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REPORT CONTAINING RESEARCH AND ANALYSIS OF THE CATERING INDUSTRY USING OF WASTE IN GASTRONOMY WITHIN THE ERASMUS + PROJECT **„GastroWaste”**

Elements of the report:

1. Gastro waste – introduction, basic definitions on an example Poland, Spain and Latvia.
2. Gastro waste in vocational school curricula on an example school from Poland, Spain and Latvia.
3. Gastro waste in menu of catering and hotel industry on an example companies from Poland, Lithuania and Latvia.
4. Latest trends in healthy food system and people expectations. Gastro waste Trends 2023.

Report annexes:

1. Work documentation.
2. Photo documentation.
3. Training program in Spain - "The use of waste and semi-finished products in the preparation of food in gastronomy"

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Elements of Diagnosis

1. Gastro waste – introduction, basic definitions on an example on Poland, Latvia and Spain

Why waste food? - health reason, social impact, financial and environmental impact.

Food waste is a problem that in recent years has become very relevant both in the political and social spheres. Social awareness has increased about the fact that it is necessary to fight against the losses and waste of food that is generated throughout the food chain. The predominant models of food production, transformation, distribution and consumption are incapable of solving the problems of food security and sovereignty of the world population. The diet of almost nine hundred million people is insufficient and poor, while a third of the first world suffers from obesity due to excessive or inadequate intake. According to the Food and Agriculture Organization of the United Nations (FAO), an estimated one third of all food produced globally is lost or wasted.

The current food system often does not consider food as basic goods, but as commodities in contexts of unequal relationships between food agents that lead to overproduction and inefficiency in resource allocation and pricing. In this context, unfair trade practices between the different agents in the food chain have been identified as one of the main causes of food loss and waste. But, to the extent that these practices are manifested in the commercial relations of these agents, they are regulated by State Law 12/2013, of August 2, on measures to improve the functioning of the food chain. This norm basically regulates the legal regime of food contracts, prohibits certain commercial practices that it considers abusive and establishes its own sanctioning regime applicable to companies that, through these practices, distort the proper functioning of the food chain.

Food losses and waste weaken the economy, make companies less competitive, increase household spending and force the Administration to allocate resources to manage food waste. In addition, their effects are the reduction of available fertile land, the loss of biological diversity, the excessive use of drinking water and energy, and the increase in the generation of waste, and are one of the causes of climate change. Although, notwithstanding the foregoing, under certain conditions, the edible parts of the food that remain on the farm itself, whether they are reincorporated into the soil or used for composting in situ, can contribute to the development of productive systems that are respectful of the conservation of the biodiversity and the environment. They also have effects in the social sphere. The economic crisis has prompted many social initiative entities and other non-profit organizations to work for food security for the entire population. Although food losses and waste and poverty are differentiated areas, these entities have played a fundamental role in food redistribution, with new models of greater involvement of the beneficiaries and proposals for social and labor reintegration based on the circular economy and efficiency in the use of resources.

In today's world, food waste has become a global problem. The United Nations Food and Agriculture Organization reports that about 30% of the world's produced food is lost or wasted. Paradoxically, the second major problem in the world is malnutrition of a part of the society.

Food waste is not only about throwing it away because of its appearance in the case of fruits and vegetables, exceeding the expiration date in the case of dairy products or spoilage - fish. A very large amount of food ends up in the trash after preparation, it is not consumed.

DEFINITION OF WASTE FOOD

There are two main kinds of wasted food: food loss and food waste. Food loss is the bigger category, and it means food that goes uneaten at any stage. In addition to food that’s uneaten in homes

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and stores, this includes crops left in the field, food that spoils in transportation, and all other food that doesn't make it to a store. Some amount of food is lost at nearly every stage of food production.

Food waste is a specific piece of food loss, which the US Department of Agriculture's (USDA) Economic Research Service (ERS), defines as "food discarded by retailers due to color or appearance and plate waste by consumers." Food waste includes the half-eaten meal left on the plate at a restaurant, food scraps from preparing a meal at home and the sour milk a family pours down the drain.

The Food and Agriculture Organization (FAO) of the United Nations defines food loss and waste as the decrease in quantity or quality of food along the food supply chain. Within this framework, UN Agencies distinguish loss and waste at two different stages in the process:

- Food loss occurs along the food supply chain from harvest/slaughter/catch up to, but not including, the sales level
- Food waste occurs at the retail and consumption level.

In the European Union food waste is defined by combining the definitions of food and waste, namely: "any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans (...)" (including things such as drinks and chewing gum; excluding things such as feed, medicine, cosmetics, tobacco products, and narcotic or psychotropic substances) "which the holder discards or intends or is required to discard".

POLITICAL AND LAW REGULATIONS IN POLAND

The Waste Framework Directive adopted on 30 May 2018 requires Member States to reduce food waste at each stage of the food supply chain, monitor food waste levels and report back regarding progress made. Moreover, it lays down obligations for Member States to:

- prepare food waste prevention programmes (specific and/or as a part of general waste prevention programmes);
- encourage food donation and other redistribution for human consumption, prioritising human use over animal feed and the reprocessing into non-food products as part of measures taken to prevent waste generation;
- provide incentives for the application of the waste hierarchy, such as facilitation of food donation (articles 4 and 9 of the revised Waste Framework Directive).

National regulations in force on the fruit and vegetables market:

1. Poland has undertaken legislative measures to prevent food waste and facilitate the provision of food for social objectives, which are simultaneously supported by national programmes and strategies.

The national waste management plan 2022 foresees the following measures with an impact on food waste:

- educational activities on food waste prevention;
- cooperation between the food manufacturing and the food processing sectors;
- green design;
- implementation of environmental management systems, such as EMAS, at company level;

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- public awareness activities to prevent and reduce food waste (tips for shopping, planning meals, food waste management etc.).

The Act of 19 July 2019 on food waste prevention lays down the rules for handling food and the obligation for food business operators to prevent food waste.

2. Under the *Operational Programme Food Aid 2014-2020* (POPŻ), implemented as part of the Fund for European Aid to the Most Deprived (FEAD), specific rules were introduced to avoid food waste by the beneficiaries of the programme and its partner organisations, at several stages of its implementation.
3. Since 2013, all donors who provide food for public-benefit organisations have been entitled to deduct **VAT** in Poland (*Act of 11 March on goods and services tax – Journal of Laws [Dz.U] of 2016, Item 710, as amended*). This applies to food business operators such as food manufacturers, distributors, wholesalers, restaurant-owners or caterers (art. 43 ust. 1 pkt 16 of the Act).
4. The *Education Law* (*Journal of Laws* [Dz.U.] of 2020, Item 910, consolidated text) includes measures to promote sustainable development aspects among children and young people. Schools carry out **educational activities** to make pupils aware about healthy diets, methods of food preservation, food economy in the country and around the world, taking into account environmental issues, raising awareness and developing habits to prevent food waste.

POLITICAL AND LAW REGULATIONS IN LATVIA

The waste management sector is one of the most important sectors in the country and the waste management system is one of the most important strands of EU and Latvian legislation on environmental protection and good governance and management of resources. In total, more than 40 laws, regulations and documents regulate this sector in Latvia.

The purpose of Waste Management Law is to establish waste management procedures to protect the environment, human life and health by preventing the generation of waste, ensuring the separate collection and recovery of waste generated in the territory of Latvia, as well as promoting the efficient use of natural resources and reducing the amount of waste to be landfilled.

Latvian law states that each person or company is responsible for its own waste. For example, everyone whose property generates municipal waste is obliged to provide space for a waste container and access to a municipal waste collection point for the vehicle of the waste contractor who has concluded a contract with the municipality for the management of municipal waste.

There are not many points, even on waste sorting, that are relevant to the country's population. Such laws and procedures are determined by each individual municipality. However, the law says that you can't put construction waste, bulky waste and hazardous waste in a municipal waste container. They must be taken to a waste sorting point. Also, the laws that a distributor of electrical and electronic equipment who supplies new household electrical or electronic equipment directly to the user shall ensure that waste electrical and electronic equipment is accepted without charge. (https://likumi.lv/ta/id/221378-atkritumu-apsaimniekosanas-likums)

The collection and recycling of used cooking oil requires that all waste oil generated by restaurants and other food establishments must be collected and disposed of in an environmentally friendly way. Here are the general steps that restaurants in Latvia need to follow to collect and recycle used cooking oil:

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- Store used cooking oil in a designated container: Restaurants should use a designated container to store their used cooking oil. This container should be labeled as "used cooking oil" and kept in a secure and safe area to prevent spills.
- Contact a licensed waste oil collector: Restaurants in Latvia should contact a licensed waste oil collector to arrange for the collection and recycling of their used cooking oil. There are several licensed companies in Latvia that specialize in the collection and recycling of waste oil.
- Schedule regular pickups: Once a restaurant has identified a licensed waste oil collector, they should schedule regular pickups based on the amount of waste oil they generate. This can range from weekly to monthly pickups, depending on the volume of waste oil generated.
- Keep records: Restaurants are required to keep records of their waste oil collection and disposal activities. This includes the amount of waste oil generated, the dates of collection and disposal, and the name of the waste oil collector.
- Ensure proper disposal: The licensed waste oil collector is responsible for ensuring that the waste oil is disposed of in an environmentally friendly way. In Latvia, waste oil is usually recycled and turned into biodiesel fuel or other industrial products.

