outcomes

- To understand the importance of food waste prevention
- To distinguish between food waste management options based on their sustainability rank
- To become familiar with the current state of solid waste management in Europe

Self-assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

- Abeliotis, K., Lasaridi, K., & Chroni, C. (2014). Attitudes and behaviour of Greek households regarding food waste prevention. *Waste Management & Research*, 32(3), 237–240.
- Facchini, E., Iacovidou, E., Gronow, J., & Voulvoulis, N. (2018). Food flows in the United Kingdom: The potential of surplus food redistribution to reduce waste. *Journal of the Air & Waste Management Association*, 68(9), 887–899. <https://doi.org/10.1080/10962247.2017.1405854>
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- Priefer, C., Jörissen, J., & Bräutigam, K.-R. (2016). Food waste prevention in Europe – A cause-driven approach to identify the most relevant leverage points for action. *Resources, Conservation and Recycling*, 109, 155–165. <https://doi.org/10.1016/j.resconrec.2016.03.004>
- Rajeh, C., Saoud, I. P., Kharroubi, S., Naalbandian, S., & Abiad, M. G. (2021). Food loss and food waste recovery as animal feed: A systematic review. *Journal of Material Cycles and Waste Management*, 23(1), 1–17. <https://doi.org/10.1007/s10163-020-01102-6>
- Schneider, F. (2013). The evolution of food donation with respect to waste prevention. *Waste Management*, 33(3), 755–763. <https://doi.org/10.1016/j.wasman.2012.10.025>
- Westendorf, M. L. (2000). Food Waste as Animal Feed: An Introduction. In M. L. Westendorf (Ed.), *Food Waste to Animal Feed* (pp. 3–16). Iowa State University Press. <https://doi.org/10.1002/9780470290217.ch1>

Unit 1.5 The challenge of addressing food waste

Description

This unit's task is to discuss the main challenges when it comes to addressing food waste. It starts by introducing the trainee to the sustainable development goals and explains their connection with food waste. It also discusses the main challenges that businesses and municipalities face when it comes to addressing the issue.

Resources

- Up to 10 ppt slides to be presents online
- Training manual to contain 6-10 pages of text including graphs, tables sources for further reading, etc.

Aim

- Introduce the trainee to main challenges of addressing food waste.
- Give an overview of connection between food waste and sustainable development goals

Subunits

- 1.5.1 Sustainable Development Goals
- 1.5.2 Main challenges
 - 1.5.2.1 Measuring and monitoring food loss and waste
 - 1.5.2.2 Social and private benefits and costs
 - 1.5.2.3 Policies and intervention
 - 1.5.2.4 Interactions between stages along food value chain
 - 1.5.2.5 Income transitions and the shifting importance of losses and waste
- 1.5.3 Other Challenges

Learning Outcomes

- To understand what are main challenges of addressing food waste.
- To realize the impact of food waste on the Sustainable development goals

Self-assessment

5 multiple choice/True-False questions in the form of quiz

Suggested Literature

Anyabwile, A., & Walker, S. (n.d.). 5 Ways to Put Food on a Water Diet.

Arneht, A., Barbosa, H., Benton, T. G., Calvin, K., Calvo, E., Connors, S., Cowie, A., Davin, E., Denton, F., & Diemen, R. van. (2019). Summary for policymakers.

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- Fabi, C., English, A., Mingione, M., & Jona Lasinio, G. (2018). Sdg 12.3. 1: Global food loss index. FAO, Rome.
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- Scherhauer, S., Moates, G., Hartikainen, H., Waldron, K., & Obersteiner, G. (2018). Environmental impacts of food waste in Europe. *Waste Management*, 77, 98–113. <https://doi.org/10.1016/j.wasman.2018.04.038>

Module 2. Food waste in the HORECA sector

Description

Module 2 is aimed at educating HORECA personnel on food waste topics. Specifically, it starts by discussing how food waste emerges during the different stages of the production (pre-kitchen, kitchen and post-kitchen). In addition, the module covers the benefits and barriers that a HORECA business may exhibit when it comes to adopting a zero-waste strategy. The rest of the module presents guidelines on how to measure and monitor food waste and the strategies to prevent and reduce food waste.

Resources

- Up to 50 ppt slides to be presented online.
- Training manual to contain up to 30-50 pages of texts, including graphs, tables, sources for further reading, etc.

