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Marie Šarvašová

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**Food Waste Prevention in Restaurants and Households
from a Global and Czech Perspective**

Marie Šarvašová

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Marie Šarvašová

Vedoucí práce: PhDr. Ivona Mišterová, Ph.D.
Katedra anglického jazyka a literatury
Fakulta filozofická Západočeské univerzity v Plzni

Konzultant: Bc. Jana Havlíčková, M.B.A.
Katedra anglického jazyka a literatury
Fakulta filozofická Západočeské univerzity v Plzni

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Prohlášení

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Plzeň, květen 2021

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Poděkování

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V neposlední řadě patří velké poděkování mé rodině a přátelům, kteří při mně stáli během zpracovávání této práce a také během celého studia.

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1 INTRODUCTION

The aim of this Bachelor's Thesis is to introduce in detail the issue of food waste in households and restaurants in the world and in the Czech Republic.

Theoretical part of the thesis consists of explanations of what food waste is in a global perspective and the difference between food waste and food loss. In addition, there are some of the typical phenomena (deforestation of the Amazon rainforest, desertification, etc.) which were caused by food wasting. As the thesis includes the term "prevention", a considerable part is dedicated to the possibilities of how to manage food waste. Reducing food waste could be reached either by reduction, redistribution of unconsumed meals, or simply by careful treatment, for example, not sending the discarded food to landfills. Last paragraphs are dedicated to food waste in the world and in the Czech Republic. It describes how far the inhabitants (from the world and the Czech Republic) have improved their ways of food waste disposal over the past decade. The thesis focuses on restaurants and households.

In the practical part, the glossary of neologisms is presented. This is to introduce words which have been established in recent years. These words are varied and some of them have become very popular. The reader may learn who is a freegan, or what it means when somebody wishcycles. However, the main point of the practical framework consists of a survey and a questionnaire. The questionnaire provides opinions of selected Czech restaurants on the food waste issue. The main objective is to find out how the respondents manage their food waste; if they buy food responsibly, what they do with leftovers or food that was not processed, if there is any measure that helps to reduce this kind of waste and how the corona pandemic affected them. Results of the survey will be collected through phone calls. There is an estimated number of 70 respondents. It means that every

region of the Czech Republic is covered, whereas about five restaurants of each region will be approached. The collected data will be registered into an online survey platform and it will be evaluated afterwards.

Food waste is considered a global problem. Population growth is on the increase and the amount of food, that is thrown away, is reaching enormous figures as well. According to GIS (Geographic Information System 2017, n. p.), to feed the population of almost 7.5 billion of people, “the world produces four billion metric tons of food every year”. However, 30-50 percent of the food production is never used. It is wasted either by humans or by production alone. Sources such as energy, water or land that are needed for crop growing are considered the secondary causes of food wasting. As the GIS statistics present, “North America & Australia/New Zealand come first as the highest food wasters, along with Europe/Russia, then East Asia. Food losses and waste amounts to roughly \$680 billion in industrialized countries and \$310 billion in developing countries”. (GIS 2017, n. p.)

The primary printed source includes the book *Waste* written by Tristram Stuart. For the glossary of neologisms, *A Very Modern Dictionary* by Tobias Anthony was used. Sources like *Foodwaste: Home Consumption, Material Culture and Everyday Life* (2014) by David Evans or *My Zero-Waste Kitchen: Easy Ways to Eat Waste Free* (2017) by Kate Turner have served as devices to study and fully understand the issue. Other source employed for writing this Bachelor’s Thesis consists mainly of electronic sources. This is because of the current situation of the corona pandemic and the selected topic as well. Food waste is a changing issue and the electronic sources were needed, mainly for the reason of topicality. In addition, many articles, interviews of environmental activists, movies (e.g. *Kiss the Ground*, *A Life on Our Planet*) or the Netflix TV series *Rotten* are covered.

2 THEORETICAL PART

2.1 Food Waste: The Global Food Scandal

Food is considered one of the most important sources for life on the planet. A human body is not able to live without a regular food intake. According to the Merriam Webster Dictionary definition, food is a “material consisting essentially of protein, carbohydrate, and fat used in the body of an organism to sustain growth, repair, and vital processes and to furnish energy”. (Merriam Webster Dictionary 2004, p. 487). In the food chain, humans are the main consumer. “Humans are said to be at the top of the food chain because they eat plants and animals of all kinds but are not eaten consistently by any animals”. (Markgraf 2019, n. p.)

Through the human race’s development, we have learnt how to grow food, how to take care of it or how to promote it. As a propagation is mentioned, those who create the demand (supermarkets, retailers, restaurants or a standard consumer) are supposed to know how to deal with the global food supply. However, the representatives mentioned above may not be educated enough about the issue. From a practical sphere, “40 percent of food in the United States today goes uneaten”. (Gunders 2017, n. p.) That amount represents “over 365 million pounds of food each day”. (Murdock 2017, n. p.) Converting it to kilograms, it would be around 166 million kilograms. In spite of this, 1 in 8 Americans still suffer from food insecurity. (Murdock 2017, n. p.) “Six percent of China’s total food production – are lost or wasted in China annually, enough to feed 30 to 50 million people”. (Marchisio 2020, n. p.) “The Japanese - with their love of sushi, caviar and imported luxuries - manage to dispose of food worth ¥11 trillion annually”. (Stuart 2009, p. xvi.) After conversion to the Czech Koruna, the amount would be 2.2 billion CZK. The United Kingdom wastes “approximately 32 percent of all food purchased per year”. (UNEP 2007, n. p.) The statistics show that globally, one third of food produced goes to waste or is lost. (FAO 2011, n. p.) By converting the values to money, “food losses and waste amount to roughly

US\$ 680 billion in industrialized countries and US\$ 310 billion in developing countries”. (UNEP 2007, n. p.)

Nowadays, food waste is viewed as a global scandal and the issue of reducing the food waste could be reckoned on the same level as smokestacks, cars and their emissions or oil spills. In the past few years, we as the planet inhabitants began reaching the ecological limits that our planet can carry. There is natural evidence. For instance, iceberg melting and the associated issue of global warming. The Amazon rainforest wildfires. Hurricanes and floods all over the world. All of the wasted food is a huge contributor to climate change. Dana Gunders, Senior scientist of Natural Resources Defense Council states that “of all the challenging problems out there, reducing the amount of food we are wasting is one of the easiest”. (Murdock 2017, n. p.)

3 DEFINITION OF FOOD WASTE AND FOOD LOSS

In the beginning, an explanation of the difference between main definitions is required. The main terms are food waste and food loss. “Food waste refers to the decrease in the quantity or quality of food resulting from decisions and actions by retailers, food service providers and consumers.” (FAO 2011, n. p.) This kind of food cannot be consumed, as it is discarded. It is a typical process for industrial countries and serves as an indicator of a country’s culture. An example could be reaped oranges. As a box full of these oranges with brown spots on them appears, it is spoken about food waste. “Food loss is the decrease in the quantity or quality of food resulting from decisions and actions by food suppliers in the chain, excluding retailers, food service providers and consumers”. (FAO 2011, n. p.) Additionally, food losses are caused by complications at the beginning of the agri-food chain - mostly, it concerns farmers who stay on the top of the chain. The losses occur during planting, harvest, growing or transport. It is a typical process for developing countries. To give an example: with oranges, the food loss would be a fall from a lorry that is transporting the fruit. A scheme depicting the food waste and food loss is below.

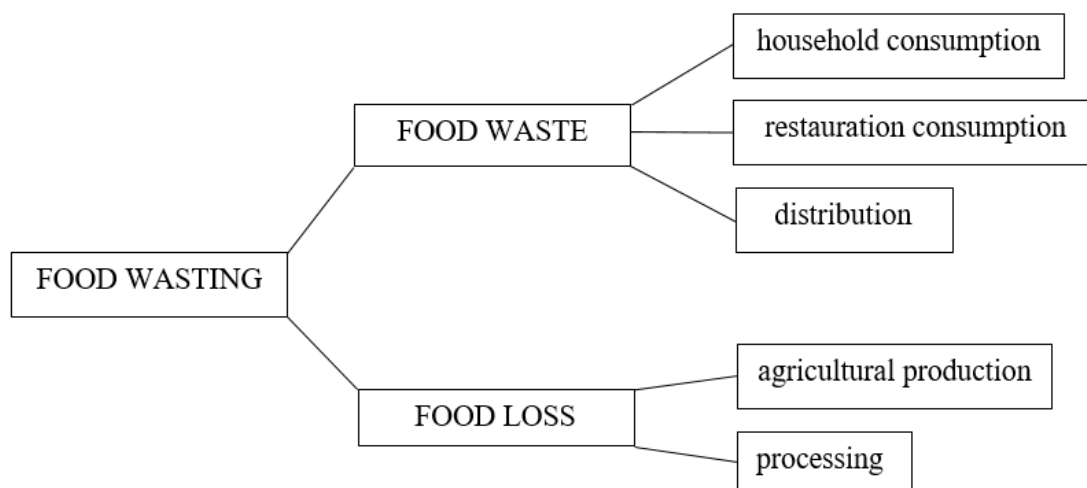


Fig 1 Food Wasting Scheme, Foodnet 2012

4 THE EVOLUTIONARY ORIGINS OF SURPLUS

4.1 What Is a Surplus

First of all, an explanation or a concept of the word surplus needs to be clarified. Surplus is “an amount of something that is more than what is needed or used”. (Longman Dictionary 1978, p. 1672) It is caused by demand. For instance, supermarkets usually create a surplus of food as they build a supply for customers. On account of making a business, “surplus has been the foundation for human success for over 10,000 years. Everything we call civilization depends upon it”. (Stuart, 2009, p. 167) There is a fight against the food surplus and generally, the surplus is viewed from a negative aspect. However, it can be managed. It can be used for feeding humans, for example through sales to secondary markets or donations to charitable organisations or food banks. Alternatively, surplus food can be used to feed animals. Waste recovery and recycling are an option as well. The lowest-priority choice could be waste disposal, typically landfills. A potential solution will be introduced in another chapter. From another point of view, the glut of food may cause lower prices for consumers. To some of the legislations, a producer is even obliged to sell the product at lower prices. Although, by selling the offer under the price, a cycle is set in motion. As the lower prices occur, there are more consumers, who buy the product, as it is cheaper. The consumer demand increases and the result is supply shortages. A standard reaction to it is that prices are going back up. However, the customers turn away from the products. (Kenton 2021, n. p.)

4.2 The Evolution of Surplus

It is assumed that the food waste phenomenon is a recent matter and in comparison with the past, people are not frugal enough. What is more, to this presumption, food was too valuable to be discarded. However, the wastefulness goes much farther. The first milestone,

which is worth mentioning, was animal hunting. Archeological researches suggest that Homo sapiens had no previous knowledge of hunting. They had no idea how to regulate their hunting sustainably. As the hunters killed a mammoth or a rodent, a significant part of the loot was left to rot. Instead of that, they “could have cut the carcass into strips and dried it out to preserve the meat”. (Stuart 2009, p. 170) Consequently, it has caused the extinction of wild animals and large ecosystems were disrupted. Another milestone was storing grains in so-called pits. After that, domestication and cultivation of crops were established. Before 13,000 years, ways of storing wild grains in pits were developed. It was a solution for prevention of dry food and especially, seeds were protected from germinating. The technological and social development contributed to overreaching the supply of food needed, mainly for the reason of stockpiling. In addition, the human population established a more settled life. Today, the surplus reaches large dimensions and may be unmanageable. People need to make a difference between a positive surplus and a negative surplus. In some parts of the world, current levels of over-production exceed extensively. Reduction of imports and support of local production are recommended. Terms such as over-production and over-consumption are related to an issue which is mentioned. By giving the food away, it helps to build prestige for individuals. In that case, we are talking about a positive aspect. On the other hand, businesses (e.g. supermarkets) often stock their shelves with innumerable products. They are aiming to get their customer base by demonstrating that they are able to provide more supply than their competitors do. Selling goods by the illustration of abundance has become popular recently. Grocery stores over-buy food to trick customers into purchasing items. (Stuart 2009, p. 169-183) Farmer Delaney Zayac explains this issue in the documentary Just Eat It: “If this was what I had (he is presenting a bunch of chard laying in a supermarket crate) and there was an hour left in the market, that one bunch of chard would sit there,

and no one would buy it. But if I had 30 bunches of chard all bursting out, I would probably sell 25 bunches of chard.” (Our Changing Climate 2020, n. p.) Speaking of over-consumption, surplus is the cause of obesity. Obesity is considered as an exceedingly serious matter of our society. “Two thirds of Americans are overweight, half of those are obese, and nearly 8 percent suffer from the related condition of type 2 diabetes; Europeans are well on the way to joining them.” (Stuart 2009, p. 178) An instinct of over-consumption has become deeply rooted in humans. Therefore, the adaptation is encouraging us to eat when food is in abundance. What is interesting is the outcome of a research made by the Natural Resources Defense Council. The researchers found out that when it comes to food, people are uncomfortable with white space. They say the human brain appreciates it in buildings or in design. However, when we are speaking about food, we do not want to see an empty space in a refrigerator or on our plates. Following this, the population is not able to handle storage at home and a sizable proportion of food is thrown away. (Murdock 2017, n. p.) By contrast, the founder of modern demography, Thomas Robert Malthus looked at an agricultural system of China and India and found out that these enormous populations are “surviving on the smallest possible quantity of resources produced in the most efficient way on the available land”. (Stuart 2009, p. 179) A vegetarian diet based primarily on rice and other local cereals stands in contrast with a European diet which is based on fattening up vast numbers of animals and using land to grow animal feed rather than food that could be used for human nourishment.

5 IMPACTS OF WASTE

Waste as a global problem makes an impact on society and economics. Secondly, it is massively involved in the devastation of the environment. In association with the environment, valuable resources such as water, propellants and human work are wasted. In many cases, these resources are considered more important than thrown-away food. Already mentioned surplus goes hand in hand with it. The valuable natural resources would never do without energy which is one of the most highly regarded resources. Fuel that comes in connection with the energy is a tool that is used for pulling tractors. It produces nitrogen fertilizer, heat and other farm inputs. "Water scarcity is one of the world's most pressing problems, and household water-saving measures are being encouraged in many countries." (Stuart 2009, p. 90) In fact, wasting water caused by throwing away food deserves more attention than wasting water produced by toilets, baths, and washing machines. "If 25 percent of the world's food supplies are being unnecessarily wasted, this represents a loss of water withdrawn by farmers from rivers, lakes and wells amounting to approximately 675 trillion litres, or easily enough for the household needs of 9 billion people using 200 litres a day." (Stuart 2009, p. 90) An appreciation of natural sources and not wasting them should be covered. It is shown in this example: "It takes an average of around 31 million kcal of primary energy input to grow a tonne of tomatoes with a calorific content of just 170,000 kcal. By contrast, it takes just 600,000 kcal of primary energy input to grow a tonne of bread-wheat which contains 3-3.5 million kcal, an energy input:output ratio 918 times higher. In other words, the energy that goes into growing the 61,300 tonnes of perfectly good tomatoes that people throw into their household rubbish bins in the UK, is equal to the amount it takes to grow enough wheat to relieve the hunger of 105 million people." (Stuart 2009, p. 88) Wheat as a superfood will be introduced in the following paragraph.

