Module 1, Session 1

Slide 1

Introduction to Food Waste, Supply and Inventory Management

Slide 2 - Session 1

This session is concerned with preliminary information on the phenomenon of food waste. You will find information on food waste, food security, sustainability, and definitions of environmental protection. The scale of waste will be presented in subsequent links of the food chain, with particular emphasis on the global food industry and the catering sector. We will tell you about the causes of food waste in the foodservice establishments.

Slide 3 - Basic concepts

The concepts of "food security", "food safety", and "food losses and waste" are fundamental and inextricably linked. The link between these terms is food, defined as "substances or products, whether processed, partially processed or unprocessed, intended for human consumption or reasonably expected to be consumed by humans".
“Edible parts” is defined as any parts of food that were intended for human consumption. “Inedible parts” is defined as any components associated with a food that are not intended to be consumed by humans. Examples of inedible parts associated with food could include bones, rinds and pits/stones.
Food is undoubtedly one of the invariable values necessary for maintaining life and health for humans, and the right to it was recognized in the UN Universal Declaration of Human Rights in 1948.

Slide 4 - Food security

Food security has been a concern for societies for centuries, but it was not until 1974, following the food crisis, that the first definition of the term was presented at the World Food Summit. Today, “food security” is defined as a situation in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and preferences for an active and healthy life.

Slide 5 - Food security

According to the FAO, food security is based on four pillars. The first is food availability, which includes sufficient quantities of food of appropriate quality supplied through domestic production or imports (including food aid). Food access means that individuals have access to adequate resources for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live (including traditional rights such as access to shared resources). The third pillar is the utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of

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non-food inputs in food security. The fourth pillar is stability, meaning that the population, household or individual has access to adequate food at all times. They should not risk losing access to food due to sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). Therefore, the concept of stability can refer to both the availability and access dimensions of food security.

Slide 6 - Food safety

Food security is inextricably linked to food safety – one of the elements of food quality fundamental to consumer health. Food safety, according to Codex Alimentarius, is the assurance that food will not cause harm to the health of the consumer if it is prepared and/or consumed by its intended use. According to FAO estimates, unsafe food containing harmful bacteria, viruses, parasites or chemicals causes over 200 diseases. It should be recognized that the hygiene and quality of the food we eat significantly impact public health. The transmission of hazards from one product to another, the so-called cross-contamination, improper use/utilization of food, inappropriate storage and preparation conditions and poor hygiene by staff are listed by the World Health Organization as key factors causing the spread of food-borne pathogens. For this reason, food safety and hygiene practices are essential, including correctly storing food products, maintaining a clean environment during food preparation and ensuring that meals are free from microorganisms.

Slide 7 - Safe food

Safe food is food free from biological, chemical or physical hazards. Biological hazards are: pathogenic bacteria, e.g. Salmonella, may be present in poultry and eggs.Viruses that may be transmitted through food, e.g. rotaviruses.
Parasites, e.g. armed tapeworm, unarmed tapeworm. Chemical hazards are various chemical substances and heavy metals that may be present in food. Chemical hazards include residues of veterinary drugs and plant protection products, e.g. due to failure to comply with withdrawal periods, cleaning and disinfecting agents after improper rinsing, or added by mistake. Physical hazards, on the other hand, are various types of foreign bodies that may cause, e.g. injuries to the consumer. The source of physical threats may be humans (e.g. hair, nails, jewellery), packaging (e.g. glass or plastic shards), or the environment in which food is prepared - e.g. plaster falling off the walls, glass from a cracked lamp.

Slide 8 - Food loss

Let's move on to the concept of food loss and waste, which is the main topic of the training. It should be emphasized that there is currently no binding definition of this phenomenon, and the international literature provides various terms and definitions regarding irrational food management. This concept was first defined by the Food and Agriculture Organization of the United Nations as all products intended for human consumption, which, despite being produced, were not consumed by them.
They include the amount of food initially produced for consumption purposes but eventually was naturally lost due to a reduction in weight (e.g., dried), spoiled, or used for other purposes (e.g., for biofuel, compost, feed, etc.).

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Food loss does not include non-edible parts (e.g., bones, peelings, etc.) and raw materials and products produced initially for non-consumption purposes (e.g., feed, bio-components, bioenergy, etc.).

Slide 9 - Definition

The FAO definition distinguishes the concept of food losses, which refer to the first links in the food chain, i.e. primary production and processing, and waste understood as losses in the mass of food recorded at the level of trade, catering, and households.

Slide 10 - Food waste

The FUSIONS project, funded by the European Commission, proposes to use the term waste that occurs at all stages of the food chain and includes both edible and inedible parts of food. Food destined for animal feeding or used to produce certain materials is not considered waste.