Aim

- Inform the trainee about the different types of food waste (Pre-kitchen waste, Kitchen waste, Post kitchen waste)
- Introduce to the trainee the zero-waste strategy and inform on the benefits and barriers when adopting it.
- Present the guidelines for measuring and monitoring of food waste
- Inform on the strategies to prevent and reduce food waste

Units

- 2.1 Pre-kitchen waste, Kitchen waste, Post kitchen waste
- 2.2 Benefits & Barriers of adopting a zero-waste strategy
- 2.3 Guidelines on how to measure and monitor food waste
- 2.4 Strategies to prevent and reduce avoidable food waste
- 2.5 Strategies to manage unavoidable food waste

Learning Outcomes

- Understand how the problem emerges during their operations
- Learn about the benefits of a zero-waste strategy
- Gain familiarity on food waste measurement and monitoring
- Gain familiarity with strategies to prevent and reduce food waste

Self-assessment

5 questions per unit in the form of a multiple choice/True-False quiz

Suggested literature

- Betz, A., Buchli, J., Göbel, C. & Müller, C. (2015). Απόβλητα τροφίμων στον ελβετικό κλάδο υπηρεσιών τροφίμων – Μέγεθος και δυνατότητα μείωσης. *Διαχείριση αποβλήτων*, 35, 218-226. <https://doi.org/10.1016/j.wasman.2014.09.015>
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Grinberga-Zalite, G., & Zvirbule, A. (2022). Analysis of Waste Minimization Challenges to European Food Production Enterprises. *Emerging Science Journal*, 6(3), 530–543. <https://doi.org/10.28991/ESJ-2022-06-03-08>

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Martin-Rios, C., Hofmann, A., & Mackenzie, N. (2021). Sustainability-Oriented Innovations in Food Waste Management Technology. *Sustainability*, 13(1), Article 1. <https://doi.org/10.3390/su13010210>

<https://www.fusions.org/phocadownload/Publications/FUSIONS%20Food%20Waste%20Quantification%20Manual.pdf>

Gładysz, B., Buczacki, A., & Haskins, C. (2020). Lean Management Approach to Reduce Waste in HORECA Food Services. *Resources*, 9(12), Article 12. <https://doi.org/10.3390/resources9120144>

Unit 2.1 Pre-kitchen waste, kitchen waste, post-kitchen waste

Description

In this unit, first of all attention is given to the definition and meaning of a number of concepts that are relevant as far as the generation of food waste in the context of the HORECA sector is concerned. Thus, the distinction between avoidable and unavoidable food waste is discussed, as well as the emergence of food waste during the different production stages: pre-kitchen, kitchen and post-kitchen waste. For the latter three types of food waste, an overview is subsequently given of their main causes and respective relative importance.

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 7-12 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Inform the trainee about the different types of food waste in the HORECA sector (avoidable food waste versus unavoidable food waste; pre-kitchen waste, kitchen waste, post-kitchen waste)
- Inform the trainee about the main causes and the relative importance of food waste in the different production stages in the HORECA sector

Subunits

- 2.1.1 Definitions

- 2.1.1.1 Avoidable and unavoidable food waste in the HORECA sector
- 2.1.1.2 Pre-kitchen, kitchen and post-kitchen waste
- 2.1.2 Relative importance of the various types of food waste in the HORECA sector
 - 2.1.2.1 Relative importance
 - 2.1.2.2 Main causes

Learning Outcomes

- To understand the distinction between avoidable and unavoidable food waste in the context of the HORECA sector
- To understand how food waste emerges throughout the various stages of production in HORECA operations (pre-kitchen waste, kitchen waste, post-kitchen waste)

Self-assessment

5 multiple choice/True-False questions in the form of quiz

Suggested Literature

- Betz, A., Buchli, J., Göbel, C. & Müller, C. (2015). Food Waste in the Swiss Food Service Industry – Magnitude and Potential for Reduction. *Waste Management*, 35, 218-226. <https://doi.org/10.1016/j.wasman.2014.09.015>
- Cordingley, F., Reeve, S. & Stephenson, J. (2011). Food Waste in Schools. WRAP, Banbury, United Kingdom. <https://wrap.org.uk/sites/default/files/2020-10/WRAP-food-waste-in-schools.pdf>
- Dhir, A., Talwar, S., Kaur, P. & Malibari, A. (2020). Food Waste in Hospitality Food Services: A Systematic Literature Review and Framework Development Approach. *Journal of Cleaner Production*, 270, 122861. <https://doi.org/10.1016/j.jclepro.2020.122861>
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- McAdams, B., von Massow, M., Gallant, M. & Hayhoe, M.-A. (2019). A Cross Industry Evaluation of Food Waste in Restaurants. *Journal of Foodservice Business Research*, 22 (5), 449-466. <https://doi.org/10.1080/15378020.2019.1637220>