5.1 Neo-Colonialism

Lately, there has been a trend that richer countries are buying land in developing countries. Jacques Diouf, the head of the FAO, stated the non-official name “neo-colonialism”. For instance, an exemplary situation is represented: “In 2008 the South Korean firm Daewoo Logistics sought to increase the security of the nation’s food supply by buying a ninety-nine-year lease on 1 million hectares of land in Madagascar to grow food which will be exported to South Korea.” (Stuart 2009, p. 87) The main crop was supposed to be a maize and the cultivators were supposed to be local inhabitants. As follows, the poor nations are to produce food for the rich nations and it may happen at the expense of their local hungry natives. Therefore, even if it may be viewed as a benefit from an investment in agriculture, it does not solve the issue of hungry and malnourished populations. Secondly, it has become an extinctive phenomenon, as violence and lawlessness has occurred. The direction of richer countries may be judged as overly irresponsible. Taking it from the aspect of what impact it has on the environment, natural resources could be used up during this process. Soil is dried out or water tables become inaccessible. However, what neo-colonialism represents is that affluent countries do not suffer when there are any natural resources left. What they usually do in these situations is that their custom is moved elsewhere. However, farmers (i. e. farmers from developing countries) cannot move their farms. (Stuart 2009, p. 87-88)

In the next paragraphs, there will be introduced four representatives of impacts of food waste on the environment. They are considered ecological and social subjects as well. In the last paragraph, wheat as a superfood is mentioned, as it summarizes some of the previous natural disasters and their possible transformation for better and efficient use of resources. Mentioning food waste impacts on the environment is essential, mainly for the reason that the way in which the population consumes food, is ruining the ecosystem which humans are dependent on.

5.2 The Amazon Rainforest

An area of the Amazon rainforest in Brazil located in South America is considered to be one of the most endangered places in the world. Therefore, it is worth dedicating an individual paragraph to it. Since its existence, the Amazon has suffered from natural disasters, especially from extensive fires. Wood extraction was another threat and South American inhabitants did not know how to be sustainable in this aspect. As the government decided to move people from cities like Rio de Janeiro or Sao Paulo, wanting the growth of economy and cultivation of land, a land rush was sparked. First of all, the land has begun turning into pasture where the locals raised cows to sell meat. The potential of the land was discovered and the expansion into the rainforest commenced the deforestation. The area became a very profitable source. In 2006, a turn of events was recorded. The annual destruction rate of the Amazon rainforest has dropped - by 70 percent. However, the year 2019 brought complications - the already mentioned fires that were spreading unstopably. The issue was considered virtually impossible to control. Nowadays, another aspect of the problem has been discussed. In the past few years, the rainforest has been deforested even more and used to create more agricultural land for food consumption. In over a decade,

it reached the highest level (as shown in the picture).
(Ellis, Thornell, Atthayde 2019, n. p.)

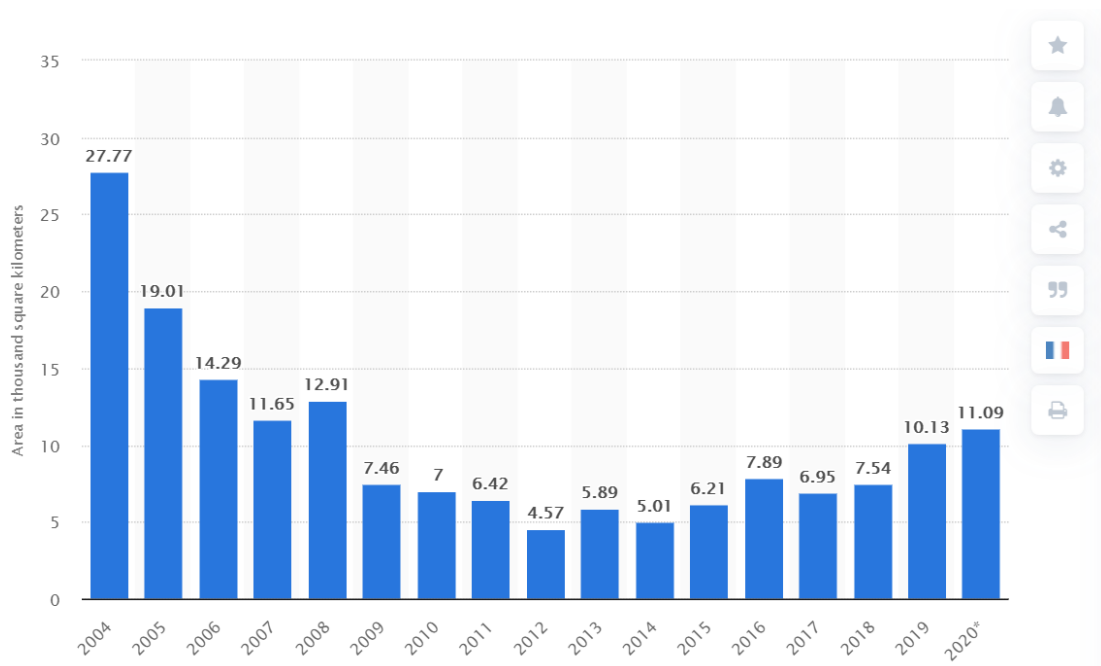


Fig 2 Deforestation Area in the Brazilian Amazon from 2004 to 2020, Pasquali 2020

5.3 Desertification

The term desertification is generally known as “the process by which useful land, especially farm land, changes into desert”. (Longman Dictionary 1978, p. 423) However, in the past few years, the meaning has become much wider. Generally, water and carbon are tied to organic matter in the soil. When a human damages the soil, for example by ploughing, these two constituents are released into the atmosphere. After that, the soil dries up and turns into dust. This is the process in a current form. The only solution to stop desertification is not to create plains of land. The human race has to understand the expanding environmental problem. If there is no living plant, there will be more evaporation. Consequently, no evaporation is needed, but a transpiration is. During the transpiration process, moisture is led through the plant, following an increase of humidity. In the end, the humidity causes rain.

In conclusion, if no plant occupies the land, there is no object that would stop releasing water and the caused heat leaves the soil bare.

5.4 Greenhouse Gas Emissions

“In 2006 the World Bank estimated that deforestation alone may be responsible for 20 percent of greenhouse gas emissions, and the Intergovernmental Panel on Climate Change suggests that land use changes could have caused up to a third of global warming during the 1990s.” (Stuart 2009, p. 93). That is one possible cause of greenhouse gas emissions. Another cause is the production of food or crop that has been grown in the deforested area. It is proven that up to 30 percent of European emissions take part in the production of food. If food consumed in restaurants is included, emissions take up 41 percent. (Stuart 2009, p. 77) After the process of the production and consequently the consumption, the food is being incinerated. An incineration - another factor in the formation of greenhouse gas emissions - results in genesis of a toxic wastewater, methane and greenhouse gas. An increased concentration of methane (together with nitrous oxide) in the atmosphere limits the amount of radiation of accumulated heat caused on Earth to escape back into space, which may subsequently result in global warming. On the contrary of incineration stay emissions from food waste as it decomposes in landfill sites. Most of the decomposition comes from the absence of oxygen. It means it occurs anaerobically. Experts believe that incineration and composting of organic waste are more prospective methods than landfilling. During these two processes, organic matter creates only carbon dioxide which is able to come back to animate matter (by photosynthesis). During the landfilling, up to 30 percent of methane has escaped to the upper atmosphere. There is a regulation authorized by the European Union speaking of landfill remission. The first plan occurred in 2006, when the share of biodegradable

waste in landfills was expected to fall to only 75 percent in the old EU countries (in comparison with the year 1995). In 2009, the value is expected to fall to 50 percent and in the year 2040, there should exist only those landfills that include so called inert matters. Inert matters represent non-toxic and environment-friendly matters. (Kulovaný 2005, n. p.)

5.5 Sugar Cane in Kenya

Another impact on the environment caused by wasting is growing sugar cane in an area of the Tana River Delta in Kenya. The main purpose of the decision made in 2008 was bioethanol production implementation as Britain asked for demand. An ecologically invaluable wetland extending for 21,000 hectares is very important for many animal species, especially for the critically endangered Tana red colobus and for the living of anglers and farmers. The issue is considered a social and ecological disaster and if the process is going to keep continuing in the future, the whole biodiversity of the area may be rapidly decreased. (Jowit 2008, n. p.)

5.6 Wheat as a Superfood

Wheat has been accounted as a remarkably seminal crop by far. It is believed that it saves energy and water. What is more, the production could solve the matter of malnourished people in the world. Greenhouse gas emissions could be reduced as well. From the sight of nourishment, wheat is a vitamin- and mineral-rich nutrient for the human body. The crop helps reduce the risk of the already mentioned obesity, supports healthy digestion and there is a lower risk of heart disease. Therefore, after introducing the impacts of waste on the environment and on society, wheat is worth mentioning. According to some statistics, 36,000 tonnes of wheat would produce enough food to save 1.2 million of the world's malnourished people from hunger, it would save

7.5 million tonnes of water and reduce greenhouse gas emissions equivalent to 14, 340 tonnes of carbon dioxide. (Stuart 2009, p. 90)

6 PREVENTION OR A NOT INSOLUBLE PROBLEM

As mentioned above, food waste is a significant ecological and social issue. Orientation on renewable resources represents an effective and responsible way for the future. There has been a massive amount of institutions or summits which debated about climate change. In the first place, climate change is caused by the population which wastes food. After that, the food becomes landfilled or composted and it results in releasing the harmful emissions into the atmosphere (carbon dioxide). Together with the worldwide known food waste route - landfilling - is the process associated with some other harmful routes. It could be incineration, extraction of "mixed municipal waste through mechanical biological treatment" or autoclaving system, where the waste is mixed with steam under pressure. (Stuart 2009, p. 235) These are the routes that are aimed to not to be used. As the subject of the matter has been discussed, and many of us are fighting against it, during the past few years, several solutions are beginning to see the light of the day. In the following paragraphs, selected examples, which show effective and preventable solutions, are introduced.

6.1 Regeneration

To introduce, what regeneration is, a definition of the word regenerate from the Longman Dictionary is borrowed: to regenerate means "to make something develop and grow strong again". (Longman Dictionary 1978, p. 1380) Cambridge Dictionary states regeneration as the "act of improving a place or system, especially by making it more active or successful". (Cambridge Dictionary) The definitions express it in an exact way. The only way to take care of agricultural lands, which give consumers the crops, and make it more profitable (especially from the environmental point of view) is to use its potential. A solution is thus not manipulation with chemicals or frequent soil ploughing. The solution stands for the soil's health. The next main

principles of soil health are represented: least amount of mechanical disturbance (it means no till), diversity (main secret is in growing as many species in one field as possible), an armour on the soil (it could be perennials and other trees), living root and lastly, animal integration. Breeding animals on a farm guarantees quality of land. However, a secret of success consists of several aspects: how large the land for pasturing animals will be, how long the animals will feed on it or how many cattle will be let in a defined area. Dung, urine and hooves are the key.

France, the main leader of the climate change matter and matter of soil, has firstly come up with a plan on how to discover the potential of soil again. Specifically, French minister of agriculture Stéphane Le Foll decided to present a solution about the issue in pursuance of COP21 project. COP21 is “officially known as The 21st Conference of the Parties (or COP21) to the 1992 United Nations Framework Convention on Climate Change (UNFCCC). This meeting involves world leaders negotiating an international agreement to limit greenhouse gas emissions and hold planetary warming below 2°C (3.6°F) of pre-industrial levels”. (Climate Central 2015, n. p.) The solution concerns the increase of the carbon content in soil by converting it from the atmosphere, where the carbon is not necessary, rather detrimental by 0.4 percent annually. The already mentioned ploughing causes release of carbon from the soil. It is proven that the soil can hold more carbon than the atmosphere and plants which live on the surface of the soil. In a relatively short period, there will be an ability to store the carbon in the soil. One way to do it is avoiding toxic pesticides, GMOs (“genetically modified organism” (Longman Dictionary 1978, p. 688)) and synthetic chemicals. A non-pleasing result is that the three biggest carbon dioxide emitters - USA, China and India did not sign the agreement of carbon storing in the soil.

According to the statistics, by switching to regenerative agriculture, American farmers could save up to 100 billion dollars annually. The main purpose of this kind of agriculture is voluntariness and diversity. Therefore, those who are subsidized by the government are more predisposed to be unsuccessful with their business. To be more specific, the United States Department of Agriculture has set up a program called Commodity Credit Corporation to give farmers price guarantees. There is a condition - they have to grow specific crops. In result, the land is turning into dust, as the same crops on the same area are grown repeatedly. Secondly, the farmers are surviving only due to the government (financial) aid. In conclusion, regenerating the soil and the agricultural land may be the way how to be sustainable with the planet; not releasing the emissions and guarantee an appropriate manipulation with the crops. It could cease the process of wasting food. There is an interesting statement: What heals our soil can heal our climate. (Kiss the Ground 2020, n. p.)

6.2 Landfill Bans in Korea

“In the 2019 Global Waste Index, Korea ranked first place out of all 36 Organisation for Economic Co-operation and Development (OECD) countries for best waste management.” (Lee 2020, n. p.) However, as far as the food waste (plastic waste as well) is concerned, it is still one of the countries whose wastefulness is enormous. The following factors influence it. Several dishes in one meal are typical for their culture and the cuisine in general is very diverse; it often includes a complicated meal preparation, for instance, a meal called namul. “Namul refers to seasoned herbal menus made with leaf or grass vegetables such as spinach, bean sprouts, or seaweed - all staple side dishes in everyday Korean meals.” (Lee 2020, n. p.) Therefore, in the 1990s, the Korean government decided to implement restrictions which are regarding trash disposal. After the introduction

of purchasable trash bags (price amounted from two cents to 1.40 dollars per bag), which has appeared as a non-efficient step, as the inhabitants began to fill public trash bins with their trash, a ban of landfill dumping and incineration was established. Main task was to build around 260 factories during 10 years which would turn the food waste into fertilizer or animal feed. Korea has immediately recorded success, as the statistics has confirmed. "Korea altogether turns 95% of the country's total food waste into animal feed or fertilizer." (Lee 2020, n. p.) Radio-frequency identification machines (known as RFID, shown in the picture below) have been established with the implementation of landfill bans. During the years 2013-2017, around six thousand machines were installed in environs. "Each household is issued a prepaid card with a unique identification number, which the machine scans when trash is thrown away, and charges the amount money by weight." (Lee 2020, n. p.) As a result, many people have begun composting at home and there has been a decrease of 25 percent in overall food devaluation. The smoking bans have expanded to countries other than Korea. Ireland, France, Japan and for example the United Kingdom have accepted the law as well. What this kind of innovation aims to show is the fact that populations are able to get used to the most dramatic changes. Only satisfactory effort is required. (Lee 2020, n. p.)



