

Food safety versus food security in a world of famine

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Abstract

Aim: The purpose of this article is to discuss the tension that can arise when trying to ensure food safety, which is governed by ever-stricter regulations, and food security, which is a top priority objective of global security and the security of each state. These legal food safety regulations, which can be exaggerated in some cases, are contributing to the already severe famine of food waste to the detriment of the starving population on Earth. The study aims to shed light on how the stricter regulations for food safety and food security have impacted the situation.

Method: Specific characteristics of the European Union were presented in the current research using a case study approach, although they are applicable globally. The selection of the study unit, or Romania as a member of the European Union, and its delimitation are emphasised at the expense of factors relevant to the research methodology.

Findings: According to the results, the term "food waste" does not include scraps left over after consumers have finished eating or debris from improperly storing perishables. Paradoxically, this waste has manifested itself in a heightened focus on their own safety, as evidenced by stricter regulations surrounding food handling. Maximum allowable concentrations for various contaminants are constantly in flux, with some shifts being nothing more than the selfish expression of extreme care and concern by people in developed nations.

Implications/Novel Contribution: As if the moral and financial costs of food waste weren't enough, doing so also has a detrimental effect on the planet's finite resources. According to the study's results, everyone involved in food production, distribution, and consumption should do their part to minimize food loss and waste. Farmers, food manufacturers, and processors can all learn from the study's results, as can those in the hospitality industry, grocery stores, other retailers, and consumers.

Keywords: Food safety, Food security, Ethics, Consumers, Famine

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INTRODUCTION

These days, when people in developed nations worry more than ever about their own and their families safety, the consequences of this worry are becoming increasingly noticeable. Short- and medium-term comparisons are drawn to the world's poor, the ever-more-copied Earth's resources, and the safeguarding of entities beyond the individual and the family.

The primary purpose of the studies presented here is to assess the determinants of food waste, which are now more formally expressed as worries about food safety. Once these factors are identified, analyzed, and monitored, they can be used to educate the public and influence policy.

More and more studies are highlighting the importance of ensuring food safety as one of the primary concerns of modern research into food security. However, by drawing attention to these problems, developed nations are gradually tightening the admissibility conditions in the consumption of food products, increasing the quality gap annually, and ignoring the concept of "good enough quality" (Chalfoun & Davidaviciene, 2018; Gherman & Balan, 2019; Gheorghescu, Velcotă, Martin, & Bălan, 2019).

The Food and Agricultural Organization of the United Nations (FAO) has compiled a list of the points in the food chain that contribute to technological food losses and food waste. Inadequate harvesting time, climate, harvesting practices, handling practices, and treatments applied to food before marketing are all significant causes

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of failures and, implicitly, food waste on the farm. Inadequate storage and decisions made earlier in the supply chain that determines the products have a shorter shelf life lead to substantial losses at storage. Good infrastructure and efficient commercial logistics are crucial in transport (the movement of products from the farm to the food warehouses and then to the stores) to reduce food waste. Inadequate installations, technical failures, or human error frequently lead to food waste, even though processing and packaging play a decisive role in food preservation. The short shelf life, the requirement for food to meet aesthetic standards in terms of color, shape, and size, and the variability in demand all contribute to food waste in retail settings. Consumer food waste occurs most frequently at the home level due to improper shopping and meal preparation, excessive purchasing (influenced by excessive portioning and packing dimensions), labeling confusion ("best before..." and "use before..."), and improper storage conditions.

In addition to all of this, the authors of the present study note that the rules of food hygiene and the requirements of food admissibility are becoming stricter each year, often without sufficiently motivated scientific coverage, which leads to the removal from the market of foods that, often, can be consumed with minimal or even nonexistent risks for specific categories of consumers.