- Principato, L., Pratesi, C.A. & Secondi, L. (2018). Towards Zero Waste: An Exploratory Study on Restaurant Managers. *International Journal of Hospitality Management*, 74, 130-137. <https://doi.org/10.1016/j.ijhm.2018.02.022>
- Silvennoinen, K., Heikkilä, Katajajuuri, J.-M. & Reinikainen, A. (2015). Food Waste Volume and Origin: Case Studies in the Finnish Food Service Sector. *Waste Management*, 46, 140-145. <https://doi.org/10.1016/j.wasman.2015.09.010>
- Sonnino, R. & McWilliam, S. (2011). Food Waste, Catering Practices and Public Procurement: A Case Study of Hospital Food Systems in Wales. *Food Policy*, 36, 823-829. <https://doi.org/10.1016/j.foodpol.2011.09.00>

Unit 2.2 Benefits & Barriers of adopting a zero-waste strategy

Description

This section examines the concept of the zero-waste strategy and explains the barriers and benefits of its adoption in the HORECA sector. In the light of the barriers of this strategy, the economic, technical as well as socio-cultural barriers will be covered and provide the users suggested guidelines to avoid them. The last and most important part of this section deals with the benefits of adopting a zero-waste strategy, going into the environmental, economic and social aspects of the zero-waste strategy.

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 7-12 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Highlight the importance of a zero-waste strategy
- Raise awareness on the benefits of the zero-waste strategy
- Show the barriers to its adoption and the ways to overcome them

Subunits

- 2.2.1 Definition of zero-waste strategy
- 2.2.2 Barriers
 - 2.2.2.1 Financial barriers
 - 2.2.2.2 Technical barriers
 - 2.2.2.3 Socio-cultural barriers
- 2.2.3 Benefits
 - 2.2.3.1 Environmental benefits
 - 2.2.3.2 Financial benefits
 - 2.2.3.3 Social benefits

Learning Outcomes

- Understand the meaning and importance of a zero-waste strategy in the HORECA sector.
- Discern the economically, technically and socio-politically benefits of adopting the zero-waste strategy
- Prepare the trainees on the obstacles when it comes to adopting this strategy

Assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

Grinberga-Zalite, G., & Zvirbule, A. (2022). Analysis of Waste Minimization Challenges to European Food Production Enterprises. *Emerging Science Journal*, 6(3), 530–543. <https://doi.org/10.28991/ESJ-2022-06-03-08>

Jamal, H. (n.d.). Functional Elements of Solid Waste Management System. Retrieved February 7, 2023, from <https://www.aboutcivil.org/functional-elements-solid-waste-management-system>

Martin-Rios, C., Hofmann, A., & Mackenzie, N. (2021). Sustainability-Oriented Innovations in Food Waste Management Technology. *Sustainability*, 13(1), Article 1. <https://doi.org/10.3390/su13010210>

Nobre, G. C., & Tavares, E. (2021). The quest for a circular economy final definition: A scientific perspective. *Journal of Cleaner Production*, 314, 127973. <https://doi.org/10.1016/j.jclepro.2021.127973>

Rizos, V., Behrens, A., Kafyeke, T., Hirschnitz-Garbers, M., & Ioannou, A. (2015). The Circular Economy: Barriers and Opportunities for SMEs (SSRN Scholarly Paper No. 2664489). <https://papers.ssrn.com/abstract=2664489>

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Vinck, K., Scheelen, L., & Du Bois, E. (2019). Design opportunities for organic waste recycling in urban restaurants. *Waste Management & Research*, 37(1_suppl), 40–50. <https://doi.org/10.1177/0734242X18817714>

Unit 2.3 Guidelines on how to measure and monitor Food Waste

Description

The scope of this unit is to explain to the HORECA personnel, the guidelines on how to measure and monitor the amount of food waste that it is produced during their operations. It

presents how waste segregation facilitates the measurement and monitoring of the different waste streams emerging during operations. In addition, through case studies it provides the trainee guidelines on how to measure and monitor the waste produced.