By following these procedures, restaurants in Latvia can ensure that their used cooking oil is collected and recycled in an environmentally friendly way, reducing the environmental impact of their operations and complying with local regulations.

The Latvian Cabinet of Ministers has prepared a National Waste Management Plan 2021-2028. The aim is to increase Latvia's sustainability, reduce pollution and promote waste sorting. The plan foresees the creation of stronger waste management regions, thus developing and increasing waste recycling capacity, as well as the expansion of separately collected waste streams to allow for the separate collection of both biological waste and textile waste by 1 January 2025. Increased separate collection will allow progress towards reducing the amount of waste going to landfill, so that by 2035 no more than 10% of the total municipal waste is landfilled (currently more than 60%) and at least 65% of the total municipal waste is recycled. (https://likumi.lv/ta/id/320476-par-atkritumu-apsaimniekosanas-valsts-planu-20212028-gadam)

POLITICAL AND LAW REGULATIONS IN SPAIN

In Spain, catering waste disposal is subject to specific regulations that aim to prevent environmental contamination and ensure public health. The following are some general guidelines on how to dispose of catering waste in accordance with Spanish law (*Law 3/2020, of March 11, on the prevention of food losses and waste*):

1. Separate the waste: It is essential to separate the different types of waste generated in the catering activity, such as food waste, plastic, glass, paper, and cardboard.

2. Use appropriate containers: Use suitable and labeled containers for each type of waste. For example, use a container with a green lid for organic waste and a container with a yellow lid for plastic waste.

3. Keep waste containers clean and closed: Waste containers must be clean, covered, and free of leaks or spills to prevent environmental contamination.

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4. Contract with authorized waste management companies: catering establishments must contract with authorized waste management companies to collect and manage their waste properly.

5. Comply with waste transport regulations: Transporting waste to authorized waste management facilities must comply with Spanish waste transport regulations, including proper labeling and documentation.

HIERARCHY OF USE PRIORITIES

The Law establishes that all agents in the food chain must have a prevention plan to avoid waste, and establishes a hierarchy of mandatory priorities (article 5), the first of which is the use for human consumption, through donations to non-profit companies or food banks.

For the donation of food, the food industries, commercial establishments and hotels and restaurants must sign agreements with the receiving organizations in which the conditions of collection, storage and transport and the selection of food must be specifically included, among other aspects.

The food that is donated must have a sufficient shelf life to allow its distribution and safe use to its final recipients. Both the donor agri-food companies and the receiving organizations are obliged to guarantee the traceability of the donated products through a registration system for their entry and exit (article 7).

In the second order of hierarchy, unsold foods but which are in optimal conditions for consumption must be transformed (juices, jam, etc.). When they are not suitable for human consumption, food must be used as by-products for animal feed or feed manufacturing, for industry, to obtain quality compost for agricultural use, or to obtain biogas or other types of fuel.

OBLIGATIONS OF AGENTS IN THE AGRI-FOOD CHAIN

In addition to the obligation to comply with this hierarchy of uses that prevents the disposal of food in the garbage, the agents that operate in the food chain will have to have adequate facilities and personnel training so that the handling, storage and transport processes are carried out carried out under suitable conditions that minimize losses, as well as systems that guarantee the maintenance of the cold chain.

Products with an expired best-before date must be presented to the consumer separately and clearly differentiated from the rest, with lower prices, or be used as a donation.

Hotel establishments and other food services will have to offer their customers the possibility of taking away, at no additional cost, what they have not consumed and they will have to report it visibly, preferably on the menu. For this, they must have suitable reusable containers.

Institutions such as health and educational centers or residences that offer catering or dining services, either with their own means or from others, must also have programs for the prevention and reduction of food losses and waste that also comply with the hierarchy of priorities established in the law.

All agents in the food chain must report annually on food losses, as well as compliance with their prevention plans

The rule provides that food distribution companies should encourage, together with the administrations, the sale of products with a best-before or expiration date. Retail establishments with a surface to be determined by the autonomous communities (never less than 400 square meters), must

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promote lines of sale of products considered ugly, imperfect or unsightly that are in optimal conditions for consumption.

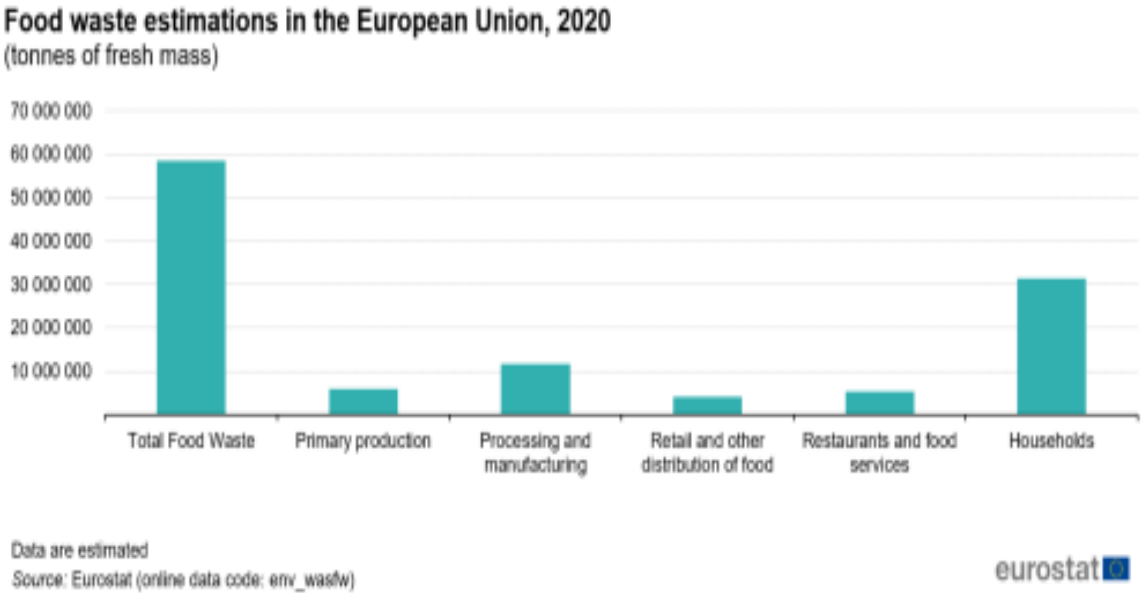
Likewise, they should encourage the sale of seasonal, local, ecological and environmentally sustainable food and in bulk, and improve information on their use.

The law stipulates that the Government will adopt public policies and measures to promote the adaptation of best-before dates to the prevention and reduction of food losses and waste, and, where appropriate, the possibility of placing products with expiration of the best-before date (article 9), for which the criteria established by the European Union in the legislative proposals on the matter will be taken into account

STATISTICAL DATA OF WASTE FOOD IN EU AND POLAND, LATVIA AND SPAIN

At EU level, the total food waste measured in 2020 nearly reached 59 million tonnes of fresh mass. Household food waste represented more than 31 million tonnes of fresh mass, with a 53 % share of the total. The second sector in terms of share (20 %) was processing and manufacturing, where the amount of measured food waste was nearly 12 million tonnes of fresh mass. The remaining share, a quarter of the total food waste, was from primary production sector (6 million tonnes, 11 % share towards the total amount of food waste), restaurants and food services (more than 5 million tonnes, 9 % share towards the total) and retail and other distribution of food sectors (more than 4 million tonnes , 7 % share). These amounts are presented in Figure 1.

Figure 1.



The average Pole wastes 247 kg of food a year, putting Poland in fifth place in Europe, where the average is 173 kg per capita, the Polish Economic Institute (PIE) has reported. The most commonly wasted foods in Poland are bread, fruit and smoked meats.