Slide 11 - Sustainable Development Goals

World leaders came together in 2015 and made a historic promise to secure the rights and well-being of everyone on a healthy, thriving planet when they adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs). The Agenda remains the world's roadmap for ending poverty, protecting the planet and tackling inequalities. The 17 SDGs, the cornerstone of the Agenda, offer the most practical and effective pathway to tackle the causes of violent conflict, human rights abuses, climate change and environmental degradation and aim to ensure that no one will be left behind. The SDGs reflect an understanding that sustainable development everywhere must integrate economic growth, social well-being and environmental protection. The Sustainable Development Goals are a call for action by all countries – poor, rich and middle-income – to promote prosperity while protecting the planet. They recognize that ending poverty must go hand-in-hand with strategies that build economic growth and address a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection.

Slide 12 - Goal 12: Ensure sustainable consumption and production patterns

Goal 12 is about ensuring sustainable consumption and production patterns, which is key to sustain the livelihoods of current and future generations. Our planet is running out of resources, but populations are continuing to grow. If the global population reaches 9.8 billion by 2050, the equivalent of almost three planets will be required to provide the natural resources needed to sustain current lifestyles. We need to change our consumption habits. Economic and social progress over the last century has been accompanied by environmental degradation that is endangering the very systems on which our future development and very survival depend. A successful transition will mean improvements in resource efficiency, consideration of the entire life cycle of economic activities, and active engagement in multilateral environmental agreements. Sustainable Development Goal 12, target 12.3 captures a commitment

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to halve per capita global food waste at the retail and consumer levels and to reduce food loss across supply chains by 2030. SDG 12.3 has a key role to play in the delivery of other Sustainable Development Goals, including those around Zero Hunger (SDG 2), Sustainable Cities (SDG 11) and Climate Action (SDG 13) Achieving Goal 12 – requires fostering circular economy models, sustainable production practices and responsible consumption.

Slide 13 - The scale of food waste in the world

How much food is wasted in the world? According to the FAO report, in the first decade of the 21st century, about 1/3 of the food for human consumption was wasted every year, about 1.3 billion tons. 1/3, i.e. if we have three apples, one is not consumed but usually ends up in the waste container; it is as if one-third of our groceries were thrown into the bin immediately after bringing them from the store.

Slide 14 - Which region wastes the most?

Food waste is a global problem, as seen in the attached graph. The scale of waste depends on the country's economic development. The phenomenon's scale is much greater in the so-called developed countries, and consumers are mainly responsible for this. In low-income countries, food is lost primarily at the initial and middle stages of the food supply chain. The most food is wasted per person, taking into account the entire food chain, in North America and Oceania (approx. 300 kg) and in Europe (approx. 260 kilograms), and the least in South Asia (approx. 120 kg per person/year) and Sub-Saharan Africa (approx. 170 kg/person/year). However, considering the household, a significant difference can also be seen in Europe and North America - waste of approx. 95-115 kg/person/year. In Southeast Asia and Sub-Saharan Africa - 6-11 kg/year.

Slide 15 - Structure of food waste sources generated in EU

The FUSIONS project estimated that the 28 EU countries wasted around 87.6 million tonnes of food, of which households were responsible for around 53% (46.5 million tonnes). The following positions were food processing (16.9 million tonnes; 19%), primary production (9.1 million tonnes; 11%), catering (10.5 million tonnes; 12%) and wholesale and retail trade (4.6 million tonnes; 5%). It was determined that 173 kg of food was wasted per EU inhabitant per year. According to the study's authors 2011, the total mass of food produced in the European Union was 865 kg/person. This means that 20% of the food produced was wasted.

Slide 16 - Food waste

The Food Waste Index tracks the global and national generation of food and inedible parts wasted at the retail and consumer (household and food service) levels. UNEP is its custodian. In contrast to the Food Loss Index, the Food Waste Index measures total fresh mass of food waste (rather than specific commodities).

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Slide 17 - Food waste estimates across Europe

In 2023, the European Commission published for the first time, through Eurostat, the results of the monitoring of food waste across the European Union (EU).
EU Member States are required to measure food waste generated at all stages of the supply chain, using the methodologies set out in Annex III of Commission Delegated Decision (EU) 2019/1597 (European Commission 2019).
To complete measurement in line with Food Waste Index requirements, Member States are invited to:

- Define a scope – i.e. select the sector(s) they are able to report on
- Select suitable methods to measure food waste (net fresh mass)
- Conduct studies using the chosen method(s)
- Scale measurement from representative studies into national estimates
- Report food waste for the Food Waste Index
- Repeat studies regularly (at least every four years) using a consistent methodology.

Slide 18 - Food waste estimates across Europe

Substantial variation is observed across all sectors in Europe (see Figure). At this point, given that the specific methodologies for each Eurostat-reported data point are not known, it is hard to say whether this reflects real variation or differences in methodologies and scopes, particularly in the retail and food service sectors. However, the data does reinforce the importance of household food waste as being particularly large and worthy of focus. Also, significant differences between countries can be observed in food waste in the food service sector. The largest, over 30 kg/person, of food is wasted in this sector in Malta and Ireland. Countries where 20 to 30 kg is wasted per person per year include Austria and Switzerland. In Greece, around 20 kg is wasted per person. In countries such as Poland, Spain, and Slovenia, it is less than 5 kg. Data for Italy are not available.