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 7-12 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Help trainee understand how waste segregation facilitates measurement and monitoring of waste
- Provide the trainee guidelines on how to perform waste measurement and monitoring

Subunits

- 2.3.1 Segregation of different waste streams
- 2.3.2 The principles of Food Waste Measurement
- 2.3.3 Recommended approaches on measuring and monitoring
- 2.3.4 Training and Awareness
- 2.3.5 Case studies of effective food waste measurement

Learning Outcomes

- To learn how to efficiently measure and monitor food waste
- To learn how to train their employees/stuff on measuring food waste

Self-assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

<https://www.eu-fusions.org/phocadownload/Publications/FUSIONS%20Food%20Waste%20Quantification%20Manual.pdf>

https://food.ec.europa.eu/system/files/2018-04/fw_lib_fwp-guide_food-waste-measurement_wrap-2018.pdf

<https://blog.winnowsolutions.com/how-to-calculate-food-waste-in-restaurants>

<https://pos.toasttab.com/blog/on-the-line/reduce-food-waste>

<https://stopfoodwaste.ie/resource/measuring-your-food-waste>

<https://www.ecepl.com/food-waste-management/>

<https://www.highspeedtraining.co.uk/hub/restaurant-food-waste/>

Unit 2.4 Strategies to prevent and reduce avoidable food waste

Description

This section focuses on the potential strategies to prevent and reduce avoidable food waste throughout the various production stages in the HORECA sector. In that respect, initially a SWOT analysis is performed with regard to food waste mitigation in the HORECA sector. Subsequently, the most important measures that can be taken in terms of avoidable food waste prevention and reduction are discussed, as well as the main associated critical success factors. As far as the potential actions are concerned, a distinction is made between general measures and measures pertaining primarily to pre-kitchen, kitchen and post-kitchen waste, respectively.

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 7-12 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Inform the trainee about the most important potential strategies to prevent and reduce avoidable food waste throughout the various production stages in the HORECA sector
- Give the trainee an understanding of the critical success factors associated with the potential strategies

Subunits

- 2.4.1 SWOT analysis of food waste mitigation in the HORECA sector
- 2.4.2 Potential measures and associated critical success factors
 - 2.4.2.1 General measures
 - 2.4.2.1.1 Maintaining ‘cold chain’
 - 2.4.2.1.2 Food waste monitoring
 - 2.4.2.1.3 Overall planning
 - 2.4.2.2 Measures pertaining primarily to pre-kitchen waste
 - 2.4.2.2.1 Demand forecasting
 - 2.4.2.2.2 Procurement
 - 2.4.2.2.3 Stock management
 - 2.4.2.2.4 Menu design
 - 2.4.2.3 Measures pertaining primarily to kitchen waste
 - 2.4.2.3.1 Storage
 - 2.4.2.3.2 Preparation
 - 2.4.2.3.3 Plating
 - 2.4.2.3.4 Serving
 - 2.4.2.4 Measures pertaining primarily to post-kitchen waste
 - 2.4.2.4.1 Sales and customer service

- 2.4.2.4.2 After sale and after service

Learning Outcomes

- To know and understand the most important potential strategies to prevent and reduce avoidable food waste throughout the various production stages in the HORECA sector
- To understand the critical success factors associated with the potential avoidable food waste mitigation strategies

Self-assessment

5 multiple choice/True-False questions in the form of quiz

Suggested Literature

- Betz, A., Buchli, J., Göbel, C. & Müller, C. (2015). Food Waste in the Swiss Food Service Industry – Magnitude and Potential for Reduction. *Waste Management*, 35, 218-226. <https://doi.org/10.1016/j.wasman.2014.09.015>
- Cordingley, F., Reeve, S. & Stephenson, J. (2011). Food Waste in Schools. WRAP, Banbury, United Kingdom. <https://wrap.org.uk/sites/default/files/2020-10/WRAP-food-waste-in-schools.pdf>
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- Engström, R. & Carlsson-Kanyama, A. (2004). Food Losses in Food Service Institutions – Examples from Sweden. *Food Policy*, 29, 203-213. <https://doi.org/10.1016/j.foodpol.2004.03.004>
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- McAdams, B., von Massow, M., Gallant, M. & Hayhoe, M.-A. (2019). A Cross Industry Evaluation of Food Waste in Restaurants. *Journal of Foodservice Business Research*, 22 (5), 449-466. <https://doi.org/10.1080/15378020.2019.1637220>
- Ofei, K.T., Holst, M., Rasmussen, H.H. & Mikkelsen, B.E. (2014). How Practice Contributes to Trolley Food Waste. A Qualitative Study Among Staff Involved in Serving Meals to Hospital Patients. *Appetite*, 83, 49-56. <https://doi.org/10.1016/j.appet.2014.08.001>
- Ofei, K.T., Holst, M., Rasmussen, H.H. & Mikkelsen, B.E. (2015). Effect of Meal Portion Size Choice on Plate Waste Generation Among Patients with Different Nutritional Status. An Investigation Using Dietary Intake Monitoring System (DIMS). *Appetite*, 91, 157-164. <https://doi.org/10.1016/j.appet.2015.04.043>