LITERATURE REVIEW

The literature consulted for the research contains titles of the consecrated profile organizations ([Food and Agricultural Organization, 2019](#); [Les Amis de la Terre, 2014](#); [World Health Organisation, 2010](#)), as well as articles resulting from the researches of different renowned researchers from all over the world ([Jangulashvili, Balan, Iancu, Jangulashvili, & Pirvulescu, 2017](#); [Shiklomanov, 2000](#); [Sperber & Stier, 2009](#); [Zahiu & Dachin, 2001](#)), but also young Romanian researchers, members of the new generation of researchers and consumers, coordinated by the authors of this article ([I. Balan, Popescu, Iancu, & Popescu, 2017](#); [Ene, 2005](#); [Gheorghescu & Balan, 2019](#); [Gherman & Balan, 2019](#)).

For reducing food waste it is necessary to know where it is happening and where interventions with the strongest impact should be applied. However, the specialized literature presents slightly the fact that most of the population is educated at an excessive level regarding food safety, as a decisive factor in food security. In European Union, young adults learn from primary classes what a healthy food means and what to look for when they are reading a food label, but no authority explains to them that excessive care for healthy foods which has become an obsession for the contemporary world in the developed countries, is often unjustified and causes a food waste that is hard to imagine.

The food waste actions are not explained by consecrated research units to the younger generations nor the fact that this food waste it generates a huge waste from a wide range of other resources.

METHODOLOGY

Part of the research presented we performed on the situation of Romania, considering that this country is somewhere in the middle between the highly developed and the undeveloped countries. ([Gheorghescu et al., 2019](#)).

The study presents particular aspects of the European Union, but they can be generalized worldwide. The case study is the most appropriate method then a complete and in-depth investigation of a topic is desired, but also of the context in which it is conducted. The emphasis is on the choice of the study unit, respectively on Romania as a state of the European Union, and on its delimitation to the detriment of the considerations related to the research method. We chose the case study because in the context of the topic of food security it is more intensive, being more complete, richer and more detailed.

The evolution in time of the food waste, as a determinant element of the food security is not included in the presented study, because we considered the evolution irrelevant, in relation to the actual impact of the state of affairs. Last but not least, the case study presented in Romania in the context of the European Union, does not neglect the case's relationship with the outside, which is why delimiting the borders of the case is important to see what goes into the case and what remains in its context.

RESULTS AND DISCUSSION

Researching the situation of the food security measures applied in Romania and the effects it has had on the food waste, measures that are approximately similar to those of all the other member states of the European Union, we have highlighted three reference sections of the research, which relate between its in several directions (I. M. Balan, 2007).

Section I-Food Security

Food security is part of each country's security and subsequently a part of the global security. Ensuring the food security of country's people is one of the primary duties of the state. A country needs to manage efficiently and rationally the resources as otherwise even the existence of the people and the state in endangered.

The issue of food security, of providing basic agri-food products of a certain quality represents a major concern facing on a smaller or larger extent all countries but those underdeveloped or developing even more. As a paradox for the current period, in full development of an information society many countries are facing this problem. Therefore, today, the food issue represents a factor that may lead to global instability. Ensuring the food security for all and every person contributes to the social peace of each country, to stability and prosperity (Ene, 2005).

Food security is one complex and general issue of the humankind and its responsibility is shared by all countries worldwide. This aspect was proved by different studies researching the people's nutrition, the evolution of the agricultural production, the population's evolution and the use of resources. A proper nutrition has to be regarded both from the perspective of satisfactory quantity of food and from the perspective of its quality and diversity (Zahiu & Dachin, 2001).

The concept of food security was first formulated after the Second World War within the frame of the debates of the FAO when in 1963, in Rome, Italy was launched the famous manifest "Proclaiming the right of each person to eat for coping with its hunger".

FAO defines the food security as follows: "the direct access of all people to the required food to satisfy the vital functions and to live a healthy and active life. The food security of each country can be ensured primarily from its internal resources by the public policies of each state. The food security is an extremely dynamic concept that has evolved over time. In this respect, in the developed countries the food security was achieved by creating a viable agricultural sector by practicing long-term and costly policies that supported the sector. Nowadays in these respective countries the concept has evolved to different meanings. Due to the fact that these countries managed to ensure the food in sufficient quantities, the highlights focus on quality, food safety and social protection, more oriented towards the protection of the health of the consumers (Zahiu & Dachin, 2001).