Fig 3 Radio-Frequency Identification Machines (RFID), Gyong 2020

6.3 Anaerobic Digestion

Another way to dispose of food waste is called anaerobic digestion. To explain the term, definitions from dictionaries are borrowed. Anaerobic represents an object that does not need oxygen in order to live. (Longman Dictionary 1978, p. 46) The word digestion means “the action, process, or power of digesting: as the process of making food absorbable by dissolving it and breaking it down into simpler chemical compounds that occurs in the living body chiefly through the action of enzymes secreted into the alimentary canal”. (Merriam Webster 2004, p. 349) Another definition stands for “the process in sewage treatment by which organic matter in sludge is decomposed by anaerobic bacteria with the release of a burnable mixture of gases”. (Merriam Webster 2004, p. 349) To sum it up, organic waste materials (food and slurry) are broken down in the absence of oxygen during a process. To further illustrate how the anaerobic digestion works, the following scheme is used:

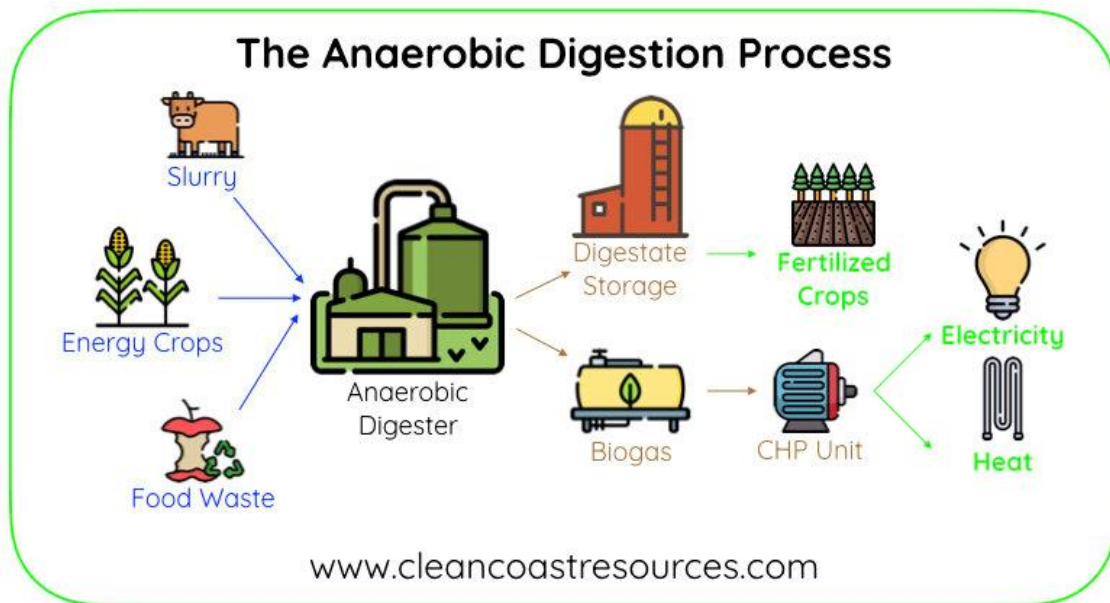


Fig 4 Anaerobic Digestion Process Scheme, Pullen 2020

1. "Organic waste is separated from inorganic materials and sent to an anaerobic digester containing three types of microorganisms: acidogenic bacteria, acetogenic bacteria and methanogens.
2. Microorganisms begin to break the organic waste down into sugars and fatty acids, in a biochemical reaction called hydrolysis.
3. Acidogenic bacteria convert the sugars and amino acids into carbon dioxide, hydrogen, ammonia, and other organic acids.
4. Acetogenic bacteria convert the organic acids produced in the last step into more carbon dioxide, hydrogen and ammonia.
5. Methanogens convert the products of the last two steps into a biogas made up of 60 percent methane and 40 percent carbon dioxide.
6. Biogas is used to generate heat and electricity." (Hazimihalis 2019, n. p.)

"The AD process results in 3 by-products: Biogas, typically between 55% - 75% methane. After impurities have been filtered, the biogas can be burned in a CHP unit to generate electricity. Digestate,

a high quality soil conditioner and fertilizer, rich in nitrogen, phosphate and potassium. Heat, generated from the combustion of the methane gas, can be captured and put to use as either steam or hot water.” (Pullen 2020 n. p.) CHP is an abbreviation for “combined heat and power”. (Collins Dictionary 2021, n. p.)

Thus far, anaerobic digestion is observed as the best treatment technique, especially for most mixed-food waste in Europe. There is no greenhouse gas emerged, the process produces 100 percent renewable energy, and the final matter could be used as a fertilizer. As the global warming has been mentioned above, the digestion reduces acidification, or eutrophication. Eutrophication is “the process by which a body of water becomes enriched in dissolved nutrients (as phosphates) that stimulate the growth of aquatic plant life”. (Merriam Webster 2005, p. 432) On the other side, there are some disadvantages noticed. The main disadvantage is represented by maintenance. From this point of view, the construction itself is expensive. A massive capital is required in the beginning. “It is estimated that it takes 30 to 60 minutes daily to ensure the efficient running of the system.” (Clements 2018, n. p.) Therefore, some governments in Europe have decided to supply grants and subsidies, as they want to support this kind of industry. Germany has become successful in the digestion implementation. On account of subsidies, “farmers could charge for allowing companies to dispose of their waste” in that case. (Stuart 2009, p. 235) Additionally, support by the Renewable Energy Sources Act (established in 2000) has enabled a fixed subsidy, which is paid out “for every unit of renewable energy produced”. (Stuart 2009, p. 235) Another disadvantage is that the digesters always have to run efficiently. It means, a constant source of raw materials is demanded - food waste from human sources, animal slurry, and herds of cows that primarily support the farm. This causes a limit, meaning that a farmer

who is interested in anaerobic digestion has to own a large farm. The non-large farms may be considered inefficient.

6.4 Food Waste Donations: FareShare

An efficient way of dealing with food waste and hunger is a food donation. One of the famous organisations which is dealing with these issues is called FareShare. The organisation resides in the United Kingdom. "FareShare is the UK's national network of charitable food redistributors, made up of 18 independent organisations." (FareShare 2021, n. p.) Following this, the network collects the surplus food coming from the food industry (i. e. supermarkets or restaurants) and gives it to charities and other groups in need. According to FareShare's research, "8.4 million people in the UK are struggling to afford to eat" and "250,000 tonnes of the food that goes to waste each year is still edible". (FareShare 2021, n. p.) Considering the gained facts, the association had decided to solve the issue. The organisation will be introduced in numbers: 24.074 tonnes of food was redistributed to charities, the network has boasted 1.500 volunteers, FareShare supports up to 933.178 people every week and a significant information is the value of given food - the food donation would represent £14.1 million. (FareShare 2021, n. p.) To sum up everything that has been stated, the charities and food donations are a futuristic prevention, mainly for the reason that we as the planet inhabitants can reduce the food waste and food loss by only giving the food that is considered as unconsumable.

6.5 Kitchen Hacks

Food and its preparation is connected with a place that is called kitchen. In this place, the world population gives rise to food surplus, scraps and organic waste in general. In contrast, the kitchen is an initial place where the food waste problem can find a solution. Since the thesis

has been concentrated on households and restaurants, the major steps on how to reduce the waste in these places are mentioned in the following paragraphs.

6.5.1 Storage

Each food item has its natural environment; it means that the consumers have to take care of the item's placement. Some items require to be stored inside and some of them outside a refrigerator. Secondly, the most appropriate choice is storing vegetables and fruits separately, mainly for the reason that many food items give off natural gases during their ripening. If surplus occurs, freezing or preserving is recommended. The last point is not to wash the item unless it is prepared to be eaten. The water accelerates the decomposition process.

6.5.2 Planned Shopping

Before the food is brought home and stored, it needs to be bought. Therefore, planned shopping is another efficient indicator on how to prevent one of the origins of food waste. What is more, it saves money. First, an evaluation of kitchen ingredients is a step to avoid overbuying. A proper list of meals which are planned to be cooked in the following week is considered as another preventive measure. If there is a household where a family lives, a running list of meals and ingredients could help. After that, the shopping, as well as the preparation are fast and easy to make. To sum up what has been stated, buying only what is needed and what will be used is the key to efficient shopping.

6.5.3 Preparation

The step after shopping is to process the bought items, especially the perishable ones. It is recommended to wash them, dry, chop or slice them and place them into specified bins in the cupboard, freezer or fridge. The freezer is an adequate tool. The consumer can use it for freezing bread or meat that he or she is not able to consume in time.

(Turner 2017, p. 1 - 72)

7 THE WORLD AND FOOD WASTE

The food waste issue is viewed as a problem, partially for the reason that there are many people living on the planet and this amount is going to rise in the future. It is estimated that between 2020 and 2050, “over 2 billion people will join our planet”. (The World Counts 2021, n. p.) Following this, the population has to learn how to manage food waste increase and the food waste limits which are increasing as well. Secondly, as it is mentioned in the previous paragraphs, over 800 million inhabitants suffer from undernourishment and hunger. If a quarter of the globally wasted food in Europe and the United States was taken and transformed, the 800 million inhabitants could be saved. (The World Counts 2021, n. p.)

According to the UN’s Sustainable Development Goals, it is reckoned to reduce “food loss in production and supply chain” and “cutting in half global food waste at the retail and consumer levels per capita” by the end of 2030. (The World Counts 2021, n. p.) However, there is one serious obstacle - the rising population growth. In a year, there will be 800 million more people. On account of that, even if shrinking the level of food waste per capita in half would be successful, the index of total global food waste would probably ruin the UN’s predictions. (The World Counts 2021, n. p.) In every case, to stop throwing food away occurs as the most efficient solution. The following picture illustrates how much food is lost or wasted globally (including industrialized and developing countries) and in the second part, calories per person that could save the matter of hunger and undernourishment are considered.

1/4 TO 1/3 OF ALL FOOD PRODUCED FOR HUMAN CONSUMPTION IS LOST OR WASTED

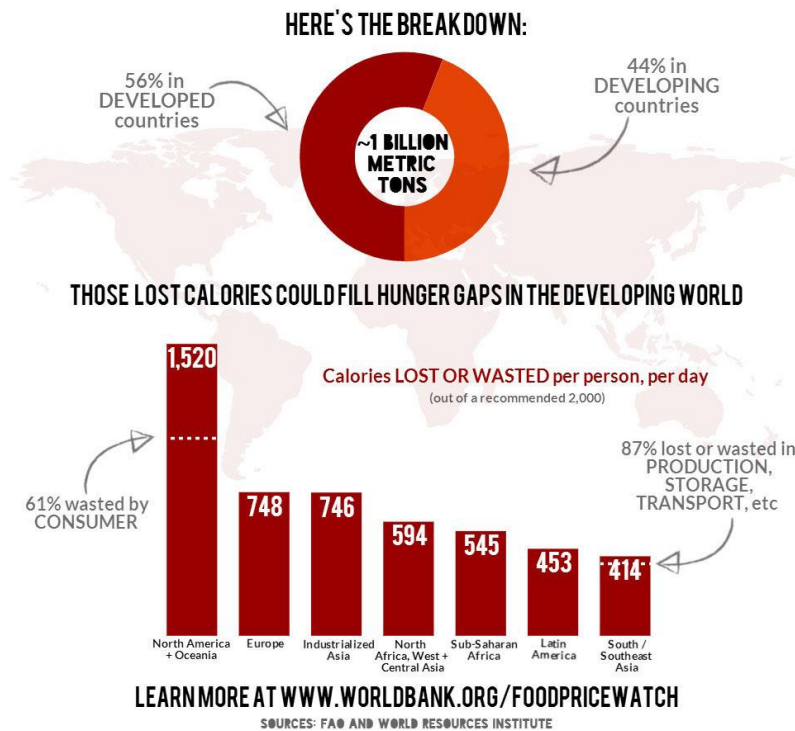


Fig 5 Food Loss and Waste, The World Bank 2014

The thesis focuses on households and restaurants, thus food waste in these spheres will be introduced. Updated schemes and statistics are included.

7.1 Households

According to the IFCO Magazine, “avoiding food waste efficiently along the supply chain and in all our households can result in a win-win scenario”. (IFCO SYSTEMS 2020, n. p.) As it has been already stated in the Kitchen Hacks paragraph, the change begins in households - in kitchens. Therefore, with the population’s willingness, a major part of the discussed issue may be solved. The IFCO Magazine has published that “private US households waste around 43% of all food”. (IFCO SYSTEMS 2020, n. p.) In general, the American consumers’ involvement in food wastage has a larger share than the wastage of retailers. In the European Union,

the households' level of wastage amounts to 50 percent. The British charity WRAP has released data of the United Kingdom; it values it at 70 percent. (IFCO SYSTEMS 2020, n. p.) In the table below, the most prominent countries are represented, together with a number of tonnes of food waste that is thrown away annually. The monetary amount (in Euros) is included.

REPRESENTATIVE	NUMBER OF TONNES (in million)	PRICE VALUE (in billion, Euros)
US	40	135
EU	47	98
UK	4.5	11.7
AUSTRALIA	7.3	12.4
CHINA	17-18	---

Tab 1 Food Waste in Prominent Countries: Number of Tonnes and Price Value, IFCO 2020

Next picture illustrates European inhabitants' expectations of their household consumption. The United States of America perceive their wastage lower as well. Moreover, British inhabitants are claiming that they are able to use 95 percent of their groceries. (Wagner 2018, n. p.) In all cases, a value between perceived food waste and actual food waste is appreciably different.