Principato, L., Pratesi, C.A. & Secondi, L. (2018). Towards Zero Waste: An Exploratory Study on Restaurant Managers. *International Journal of Hospitality Management*, 74, 130-137. <https://doi.org/10.1016/j.ijhm.2018.02.022>

Sonnino, R. & McWilliam, S. (2011). Food Waste, Catering Practices and Public Procurement: A Case Study of Hospital Food Systems in Wales. *Food Policy*, 36, 823-829. <https://doi.org/10.1016/j.foodpol.2011.09.00>

Unit 2.5 Strategies to manage unavoidable food waste

Description

This unit explains the strategies for the management of unavoidable food waste. Unit 2.5 sets the definition of unavoidable food waste and describes the different types of separate collections systems. In addition, it provides the guidelines and strategies to manage unavoidable food waste (composting on-site, collaboration with local external partners such as farmers, biorefineries, etc., on-site anaerobic digestion, on-site pre-treatment, food rescue - donation for human consumption - donation of surplus food and finally education and awareness raising).

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 7-12 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Inform the trainee about the different types of separate collection system
- Identify the strategies-guidelines for managing unavoidable food waste

Subunits

- 2.5.1 About unavoidable food waste
- 2.5.2 Strategies
 - 2.5.2.1 Reuse – Transform – Substitute the unavoidable food waste
 - 2.5.2.2 Composting On-site
 - 2.5.2.3 Collaboration with local external partners such as farmers, bio-refinery, etc.
 - 2.5.2.4 Education and Awareness

Learning Outcomes

- To understand the multidimensional strategies
- Awareness and education on different types of separate collection systems

Self-assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

- Deselnicu, D. C., Militaru, G., Deselnicu, V., Zăinescu, G., & Albu, L. (2018). Towards a Circular Economy– a Zero Waste Programme for Europe. 563–568. <https://doi.org/10.24264/icams-2018.XI.4>
- Di Foggia, G., & Beccarello, M. (2022). An Overview of Packaging Waste Models in Some European Countries. *Recycling*, 7(3), Article 3. <https://doi.org/10.3390/recycling7030038>
- Gładysz, B., Buczacki, A., & Haskins, C. (2020). Lean Management Approach to Reduce Waste in HORECA Food Services. *Resources*, 9(12), Article 12. <https://doi.org/10.3390/resources9120144>

Module 3. Food waste management at municipal level

Description

Section 3 is dedicated to the food waste management at municipal level. It explains how municipalities identify, measure and monitor waste. In addition, it shows how separate collection can facilitate different treatment purposes. It also describes how food banks work and the way municipalities can raise awareness regarding food waste through educational campaigns. Last, other methods of food waste management are also mentioned.

Resources

- Up to 50 ppt slides to be presented online.
- Training manual to contain up to 30-50 pages of texts, including graphs, tables, sources for further reading, etc.

Aim

- Provide the methods to identify, measure and monitor food waste at a municipal level
- Explain the different treatment purposes
- Describe how food banks can assist on the mitigation of food waste
- Highlight the importance of awareness campaigns

Units

- 3.1 Waste stream identification, measurement and monitoring
- 3.2 Separate collection systems for separate treatment purposes
- 3.3 Food banks - Donation
- 3.4 Educational & Awareness campaigns
- 3.5 Other methods to prevent/reduce food waste

Learning Outcomes

- Understand how to identify, measure and monitor food waste at a municipal level
- Learn about the different waste treatment options
- Learn how food banks can enable food redistribution

- Understand how citizen awareness can be raised in order to fight food waste

Self-assessment

5 questions per unit in the form of a multiple choice/True-False quiz

Suggested Literature

Suggested Literature

Commission, E. (2019). Commission Delegated Decision (EU) 2019/1597 of 3 May 2019 supplementing Directive 2008/98/EC of the European Parliament and of the Council as regards a common methodology and minimum quality requirements for the uniform measurement of levels of food waste. *Off. J. Eur. Union*, 62, 77–85.

Corrado, S., Caldeira, C., Eriksson, M., Hanssen, O. J., Hauser, H. E., Van Holsteijn, F., Liu, G., Östergren, K., Parry, A., & Secondi, L. (2019). Food waste accounting methodologies: Challenges, opportunities, and further advancements. *Global Food Security*, 20, 93–100.

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Bernstad, A., & J. La Cour Jansen. 'Separate Collection of Household Food Waste for Anaerobic Degradation – Comparison of Different Techniques from a Systems Perspective'. *Waste Management*, volume 32, issue. 5, May 2012, p. 806–15. DOI.org (Crossref), <https://doi.org/10.1016/j.wasman.2012.01.008>.