PIE said that the total annual food waste in all EU member states stands at around 88 million tonnes. The primary sources of wasted food in Poland are households, which account for 53 percent of all food thrown away, followed by food processing (19 percent), restaurants (12 percent), production

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(11 percent) and distribution (5 percent), according to experts cited in the latest edition of 'PIE Economic Weekly.

"Among the causes of throwing away food, the most commonly expressed, for several years, has been food exceeding the use-by date (29 percent of cases). Other important reasons are: over-shopping (20 percent), excessive portions (15 percent), buying poor quality produce (15 percent) and improper storage (13 percent), PIE said.

According to food banks in Poland, as many as 1.6 million people may be living in extreme poverty and every year the country wastes around 9 million tonnes of food.

According to research conducted among respondents of the Polish Federation of Food Banks, the most frequently wasted products are:
bread - 49% of respondents, fruits - 46%, cold cuts - 45%, vegetables - 37%, yogurts - 27%, potatoes - 17%, milk - 12%, meat - 10%, cheese - 10%, ready-made meals - 9%, fish - 5%, eggs - 4%.

From 2020, a common methodology is being used throughout the EU Member States to collect and compile information on food waste measurements at each stage of the food supply chain - primary production, processing and manufacturing, retail and other distribution, catering and households.

Statistics show that on average, 127 kg of food waste per capita is thrown away each year in the EU. Households accounted for 55% of food waste in 2020, representing 70 kg per capita, with the remaining 45% coming from the food supply chain. (http://www.laukutikls.lv/nozares/lauku-telpa/copa_cogeca/partikas-kedes/partikas-atkritumi-127-kg-uz-cilveku-es). In Latvia, the figure is even higher. On average, 145 kg of food per capita is thrown away in Latvia every year. Of this, 57% or 82 kg is thrown away by households and the remaining 43% is generated in the food supply chain. Latvia has the 8th highest per capita household waste rate out of the 27 EU Member States. (https://ec.europa.eu/eurostat/databrowser/view/env_wasfw/default/table?lang=en)

Authorities estimate that in 2021 a household in Latvia lost around €500 a year by throwing away left-over or spoiled food. However, taking inflation into account, today this would amount to €630. Berries, vegetables and root crops, as well as dairy products, are the most commonly wasted. City dwellers, those with higher incomes and young people are the most wasteful. The most common reason is that people simply buy more than they can eat. (https://zinas.tv3.lv/latvija/sabiedriba/gada-laika-viens-latvijas-iedzivotajs-atkritumos-izmet-vismaz-100-kilogramus-partikas/)

A study on waste sorting habits shows that only 9% of people in Riga sort organic and food waste. The most active biodegradable waste sorters live in the countryside (45%), where 87% compost biodegradable waste, taking the opportunity to enrich the soil. The relatively slow rate of biodegradable waste sorting in Riga is influenced by the fact that the capital has a very poorly developed biodegradable waste collection infrastructure and most people live in apartment buildings. (https://cleanr.lv/clean-r/aktualitates/eksperti-bio-atkritumu-skirosanas-vajais-posms-nepietiekami-strikti-noteikts-valsts-regulejums-infrastrukturas-izveide-un-sabiedribas-izpratnes-trukums/)

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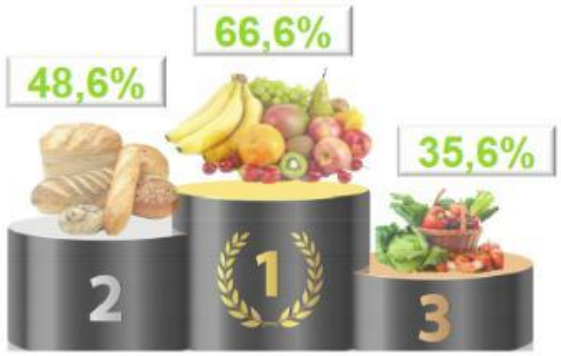

Catering establishments can dispose of their waste in accordance with Spanish law and contribute to environmental sustainability.

Residents of Spain waste 90 kg of food per inhabitant in 2020, which represents a total of 4.2 million tons of waste per year.

18 kilos in the case of primary production sectors and 30 kilos per inhabitant in the food and beverage manufacturing sector.

Four kilos of food waste per person in restaurants and food services and in retail and food distribution trade were seven.

WASTE FOODS AND LOCAL PRODUCTS.
LOCAL TRADITIONS, HISTORY IN FIELD OF GASTRONOMY WITH LOCAL PRODUCTS TRADITIONS IN LATVIA, SPAIN AND POLAND

In Latvia, there are several dishes and recipes that use food waste or by-products. A good example of a traditional national dish is Rye bread soup or (Rupjmaizes zupa). It is a delicious way to use any leftover rye bread as it is boiled in water over low heat and infused with sweetness from dried fruits. The addition of cinnamon, cloves, and a little brown sugar enhances the tangy flavor of the rye. When it's complete, serve cold and top with whipped cream.

In Latvia, there are a number of companies and organizations that are creating ecological products using food waste. Here are a few examples:

- Waste-to-Energy: In recent years, Latvia has also developed modern technologies for managing food waste. For example, some companies use food waste to produce biogas, which can then be used to generate electricity. This is a more sustainable way of dealing with food waste than simply sending it to landfills.
- Composting: Composting is another way that Latvia manages food waste. Many households and farms compost their food waste to create a nutrient-rich soil amendment that can be used in gardening and agriculture. Companies and farms collect organic waste from restaurants, supermarkets, and households, and use a special process to turn it into high-quality organic fertilizer.
- Cosmetics: Small companies create ecological products using food waste, such as organic cosmetics made from fruit and vegetable peels.
- Animal food: farms use food waste to produce animal feed. They collect waste from nearby grocery stores and restaurants, and process it into a nutritious feed for their animals.

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Latvia has a rich tradition of using and managing by-products and food waste, and continues to develop innovative technologies and practices to promote sustainability and circular economy principles. By creating ecological products from food waste, these companies and organizations are helping to reduce the environmental impact of food waste, while also creating new economic opportunities and promoting sustainable business practices in Latvia.

In Spain

Spain has a long history of traditional food production, and many of these food production processes generate by-products and waste. However, in recent years, there has been a growing interest in using and managing these by-products and waste in more sustainable ways.

Here are some examples of technology used for managing by-products and waste from traditional food production in Spain:

Olive oil production: Olive oil production is a traditional industry in Spain that generates large quantities of waste, including olive pomace, which is the leftover pulp and seeds from the olives. Advances in technology have made it possible to extract more oil from the pomace, reducing waste and increasing the profitability of the industry. Additionally, the pomace can be used as a fuel source for biomass boilers, further reducing waste.

Wine production: Wine production in Spain generates a significant amount of grape marc, which is the leftover skins, seeds, and stems from the grapes. Grape marc is rich in antioxidants and can be used to make nutritional supplements, as well as for the production of brandy and other spirits.

Rice: Valencia is famous for rice cultivation. There is production of bioplasts from rice starch.

Meat production: The meat industry in Spain generates a significant amount of animal by-products, including bones, blood, and fat. Advances in technology have made it possible to transform these by-products into a range of valuable products, including animal feed, biodiesel, and fertilizers.

Bread production: Bread production generates a significant amount of waste in the form of stale bread. Advances in technology have made it possible to transform stale bread into breadcrumbs and other food products, reducing waste and generating additional revenue for the industry.

Cheese production: Cheese production generates whey, which is the liquid remaining after the curds have been removed. Whey is rich in protein and can be used to produce a range of products, including infant formula, sports supplements, and animal feed.

Oranges and tiger nuts in Valencia: Valencia is the biggest exporter of oranges in the word. Tiger nuts are a unique product from which the most typical cooling drink in Valencia is pressed: horchata.
Here are several technologies available for the use and management of by-products/waste from the tradition of oranges and tiger nuts.

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Biogas production: Biogas can be produced from the organic waste generated during the production of oranges and tiger nuts. This process involves anaerobic digestion, where microorganisms break down the organic matter to produce biogas, which can be used as a source of renewable energy.
Extraction of essential oils: Essential oils can be extracted from the peels of oranges and the roots of tiger nuts. These oils can be used in the production of cosmetics, perfumes, pellet and peand flavorings. **(Anexo 5)**
Conversion to biofuels: The waste from oranges and tiger nuts can be converted into biofuels such as biodiesel and bioethanol, which can be used as a renewable alternative to fossil fuels.
Pyrolysis: Pyrolysis is a thermal process that can be used to convert organic waste into biochar, a type of charcoal that can be used as a soil amendment or as a source of renewable energy.