The food security in developing countries is more difficult to achieve and in conditions less favourable. In these countries, the food consumption is extremely low with regard to the quantity as well as to the quality, being characterised by a structure in which the products of animal origin have a very low share, this situation being present in many countries worldwide. It is highly important that these countries ensure the food from their own resources and consolidate the agri-food markets in order to achieve independence form the developed countries large producers of agri-food stuff.

Food security is a relatively recent concept rising from the beginning of the '70s. The concept evolved from considerations rather quantitative and economic towards a definition encompassing the quality of the food and the human dimension.

The concept has developed on the background of the current overpopulation of many parts of the planet and the price increase for the food products all while in general, their quality is decreasing. Another factor that imposed the need of finding a system approach of the food issue at global scale is the accelerated urbanisation, the fact that more and more people live in cities while the rural areas are depopulated.

The FAO has edited a quarter of a century ago, in 1987, a special report on this theme, the Brundtland Report, taking the name of the main author, launching at the time the complementary concept of "sustainable development".

At the same time, in the same policy was introduced the concept of "traceability" which supposes the possibility to trace back the origin and the processing technology of a food product, following the expression, "from

stable to table" ([Revista Nato, 2012](#)).

What is the food waste?

[Food and Agricultural Organization \(2019\)](#) The food waste means that entire quantity of food produced for human consumption that are lost or being thrown away from the production place to the plate.

We buy more than we need. The difference between the available quantity and the consumed one is very large resulting in food and final products loses but also in processing stages for consumption. The wasted food (garbage) are products that are not used in the daily consumption but still we continue to buy more.

Around 88 million tonnes of food are wasted annually in the EU, with associated costs estimated at 143 billion euros. Wasting food is not only an ethical and economic issue but it also depletes the environment of limited natural resources.

All actors in the food chain have a role to play in preventing and reducing food waste, from those who produce and process foods (farmers, food manufacturers and processors) to those who make foods available for consumption (hospitality sector, retailers) and ultimately consumers themselves ([Popescu, Iancu, Popescu, & Balan, 2017](#)).

The most recent estimates of European food waste levels reveal that 70% of EU food waste arises in the household, food service and retail sectors, with production and processing sectors contributing the remaining 30% ([European Commission, 2016](#)).

The largest food waste in UE is recorded in the urban areas: while the rural communities are using traditional methods to valorise the food remains for the household, in urban areas over 95% for the cities' food waste end up in the trash landfills, making impossible the recycling of any type of waste, food or non-food.

Beyond the moral and social aspects, the waste is translated into considerable negative effects over the environment: waste and loss of water resources, soil and energy, habitats and biodiversity, Green House Gas (GHG) emissions and contribution to the climate changes, pollution (water, soil, air) by fertilisers, pesticides and methane resulted from the decomposition of food that end in the trash landfills.

The food waste drives to considerable material loss all along the chain: producers/importers, traders and consumers ([Food and Agricultural Organization, 2019](#)).

Food waste in Romania

The food waste in Romania represents a major social problem: throwing away about 250 kg of food per inhabitant (above the European average), while 4,74 million people are living on the poverty edge and have difficulties to ensuring the food ([Wolek et al., 2009](#)).

In Romania, the statistics indicate 5 million tonnes of food wasted yearly, representing between one third and half of the total quantity of food designated for human consumption produced for one year, meaning approximately 250 kg/person, compared to 179 kg/person, the European average, while approximately 25% from the country's population (4,74 million people) live at the edge of poverty and have difficulties to find their daily food.

Approximately one third of all products from Romania end in the trash bin or are uselessly wasted every year. This amount corresponds to approximately 2,55 million tonnes of food products or the cargo load of 127.500 lorry trucks lined up from Bucharest to Munchen.

Absolutely every single one of us wastes in his/her household in average 353g food per day. In most situations, the food wasted represents a full meal.

What are the reasons for food waste?

- We do not have a shopping list or when we do, we don't follow it.
- We go shopping before the fridge is empty.
- We don't trust our senses and we follow only the information on the labels.
- We don't check the fridge before shopping.
- We do not store properly the food products.
- We cook in quantities too large.

- We shop when hungry.