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Chinie, C., Biclesanu, I., & Bellini, F. (2021). The Impact of Awareness Campaigns on Combating the Food Wasting Behavior of Consumers. *Sustainability*, 13(20), 11423.

Changes to the waste management plan of the Republic of Croatia for the period 2017-2022. (2022). https://narodne-novine.nn.hr/clanci/sluzbeni/2022_01_1_1.html

Unit 3.1 Waste stream identification, measurement and monitoring

Description

This unit gives an overview of recognized methods of identifying, measuring and monitoring of food waste in municipalities in different waste categories (food waste, biowaste, mixed municipal waste) in different stages (household waste generation, collected waste, recycled, recovered and landfilled waste). Additionally, this unit deals with the legal obligations of

municipalities regarding food waste measuring and monitoring according to the EU and national policies, together with the successful implementation, challenges and good practice examples.

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 7-12 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Inform the trainee on obligations and recognized methods of identifying, measuring and monitoring of food waste at the municipal level
- Give examples of identified challenges and good practice

Subunits

- 3.1.1 Food waste management (legal obligations and implementation)
- 3.1.2 Methods of waste stream identification
- 3.1.3 Methods and frequency of waste stream measurement
- 3.1.4 Waste monitoring

Learning Outcomes

- To become familiar with the legal framework regarding food waste measurement and monitoring in municipalities
- To gain knowledge on recognized methods of food waste identification and measurement in municipalities
- To gain knowledge on monitoring of food waste in municipalities
- To gain insight into challenges and good practice of the above

Self-assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

Commission, E. (2019). Commission Delegated Decision (EU) 2019/1597 of 3 May 2019 supplementing Directive 2008/98/EC of the European Parliament and of the Council as regards a common methodology and minimum quality requirements for the uniform measurement of levels of food waste. *Off. J. Eur. Union*, 62, 77–85.

Corrado, S., Caldeira, C., Eriksson, M., Hanssen, O. J., Hauser, H. E., Van Holsteijn, F., Liu, G., Östergren, K., Parry, A., & Secondi, L. (2019). Food waste accounting methodologies: Challenges, opportunities, and further advancements. *Global Food Security*, 20, 93–100.

Croatian Agency for Environment and Nature. (2015). Methodology for determining the composition and quantity of municipal or mixed municipal waste. <https://www.haop.hr/sites/default/files/uploads/specificni->

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Ministry of Economy and Sustainable Development of the Republic of Croatia. (2022). Report on municipal waste for 2021. https://www.haop.hr/sites/default/files/uploads/inline-files/OTP_Izvje%C5%A1%C4%87e%20o%20komunalnom%20otpadu%20za%202021.%20godinu_V2_2.pdf

Ministry of Economy and Sustainable Development of the Republic of Croatia. (2022). Statistical research on food waste in Croatia. <https://www.haop.hr/hr/tematska-podrucja/otpad-registri-oneciscavanja-i-ostali-sektorski-pritisci/gospodarenje-otpadom-13>

Reynolds, C., Goucher, L., Quedsted, T., Bromley, S., Gillick, S., Wells, V. K., Evans, D., Koh, S. C., Carlsson Kanyama, A., & Katzeff, C. (2019). Consumption-Stage Food Waste Reduction Interventions—What Works and How to Do Better. Food Policy.

Waste Management Act of the Republic of Croatia. (2021). https://narodne-novine.nn.hr/clanci/sluzbeni/2021_07_84_1554.html

Unit 3.2 Separate collection systems for separate treatment purposes

Description

This section examines the different collection systems and treatment purposes regarding the food waste. In the light of this, the characteristics of each one will be covered giving the user suggested guidelines for selecting the best system and treatment each time them. Moreover, specific examples and images from existing and successful practices will assist the educational process, by providing visual representation.