These are just a few examples of the technology used for managing by-products and waste from traditional food production in Spain. Advances in technology are making it increasingly possible to turn waste into a valuable resource, creating new opportunities for sustainable economic growth in the food industry.

Nutrition using a waste food - techniques, recipes, meals
Using food waste for nutrition can be a great way to reduce waste and save money while providing nutritious meals. Here are some techniques, recipes, and meals that can be made from waste food in Spain:

Broths and Soups: One of the easiest and most nutritious ways to use food waste is to make broths and soups. You can use vegetable scraps, such as onion skins, carrot tops, and celery leaves, to make a flavorful and nutritious broth. You can also use leftover vegetables, such as cauliflower stalks or broccoli stems, in soups.
Las croquetas: In Spanish homes, a very typical dish is cocido soup, which consists of broth, many vegetables and various types of meat. On the second day, Spanish families make stuffing for croquettes from the leftover cocido.
Arroz al horno: The broth left over from the cocido soup is used to make the typical Valencian dish arroz al horno
Seafood: Shells of seafood are used to prepare broths, e.g. for paella.
Dessert las torrijas: It is made of bread leftovers, namely hard pieces of bread, which are later dipped in milk.
Cold gazpacho soup: very ripe tomatoes are used to make it.
Las migas: another dish that uses leftovers of old bread
Vegetable Stir-Fry: A vegetable stir-fry is a great way to use up leftover vegetables. Simply sauté the vegetables in some oil and add some spices and soy sauce for flavor. You can serve it over rice or noodles for a nutritious and satisfying meal.
These are just a few examples of the techniques, recipes, and meals that can be made from waste food in Spain. By getting creative in the kitchen, we can reduce waste and provide nutritious meals for ourselves and our families.

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In Poland Podlaskie Voivodeship borders on three countries - Russia, Lithuania and Belarus. Such geographic location means that each of these countries leaves a visible imprint on the culinary culture of the region. Thanks to them, the cuisine of Podlaskie Voivodeship is unique - full of a variety of products that are produced on the basis of traditional recipes that do not contain any additives, preservatives, high chemistry of the technological process. These products can therefore be called organic products. It is also an area where there is still very little environmental pollution, and smog is hardly heard of.

Polish cuisine has been the same for centuries: simple, based on local seasonal products, nutritious and most importantly tasty. It is known for using especially such plant products as: potatoes, cabbage, beets, carrots, parsnips, turnips, apples, pears, plums, cranberries, blueberries, birch sap, mushrooms, herbs, e.g. caraway, rosemary, mint, lovage, juniper.

A number of initiatives are carried out throughout the country to select the best products derived from the traditions and cultivated customs of various regions of Poland. One of such competitions is "Our Culinary Heritage - Tastes of the Regions. In addition to provincial competitions, selected dishes and products are submitted to the national competition "Pearls" held during the Polagra Food Fair in Poznań.

Regional and traditional products are of high quality, and thus a reputation that needs to be protected. This is achieved by the certification of products, which in Poland is handled by the Ministry of Agriculture and Rural Development (MRiW), and within the European Union - by the European Commission. The Ministry of Agriculture and Rural Development also maintains an official register of products distinguished by their quality and manufacturing tradition, as well as those contributing to the cultural heritage of the regions concerned (a traditional regional product may be one that proves at least a 25-year tradition of the product). Currently, the register includes over 1,100 traditional products, the most of which is in the Podkarpackie Province (149). For customers, it is a signal that the product is of high quality.

NUTRITION USING A WASTE DIET - TECHNIQUES, RECIPES, MEALS

Pickling, drying, canning, fermenting, freezing and curing are all methods that we can use to make food last longer, thus reducing waste. Not only will these methods shrink carbon footprint, they will save money as well.

Recipes for dishes made from leftovers and food waste:

1. Vegetable leftover soup

Ingredients:

• Leftover vegetables (such as carrots, parsley, celery, cabbage, onion)

• Water

• Dried croutons

• Seasonings (such as salt, pepper, herbs)

Instructions:

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Cut the vegetables into smaller pieces, put them in a pot and cover with water. Cook on low heat for about 30 minutes. Then blend until smooth. Season with salt, pepper and herbs to taste. Sprinkle with dried croutons on top.

2. Vegetable and Bread Leftovers Salad

Ingredients:

• Leftover bread (e.g. slices, rolls, baguettes)

• Leftover vegetables (e.g. lettuce, tomato, cucumber, bell pepper)

• Vinaigrette dressing (e.g. oil, vinegar, mustard, honey, spices)

Instructions:

Cut the bread into smaller pieces and sauté them in a pan. Cut the vegetables into smaller pieces. Mix the bread and vegetables together and add vinaigrette dressing.

3. Meat Leftovers Soup

Ingredients:

• Leftover meat (e.g. chicken, turkey, beef)

• Leftover vegetables (e.g. carrots, parsley, celery, cabbage, onions)

• Water

• Seasonings (e.g. salt, pepper, herbs)

Instructions:

Cut the meat and vegetables into smaller pieces, put them in a pot, and cover with water. Cook over low heat for about 30 minutes. Then blend the mixture into a smooth cream. Season to taste with salt, pepper, and herbs.

4. Vegetable Leftovers Omelette

Ingredients:

• Leftover vegetables (e.g. lettuce, bell pepper, tomato, onion)

• Eggs

• Milk

• Salt, pepper

Instructions:

Cut the vegetables into smaller pieces. Beat the eggs with milk and season with salt and pepper. Add the vegetables to the eggs and mix. Pour onto a frying pan and cook until golden brown.

5. Buckwheat Cutlets

Ingredients:

• 1 cup cooked buckwheat

• Onion

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• 2 cloves of garlic

• 2 eggs

• ½ cup breadcrumbs

• Salt and pepper to taste

• Oil for frying

Instructions:

Chop the onion and garlic, and sauté in a pan until soft. In a large bowl, combine the cooked buckwheat, sautéed onion and garlic, eggs, and breadcrumbs. Season with salt and pepper, and mix well. Let the mixture rest for 30 minutes to allow the ingredients to combine. Heat oil in a frying pan and form the buckwheat mixture into patties, placing them in the pan. Fry until golden brown on both sides.

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Gastro waste in vocational school curricula on an example school from Poland, Latvia and Spain

POLAND

The topic of utilizing food waste in Polish education programs is already somewhat present, but still not enough. Topics related to ecology and environmental protection are included and integrated with other subject materials. Various educational initiatives are organized by different institutions aimed at promoting knowledge about processing and utilizing food waste. Such actions also take place in schools targeted towards students in culinary, hospitality, and landscape architecture classes. Their goal is to promote pro-environmental attitudes among students and teachers, as well as reducing the amount of waste produced. Issues such as waste segregation, composting, and utilization of food remnants are discussed. Schools attempt to implement all possible new ideas that can help reduce food waste. With their own culinary workshops in school, teachers impart knowledge on the different types of waste in gastronomy and their proper segregation, which contributes to minimizing negative environmental impacts. Additionally, ways to minimize waste production are discussed, which may include menu planning to reduce waste and increase the effectiveness of food production and storage processes.

The most wasted food products are typically those with a short shelf life or those that spoil quickly. The most frequently wasted foods are fruits and vegetables, as they are often discarded due to their short shelf life and sensitivity to mechanical damage. Another category is meat and fish, which are wasted due to storage and transportation issues, as well as their expiration dates. Bread and baked goods are often wasted due to their short shelf life and tendency to dry out. Milk and dairy products are also wasted due to their quick spoilage and short shelf life. However, it is important to note that food waste applies not only to products that spoil, but also to food that is in good condition but unnecessarily thrown away. For example, excess food left on plates.

Various projects are also being carried out in schools. Thanks to them, students have created a compost bin located on our agrobiological plot next to the school. They used five pallets, four of which were joined together to form a square shape, and the fifth was attached as a lid. Holes were cut in the bottom of the pallets to allow composted waste to be drained into the ground. A protective net was placed on the top of the compost bin to protect the compost from pests and birds. It should be remembered that the compost bin should be located where it has access to air and sunlight, and should not be too damp. Composting is a natural process that takes some time, so you need to be patient and regularly turn the components inside the compost bin to ensure even decomposition of waste.

As part of the project, students also went to a university where they listened to a lecture from specialists in the field of environmental protection, economics, and nutrition. After the meeting, classes were held on analyzing the food basket, which is the way we buy food and what products most often end up in the basket. The factors that influence our purchasing decisions were discussed, as well as how they can be changed to reduce the amount of wasted food. As part of the exercises, students conducted monitoring and research on the amount of wasted food in the school canteen, located in the dormitory. Thanks to this, we saw how big the problem is and what products are most often thrown away.