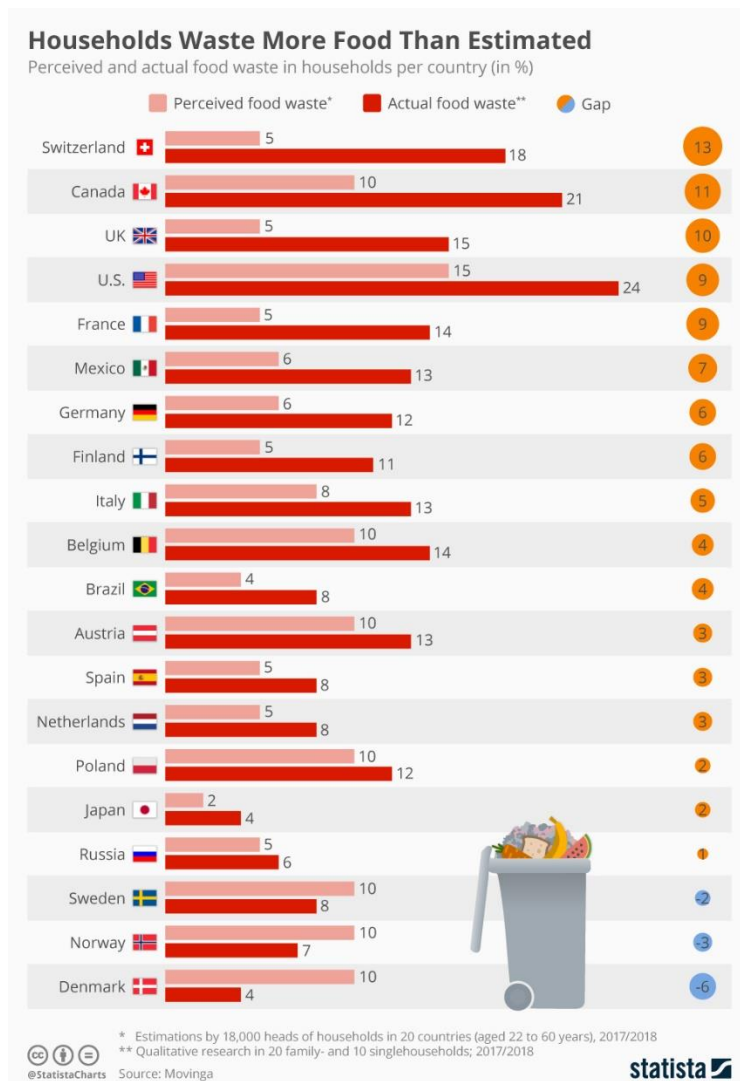


Fig 6 Households Waste More Food than Estimated, Wagner 2018

7.2 Restaurants

Restaurants in a global perspective waste approximately between 4 and 10 percent of all food. The value represents wasted food during the process before reaching the consumer. (Natural Resources Defense Council 2017, p. 24) Main reasons point to an extensively large menu choices, oversized portions that the consumer is not able to eat and disinclination of store management. Furthermore, from the food processing point of view, overbuying, overproduction and spoilage are considered as other causes of the food waste level. This issue is viewed as hard to solve. However, several solutions have

begun to see the light at the end of the tunnel. The main two are introduced below.

7.2.1 The First Initiative: Winnow

Marc Zornes, cofounder of WINNOW in the United States (a company concerning the cutting of food waste), has decided to change the behaviour of chefs in the food industry. Zornes has noticed that there is a fear of failure by running out of food offers and losing on the business market. A consequence of the fear is the already mentioned overproduction, followed by food waste or food loss. Therefore, Zornes' aim is to "connect commercial kitchens, create a movement of chefs and inspire others to see that food is too valuable to waste". (Harris 2021, n. p.) For instance, there is a Winnow Vision system which assists chefs to accurately find out the waste, cut costs and save time. Photos of wasted food are taken by the system. Consequently, the machine trains itself to recognise what has been thrown in the bin. In conclusion, food will be thrown in the appropriate bin and the data will be captured automatically. (Harris 2021, n. p.) People who have used the Zornes' initiative technology, have recorded a significant change in their industry - it has saved them money and the way they look at the food waste issue as well.

7.2.2 The Second Initiative: Instock

Instock is a complex of three restaurants in the Netherlands. Three persons, Bart Roetert, Freke van Nimwegen and Selma Seddik, have found an initiative. They have noticed the thrown-away food by supermarkets, packaging companies or growers and realized that the food could be used for consumption. Consequently, the trio has begun to drive around local markets and collect the excess items.

From those collected materials, “delicious and creative dishes are created”. (Meyer 2021, n. p.) On the website, Instock offers their products, such as a Cookbook, special beers or granola. Lately, schools have been integrated into this program and in turn, the restaurant educates children about food waste and its potential danger. (Meyer 2021, n. p.)



Fig 7 Zero Waste Dining at Instock Restaurant, Amsterdam, Kranendonk 2015

8 THE CZECH REPUBLIC AND FOOD WASTE

The current food waste situation is on the same level around the world and in the Czech Republic as well. In both cases, it is perceived as a relevant social, ecological and economical problem. In the Czech Republic, the already mentioned issue has been intensively worked on since only the year 2000. There has not been a survey that has concerned food waste prevention so far. Education on this topic is considered insufficient in general. Veronika Láchová, a CEO of Czech Federation of Food Banks, states that there is not enough money for educational programs conducted to reduce food wasting in households. Transparency is viewed as another issue. In accordance with this, a project by the Faculty of Business and Economics at the Mendel University in Brno was established. Their goal is to change the population's behaviour that openly confesses to wasting and consequently, to minimize food wasting levels in the future. (Koucká 2019, n. p.) According to a survey performed by the Centre for Public Opinion Research, participation of Czech inhabitants who consider the issue as weighty has increased since the last survey made in 2018 (by 6 percentage points). Many respondents consider food waste reduction in a sense of money saving. This reason is important for 81 percent of respondents. Sixty-five percent of them see an ecological asset for planet burden. Sixty-three percent of respondents consider the prevention as time saving. A significant amount of 40 percent of respondents have stated that they had had an experience of food shortage before and therefore they aim not to waste. According to the European Commission's estimates, the Czech Republic throws away not such a significant amount of food in comparison to other European Union states. An estimated number represents 829 851 tonnes of food waste from restaurants, shops and households (i. e. 6.4 percent of total production, agricultural waste is not included). (ISPV 2019, n. p.) Many legislatives regulate the food waste matter. For instance, since January 2018, retail chains with a sales

area of over four hundred square meters are obliged to donate unsellable food to food banks or to non-profit organisations instead of sending it to landfills. The legislation includes food with a damage package or wrong label. If the chain does not follow the legislatives, it could receive a fine of 10 million crowns. (Koucká 2019, n. p.)

8.1 Czech Households

Czech households take an enormous part in food wasting. According to TESCO's survey, it represents one third of the total amount. The already mentioned Mendel University's survey has indicated that Brno inhabitant throws away 37.4 kilograms of food annually. (Lifée 2020, n. p.) In general, the average Czech consumes 785 kilograms of food in a year and 200 kilograms from that is thrown away. According to statistics, people who live in a single household waste immensely. In contrast, households containing more members are more economical, as they are able to consume the majority of bought food. (Koucká 2019, n. p.) A lack of education in terms of sell-by date and expiration date was noticed. Therefore, the next two paragraphs are stating the definition.

8.1.1 Sell-By Date

A sell-by date refers to "the date stamped on a food product, after which it should not be sold". (Longman Dictionary 1978, p. 1490) It means that after the sell-by date, the stores should remove the product. However, past this date, a customer can still consume the product. If the date has expired and it is still on offer, it should be consumed as soon as possible. Primarily, the customer should inform the retail about the occurred issue. It is esteemed that the sell-by date is an information for the store.

8.1.2 Expiry Date

According to the Longman Dictionary, an expiry date represents “the date after which something is not safe to eat or can no longer be used”. (Longman Dictionary 1978, p. 549) After this date, the item should not be consumed, as spoils, damages or other ineffective signs could be found. In other words, the food has lost its “best if used by” date.

8.2 Czech Restaurants

The Save Food organisation by the United Nations has announced, “about 27,000 tons are thrown away every year, even though it is edible”. (T. [SIC] Lidia 2019, n. p.) In the past years, many Czech restaurants are fighting against the food waste issue by donating to people in need or by offering unsold foods in mobile apps. However, there are obstacles that need to be solved. For instance, the hygienic aspect is adjusted by strict regulations. Secondly, selected restaurant institutions do not have enough money to pay for food transport (e. g. to the food banks). In spite of mentioned obstacles, the amount of restaurants that are involved in food waste reduction is rising. The use of mobile applications is expanding in the Czech Republic. The point is that everyone can order food with a discount. The most famous representatives are called Nesněženo and Jídlov. The first interactivity has occurred in Brno, Moravia. Olomouc, Ostrava and Prague have introduced applications gradually. It is stated that approximately 200 portion are sold in a day. This established prevention has been considered successful so far. It meets the aim of reducing the food waste level. (T. [SIC] Lidia 2019, n. p.)

8.3 Organisations and Campaigns in the Czech Republic

A process of establishing new organisations and projects that are dealing with food waste is on the increase in the Czech Republic. The population is learning how to educate consumers about food waste recycling

and redistribution routes, and is adapting to innovations. One of the leading organisations or associations is called Zachraň jídlo.

8.3.1 Zachraň jídlo

Persons who consider the food waste issue serious and socially inadmissible founded an organisation called Zachraň jídlo in 2013. The society decided to project preventive measures on how to reduce the rising food waste. They aim to motivate change. Contemporaneously, they provide assistance for making the changes. There are workshops, documentaries or recipes published on their website. In 2019, a campaign called Use Me was founded and it aims to raise public awareness of the terms sell-by date and expiry date. On account of the terms, the organisation has found out that 8.8 million tonnes of food is thrown away in the European Union annually. In 2017, the organizers connected with the teenage generation, as they called on to post a picture of a blank plate on social media Instagram. The aim was to promote finishing meals. According to Zachraň jídlo, the teenage generation is classified as the high-risk group. The campaign has received the name Vyližto. A new campaign, which occurred in 2020, concentrates on clear interpretation of rules for donating ready-made meals and simplifying the whole process, as the issue is relevant. (Zachraň jídlo 2021, n. p.)



Fig 8 Campaign Vyližto, Zachraň jídlo 2017

8.3.2 Gleaning

Gleaning is a project made by the Zachraň jídlo organisation that was founded in 2015. Gleaning is an old method that has existed in the past. However, it has been omitted in the current situation. Therefore, the organisation decided to re-establish its tradition and involved many people with it. The point resides in collecting crops that have remained on fields, as they did not meet the cosmetic requirements for retailers. Cosmetic defects include inappropriate shape, colour or size. The result of the event was that even the food that did not have an adequate appearance could be used in the most efficient way. Gleaning has been a successful method, as it contributed to raising public awareness about food waste. (Zachraň jídlo 2021, n. p.)

9 PRACTICAL PART

9.1 Methodology

The first part of the practical framework is a glossary consisting of English neologisms that are related to the food waste issue. According to the Longman Dictionary, a neologism means “a new word or expression”. (Longman Dictionary 1978, p. 1101) They enrich already known semantic fields by a new term. Neologisms are reflected by words that are already in existence or they create a completely new word. The process of word formation, that is often used, is blending (“smoke + fog = smog, spoon + fork = spork” (Literary Terms, n. p.)) or derivation (“Latin word: sub, meaning: under, derived words: submarine, subway” (Literary Terms, n. p.)).

Most of the words were found on the internet. These electronic sources include the latest and most modern neologisms that are used by English-speaking cultures. Another source for finding the words is represented by a book *A Very Modern Dictionary* by Tobias Anthony. The introduction of English new words contributes to the understanding of new trends and views in a contemporary English-speaking society. Secondly, in some parts of the world, food waste is no longer just a process. Many inhabitants have begun to be initiative and consider this issue seriously. A glossary of neologisms is a confirming evidence.

The main objective of the practical part includes a survey and its analysis. The survey consists of 18 questions and it was distributed to selected Czech restaurants. There are various forms of questions, such as open-ended ones (an appropriate indicator for the author of what the interesting regulation of each restaurant is) or multiple-choice type of questions (an appropriate tool to familiarize a restaurant using the question and to help to imagine their situation). To follow the purpose of this thesis, there are questions presented, such as if the restaurants buy food responsibly, what is done with the remains (i. e. leftovers and waste

during the kitchen preparation) and if they know about mobile applications that fight against food waste.

The author collected the data via phone calls. Afterwards, they were entered into the online platform survio.cz. Consequently, the collected data were evaluated. Following this, tables and charts are to be seen.

The survey is presented in Czech and will be translated into English. Both the original Czech version and the English translation are placed in the appendix.

10 FOOD WASTE RELATED NEOLOGISMS

10.1 Glossary of Neologisms

1. Bio-bus

A bus of which power is based on a bio gas - methane. The gas is “generated through the treatment of sewage and food waste”. (Katermina 2020, p. 9)

2. Carboleaver

“The person on a low-carb diet who always leaves the carb foods from their entrée on the plate.” (Cury 2017, n. p.)

3. Coldscape

Technologies that help to store food, transport and prepare it. (Katermina 2020, p. 10)

4. Freegan

Compound of the words free and vegan. “A person who eats only free, discarded food, typically from the refuse of shops or restaurants, supposedly for ecological and/or ethical reasons.” (Anthony 2017, p. 34)

5. Left-Unders

“Food that has been wrapped up for later consumption and placed under other items in the refrigerator.” As a result, it was forgotten. (Cury 2017, n. p.)

6. Localisation

“A market term that refers to the desires of modern consumers for products that are local and ideally, independent. Has contributed to the rise in popularity of craft beer and reflects current importance being placed on locally-sourced food produce.” (Anthony 2017, p. 53)

7. Locavore

“A person who eats only local produce, usually food grown and raised within a certain radius from where they live.” (Anthony 2017, p. 53)

8. Smice

“Smelly ice that can make a drink taste “off” - usually a result of old age and contamination from other foods in the freezer.” (Cury 2017, n. p.)

9. Upcycle

To upcycle means to find a new life in an used object. “In upcycling, the product is not shredded back into raw material (like the process for recycling) but repurposed just as it is. Upcycling requires less energy than recycling and extends the cycles of the use of a product.” (YourKarmaApp 2019, n. p.)

10. Wishcycle

To wishcycle means to throw a “questionable item in the recycling bin, hoping they can be recycled”. It represents a threat to the success of the curbside recycling program which is a tool that educates inhabitants what to recycle and what not to. (Lethbridge, n. p.)

11 ANALYSIS AND INTERPRETATION OF RESULTS

11.1 Survey

Question number 1: In which region is your restaurant located?