Resources

- Up to 15 ppt slides to be presented online.
- Training manual to contain 15-20 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Provide necessary information regarding separate collection and separate treatment purposes, so as municipalities opt for the most suitable collection/treatment system

Subunits

- 3.2.1 Definitions
 - 3.2.1.1 Separate Collection Systems

- 3.2.1.2 PAYT
- 3.2.1.3 Bins for separate collection of bio-waste
- 3.2.2 Bio-waste
- 3.2.3 Separate Treatment Purposes
 - 3.2.3.1 Animal Feed
 - 3.2.3.2 Biorefinery
 - 3.2.3.3 Aerobic Digestion
 - 3.2.3.3.1 On-site treatment (Home Composting)
 - 3.2.3.3.2 Decentralized treatment (Municipal Composting)
 - 3.2.3.4 Anaerobic Digestion
 - 3.2.3.5 Incineration

Learning Outcomes

- To understand the different systems for separate waste collection
- To understand the different systems for separate waste treatment
- To opt the most suitable collection and treatment system for their needs

Self-assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

Academy, Mission Zero. 'Separate Collection of Bio-Waste: An Opportunity for European Cities'. Mission Zero Academy, 21 December 2021, <https://www.missionzeroacademy.eu/circular-economy/why-separate-collection-of-biowaste-is-fundamental-for-a-circular-economy/>.

Bernstad, A., και J. La Cour Jansen. 'Separate Collection of Household Food Waste for Anaerobic Degradation – Comparison of Different Techniques from a Systems Perspective'. Waste Management, volume 32, issue. 5, May 2012, p. 806–15. DOI.org (Crossref), <https://doi.org/10.1016/j.wasman.2012.01.008>.

Garcia-Garcia, Guillermo, κ.ά. 'A Methodology for Sustainable Management of Food Waste'. Waste and Biomass Valorization, volume 8, issue. 6, September 2017, p. 2209–27. Springer Link, <https://doi.org/10.1007/s12649-016-9720-0>.

Gerassimidou, Spyridoula, κ.ά. 'A Tool for the Selection of Food Waste Management Approaches for the Hospitality and Food Service Sector in the UK'. Resources, volume 11, issue 10, September 2022, p. 80. DOI.org (Crossref), <https://doi.org/10.3390/resources11100080>.

Kumar, T. Bharath, και Deepak Prashar. 'Review on Efficient Food Waste Management System Using Internet of Things'. International Journal of Current Research and Review, volume 13, issue 06, 2021, p. 142–49. DOI.org (Crossref), <https://doi.org/10.31782/IJCRR.2021.13603>.

Rolewicz-Kalińska, Anna, κ.ά. ‘The Circular Economy and Organic Fraction of Municipal Solid Waste Recycling Strategies’. *Energies*, volume 13, issue. 17, January 2020, σ. 4366. www.mdpi.com, <https://doi.org/10.3390/en13174366>.

Unit 3.3 Food banks – donation

Description

In this unit, the user will be familiarized firstly, with the definitions of food donation and food banks and secondly with the restrictions and the barriers when it comes to implementing them. Moreover, the process of food surplus examination as well as the selection of the most suitable partners for establishing a food bank will be analysed. Lastly, the user will understand the food bank’s logistics and its socioeconomic and environmental benefits through some examples and visual representations of its operation.

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 15-20 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- To provide all the necessary information and characteristics (restrictions, barriers and food safety) to users regarding the food banks, in order to be capable to analyse each occasion separately and decide the best partners given their business plan (logistics, benefits etc).

Subunits

- 3.3.1 Establishing the criteria for food donation
- 3.3.2 Examination of food surplus
- 3.3.3 Selecting the right partners
- 3.3.4 Cooperation requirements
- 3.3.5 Logistics in a Food Bank
- 3.3.6 Social, economic and environmental benefits

Learning Outcomes

- To realize the importance of a food bank
- To understand the barriers and restrictions regarding the food donation
- To analyse and create a sustainable business plan regarding the operation of a food bank

Self-assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

A SUSTAINABLE APPROACH IN FOOD BANK LOGISTICS - ProQuest.
<https://www.proquest.com/openview/816bb1177f05a68d15bdc2c369f3ee9d/1?pq-origsite=gscholar&cbl=2037614>.

EUR-Lex - 32021R0382 - EN - EUR-Lex. <https://eur-lex.europa.eu/eli/reg/2021/382/oj>.

EUR-Lex - 32021R1374 - EN - EUR-Lex. <https://eur-lex.europa.eu/legal-content/EN/PIN/?uri=uriserv%3AOJ.L.2021.297.01.0001.01.ENG>.

González-Torre, Pilar L., και Jorge Coque. 'How Is a Food Bank Managed? Different Profiles in Spain'. Agriculture and Human Values, volume. 33, issue. 1, March 2016, p. 89–100. Springer Link, <https://doi.org/10.1007/s10460-015-9595-x>.

Hazard Analysis Approaches for Certain Small Retail Establishments and Food Donations: Second Scientific Opinion | EFSA. 7 November 2018, <https://www.efsa.europa.eu/en/efsajournal/pub/5432>.