During school lessons, we organize cooking workshops where students learn how to prepare meals from food scraps, such as soups or one-pot meals. This way, young people gain knowledge about the ecological and economical use of food, as well as culinary skills.

Food waste can be used in many ways. In schools, the practice of producing organic fertilizer from composted food scraps is common. The fertilizer is used for gardening on the school grounds and also in agricultural crops on the school farm located nearby. If possible, students from the food service and gastronomy program harvest seeds from leftover foods such as vegetables and fruits, and then pass them on to students in the landscape architecture program, who plant new crops from the seeds. Next to

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the school, there are buildings where residents raise free-range poultry, including chickens, which are adjacent to the school's land. In this way, some of the food waste is used to feed the chickens.

In the kitchen, students use things like orange and lemon peels in various dishes to add flavor and aroma. They use them in pastries, chicken, pasta, salads, and even make citrus peel preserves in their own pantry, called "School Pantry," by grating the peels and boiling them in sugar water until the mixture thickens, then transferring it to jars. Another example is using carrot or beet leaves as additions to soups, salads, and casseroles, and they can even be used in pesto. Students in the hotel management program used beet and carrot leaves as an addition to their smoothies. During class, students who had cooked too much buckwheat prepared another dish in the form of cutlets. Leftovers such as meat, fish, vegetables, or pasta are often used to make different kinds of casseroles. Many food elements that are usually discarded, such as stems, peels, bones, and seeds, can be used to make broths, stocks, marinades, or various types of pastes or purees. Bread that quickly loses its freshness has a variety of uses in any kitchen. It is primarily used for breading meat, fish, or vegetables. Students use a blender to grind it, but a mortar and pestle can also be used for this purpose. Dried bread crumbs are also popular and can be added as a thickening agent to cream soups. A traditional use for stale bread is to soak it in water and add it to ground meat. It is important to remember to check the bread for mold or other harmful substances before using it, as it should be discarded in such cases. There are also many uses for coffee grounds. At school, we have three coffee machines, and at the end of the day, students collect the used coffee grounds. Landscape architecture students use them as plant fertilizer. Coffee grounds are rich in nitrogen and other nutrients, making them a good fertilizer for plants. They are added to the soil to help plants grow and bloom. Coffee grounds also work well for removing unpleasant odors. Simply rub the grounds on your hands and then rinse with water. Students also use eggshells for plant fertilization, as they contain calcium, which is an important nutrient for plants. Simply crush the eggshells and add them to the soil. Another use is to sprinkle crushed eggshells around the plant to protect them from pests such as slugs. During the Christmas season, students cut stars out of orange peels and dry them. They can be used as decorations for the Christmas tree or as a tea additive. Interestingly, they can be cut into different shapes using cookie cutters, but they must be made of metal to cut the desired shape in the orange peel. The most popular snack among our students is potato peel chips. They are very quick and easy to make, requiring only salt and olive oil. We arrange the potato peels on a baking sheet, drizzle with olive oil and sprinkle with salt, then bake in the oven at 200 degrees Celsius for 15 minutes.

Our school also has a boarding house, which includes a cafeteria for students and teachers. We have a fully equipped kitchen there, where students also have practical classes. In such a place, the skill of managing and planning food quantities is very important in order to reduce food waste. The housekeeper plans the menu for the whole week to precisely determine how much food is needed. This way, we avoid excess food and reduce the amount of waste. We also have portion sizes adjusted to the appetite of students and teachers, which results in smaller leftovers. All food waste is sorted into appropriate containers and collected by an external company.

Teaching how to store food to keep it fresh and tasty for as long as possible is also very important. Some unused products can simply be frozen, so they won't spoil and can be used again later.

We conducted a quiz among students from the classes of Food Technology and Gastronomy Services, as well as a chef, to check the level of knowledge among young people about food waste. 79 people participated in the challenge, including 24 students from the 1st grade, 19 students from the 2nd grade, 19 students from the 3rd grade, and 17 students from the 4th grade. The results are presented in the chart below:

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From the above chart, it can be seen that the youth who are just starting their adventure with gastronomy (class I) have minimal knowledge. It can also be observed that this knowledge is being expanded year by year.

We should strive to introduce more lessons about the consequences of food waste into school curricula. Students should be aware of the impact of wasting food. In classes, we can discuss the amounts of food that end up in landfills and the environmental consequences of this. We can organize more cooking workshops in which meals are prepared from leftover food. We can also introduce lessons about composting, how the composting process works, and the benefits of composting. Educational activities on recycling, including the types of waste and methods of segregation, can also be organized. Various research projects on the use of food waste could be of great interest to students. Another challenge is to encourage students to change their dietary habits. While the theory can be conveyed easily, changing dietary habits can be difficult in practice. One solution is to conduct various workshops and practical activities in which students can gain experience in a practical approach to the problem of food waste.

In Poland, in addition to the basic knowledge acquired in school, there are also other methods of improving one's skills. These include various courses, trainings, and internships. Students also undergo internships in various food processing industries, where they acquire practical skills.

Experts agree that food waste is a serious environmental and social problem. Ecologists and sustainable development scientists believe that food waste causes serious ecological problems, including greenhouse gas emissions and pollution of water and soil. Therefore, they agree that it is important to reduce the amount of discarded food by reducing food waste.

Experts in public health and nutrition point out that excessive food consumption is one of the causes of the obesity and chronic disease epidemics. Therefore, it is important to encourage more sustainable approaches to eating, such as consuming smaller portions and using seasonal products.

Experts in technological innovation and food technology are focused on developing methods to reduce food waste, such as smart food labels that indicate how much time is left to consume a given product.

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Representatives of charitable organizations, such as food banks, are trying to reduce the amount of food waste by collecting products that would otherwise be discarded and then providing them to people in need.

In summary, experts from different fields believe that reducing food waste is crucial for protecting the environment, public health, and fighting poverty.

Due to the importance of the issue of food waste for environmental protection, education in this area is becoming increasingly popular and significant. The use of food waste by students in Poland is already practiced in many schools, and educational programs and initiatives aimed at encouraging such an approach are gaining more and more interest. As a result, younger generations gain knowledge and skills that allow them to prevent food waste and lead a more sustainable lifestyle. It should also be mentioned that such actions are a great way not only for environmental education but also for developing creativity and thinking outside the box. Let's hope that this topic will become more widespread in school curriculums in the future.

LATVIA

In Latvia, the government and educational institutions are recognizing the importance of incorporating green skills, including work in environmentally sustainable fields and management of the food waste, training into secondary vocational education. Currently in RTRIT is taught as a lifelong learning module for various professions. The green skills module in Latvian secondary vocational education provides students with the knowledge and skills required to work in environmentally sustainable fields. By incorporating green skills training into vocational education, Latvia is preparing its workforce for the transition to a more sustainable and resource-efficient economy.

DESCRIPTION OF THE MODULE "Green Skills"

Aim of the module	To promote learner's ability to carry out professional activities in an environmentally friendly, resource-efficient and energy-efficient manner. And to make environmentally friendly and environmentally sound decisions in everyday life.
Module tasks	Develop learners' skills: 1. Explain the most appropriate sustainable development criteria in a given situation. 2. Link the idea of sustainable development to the rational use of natural resources. 3. Assess the impact of human economic activity on biodiversity. 4. Analyse information on the efficient use of energy resources. 5. Sort waste according to the basic principles of environmentally sound management. 6. Follow the basic principles of a healthy diet in order to ensure livelihoods.
Module entry conditions	Completed primary education.
Module assessment of learning	At the end of the module "Green Skills", the student completes an evaluation – a presentation with suggestions and recommendations. Conclusions on the sustainable use of resources in everyday life.
Module meaning and location on the map	The module "Green Skills" is a lifelong learning module. This module can be integrated into other modules if its content overlaps with vocational modules.

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CONTENTS

SUBJECT:

1. Sustainable development thinking (20% of the module of the module).
2. Sustainable use of natural resources (20% of the module of the module).
3. Interactions between nature and human management (20% of the module total).
4. Eco-friendly energy (15% of the total module volume).
5. Sustainable waste management (10% of the module total).
6. Human health friendly nutrition (15% of the module).

SPAIN

As for schools, they use the same law as catering. They have to donate leftover food to the foundations. But, it is true that they have a big problem, since they throw away a lot of food.
Unfortunately, food waste is a significant issue in schools and school programs in Spain, as it is in many other countries. A study conducted by the Spanish Ministry of Agriculture, Fisheries, and Food found that school canteens generate around 18,000 tons of food waste each year. This waste includes both edible and inedible food, such as fruits, vegetables, dairy products, and bread.