ANSWER	NUMBER OF RESPONDENTS
PRAGUE	2
SOUTH BOHEMIAN	4
SOUTH MORAVIAN	3
KARLOVY VARY	3
VYSOČINA	3
HRADEC KRÁLOVÉ	3
LIBEREC	1
MORAVIAN-SILESIA	3
OLOMOUC	1
PARDUBICE	5
PLZEŇ	7
CENTRAL BOHEMIAN	1
ÚSTÍ NAD LABEM	5
ZLÍN	1

Tab 2 Question Number 1

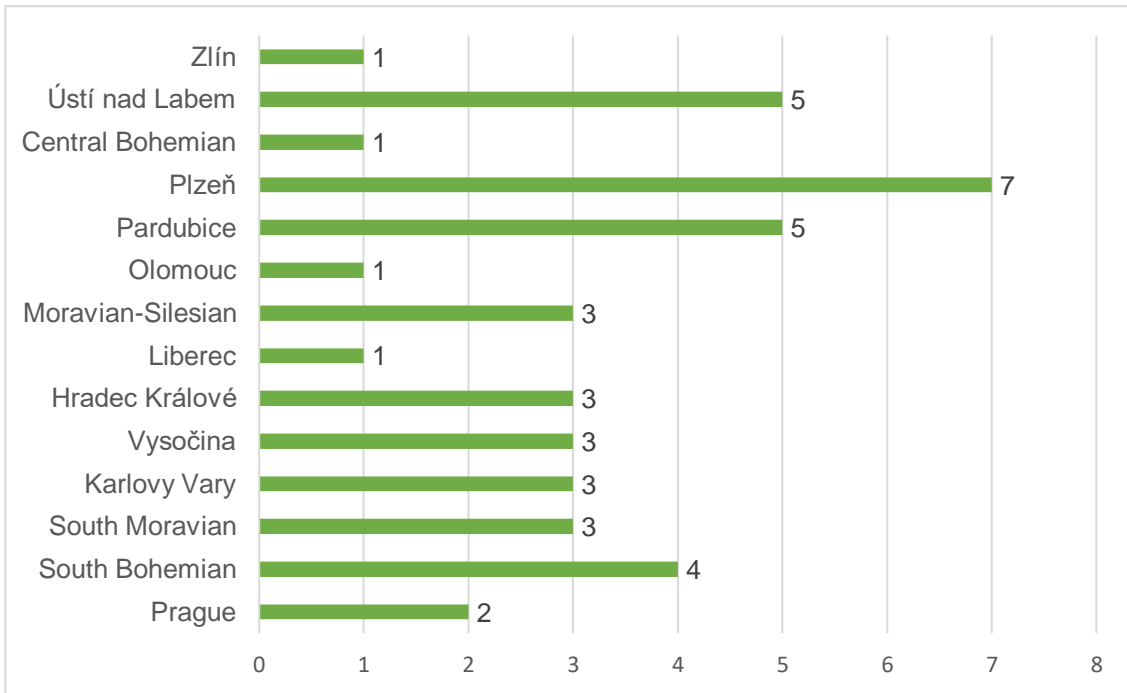


Chart 1 Question Number 1

According to the results, it is seen that most of the respondents come from the Plzeň region. The reason is that the author lives in this region. On the basis of contacts it was estimated that selected restaurants will be willing to answer the questionnaire. Other data were collected on the grounds of willingness to answer or sending back an e-mail with the filled-in questionnaire.

Question number 2: What is your job position in the restaurant?

ANSWER	NUMBER OF RESPONDENTS
PROPRIETOR	9
MANAGER	21
WAITER	7
CHEF	1
OTHERS	4

Tab 3 Question Number 2

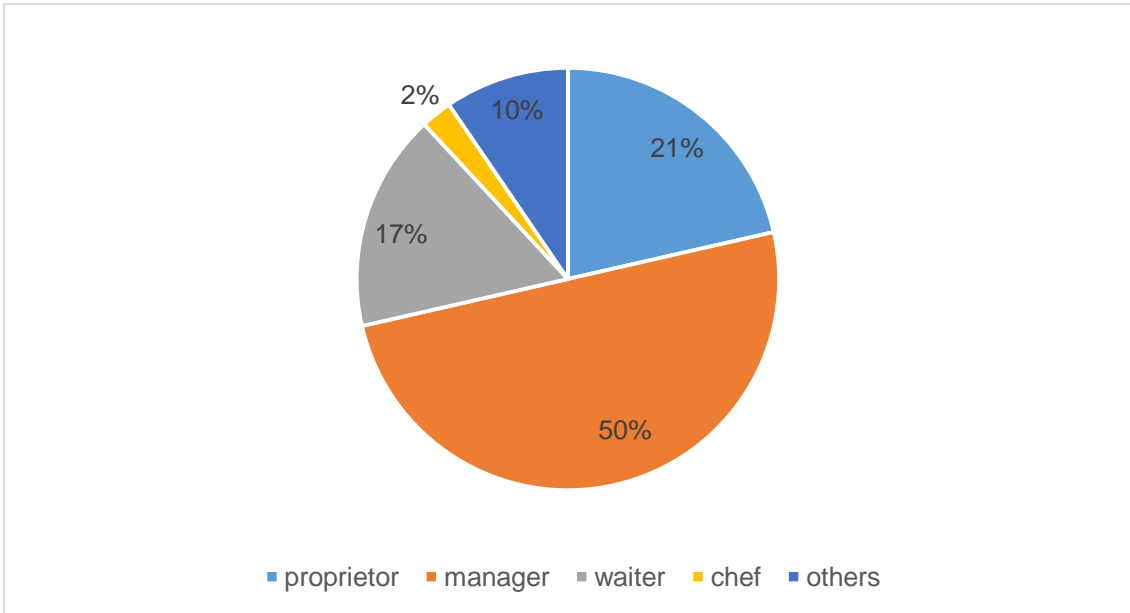


Chart 2 Question Number 2

In most of the cases, the phone calls were executed with managers of the restaurants. It was usually waiters, who transferred the author to the manager, as they thought that the superior is a more competent person to answer the questions.

Question number 3: Do you know any mobile applications that fight against food waste?

ANSWER	NUMBER OF RESPONDENTS
YES	11
NO	31

Tab 4 Question Number 3

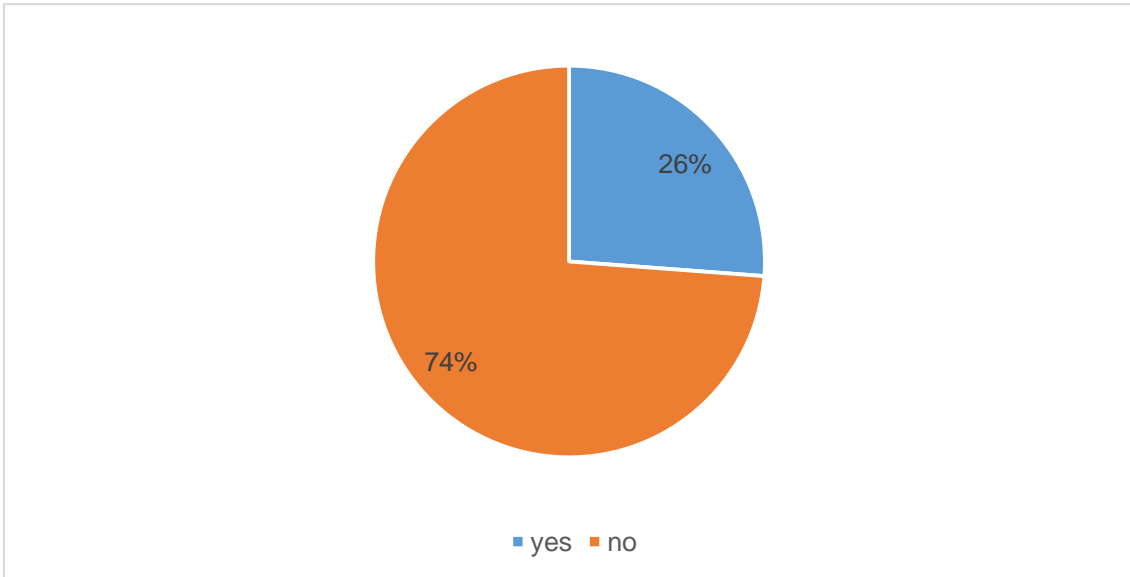


Chart 3 Question Number 3

This question seems obvious. As far as the mobile applications fighting against wasted meals are considered one of the most effective preventions in the theoretical part, 74 percent asked have never heard of the possible solution before. Those who typed “yes” (26 percent) currently use the tool or used it in the past. However, they gave up when poor management occurred.

Question number 4: When you think of wasting food in your restaurant, you would say that you...

ANSWER	NUMBER OF RESPONDENTS
DEFINITELY DO NOT WASTE	17
RATHER DO NOT WASTE	21
RATHER WASTE	3
DEFINITELY WASTE	1
DO NOT KNOW/NO OPINION	0

Tab 5 Question Number 4

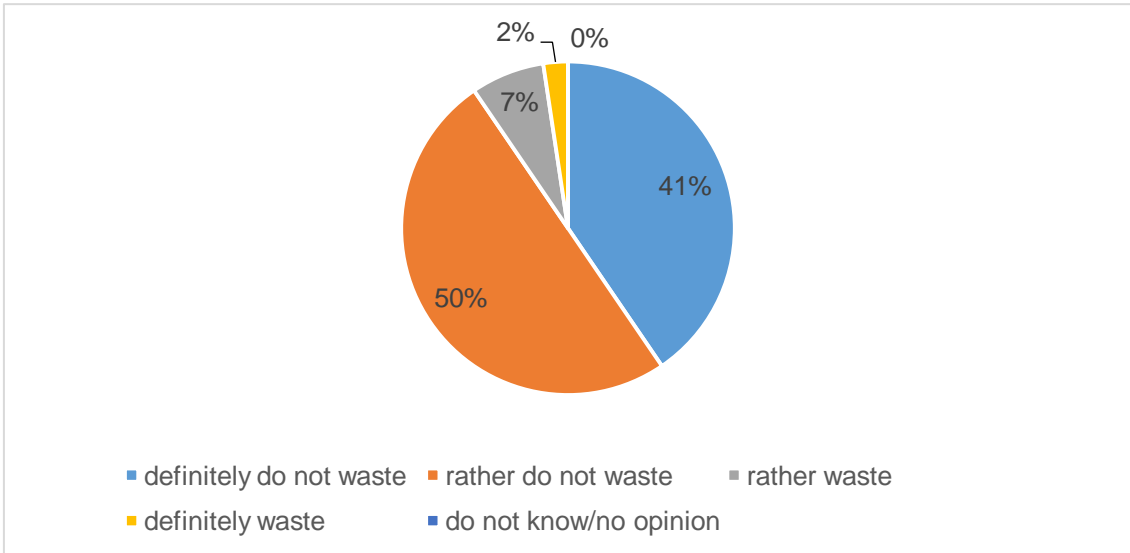


Chart 4 Question Number 4

The fourth question indicates that 50 percent of the restaurants consider themselves as those who rather do not waste. The second largest group includes those who state that they definitely do not waste (the light blue colour in the chart). These were companies whose concept is called “zero-waste” or another group that answered this option, since it was the fastest way out of the phone call. 1 respondent confessed to a vast amount of waste as he has just started the business.

Question number 5: Is there any measure to handle the remains?

ANSWER	NUMBER OF RESPONDENTS
YES	34
NO, THE REMAINS ARE THROWN AWAY	8

Tab 6 Question Number 5

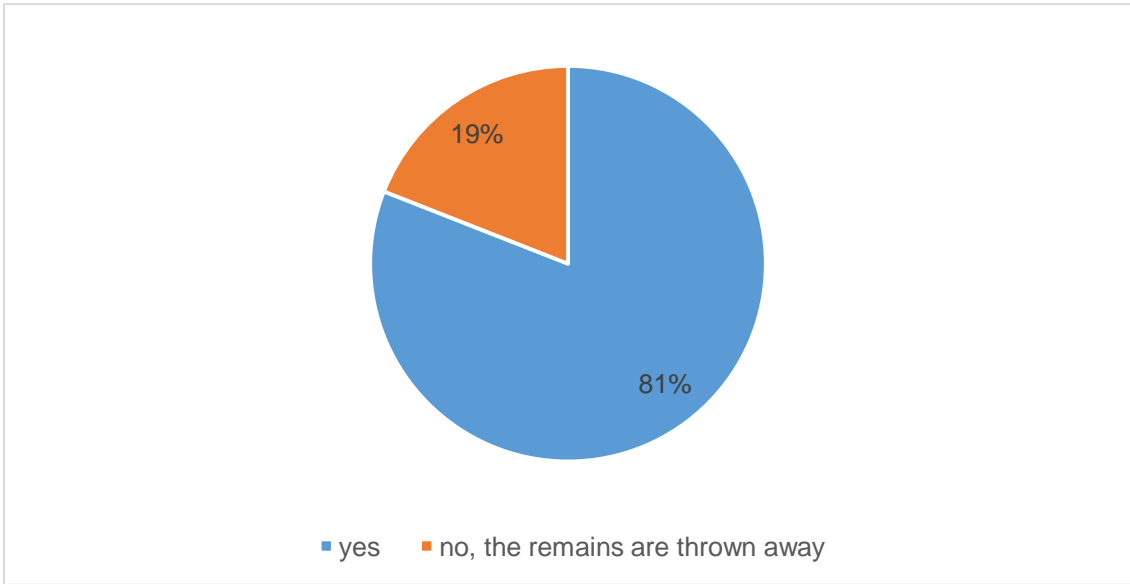


Chart 5 Question Number 5

The question including data of any existence of measures concerning the remains, results in a predominance of a positive aspect. It means that most of the respondents try to handle the food waste in an alternative way rather than sending it to a landfill or for an incineration. This part represents 81 percent.

Question number 6: If you typed “yes”, could you please describe the measure and describe what its point is?

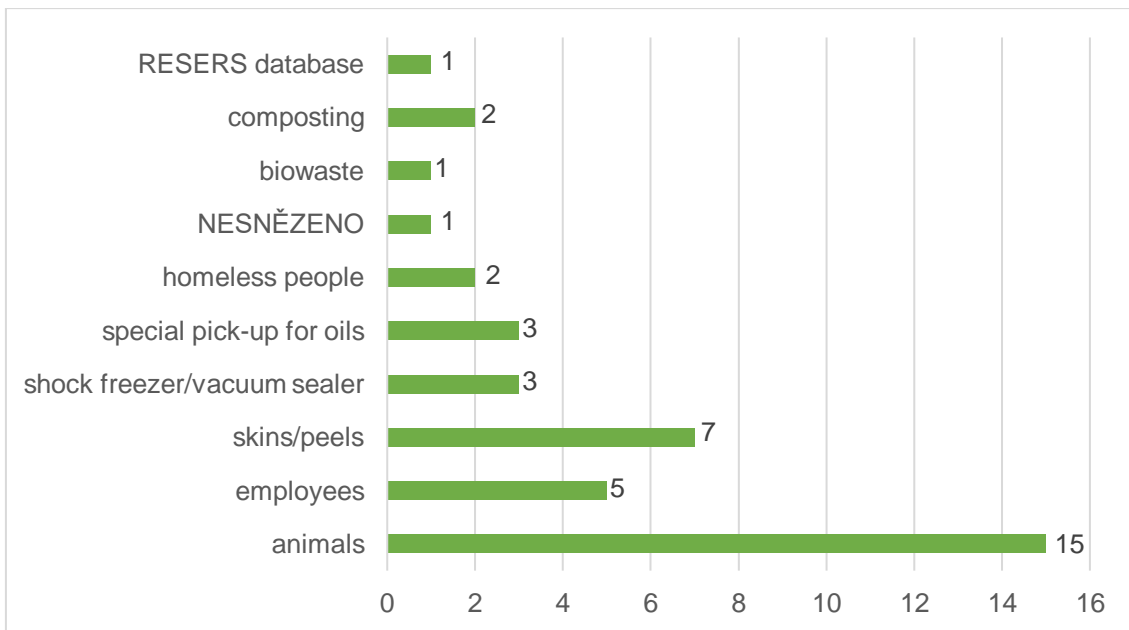


Chart 6 Question Number 6

Respondents who typed “yes” in the previous question (34 on the whole), listed various ways of handling the food waste alternatively. Answers are located in the chart above. In general, redistributing the food to animals predominates. The second frequently given answer stands for using the skins or peels for broths, sauces or lemonades and syrups. Some restaurants offer the discarded potato skins as a delicious side dish. The third frequent answer is that the edible remains are transferred to employees. Otherwise, there are many interesting alternative measures such as bio-waste or RESERS database which is a waste management article database.