At the level of the consumers a research report indicates that 24% from the food waste is cooked meal, 22% fruits, 21% vegetables, 20% bread/ bakery stuff, 11% milk and milk products, 1% meat products and 1% other food (Figure 1).

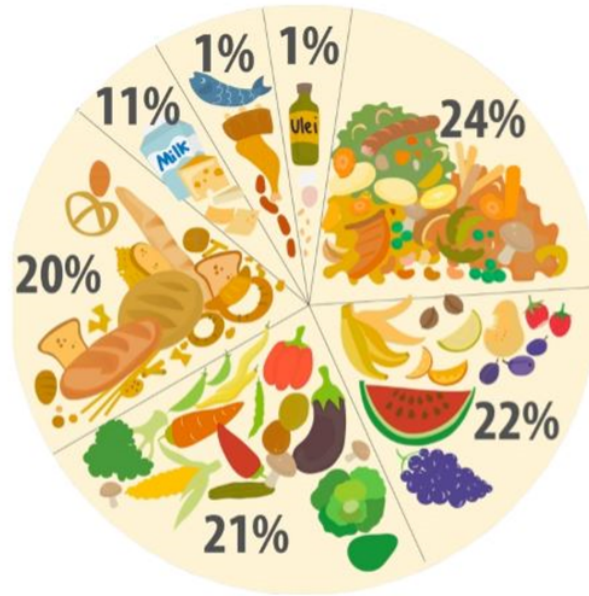


Figure 1. The food waste structure in Romania Source: (Food Waste Romania, 2019)

How can we avoid the food waste?

The food waste can be prevented if we take into account few simple instruments.

1. Buy wisely
2. Store correctly
3. Portion correctly
4. Use the remains.

Is the food waste in Romania larger than in other countries?

The losses over the entire food chain in most countries are basically the same. However, they are different in most cases according to the stage of processing in the food industry. While in the rich countries almost half of the food gets wasted by the end consumer, in poorer countries the food wastes are reduced since people cherish the food. In these regions, unfortunately, the losses during the harvest, storage or processing are larger due to obsolete or inefficient technologies or even poor know-how.

Losses in trade and processing

From a commercial or processing stand point 30% of food is wasted. Industrial processing cannot always guarantee the conformity of the products and those not filling the standards are withdrawn from the market. The sales of food products are not always as expected by the producers and once the validity period exceeded the commercial operator has the obligation to withdraw from the shelf the respective product and send it to another operator that has the obligation to destroy the respective food. Also, during the processing of different food stuff there is collateral loss. During the processing stages of milk products and cheese every time the secondary product whey is produced.

Losses in agriculture

In agriculture are lost 20 percent of total food waste. This situation happens, for example, due to the fact that not all the harvest can be gathered in time under the influence of the weather conditions or the soil horizontality in certain areas. Also, in large supermarket chains the products not following the strict quality standards are rejected and sent back to the storage with the risk of degradation overtime.

Avoiding the food waste

The large food wastes have deep implications and effects over the nature and the people. The food production induced 30% of the food waste with direct impact over the environment. What would happen if we purchased only the food and water that we need? We buy a lot and use a little. The food waste produces economic loss both to governments and households since we practically throw the money in the trash bin.

Is there a difference if a throw away an apple or a piece of meat?

Yes! More resources were used to output a product greater is the impact the wastes have, if not consumed. For one kilo of veal meat is required approximately 50 times more land and 20 times more water than for one kilo of apples.

How real are the information presented?

We do not have until today one research at the scale of over 1 million people. Most recent data are based on enquiries and estimates of the production facilities in food industry. Those elements are supplemented by data from the specialty references. For the households' trash the best estimates originate from England accounting 2000 households. Currently there are large scale researches.