There are several reasons why food waste is generated in school programs in Spain. One of the main reasons is that the amount of food prepared is often based on estimates and not on actual consumption. This can lead to overproduction and a significant amount of leftover food.
Another reason for food waste in school programs is that students are often required to take a full meal, even if they don't want or need all the food provided. This can lead to uneaten food being discarded.

However, there are efforts being made to reduce food waste in school programs in Spain. Some schools are implementing waste reduction strategies, such as trayless dining, where students only take what they can eat, and smaller portion sizes to reduce waste. Additionally, some schools are implementing composting programs to turn food waste into a valuable resource for gardens and farms.

Overall, reducing food waste in school programs is an important step towards creating a more sustainable and environmentally-friendly food system. In recent years, there has been a growing awareness of the issue of food waste in Spain, and efforts are being made to educate students and the general public about the issue. However, there is still a long way to go in terms of raising awareness and changing behaviors around food waste.

In terms of education, some schools in Spain are taking steps to incorporate the issue of food waste into their curriculums. For example, some schools have implemented educational programs that teach students about the environmental and social impacts of food waste and the importance of reducing waste. These programs may be led by teachers, guest speakers, or even student-led initiatives.

Additionally, some vocational schools and universities in Spain offer courses on sustainable food production and management, which may include a focus on reducing food waste in the food industry. Students in these programs may go on to work in professions such as food service management, food science and technology, and sustainable agriculture, where they can use their knowledge and skills to address the issue of food waste.
Overall, while there are some efforts being made to educate students about food waste in Spain, there is still a need for greater awareness and action on this issue. By incorporating the issue of food waste into school curriculums and training future professionals in sustainable food management practices, we can work towards a more sustainable and environmentally-friendly food system.

AINIA is a Valencian company that is located in the technology park of Valencia and deals with professional training to improve the level of food safety.

It has a duration of two years and is aimed at ensuring food safety and the protection of consumer rights in the European Union. Better knowledge of food law by the target groups will not only improve

the level of food safety, but will also increase their awareness of fair information practices, thus helping consumers in the European Union to make informed decisions. Correct and not misleading information.

3. Gastro waste in menu of catering and hotel industry on an example companies from Poland, Latvia and Spain

POLAND

The problem of food waste largely concerns restaurants and hotels. Wasting food in restaurants and hotels is nothing else but throwing money in the trash. That is why it is so important to implement zero waste in every establishment. The key task is to think through every aspect, starting from planning purchases, proper food storage, and using it fully when building the menu and preparing specific dishes. Restaurants worldwide are taking more and more actions to reduce the amount of waste or use it in a different way. In our area, restaurants and hotels are also taking action to effectively utilize food waste.

The first one is composting. Despite putting in huge efforts, it is known that waste will be generated during the production of dishes. This is a very good food for compost. It is then used to fertilize the soil on which vegetables used in the restaurant are grown or to fertilize the soil in pots where herbs are also grown and used in the restaurant.

In this way, food waste is used in the "Oberża nad Biebrzą" restaurant, located in Goniądz, near our town. This restaurant was created relatively recently, but it enjoys great popularity among local residents and tourists visiting the Biebrza National Park area. The head of the restaurant, Ms. Joanna Sebunia, is a huge supporter of producing her own products, but at the same time she tries to use the leftovers that arise during the production of semi-finished products in a rational way. An example of this is the aforementioned composting. Ms. Joanna stores food scraps in a compost bin located on the restaurant grounds. The obtained compost is later used to fertilize the soil on which vegetables and herbs used in the restaurant are grown.

In a similar way, food leftovers are used by Mr. Krzysztof Grygo, the owner of the "Bar pod Gajem" restaurant, located in Mońki. The company has been in existence since 2006. It offers customers both the organization of special events and a shop where they can buy deli dishes. Mr. Krzysztof also uses a compost bin, storing leftovers that are not suitable for further processing there. The resulting compost serves as a fertilizer to enrich the soil on the plot where the vegetables used in the restaurant are grown. Due to the fact that the restaurant is located in the city center, Mr. Krzysztof uses a plastic, ready-made garden compost bin as shown below:

Another restaurant/hotel that utilizes food waste is "Dwór Dobarz". It is a hotel and gastronomic complex located on the Imperial Road. The restaurant and hotel are very popular among tourists due to the location of the Dwór and the excellent cuisine. The restaurant and hotel have a very large and beautiful area around the hotel, with many plants and flowers, which are fertilized with coffee grounds, among other things. They serve as a fertilizer for plants due to their high nitrogen content and other nutrients. Fertilizer from coffee grounds can be used not only for ornamental plants but also for fruit trees and vegetables.

The owners also use banana peels in the garden, which act as a natural aphid repellent. The banana peel should be cut into small pieces and buried around the plants at a depth of a few centimeters. Eggshells are also used for plant care. They make an excellent fertilizer. Simply crush the shells and sprinkle them under the plants or grind them into a fine powder and sprinkle around the plant.

Flowers and plants at the „Dwór Dobarz”

Another extremely important issue related to introducing the zero waste method in a restaurant is the appropriate portioning of served dishes. Very often, the problem is with too large portions served

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in restaurants and hotels. Restaurant/hotel owners can observe and verify this by the amount of food left by customers. If there is certainty that the taste of the dish is fine, and it happens frequently that the dish is not finished, it means that the amount is too large and it is worth reducing it. An alternative to serving too large portions in a restaurant can be to offer to pack the remaining food for the customer. If a customer receives a proposal that we will pack their unfinished meal for them to reheat at home, they may be surprised, but they certainly should not be offended. Such a tradition has long been functioning in Western countries, which have developed their own methods of economically managing products long before zero waste.

According to the opinions of Joanna Sebunia's customers, the amount of food served at "Oberża nad Biebrzą" is ideal. The customer is satisfied, the portion is appropriate, and therefore there is not too much waste. Similarly, very rational portions can be obtained at the "Dwór Dobarz" restaurant/hotel. The owners make sure that visiting guests can taste regional dishes, including famous dumplings, pierogies, etc., but also that the portions are of the right amount, so that the customer is full and there is not too much waste.

The "Oberża nad Biebrzą" restaurant and presentation of the amount of served dishes.

The "Dwór Dobarz" restaurant and presentation of the amount of served dishes.

Another very important aspect of the attempt to reduce waste by restaurants and hotels in our region is the appropriate menu and the so-called "short menu." A smaller selection of dishes means that they are often ordered by guests, and as a result, fresh products are used in the kitchen on an ongoing basis, and the stock is replenished with the amount that is actually needed. This means that food stocks are not accumulated, which would eventually lose freshness, spoil, and end up in the trash.

The owners of the Oberża nad Biebrzą and Dwór Dobarz restaurants also focus on "seasonality" in their menu. They serve dishes made from ingredients from their own garden, such as pumpkin cream soup, carrot cake, and meringues, which are a specialty of the Dwór Dobarz chef, decorated with fruits from their own garden. The fruits are also frozen for winter use in various cocktails, drinks, and other dishes

Below are some more creative examples used by restaurant/hotel owners: Dwór Dobarz, Oberża nad Biebrzą, Bar pod Gajem.:

- BREAD:

As commonly known, bread is the most wasted food product in our country. All of the mentioned restaurants use bread leftovers to make breadcrumbs. Bread rolls and loaves are also used in the kitchens to make croutons, which are later added to cream soups, salads, and more.

- VEGETABLE BROTH:

Leftover vegetables can also have another use. You can prepare a broth from them, which serves as a base for various soups, sauces, and many other dishes. It can be stored or even frozen.

- VEGETABLE CREAM SOUP:

Vegetables from the broth (carrots, parsley, celery, white part of leeks) can also be used to prepare cream soup. Bar pod Gajem prepares delicious cream soups in this way by adding only spices and thickening them with cream.

- WINE:

Due to the fact that open wine quickly loses its flavor, the owners of Dwór Dobarz restaurant freeze it in ice cube trays and use it later for making drinks or cooking bigos or goulash..

- COOKED POTATOES:

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From too many boiled potatoes, you can make many dishes, including kartacze, which come from our region. This is how the "Bar pod Gajem" restaurant uses up the excess of cooked potatoes. Kartacze are made partly from boiled and raw potatoes, so the excess of cooked potatoes is perfectly utilized. Bar pod Gajem also has its own shop where you can buy, among other things. Kartacze are very popular in this shop. Another dish that you can make using leftover cooked potatoes is various types of dumplings (such as kopytka, kluski śląskie, gnocchi).