Question number 7: If you typed “no”, would you be interested in any co-operation where the usable remains are utilized?

ANSWER	NUMBER OF RESPONDENTS
YES	4
NO	4

Tab 7 Question Number 7

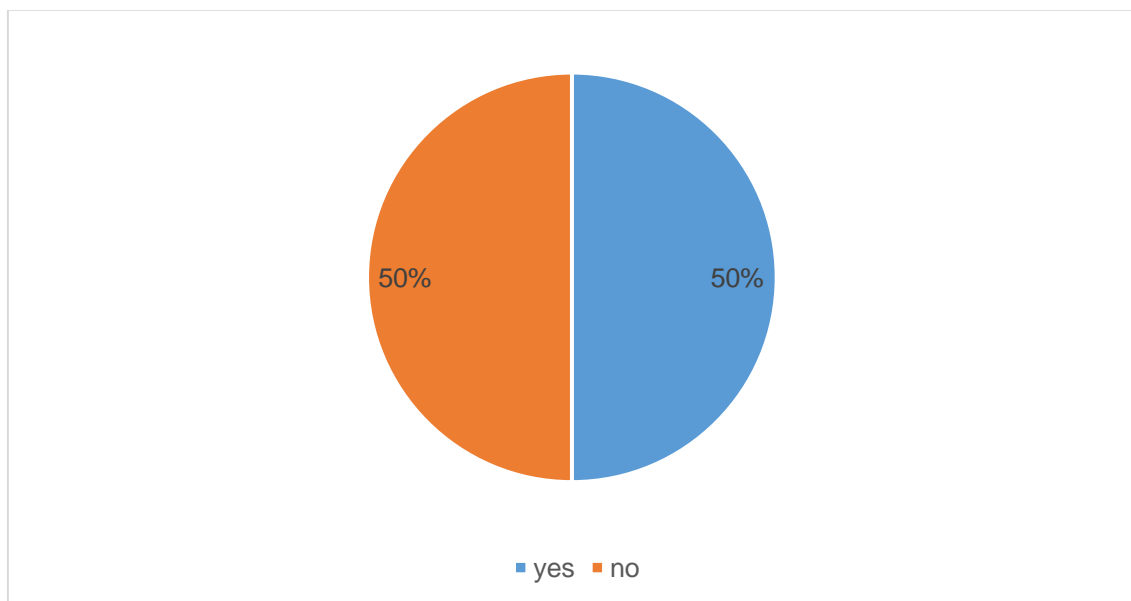


Chart 7 Question Number 7

Out of all respondents who answered “no” in question number 5, 50 percent of them would like to be part of a programme that deals with the remains in an alternative way and the other 50 percent of respondents are not interested in that matter.

Question number 8: When you do shopping for food for your restaurant, you would say that this purchase presents:

ANSWER	NUMBER OF RESPONDENTS
EXCESS QUANTITY OF FOOD	3
INSUFFICIENT QUANTITY	0
ADEQUATE QUANTITY	39
DO NOT KNOW/NO OPINION	0

Tab 8 Question Number 8

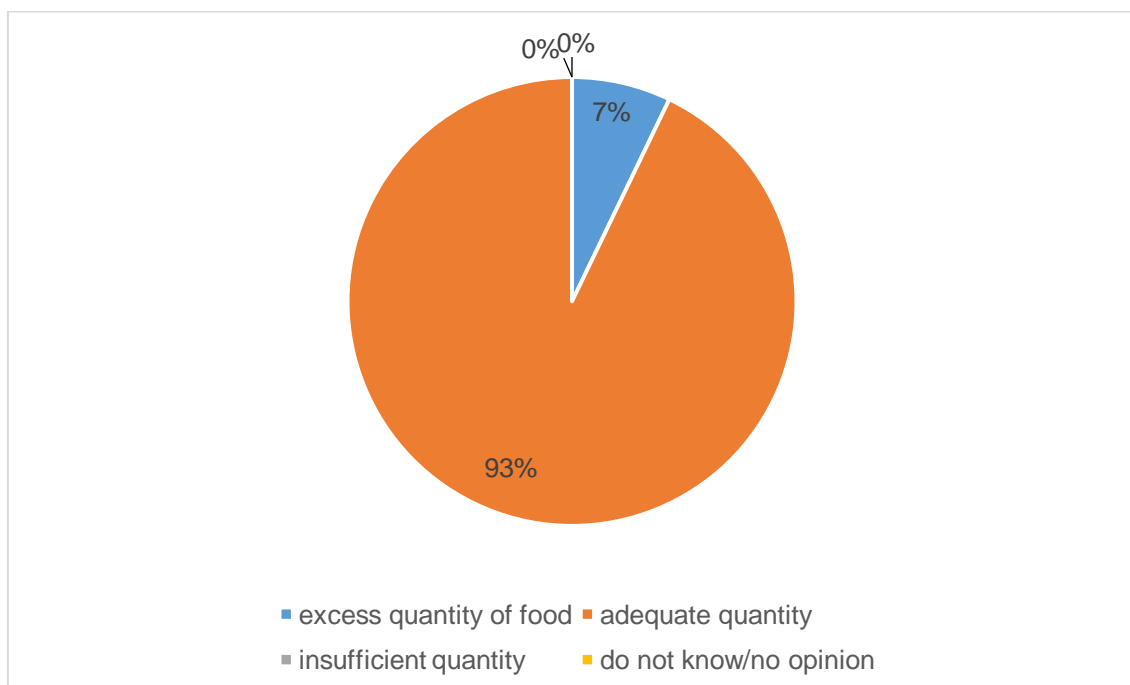


Chart 8 Question Number 8

Question number 8 turned out unequivocally; most of the restaurants do adequate shopping. The reason is that they know what kind of dishes their repeat customers require. Therefore, the shopping list remains stable. In other cases, surplus of bought ingredients rather than shortage was recorded.

Question number 9: When you consider the aforementioned shopping, what part of the ingredients bought are you able to utilize, in other words, to make a dish for customers?

ANSWER	NUMBER OF RESPONDENTS
MOST OF IT	41
ONE THIRD	1
TWO THIRDS	0
DO NOT KNOW/NO OPINION	0

Tab 9 Question Number 9

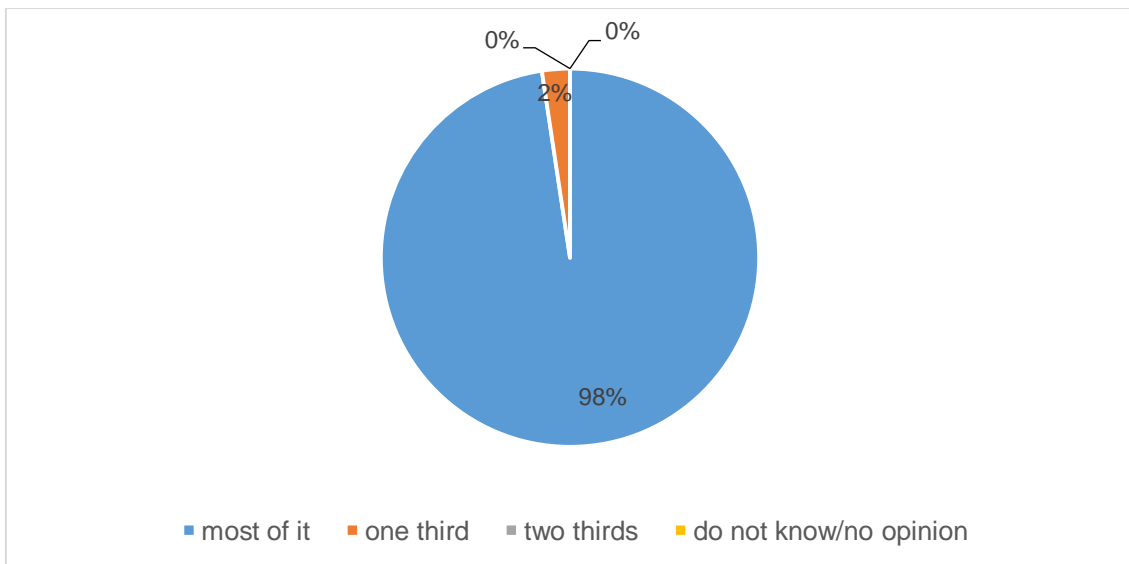


Chart 9 Question Number 9

As the author asked about the utilization of bought ingredients, most of the respondents stated that they are able to use most of it. Some of them imparted detailed data, such as 75 percent, 80-90 percent or 90 percent of the bought ingredients that were used. Only 2 percent of respondents chose the option of one third of utilized food.

Question number 10: When you consider the previously mentioned shopping and the food that was utilized from it (i. e. ready meals), what part represents the food that remained and could not be used in your restaurant anymore?

ANSWER	NUMBER OF RESPONDENTS
LESS THAN ONE THIRD	30
ONE THIRD	5
TWO THIRDS	0
MOST OF IT	0
OTHERS	4
DO NOT KNOW/NO OPINION	3

Tab 10 Question Number 10

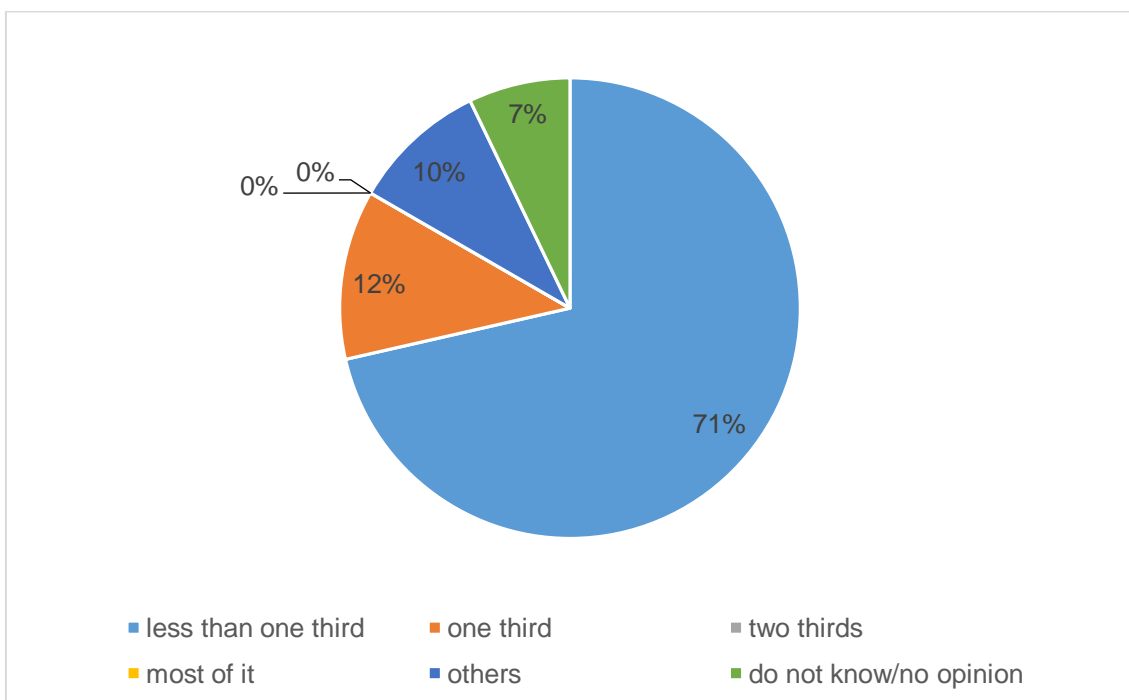


Chart 10 Question Number 10

Answers to the tenth question are considered positively. Less than one third of food that could not be used anymore hold the post for 71 percent of all restaurants. A bit more of non-consumable remains - one third - applies to 12 percent of respondents.

The option “others” includes the managers who stated that their remains represent less than one third. However, they wanted to highlight their aim. Consequently, data such as one fifth or one tenth occurred. The tenth question is the case where the option „do not know/no opinion“ was selected for the first time.

Question number 11: These remains usually result from:

ANSWER	NUMBER OF RESPONDENTS
PREPARATION IN KITCHEN	12
LEFTOVERS BY CUSTOMERS	20
INAPPROPRIATE STORAGE MANAGEMENT	9
DO NOT KNOW/NO OPINION	1

Tab 11 Question Number 11

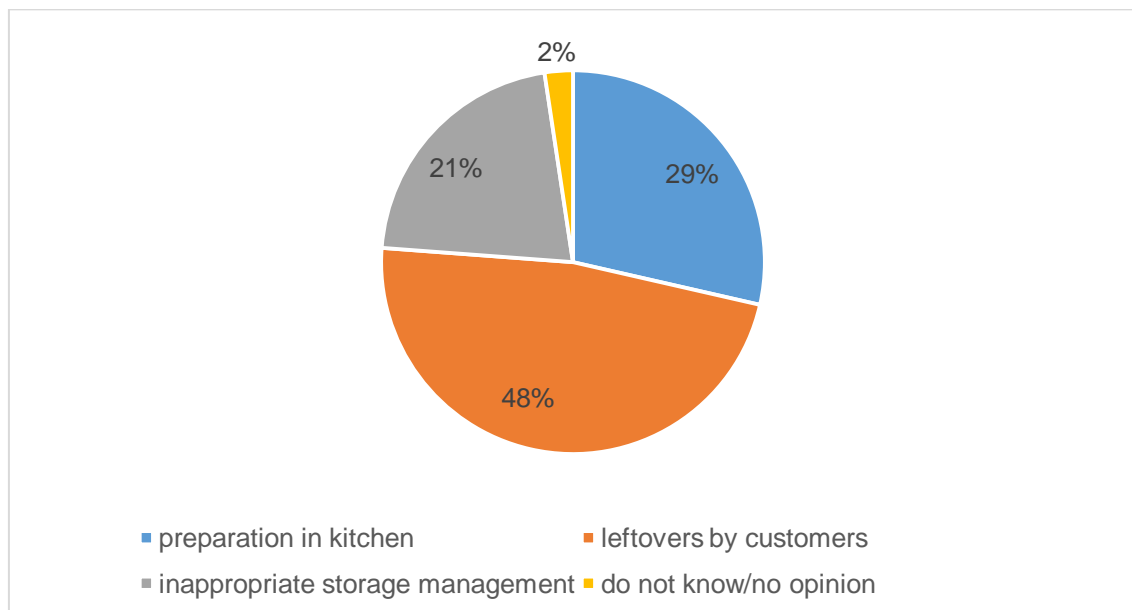


Chart 11 Question Number 11

The remains from the previous questions usually originate from leftovers that were not consumed by customers. Leftovers take part of 48 percent. Remains (also known as scraps) that arose during meal preparation take

29 percent of the whole. One respondent mentioned production losses of 30 percent in the kitchen. 9 persons asked, see the third option of poor storage management as the biggest source of remains. This choice includes ingredients that were forgotten in the refrigerator and expired, or meals that were cooked, however, not sold.