On the other hand, the structure of the nutrition diets has a tremendous impact over the food security at global level. According to the annual report elaborated by [Les Amis de la Terre \(2014\)](#) in 2015, approximately 15.500 liters of water are necessary to produce one kilo of veal meat. With the same amount of water 12 kilo of wheat or 118 kilos of carrots can be produced. In the same report, it is highlighted that "The industrial production of meat is not only a torture for animals, it also destroys the environment and engulfs large quantities of raw materials that we import to feed our animals. Europe is, after China, the largest importer of soybeans. Argentina and Brazil continue to significantly increase soybean cultivation, which is mainly eaten by the animals we slaughter. By increasing our consumption of meat, we are driving up land prices. The consequences are disastrous: on the one hand, nearly a third of the world's land is used to raise food for animals, on the other, small farmers lose their land and their livelihoods. This steak on our plate is a threat to the food security of many humans ([Les Amis de la Terre, 2014](#)).

Assurance of food security is based on three fundamental elements (Figure 2):

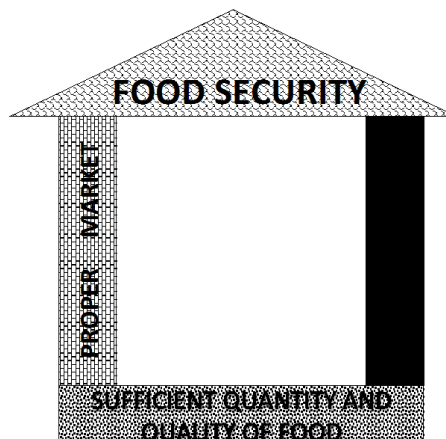


Figure 2. The house of food security

- Sufficient food available for consumption (quantity) and sufficient food safety level to assurance healthy diet (quality-nutritionally and hygienically);
- The effective access of the population to the purchase of food through the solvable demand of the population (money, purchasing power);
- An agri-food system and a proper food market (offer and access to supply).

All three of these elements are necessary and indispensable for ensuring constant food security. This "building" of elements supports food security both in small communities (isolated villages) and at the Earth's level.

Section II-Food Safety

Food safety is an umbrella term that encompasses many facets of handling, preparation and storage of food to prevent illness and injury. Included under the umbrella are chemical, microphysical and microbiological aspects of food safety (Hanning, O'Bryan, Crandall, & Ricke, 2012).

The European Union's objective in terms of food safety is to protect the consumers guaranteeing at the same time the well-functioning of the common market. Dating back in 2003, the policy is focused on the traceability concept of both inputs (e.g., feed) and outputs (e.g., primary production, processing, storage, transport and retail sales).

EU has agreed over the standards for ensuring the food products' hygiene, the health and the welfare for the animals and crops' health, as well as preventing the contamination with external substances such as the pesticides. At each stage, there are rigorous checks and the imports (e.g., meat) from outside EU have to meet the same standards and pass the same verification checks as the food produced in EU.

Key-aspects

No food product dangerous for the health or improper for the human consumption can be offered on the market. The following factors are considered:

- The normal conditions under which the food product is used by the consumer
- The information offered to the consumer
- The effect over the health on short and long term
- The toxic cumulated effects
- Specific sensibilities of certain group of consumers, such as the children.

When a food product or feed appears unsafe and is part of a products' lot, it is assumed that the entire lot is unsafe. The legislation regarding the food products is applied to all stages of the food chain, from production, processing, transport and distribution to the delivery. The companies with food profile have to: guarantee the traceability of the food products, the feed and the animals from which the food products are obtained in all production and distribution stages; to withdraw immediately from the market the food products or the animal feed or to recall all products delivered if it is considered that those are hazardous for the health; to inform the competent authorities and the consumers if necessary.

The authority provides for the European Commission and to all EU member states the technical and scientific assistance in all domains that impact over the food products safety. Also, it is responsible for the coordination of the risk assessment, identification of potential risks and for the formulation of recommendations for managing the crisis situations.

In the case of a risk identification following a risk assessment the EU member states and the European Commission can adopt precautionary measures according to a high level of health protection. In case the food or feed are presenting a major and uncontrollable risk for health or environment the emergency protection measures of the Commission can include the trade or import suspension of the respective products. Also, the EU targets the consumer protection against fraud or deceiving practices in food trade such as counterfeit food products and ensures a basis that allows the consumers to make qualified choices regarding the food products.