Hazard Analysis Approaches for Certain Small Retail Establishments in View of the Application of Their Food Safety Management Systems | EFSA. 2 March 2017, <https://www.efsa.europa.eu/en/efsajournal/pub/4697>.

Warshawsky, Daniel N. 'Food insecurity and the covid pandemic: uneven impacts for food bank systems in Europe'. Agriculture and Human Values, November 2022, p. 1–19. PubMed Central, <https://doi.org/10.1007/s10460-022-10387-2>.

Unit 3.4 Educational & awareness campaigns

Description

This unit talks about raising the awareness of citizens, restaurant owners and local actors through educational programs or educational centres. During various events and activities, the municipality distributes its environmental education program with a special focus on circularity and sustainable nutrition.

Resources

- Up to 8 ppt slides to be presented online.
- Training manual to contain 5-8 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Raise awareness and educate about the value of food through education program or campaigns that encourage citizens to reduce food waste

Subunits

- 3.4.1 Definitions

- 3.4.1.1 Education and increasing awareness of food waste at the level of households and schools
- 3.4.1.2 Education on reducing food waste in catering establishments
- 3.4.1.3 Education at the level of decision makers

Learning Outcomes

- Understand why the raising of stakeholder’s awareness is important to tackle food waste
- Understand how municipalities can raise the awareness and educate the stakeholders

Self-assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

Chinie, C., Biclesanu, I., & Bellini, F. (2021). The Impact of Awareness Campaigns on Combating the Food Wasting Behavior of Consumers. *Sustainability*, 13(20), 11423.

Fanelli, R. M., & Di Nocera, A. (2017). How to implement new educational campaigns against food waste: An analysis of best practices in European Countries. *How to Implement New Educational Campaigns against Food Waste: An Analysis of Best Practices in European Countries*, 223–244.

Unit 3.5 Other methods to prevent/reduce food waste

Description

This unit presents other possibilities for waste prevention/reduction, besides those already mentioned in the previous chapters (education, waste prevention and recovery). These methods can include financial measures, social and science engagement and partnership promotion.

Examples of financial measures could be pay as you throw programs, recycling incentive schemes or pollution taxes. Social and science engagement include urban gardening, development and improvement of collection and processing of food waste data, development of applications for easier waste prevention, etc. Unit will also cover some examples of successful partnering of waste producers and entrepreneurs in order to reduce food waste or prevent its occurrence.

Resources

- Up to 10 ppt slides to be presented online.
- Training manual to contain 7-12 pages of text, including graphs, tables, sources for further reading, etc.

Aim

- Inform the trainee on other possibilities of food waste prevention/reduction

Subunits

- 3.5.1 Financial measures
- 3.5.2 Social engagement
- 3.5.3 Science engagement
- 3.5.4 Partnership promotion

Learning Outcomes

- To broaden the horizon with other possibilities of food waste prevention/reduction and gain insight in mechanisms already tried and their pros and cons
- To create basis for new ideas or potential combining/adapting already established mechanisms for better results

Self-assessment

5 multiple choice/True-False questions in the form of a quiz

Suggested Literature

Changes to the waste management plan of the Republic of Croatia for the period 2017-2022. (2022). https://narodne-novine.nn.hr/clanci/sluzbeni/2022_01_1_1.html

EU actions against food waste. (n.d.). Retrieved March 6, 2023, from https://food.ec.europa.eu/safety/food-waste/eu-actions-against-food-waste_en

Goossens, Y., Wegner, A., & Schmidt, T. (2019). Sustainability assessment of food waste prevention measures: Review of existing evaluation practices. *Frontiers in Sustainable Food Systems*, 90.

Lee, S., & Jung, K. (2017). Exploring effective incentive design to reduce food waste: A natural experiment of policy change from community based charge to RFID based weight charge. *Sustainability*, 9(11), 2046.

Parry, A., Bleazard, P., & Okawa, K. (2015). Preventing food waste: Case studies of Japan and the United Kingdom.

Reynolds, C., Goucher, L., Quested, T., Bromley, S., Gillick, S., Wells, V. K., Evans, D., Koh, S. C., Carlsson Kanyama, A., & Katzeff, C. (2019). Consumption-Stage Food Waste Reduction Interventions—What Works and How to Do Better. *Food Policy*.

US EPA, O. (2016, May 23). Regional Resources to Reduce and Divert Wasted Food Across the United States [Overviews and Factsheets]. <https://www.epa.gov/sustainable-management-food/regional-resources-reduce-and-divert-wasted-food-across-united-states>

Waste Management Act of the Republic of Croatia. (2021). https://narodne-novine.nn.hr/clanci/sluzbeni/2021_07_84_1554.html