Question number 12: Does your restaurant offer any special discount for those meals that were not sold during the opening hours? What percentage does this discount represent?

ANSWER	NUMBER OF RESPONDENTS
YES	3
NO	39

Tab 12 Question Number 12

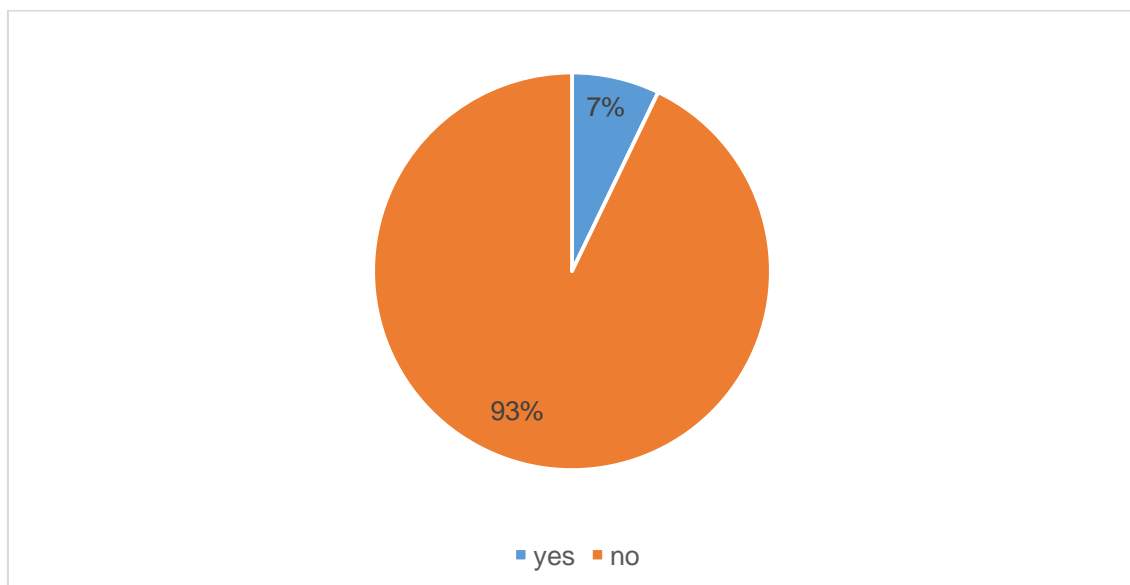


Chart 12 Question Number 12

As far as the special discount for meals that were not eaten is considered, major part of the restaurants asked do not offer such a discount. There is one particular reason and that is they always cook according to plan. They notice a considerable success in the estimation of incoming

customers. Those who typed “yes” (only three respondents) offer 30 percent discount on uneaten and unsold meals.

Question number 13: Has your restaurant introduced a dispensing window or delivery service for the purpose of staying in the market?

ANSWER	NUMBER OF RESPONDENTS
YES, WE SELL THROUGH THE DISPENSING WINDOW	17
YES, WE OFFER THE SERVICE OF DELIVERY	1
YES, WE HAVE IMPLEMENTED THE DISPENSING WINDOW AND DELIVERY AS WELL	19
NO, THE DISPENSING WINDOW AND DELIVERY WERE PART OF OUR CONCEPT BEFORE THE PANDEMIC HAS BEGUN	0
NONE OF THE ABOVE STATED, OUR RESTAURANT IS COMPLETELY CLOSED	5

Tab 13 Question Number 13

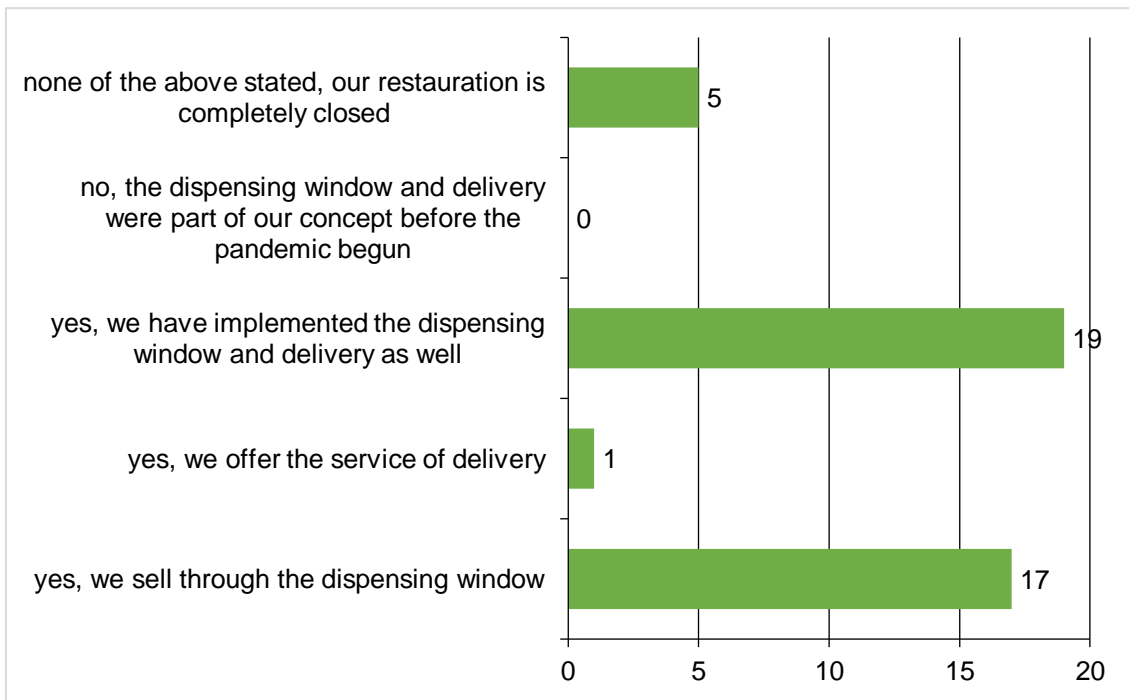


Chart 13 Question Number 13

According to the results based on question number 13, most of the restaurants did not give up and decided to stay in the market. 19 of them have implemented a dispensing window and delivery service. The delivery service includes their own management or they use services of the “Dáme jídlo” platform. Out of all 42 restaurants, 17 of them implemented only the window. On the other side, the author spoke to respondents whose company is completely closed. They are saving money and working on a new concept at the moment.

Question number 14: When considering the current situation, do you think that there is a decrease or increase in wasted food in your restaurant?

ANSWER	NUMBER OF RESPONDENTS
DECREASE	21
INCREASE	0
VALUE IS ON THE SAME LEVEL AS BEFORE THE PANDEMIC	12
DO NOT KNOW/NO OPINION	4

Tab 14 Question Number 14

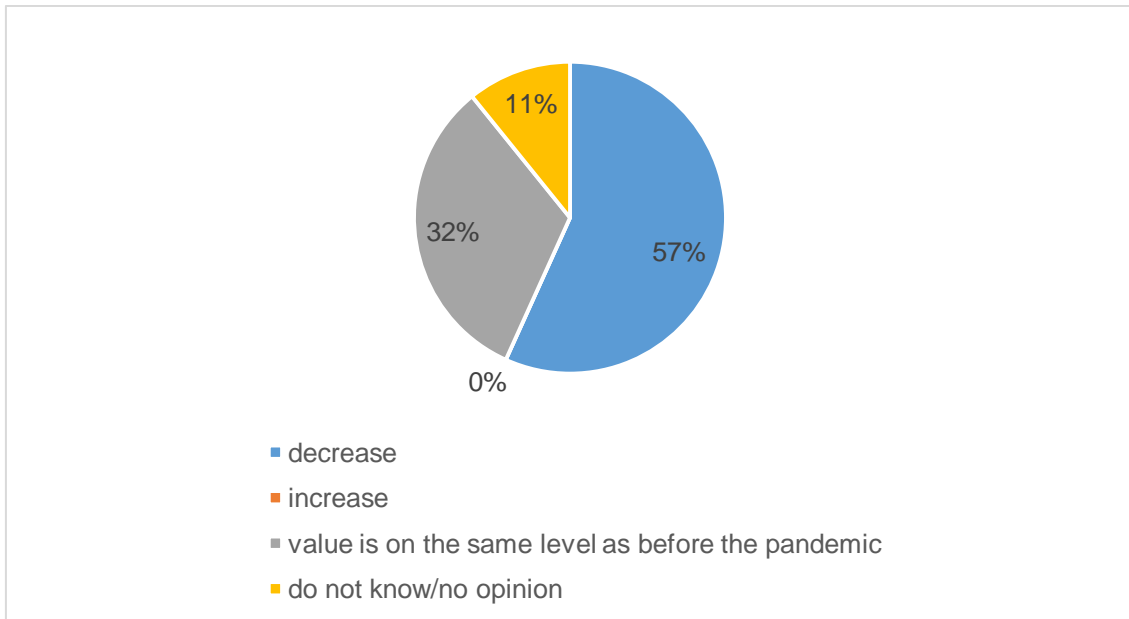


Chart 14 Question Number 14

The respondents whose restaurant is not closed answered this question (37 in total). In the current coronavirus pandemic, most of them - 57 percent - noticed a decrease in wasted food. A considerable part of 32 percent assumes the value on the same level, as it was before the pandemic has begun. 4 persons did not answer this question, as they have no opinion.

Question number 15: In your opinion, what is the reason for the decrease/increase?

Reasons for the decrease are the following: decrease of orders, menu reduction (only favourites/most sold meals), opening hours only between 11 a. m. and 3 p. m. and the fact that the food is taken out of the restaurant and there is no need of processing the remains by the company. In some cases, an improvement of the restaurant management was recorded as another option as well.

Question number 16: Have the costs of packaging increased?

ANSWER	NUMBER OF RESPONDENTS
YES	35
NO	2

Tab 15 Question Number 16

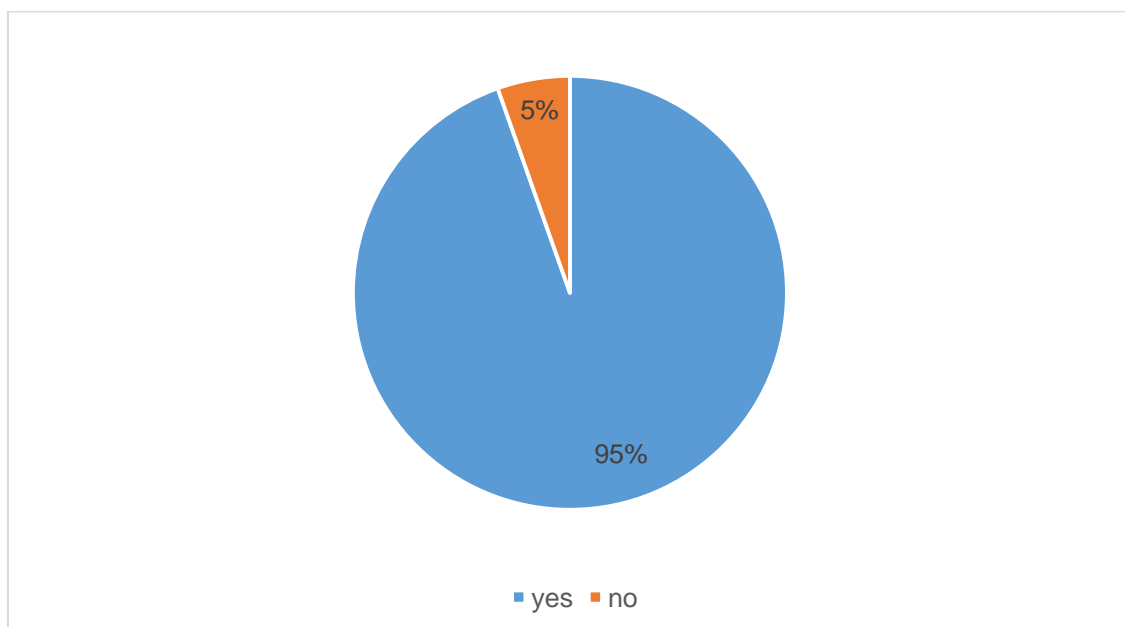


Chart 15 Question Number 16

This question was estimated to be unequivocal, namely for choosing the “yes” option. The estimation was fulfilled. However, two respondents (five percent) do not see any increase in packaging costs.

Question number 17: With regard to excess plastic consumption in the world and its impact on the environment, do you fight against the plastic packaging in any way?

ANSWER	NUMBER OF RESPONDENTS
YES	23
NO	14

Tab 16 Question Number 17

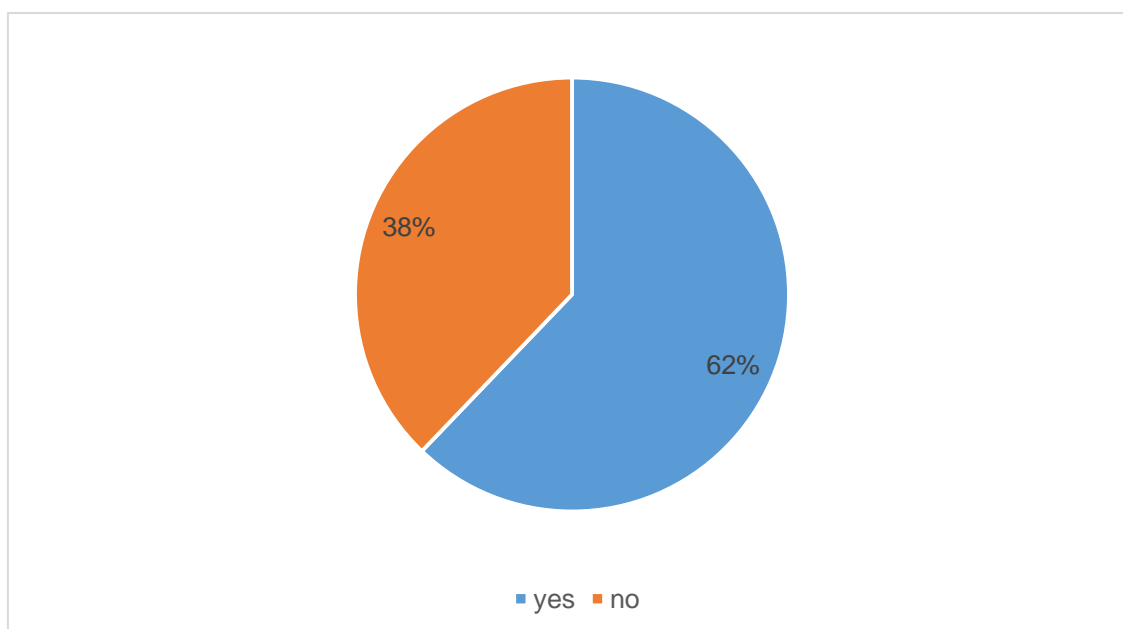


Chart 16 Question Number 17

The part of those who fight against the plastic consumption predominates; it represents 62 percent. Unfortunately, a considerable number of representatives (38 percent) do not follow the trends and offer single-use packaging.