The European Union Parliament adopts the legislation regarding the food safety by issuing directives and regulations out of which a major part is compulsory for the member states and subsequently are incorporated in the national legislation of each country. Still, being an extremely large organisation founded for eliminating the barriers

in trade among the member states and where the individual member states only have a proportional influence the results are often regarded as an excessively bureaucratic of a scale that does not fit all member states. Regarding the food safety, the error tendency forms the side of the maximum protection of the consumer can be regarded as a positive benefit.

The member states can also have legislation and controls on their own in the field of the food safety respecting the condition of not interfering with the trade flow with other countries and be considerably different in their inner structures and approaches in regulative control of the food safety.

If analysed from a scientific standpoint the food safety is a science in its essence that targets the handling, the preparation and the storage of the food products in a manner that prevents the food diseases. These aspects include a series of measures to follow in order to avoid potential health hazards.

The paths inside this flux are regarding the safety between the industry and the resellers and further on between the resellers and the end consumers. Taking into consideration the practices from the industry facing the practices from the market the considerations for the food safety include the food origin and the practices regarding the labelling of the food products, the hygiene of the food products, the food additives and the pesticide residues, as well as the policies regarding the biotechnologies and food and the orientations of the import and export management and the certification of the food quality. When the market practices for consumers are considered it is rational that the food is safe on the market in safe delivery conditions of food for consumers.

The food that can transmit diseases from one person to another, as well as those products favourable for the bacteria development that can lead to food poisoning. In the developed countries, there are complex standards of food preparation while in the less developed countries the main issue remains the availability of safe and proper water that usually represents a critical element (Jangulashvili et al., 2017; Shiklomanov, 2000)

The five key-principles of the food products' hygiene according to WHO, are (World Health Organisation, 2010):

- Preventing the contamination of the food by pathogens from humans, pets and pests
- Separation of the raw or processed food to prevent the contamination of the processed food
- Processing the food at a recommended time duration and appropriate temperature to destroy the pathogens; - Storing the food at proper temperatures
- Use of safe water and safe raw material.

In theory, the food poisoning is 100% prevented by implementing the management system of food safety known under the acronym Hazard Analysis and Critical Control Points (HACCP). Practically, the reality is slightly different as like all other management systems the management system of the food safety can and has to be permanently improved.

HACCP was developed in the 1960s in the United States to ensure food safety for the first manned National Aeronautics and Space Administration Space Missions (NASA). NASA required a zero defects program to guarantee safety in the foods astronauts consumed in space. The HACCP system has grown to become the universally accepted method for food safety assurance. HACCP is believed to stem from a production process monitoring used during World War II because traditional "end of the pipe" testing on artillery shell's firing mechanisms could not be performed, and a large percentage of the artillery shells made at the time were either duds or misfiring (Wikipedia, 2018).

HACCP itself was conceived in the 1960s when the US NASA asked Pillsbury to design and manufacture the first foods for space flights. Since then, HACCP has been recognized internationally as a logical tool for adapting traditional inspection methods to a modern, science-based, food safety system. Based on risk-assessment, HACCP plans allow both industry and government to allocate their resources efficiently in establishing and auditing safe food production practices.

Food safety targets essentially three types of contaminations:

- Physical contamination
- Chemical contamination
- Biological contamination.

HACCP expanded in all realms of the food industry, going into meat, poultry, seafood, dairy, and has spread now from the farm to the fork (Sperber & Stier, 2009). Function of the nature of the food, the food safety establishes ceilings admitted for different contaminants for all three origins. These admission limits, in fact are the admissibility limits for consumption. Their levels are debatable and varies sometimes even inside the EU function of the regulative norms in force. The development of the HACCP, of the concept and the principles as well as of its technological capacity more and more competitive of the industries in the food sector led these admissibility limits to tighter and tighter levels and this happened with an impact over the food safety.

Section - III Consumer Ethics Food Security or Food Safety?

The natural resources of Earth still allow, on paper, the nutritive support of the entire population of the globe. Certainly, the uneven distribution, the large transport and conservation during transport costs, as well as the distribution of food in less accessible areas are elements of high interest in ensuring the food security (Figure 3).