Kartacze from „Bar pod Gajem".

- HERBS AND GREEN LEAVES

Some parts of products may seem unusable, such as radish leaves. However, creative chefs find uses for them (decoration, garnish, salad addition). This way, the product is fully utilized and also adds attraction and curiosity for customers. The owners of the mentioned restaurants use herbs and leaves for pesto and all kinds of salads. Parsley or radish leaves are also used for dish decoration. Chefs from Dwór Dobarz obtain a fancy sauce by soaking young carrot leaves in water with a teaspoon of baking soda, then blending everything together with olive oil, nuts, garlic, and lemon juice.

- PUMPKIN SEEDS

Seeds are a rich source of B-group vitamins as well as vitamin C, fiber, calcium, iron, phosphorus, and magnesium. Pumpkin seeds contain beneficial oil with phytosterols and unsaturated fatty acids. After cutting the pumpkin, simply scoop them out, rinse them in a strainer, and pat them dry. Then, roast them in the oven and store them in a jar after cooling. Chefs from the mentioned restaurants use these prepared seeds as an addition to cream soups.

LATVIA

Zero waste gastronomy is a growing trend in the HORECA sector worldwide, including Latvia. Here are some examples of how Latvian restaurants and hotels are incorporating zero waste practices into their operations:

- Restorāns 3, Grecinieku iela 3, Riga - This restaurant has a unique approach to zero waste, using the entire animal in their dishes. They source their meat from local farms and use every part of the animal, from the tongue to the tail. They also have a vegetable garden on site and use all parts of the plant in their dishes.
- Valtera Restorāns, Tērbatas iela 6, Riga - This restaurant focuses on local and seasonal ingredients and uses a zero waste approach in their kitchen. They have a "waste bin" dish on their menu, which uses leftovers and scraps from the kitchen in a creative and delicious way.
- Hotel Bergs, Elizabetes iela 83/85, Riga - This hotel has implemented a comprehensive zero waste program that includes composting, recycling, and reducing food waste. They have also eliminated single-use plastics in their operations.

Restaurants in Latvia are finding innovative ways to reduce food waste and incorporate it into their menus. Here are a few interesting approaches to using food waste that you might find inspiring:

- Using fruit peels in cocktails: Many restaurants in Latvia are using citrus peels in their cocktails to add flavor and reduce waste. For example, bartenders might use lemon or orange peels to create a twist or garnish for a drink, or they might infuse the peels into syrups or bitters.
- Turning fish or meat skins into crispy snacks: Some restaurants are using fish or meat skins that would otherwise be thrown away to create crispy snacks. The skins are cleaned and dried, then

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fried or roasted until they're crispy and flavorful. They can be served as a bar snack or as a topping for salads or soups.

- Making broths and stocks from food scraps: Instead of throwing away vegetable scraps, bones, and other food waste, many restaurants in Latvia are using them to create flavorful broths and stocks. These can be used as the base for soups, stews, and sauces.
- Incorporating food waste into desserts: Some chefs are finding creative ways to use food waste in their desserts. For example, they might use leftover fruit puree in a cake or muffin, or they might incorporate stale bread into a bread pudding or crumble.

By finding ways to use food waste in their menus, restaurants in Latvia are not only reducing their environmental impact, but also creating unique and delicious dishes that showcase their creativity and commitment to sustainability.

Common good practices in HORECA sector are:

- Using local and seasonal ingredients to reduce transportation and packaging waste
- Composting food waste to create fertilizer for gardens or farms
- Eliminating single-use plastics in operations

Bad practices:

- Overordering ingredients and throwing away excess food
- Using plastic containers or packaging for takeaway food
- Not properly sorting or disposing of waste, leading to contamination of recyclables or compostable.

The HORECA sector in Latvia is starting to embrace zero waste gastronomy practices, but there is still room for improvement. By reducing food waste and implementing sustainable practices, restaurants and hotels can not only benefit the environment but also attract customers who value sustainability and social responsibility.

SPAIN

Gastrointestinal waste food, or food waste from the gastronomy sector, is a significant challenge in Spain. The impact of food waste in this sector is both economic and environmental. It is estimated that the Spanish gastronomy sector generates about 63,000 tons of food waste each year, which has a significant economic cost in terms of lost revenue and wasted resources.

However, there are also many local activities and cultural practices in Spain that aim to address this challenge. For example, there are a growing number of organizations and initiatives focused on reducing food waste in the gastronomy sector, such as the "Zero Waste" movement, which promotes sustainable practices in the restaurant industry. There are also a variety of food banks and other charitable organizations that work to redistribute surplus food to those in need.

Zero waste (or zero waste) is a movement that is committed to reducing waste in day to day and in its maximum exponent, simplifying the life of the person who carries it out and helping to improve the environment.

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This movement follows 5 principles:

- **Reject everything that we do not need**, asking us twice before buying. Many times we buy on impulse and then we stop using what we have bought so we throw it away.

- Reduce: We do not reject it because we need it, and can we reduce its consumption. Buy the necessary amount in bulk instead of the 1 kg package, buy durable and energy-saving bulbs, instead of buying Chinese bulbs that last little and means buying more, etc.

- Reuse: the paper printed on one side, can I reuse it before throwing it away.

- Recycle: There is no choice but to send it for recycling when we cannot reject it, reduce it or reuse it. At this point, our trash has been greatly reduced and what we recycle is very little.

- **Composting:** For the more advanced, organic remains can be used to make compost and nourish our plants, gardens or the gardens of our friends.

Gastro waste foods in the restaurants

Restaurants and bars generate a lot of organic, plastic, glass and even chemical waste. Some of them are recyclable and we can use common services for recycling as long as you make the appropriate classification:

Green container: Crystal and glass.

Blue container: Packaging and cardboard and paper materials.

Yellow container: Plastic and brass containers and materials, tetrabricks and tins for preserves and/or beverages.

Grey/brown container: The brown container is intended for organic waste.

Within restaurant waste we find a typology with a special treatment: **"fatty waste"**. Within this waste, which to be recycled must be collected by an authorized **professional company**, we would find frying oils and other types of animal and vegetable fats related to the treatment, cooking or consumption of food.

The recycling of this type of greasy waste from restaurants, as is the case with the recycling of used oil, is mandatory because it is a highly polluting material: it is estimated that one liter of oil can contaminate up to one thousand liters of water.

Once treated, the fatty residues are used for the production of biofuels, soaps and other uses in the chemical industry (manufacture of waxes and varnishes, etc.).

Oil recycling, as one of the main waste products from restaurants, aims to comply with:

Restaurant waste management should be a priority, in the same way as cleaning storage or use spaces with a high probability of contamination (refrigerators, freezers, surfaces, pantries, etc.).

Activities in the restaurants

- establishing an isolation system from when it is produced until it is disposed of and installing containers with hermetic closure and non-manual operation in areas of the kitchen where food remains are handled,
- garbage containers installed in the restaurants and located in specific areas that are easy to clean and disinfect, and completely isolated from food circulation and storage áreas,

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- having a water intake, mesh drain, few joints in the flooring, half-rounds in the wall and hermetic closure to prevent the passage of insects and rodents,
- the evacuation of waste from restaurants must be continuous to avoid accumulation. The waste will be transported abroad by a route that does not pose a risk of contamination for people, materials, equipment or food.
- Removing the garbage from the kitchens to avoid bad odors, contamination and the appearance of harmful organisms,
- Installing leak-proof, waterproof and pest-proof trash cans and bins with tight-fitting or tight-fitting lids,
- Thoroughly and frequently clean the containers where the garbage accumulates,
- Avoiding the massive generation of waste in the restaurant kitchen thanks to the definition of the menu, the rotation of products (especially fresh products), and smart purchasing.

Local activities

- Give customers the option to take leftover food home,
- Purchase disposable containers. And if the containers are made of plastic, remind costumers that plastic is a recyclable and reusable material,
- Bet on refillable items instead of buying plastic bottles/paper cups, for example,
- Reuse before buying,
- Avoid single-use items, as well as those that are sold prepackaged,
- Compost organic waste,
- Invent new uses for items you no longer need,
- Embrace a healthier, more sustainable diet,
- Buying only what you need and plan your food well,
- Choosing ugly fruits and vegetables,
- Store food sensibly: move older items to the front of the cabinet or fridge, and place new ones at the back,
- Use airtight containers to keep open food fresh in the fridge, and be sure to close packages to keep insects out,
- Value leftovers: if you don't eat everything you make, freeze it for later or use the leftovers as an ingredient in another meal,
- Make use of wasted food,
- Support local food producers: by buying local products, you support family farmers and small businesses in your community. It also contributes to the fight against pollution by reducing the distances traveled by trucks and other delivery vehicles,
- Buy fish that has been sustainably caught or raised,
- Use less water.