Question number 18: If you typed “yes”, how do you fight against it?

All respondents who answered positively in the previous question implemented many measures on how to avoid the single-use packaging. A significant part consists of putting food into bins called “Rekrabička”, which will be described in the conclusion. Some restaurants recorded success, as 90 percent of offers are distributed in these food bins. Rest of the measures stands for recyclable materials such as bioplastic or containers made from bran.

12 CONCLUSION

The Bachelor's thesis "Food Waste Prevention in Restaurants and Households from a Global and Czech Perspective" aimed to represent the global issue of food wasting. Food, that is discarded, is considered a result of our being on this planet. Food waste is a matter that will not disappear. It can be reduced or the inhabitants could get educated about the matter and learn how to redistribute the food, for example, to people in need. In addition, buying local ingredients (i. e. from a local farmer) could avoid the deforestation of the immense rainforest in Brazil that is a source for many people in the world. The work aims to show that there is a way to be more responsible when speaking about food waste. The thesis is divided into two parts. The first one is dedicated to the situation described above, aiming to raise public awareness and educate them and the second one analyses data achieved from the questionnaire.

The survey results proved to be seminal for the evaluation. A total number of 42 respondents out of 70 gave their answers. Platforms that were used are the following: phone calls, emails, text messages and Instagram messages. Selected questionnaires were accomplished in person, whereas one survey was lead in English. The phone calls took approximately 10 minutes each and were carried out within one week.

The main objective was to find out how the respondents manage their food waste. The first question mentioning food waste concerned the mobile application. It was to indicate if the administration is aware of the global issue and if they try to implement any environmental-friendly solutions. However, the third question did not prove as an appropriate indicator. The reason is that people predominantly have not heard of this modern way. On the other side, they listed many alternative measures in the following tasks. Secondly, even though chart

number 4 indicated that most of the respondents typed “rather do not waste”, as it is said above, there will always be some waste. With that question, the asked persons (mostly managers) wanted to emphasize that they try not to waste and have implemented some solution. As far as this question is concerned, an interesting fact was noticed during the research. Fine dining restaurants stated that their concept concentrates on delight and visual aspect rather than being concerned about the discarded food. Secondly, although the vast majority answered that they do not throw the discarded food into gastro waste, most of them give the food to animals. The response was not expected, as, according to some information, it is prohibited. Another part of the questionnaire concerned shopping. The associated results turned out positively. Czech restaurants do regular purchases in an adequate quantity, whereas they are able to utilize most of it. Steps leading to these results represent a programme called stock management. The restaurant enters the data of purchased items. When the expiry date occurs, the management receives a notification to replenish the stocks. The full version of the programme is paid, which represents a disadvantage for some restaurants. The most common programmes in the Czech Republic are Dotykačka and Storyous.

The current coronavirus pandemic is connected with the willingness to be more environment-friendly. Since the increase of packaging production was estimated, Czech restaurants did not hesitate and implemented reusable materials such as bioplastic or containers made from bran. The most significant invention is considered the so called REkrabička. A returnable and reusable bin that a customer pays for and it remains in his or her possession.

To sum it up, many restaurants realize the issue of food waste. Some of them treat the waste as a routine and use the service of gastro

waste collection, some of them care for the planet and its inhabitants and try to be modern by implementing innovative ways to use food until it is completely utilized. The companies that are innovative have been predominated lately.

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14 ABSTRACT

The Bachelor's thesis examines food waste from a global and Czech issue. The main goal was to find out what is the opinion of Czech restaurants about food waste. It means how they treat this kind of waste, how they handle the management of purchasing food and its utilization or how the current coronavirus pandemic affected them.

In the theoretical part, the food waste issue is described in a global perspective. Impacts of waste on the environment and several preventable solutions to avoid accumulation of wasted food are listed. In the next part of the theoretical framework, the reader can find out on which level restaurants in the world and in the Czech Republic are. Several innovative solutions are introduced.

The practical part analyses the survey in a form of a questionnaire. 42 respondents were approached. Main questions concerned the ways of waste disposal. The answers were collected via phone calls, text messages or e-mails. The results were surprising, many restaurants try to be innovative and modern and implement new measures. A part of the practical framework is a glossary consisting of neologisms that serves to enrich the vocabulary with modern words. These words concern the mentioned issue of food waste.

15 RESUMÉ

Tato bakalářská práce zkoumá plýtvání jídlem z globálního a českého hlediska. Hlavním cílem bylo zjistit názor českých restaurací na potravinový odpad. To znamená jak nakládají s tímto druhem odpadu, zda zvládají organizaci nakupování potravin a jejich spotřebu či jak je ovlivnila současná situace koronavirové pandemie.

V teoretické části je popsáno plýtvání potravin z globálního hlediska. Je zde uvedeno jaký vliv má plýtvání na životní prostředí, a také několik preventivních řešení jak zabránit hromadění vyplýtvaných potravin. V teoretické části může čtenář zjistit, na jaké úrovni jsou restaurace v celém světě a v České republice. Je uvedeno několik inovativních řešení.

Praktická část analyzuje výzkum ve formě dotazníkového šetření. Bylo osloveno 42 respondentů. Hlavní otázky se týkaly způsobů nakládání s odpadem. Odpovědi byly zaznamenávány prostřednictvím hovorů, zpráv nebo emailů. Výsledky byly překvapující, mnoho restaurací se snaží být inovativní a jít s dobou a zavádějí tak nová opatření. Součástí praktické části je také slovíček neologismů, který slouží k obohacení slovní zásoby moderních slovíček týkajících se právě problematiky plýtvání potravin.

16 APPENDICES

16.1 Questionnaire for restaurants (translated by the author)

Hello,

I would like to ask you to fill in the following questionnaire. My name is Marie Šarvašová and I am a student at the Faculty of Philosophy of the University of West Bohemia in Pilsen in the field of Foreign Languages for Commercial Practice. By filling in my questionnaire, you will help me to compose the practical part of my bachelor's thesis. The topic of this thesis is called Food Waste Prevention in Households and Restaurants from a Global and Czech Perspective.

Food waste is a serious ecological and social issue. In a current situation, there is about 800 millions of people all around the world who suffer from hunger. The cause is often wasted food. I chose restaurants for my research together with households, since they represent a huge participation of wasted food. Secondly, there is a lack of data that would address the issue in the Czech Republic. Therefore, for the purpose of mapping the situation in the Czech Republic, I ask you to answer the following questions.

Thank you for your time.

1. In which region is your restaurant located?

- Prague
- South Bohemian
- South Moravian
- Karlovy Vary
- Vysočina
- Hradec Králové
- Liberec
- Moravian-Silesian
- Olomouc
- Pardubice

- Plzeň
- Central Bohemian
- Ústí nad Labem
- Zlín

2. What is your job position in the restaurant?

- proprietor
- manager
- waiter
- chef
- others: _____

3. Do you know any mobile applications that fight against food waste?

- yes
- no

4. When you think of wasting food in your restaurant, you would say that you...

- definitely do not waste
- rather do not waste
- rather waste
- definitely waste
- do not know/no opinion

5. Is there any measure to handle the remains?

- yes
- no, the remains are thrown away

6. If you typed “yes”, could you please describe the measure and describe what its point is?

7. If you typed “no”, would you be interested in any co-operation where the usable remains are utilized?

- yes
- no

8. When you do shopping for food for your restaurant, you would say that this purchase presents:

- excess quantity of food
- insufficient quantity
- adequate quantity
- do not know/no opinion

9. When you consider the aforementioned shopping, what part of the ingredients bought are you able to utilize, in other words, to make a dish for customers?

- most of it
- one third
- two thirds
- do not know/no opinion

10. When you consider the previously mentioned shopping and the food that was utilized from it (i. e. ready meals), what part represents the food that remained and could not be used in your restaurant anymore?

- less than one third
- one third
- two thirds
- most of it
- others: _____
- do not know/no opinion

11. These remains usually result from:

- preparation in kitchen
- leftovers by customers
- inappropriate storage management

- do not know/no opinion

12. Does your restaurant offer any special discount for those meals that were not sold during the opening hours? What percentage does this discount represent?

- yes,

-
- no

The Corona pandemic has caused many negative impacts, especially for restaurants.

13. Has your restaurant introduced a dispensing window or delivery service for the purpose of staying in the market?

- yes, we sell through the dispensing window
- yes, we offer the service of delivery
- yes, we have implemented the dispensing window and delivery as well
- no, the dispensing window and delivery were part of our concept before the pandemic begun
- none of the above stated, our restauration is completely closed

14. When considering the current situation, do you think that there is a decrease or increase in wasted food in your restaurant?

- decrease
- increase
- value is on the same level as before the pandemic
- do not know/no opinion

15. In your opinion, what is the reason for the decrease/increase?

16. Have the costs of packaging increased?

- yes
- no

17. With regard to excess plastic consumption in the world and its impact on the environment, do you fight against the plastic packaging in any way?

- yes
- no

18. If you typed “yes”, how do you fight against it?

If you wish to receive results of this questionnaire and get inspired by other restaurants on how to effectively handle thrown away or not sold food, please leave your e-mail below:

Thank you for your time and filling the questionnaire.

16.2 Questionnaire for restaurants (in Czech)

Dobrý den,

věnujte prosím několik minut svého času vyplněním následujícího dotazníku. Jmenuji se Marie Šarvašová a jsem studentkou filozofické fakulty Západočeské univerzity v Plzni v oboru Cizí jazyky pro komerční praxi. Vyplněním mého dotazníku mi pomůžete ke zpracování praktické části mé bakalářské práce na téma Prevence plýtvání jídlem v českých restauracích a domácnostech.

Problematika plýtvání potravin je velmi závažný ekologický a společenský problém. V současné situaci trpí hladem cca 800 milionů lidí po celém

světě, právě kvůli mnohdy zbytečně vyhozenému jídlu. Restaurace jsem si k šetření vybrala hlavně proto, že společně s domácnostmi tvoří velkou část vyhozených potravin a také proto, že v celé České republice chybí údaje o vzniklé situaci. Proto Vás prosím o vyplnění následujících otázek za účelem zmapování situace v ČR.

Děkuji za Váš čas.

1. V jakém kraji se nachází Vaše restaurace?

- Hlavní město Praha
- Jihočeský kraj
- Jihomoravský kraj
- Karlovarský kraj
- Kraj Vysočina
- Královéhradecký kraj
- Liberecký kraj
- Moravskoslezský kraj
- Olomoucký kraj
- Pardubický kraj
- Plzeňský kraj
- Středočeský kraj
- Ústecký kraj
- Zlínský kraj

2. Na jaké pozici ve Vaší restauraci pracujete?

- majitel
- manažer/vedoucí
- číšník
- šéfkuchař
- jiné: _____

3. Znáte nějaké aplikace, které bojují s plýtváním jídel?

- ano
- ne

4. Když se zamyslíte nad plýtváním potravinami ve Vašem podniku, řekl/a byste, že potravinami...

- rozhodně neplýtváme

- spíše neplýtváme
- spíše plýtváme
- rozhodně plýtváme
- nemám přístup k této informaci

5. Zavedla Vaše restaurace nějaké opatření, jak nakládat se zbytky?

- ano
- ne, veškeré zbytky se vyhazují

6. Pokud ano, můžete prosím popsat, o jaké opatření se jedná a v čem spočívá jeho podstata?

7. Pokud ne, měli byste zájem o spolupráci, v rámci které by se pro použitelné zbytky potravin našlo další využití?

- ano
- ne

8. Když se zamyslíte nad jedním nákupem do Vaší restaurace, představuje tento nákup:

- nadbytečné množství potravin
- nedostatečné množství
- přiměřené množství
- nemám přístup k této informaci

9. Na základě jednoho nákupu do Vaší restaurace, jakou část z tohoto nákupu je Vaše restaurace schopna zužítkovat, tzn. vytvořit z nich pokrmy pro zákazníky?

- většinu
- jednu třetinu
- dvě třetiny
- nemám přístup k této informaci

10. Když se nyní zaměříte na původní nákup a potraviny, které byly Vaší restaurací zužítkovány (tedy dorazily k zákazníkovi), jakou část představují potraviny, které zbyly a nemůžou být Vaší restaurací dále využity?

- méně jak jednu třetinu
- jednu třetinu
- dvě třetiny
- většinu

- jiné: _____
- nemám přístup k této informaci

11. Tyto zbylé potraviny/pokrmu nejčastěji pocházejí ze zdroje/činnosti:

- během vaření/přípravy
- z toho, co se nedojedlo
- nevhodné skladování
- nemám přístup k této informaci

12. Nabízí Vaše restaurace speciální cenu za nesněžené porce, které se neprodají v otevírací době? Kolik procent představuje tato sleva na toto zboží?

- ano,

- ne

Pandemická situace má mnoho negativních dopadů, především na restaurační zařízení.

13. Zavedla Vaše restaurace výdejní okénko nebo dokonce rozvoz jídel za účelem udržení se na trhu?

- ano, máme výdejní okénko
- ano, nabízíme rozvoz jídla
- ano, zavedli jsme okénko i rozvoz jídla
- ne, okénko/rozvoz jsme měli před vzniklou situací
- nic z uvedených možností nemáme k dispozici, jsme kompletně zavření

14. S ohledem na vzniklou situaci, zaznamenala Vaše restaurace pokles nebo nárůst vyplývaných potravin?

- pokles
- nárůst
- hodnota je na stejné úrovni jako před pandemií
- nemám přístup k této informaci

15. Z jakého důvodu vnímáte pokles/nárůst?

16. Zvýšily se Vám se vzniklou situací náklady na obalový materiál?

- ano
- ne

17. S ohledem na nadměrnou spotřebu plastů v dnešním světě a jejím dopadem na životní prostředí, bojujete nějakým způsobem proti plastovému obalovému materiálu?

- ano
- ne

18. Pokud ano, tak jakým způsobem proti tomu bojujete?

Pokud si přejete obdržet výsledky po zpracování dotazníku a inspirovat se ostatními zařízeními, jak efektivněji nakládat s vyhozeným, popř. nezkonzumovaným jídlem, uveďte, prosím, Váš e-mail:

Děkuji za Váš čas a vyplnění dotazníku.

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