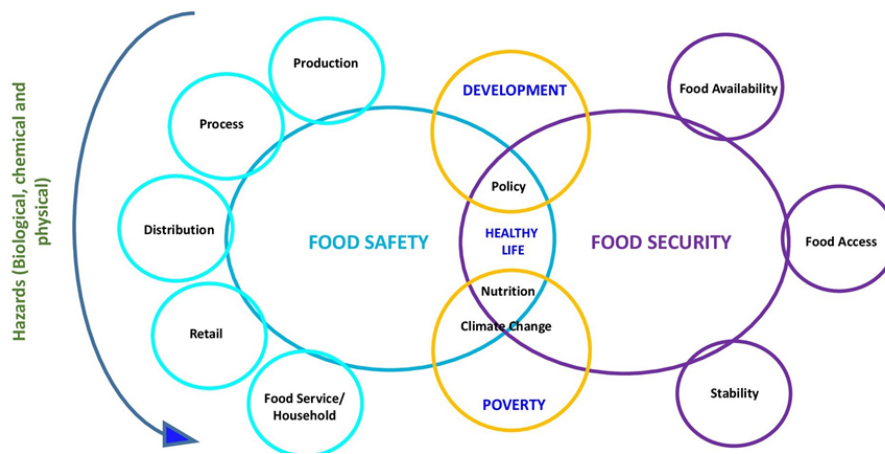


Figure 3. Interrelationship of food safety and food security Source: Agrilinks (2017)

Nevertheless, nothing can justify the food waste (and not only of food) that reaches worrisome levels even for economic operators that are processing these wastes. The food waste does not refer nowadays only to the remains from the consumers’ table or those resulting from handling and storing the food products. As a paradox, this waste arrived currently to translate into excessive care for the own safety, by exaggerating the food safety measures. As indicated above, the maximum limits admitted for different contaminants is almost constantly changing and sometimes these shifts are only the expression of excessive care and concern somehow selfish of the people from the developed countries. Certainly, the people display more and more forms of food allergies, although these forms are expressions of the body’s incapacity to adapt to certain conditions. We reserve therefore the motivated right to destroy the food products that presumably cannot be included under the requirements of "good for consumption". Whose consumption?!

CONCLUSION, RECOMMENDATIONS AND IMPLICATIONS

The aspects presented are limited to the particularities of Romania, in the context of the European Union, but it can be observed that the situation does not differ at all in other states. In addition to what we have presented, we could extend questions related to the human need for protein quantity and quality, by type of protein (of animal and vegetable origin), by age groups of the population and by daily activity of these age groups. This human need for protein consumption would be useful to be disseminated to the decision makers and then transposed into the daily diet of the population, thus avoiding food waste, thus contributing to the reallocation of resources effectively and thus contributing to the reduction and even eradication of famine. As long as the concept of "good enough quality" will not be implemented and then corroborated with sufficient quantity, reducing world hunger will not have the success that humanity now urgently needs.

If we analyse comparatively the nutritional needs of the different people of the planet, members of an EU member state and members of a less developed country we cannot observe significant differences. As example, a child aged of 5 years from EU has approximately the same nutritional needs as one child from Ethiopia or Sudan of the same age. Nevertheless, in the EU, exceeding the maximum number of germs that are allowed, for example, in milk consumption leads to its withdrawal from the market and sometimes its complete destruction. If the same milk was offered to a child from the above mentioned less developed countries (even including an effort for its treatment), it could offer an extra day of life for that child in malnutrition situation. Therefore, the question returns, for whose consumption a certain contaminated product is not fit?

Isn't this concern of ours exaggerated? The chemical, physical and biological contamination are they truly and always with no exception dangerous for us within the limits that we adopted? If so, are they so hazardous as our safety comes before the food security of millions of people suffering of famine?

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All the authors have the equal contribution on this paperwork, are also grateful for the data provided by the colleagues from Food and Agriculture Organization of the United Nations FAO and are truly dedicated to the key message of FAO: Access to sufficient amounts of safe and nutritious food is a basic human necessity, required to sustain life and promote good health.