Slide 19 - How much food is wasted globally?

In 2022, the world wasted an estimated 1.05 billion tonnes of food in the retail, food service and household sectors combined. This amounts to 132 kilograms per capita per year, of which 79 kilograms per capita was wasted in households (see Table). In households alone, this means that each person, on average, wastes significantly more than the average mass of an adult human per year, with food waste from retail, food service and households weighing more than twice the average human.This amounts to 19 per cent of food available to consumers being wasted, at the retail, food service and household levels.

Slide 20 - Food waste causes in foodservice sector

The leading cause of food waste in the catering sector is the difficulty in estimating demand and throwing away food due to preparing too much (over half of the surveyed establishments indicated the answer always and sometimes). Another cause of food waste in catering is overlooking the expiration date of food products (30% of the answers always, usually, sometimes), which in turn may be caused by improper planning of purchases, i.e. buying too much-unused food. Every tenth

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establishment declared that they always or usually throw away food due to excessively large and ill-considered purchases. In half of the surveyed establishments, food is sometimes or occasionally thrown away due to inadequate employee qualifications. In every enterprise, the critical factor responsible for errors is humans. The level of knowledge and qualifications of employees should be appropriate to the activities they perform. Lack of experience and appropriate qualifications may result in errors and food waste. Therefore, improving employee skills through mandatory training is essential and should be carried out periodically to update and consolidate knowledge. The least frequently indicated reasons for wasting food (answer: never) were the need for ideas on how to use the products to prepare other dishes (approx. 70% of responses) and purchasing low-quality products (over 60% of responses).

Slide 21 - Frequency of throwing away food products in catering establishments

One-third of the surveyed catering establishments declared that the most frequently thrown away food (with a frequency of daily and almost daily) included opened products with signs of spoilage, expired products, wilted vegetables and fruit. In one-quarter of the surveyed establishments, ready-made hot meals were thrown away daily, and cold dishes and bread were in every fifth establishment. On the other hand, the least frequently declared was the throwing away of semi-finished products. The hierarchy of products thrown away in catering establishments is presented in the figure. The most frequently thrown-away products are placed at the pyramid's base. Determining the groups of food that are most frequently thrown away is important from the point of view of reducing this undesirable phenomenon. These findings determine which operational processes should be modified to minimise the amount of food thrown away in a given establishment. For example, to reduce the risk of throwing away withered fruit and vegetables, it is necessary to consider the proper way of storing them and/or introduce a better production organisation by planning orders differently, changing the menu, etc.

Slide 22 - Structure of food waste

The foodservice sector is the second largest, after households, where the population's nutritional needs are met. Wastage in catering can be determined by factors related to the adopted organisation of the establishment's operation (e.g. self-service, server service) and the behaviour of guests using their services. Research conducted in hotel catering indicated that the most significant amount of food was wasted in the serving department, i.e., in the dining room or the form of plate waste weighed in the tableware washing room. The mass of the resulting so-called leftovers correlates with the type and form of the catering service. Serving meals as a self-service buffet (so-called buffet), when an unlimited amount of food is offered and the price is fixed, stimulates consumers to help themselves more than they can consume. The fewest plate remains were recorded in the restaurant, where dishes were served à la carte. Of each portion served to guests, an average of 0.05 kg was wasted in the form of plate leftovers, which was 5.8% of its weight.

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Slide 23 - Reasons for leaving unfinished meals in foodservice establishments

Almost half of the respondents stated that the reasons for leaving unfinished meals in food service establishments were due to overly large portions and inadequate taste. Customers are often unaware of food ingredients, which can lead to ordering dishes that will be left unfinished. About 1/5 of the consumers indicated that they did not finish their meal in a food service establishment because they found an undesirable element in a dish or ordered too many dishes. About 1/6 of the respondents indicated an unappealing look as the reason for the unfinished meal.

Slide 24 - Who wastes more food in catering establishments?

Young consumers (18–34 years old), mainly men, declared a much lower frequency of leaving food on plates. It was observed that people in the 26–35 age left significantly less plate waste than those in the 36–45 age. Therefore, regarding leftovers on plates in food service establishments, it can be assumed that younger consumers left less plate waste than older ones. The consumers who declared that they “sometimes” left unfinished meals were uneducated older women (above 60 years old). Men primarily aged 60 + with a high level of education and unemployed were the people who declared the lowest frequency of leaving plate waste in every type of food establishment

Numerous studies confirmed that women generate more plate waste than men. One reason is that women cannot consume as much food as men due to their physical structure.

Slide 25 - Thank You

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