Examples of restaurants in Spain

Celso and Manolo

Calle Libertad, 1, Madrid

Located in the same location as the legendary La Carmencita tavern, Celso y Manolo is currently the first 100% organic traditional tavern in Madrid. A concept that is embodied in a menu full of fresh and natural ingredients, which in turn make up such succulent dishes as the 'eco' sobrasada scrambled eggs

with caramelized onion and crispy potato, rice with minced pepper, onion and wild asparagus, Organic garlic chicken breast strips with wild asparagus or grilled almadraba bluefin tuna with Caribbean avocado, papaya and mango picadillo.

Azurmendi
Barrio Legina, s/n, Larrabetzu, Bizkaia
Michelin-starred restaurants also care about the environment and if not, tell the famous Eneko Atxa, who has adopted sustainability as a fundamental pillar of his cuisine. Without going any further, Azurmendi is the most sustainable restaurant according to The World's 50 Best Restaurants 2018. It is located in a bioclimatic building that reuses rainwater, takes advantage of sunlight, controls temperature and ventilation, and produces renewable energy. The result? Two tasting menus that include such successful recipes as salted brioche, herb curd, textured cauliflower and truffle, and shrimp with vegetable gel and 'old' tomato granita. **(Anexo 10)**

Le Cols
Avinguda de les Cols, 2, Olot, Girona
In a privileged setting, the rural landscape of La Garrotxa, the Les Cols restaurant offers its diners an intuitive, intimate and authentic organic cuisine that soaks up the nature that grows around it. In addition to the classic tasting menus, Fina Puigdevall and her team organize a variety of evenings worth experiencing, such as the special meal on Thursdays or picnics in the open air. Buckwheat spaghetti with truffle broth, sweet onion from the Croscat volcano with sheep cheese from Mas Farró, licorice and breadcrumbs, Duroc pork tenderloin with pomegranate and acorns, and buckwheat farinets with farro are some of the his most outstanding creations.

Fogar do Santiso
Trasellas, 13, Teo, La Coruña
This responsible gastronomy project is also a window into traditional cuisine and Galician folklore. A mix of concepts that has been committed to social, health and environmental benefits since its opening in 1996. More than three million diners have been able to prove their commitment through grilled vegetables, grown in their own garden; the feira octopus, the chestnut mousse cake or the fried organic beef churrasco. Also, as a climax, it includes a renewed version of the classic gin and tonic: the mini eco-intonic. 360º gastronomy in its purest form.

Copenhagen
Carrer del Literat Azorín, 8, Valencia

In the heart of the Ruzafa neighborhood we find this temple to vegetarian, creative and, of course, organic cuisine. The Copenhagen menu is made up of seasonal ingredients, lacto-ovo vegetarian and vegan dishes, and organic and biodynamic products. All this together with the support they profess to artisan initiatives and young entrepreneurs. This philosophy is embodied in the vegan faux gras with gingerbread and lemon bun, the fresh pumpkin, quorn and hazelnut lasagna with light bechamel sauce and pecorino cheese gratin, and the homemade pear and pecorino cheese fiocchi with candied mushrooms and a pesto base. red.

4.Latest trends in healthy food system and people expectations. Gastro Waste Trends 2023

Food waste contributes to two of the biggest global challenges today — hunger and climate change. According to the United Nations, up to 811 million people worldwide were suffering from hunger in 2020. The food and beverage industry plays a key role in understanding the impact of food waste and improving food security. Technological innovation is necessary to find new solutions to reduce food waste.

This project is funded by the European Union

What to do? (some examples):

Government should for example:

- invest in technology that makes the best use of natural resources. Many existing technologies already have various sustainability and cost-saving advantages that reduce the need for artificial preservatives while extending shelf life and improving food safety;
- make funding available for joint research into better ways of preventing food waste and finding other uses for surplus food;
- non-recyclable waste send to create useful energy;

Business should for example:

- restaurants should sell smaller portions and providing better information on the shelf life of their products;
- use more seasonal fruits and vegetables;

Consumers should for example:

- adopt a healthier, more sustainable diet;
- preventing waste food at home;
- buy only what they need;
- store food;
- understand food labelling;
- put food waste to use.

Benefits of a less waste food:

- wasting less food leads to less garbage,
- is good for the climate change and environment, can reduce greenhouse gases,
- can save household/business/government money.

Latvia, like many other countries, is adapting to the zero waste culture. Many Latvian companies are trying to get involved in reducing waste by offering a variety of more environmentally friendly options. For example, “Hooligaan Bubble Tea Riga”, which now offers customers the option to bring their own reusable jars instead of using plastic cups. This initiative not only reduces plastic waste but also encourages customers to be more environmentally conscious. “Rimi”, a Latvian supermarket chain, has also joined the zero waste movement by selling household and hygiene products without packaging. Customers can now purchase items such as toothpaste, deodorants, and dishwashing detergents without generating unnecessary waste. Similarly, cosmetic store “STENDERS” has introduced specialized stands where consumers can use their own packaging to purchase products.

The department store “Stockmann” has also taken steps to promote zero waste. They have introduced a free drinking water filling point, fully compostable bags, and a place to buy unpackaged nuts. These initiatives promote a culture of reuse and sustainability, making it easier for customers to reduce their waste output.

In early 2019, “Cafe M”, a zero-waste cafe, opened its doors. The cafe composts all bio-waste that occurs after making coffee and food in an industrial composting machine. This initiative ensures that even the cafe's waste is used efficiently, as compost can be offered to people or used in cafe flowerpots. (https://eng.lsm.lv/article/society/environment/latvia-leads-the-way-with-zero-waste-stores.a409239/)

This project is funded by the European Union

The petrol station "Virši" has come up with a new zero waste option - edible cups. Any hot or cold drink can be drunk from an edible cup instead of plastic. With sustainability and the environment in mind, Virši also offers a discount when you buy your coffee with your own mug. (https://www.instagram.com/virsi_a/)

Latvia's dedication to the zero waste movement has truly set the standard for sustainable waste management practices in the European Union. Through a combination of innovation, education, and public policy, Latvia has successfully reduced waste and increased recycling rates, setting an example for other countries to follow. As we continue to face environmental challenges, it is vital that we prioritize sustainable waste management practices and work together to create a more sustainable future. (https://www.zerowastelatvija.lv/)

In our day to day, we are surrounded by plastic, disposable objects and utensils, packaging that is difficult to recycle, packaging that takes 100 years to disappear while its content lasts between one and several weeks to be consumed. Also of things that we buy that in the end we do not need and end up throwing away sooner or later.

At the same time, many local cultures and traditions in Spain also emphasize the importance of reducing waste and making the most of all available resources. For example, in some regions, there are traditional recipes that use leftovers or parts of the animal that might otherwise be discarded.

Despite these efforts, however, there is still much work to be done to address the challenge of gastrointestinal waste food in Spain. This includes not only reducing waste in the gastronomy sector, but also addressing systemic issues in the food system that contribute to food waste, such as overproduction and inefficient supply chains.

There is a growing interest in the potential of gastro waste foods as a nutritious and sustainable food source in Spain, both among the general public and within the culinary industry. Many consumers are increasingly concerned about the environmental impact of food production and are looking for ways to reduce their carbon footprint through their food choices. As a result, there is a growing demand for sustainable, locally sourced, and waste-reducing food options.

At the same time, there is also a growing interest among chefs and culinary professionals in using gastro waste foods in creative and innovative ways. Some chefs are experimenting with new techniques and recipes that make use of commonly wasted ingredients, such as vegetable scraps and meat trimmings, to create new and exciting dishes. Others are exploring traditional cooking methods and recipes that have long made use of these ingredients.

However, there are also challenges to promoting the use of gastro waste foods in the mainstream food system in Spain. Many consumers may be hesitant to try new or unfamiliar foods, especially those that are made from waste products. Additionally, there may be logistical challenges in sourcing and distributing these ingredients, especially for small-scale producers.

Overall, while there is a growing interest in gastro waste foods in Spain, it will likely take time and effort to fully integrate these ingredients into the mainstream food system. Education and awareness-raising efforts, as well as creative marketing and distribution strategies, will likely play a key role in promoting the use of these ingredients among both consumers and culinary professionals.