REFERENCES

- AgriLinks. (2017). *Let's talk about food safety for enhancing global food security and development*. Retrieved from <https://bit.ly/2zYxdrn>
- Balan, I., Popescu, A., Iancu, T., & Popescu, G. (2017). Food security vs. food safety consumer ethics: Modern challenges. In *Conference Proceedings of Current Scientific Problems and EU Integration*, Tbilisi, Georgia.
- Balan, I. M. (2007). *Pork quality management*. Timisoara, Romania: Artpress Publishing House.
- Chalfoun, F., & Davidaviciene, V. (2018). Internet and aging population. *International Journal of Humanities, Arts and Social Sciences*, 4(6), 227-234. doi:<https://dx.doi.org/10.20469/ijhss.4.10001-6>
- Ene, C. (2005). *The impact of food security in elaboration of the nutritional and food politics* (Unpublished doctoral dissertation). University of Bucharest, Bucharest, Romania.
- European Commission. (2016). *Food use for social innovation by optimising waste prevention strategies*. Retrieved from <https://bit.ly/2SB6qaV>
- Food and Agricultural Organization. (2019). *The state of food and agriculture 2019: Moving forward on food loss and waste reduction*. Retrieved from <https://bit.ly/2WleVII>
- Food Waste Romania. (2019). *Catalog of Romanian organizations involved in waste prevention and capitalization of food surplus*. Retrieved from <https://bit.ly/2W3ifJ8>
- Gheorghescu, I. C., & Balan, I. M. (2019). Managing, minimizing and preventing food waste from Romania in the European context. *Journal Agricultural Management*, 21(3), 58-70.
- Gheorghescu, I. C., Velcotă, I. I., Martin, A. R., & Bălan, I. M. (2019). Food waste a major problem in the European Union. *Journal Agricultural Management*, 21(3), 65-80.
- Gherman, E. D., & Balan, I. M. (2019). The impact of food insecurity on the world's population. *Journal Agricultural Management*, 21(3), 76-80.
- Hanning, I., O'Bryan, C., Crandall, P., & Ricke, S. (2012). Food safety and food security. *Nature Education Knowledge*, 3(10), 9-20.
- Jangulashvili, T., Balan, I. M., Iancu, T., Jangulashvili, L., & Pirvulescu, L. (2017). Research regarding food security in Georgia dynamics of livestock, animal productions and self-sufficiency. *Advanced Research in Life Sciences*, 1(1), 53-58. doi:<https://doi.org/10.1515/arls-2017-0009>
- Les Amis de la Terre. (2014). *The atlas of life: Reality and figures about animals that we consume*. Retrieved from <https://bit.ly/35z3Ck4>
- Popescu, A., Iancu, T., Popescu, G., & Balan, I. M. (2017). Romania in the context of the integration in the European Union after a decade of transition and challenge: Modern challenges. In *Conference Proceedings of*

- Current Scientific Problems And EU Integration*, Tbilisi, Georgia.
- Revista Nato. (2012). *Food security*. Retrieved from <https://bit.ly/35vBa2h>
- Shiklomanov, I. A. (2000). Appraisal and assessment of world water resources. *Water International*, 25(1), 11-32. doi:<https://doi.org/10.1080/02508060008686794>
- Sperber, W. H., & Stier, R. F. (2009). Happy 50th birthday to HACCP: Retrospective and prospective. *Food Safety Magazine*, 42, 44-46. doi:<https://doi.org/10.1016/j.optha.2009.09.038>
- Wikipedia. (2018). *Mil-std-105*. Retrieved from <https://bit.ly/2L0IMk4>
- Wolek, T., Salasan, C., Fritsch, J., Davidova, S., Fredriksson, L., Gorton, M., ... others (2009). *Structural change in Europe's rural regions: Farm livelihoods between subsistence orientation, modernisation and non-farm diversification*. Retrieved from <https://bit.ly/3dgyYOO>
- World Health Organisation. (2010). *Prevention of foodborne disease: Five keys to safer food*. Retrieved from <https://bit.ly/2y1vCv6>
- Zahiu, L., & Dachin, A. (2001). Comparative agri-food policies. *Economic Publishing House, Bucharest, Romania*, 5(10), 53-54.