

# Food Security and Food Safety: Meanings and Connections

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## Abstract

*The phenomenon of globalization and the dynamics of agri-food trade development created a complex and challenging socio-economic environment, in which the issues of food security and food safety are both acquiring new valences. Food security and food safety involve a complex approach, particularly in the current context, as consumers become increasingly aware about food-related challenges and their health impact.*

*As many scientists and organisations stated repeatedly, food security includes food safety as an indispensable component, as the latter guarantees that the food consumed is safe and nutritious, without any risks, ensuring an adequate health level based on transparent information throughout the food supply chain.*

*The paper aims to emphasize several meanings and connections of both concepts, recognizing and acknowledging the crucial contribution of science and combined efforts of all interested actors towards finding best solutions in these fields, for the years to come.*

**Keywords:** *food; food security; food safety; agri-food trade.*

**JEL Classification:** *L66; Q18.*

## Introduction

While, for the international community, food security has become a key priority in the last decade, all countries of the world, to a greater or lesser extent, are facing the complex and difficult issue of supplying the population with enough basic agri-food products of appropriate quality, in a context of multiple challenges.

Persistent food insecurity and different forms of malnutrition/subnutrition - including both obesity and micronutrient deficiencies - affect a large part of the world's population, despite international and local efforts.

The Food and Agriculture Organization of the United Nations (FAO) estimated in its report – “The State of Food Security and Nutrition in the World 2019” - that 820 million people in the world were still hungry in 2018 (FAO, 2019b). The current situation regarding global and national food security highlights the importance of *hunger eradication* among United Nations Sustainable Development Goals (SDGs), and requires proper approaches to improve the current food system (El Bilali et al, 2019; Panait et al. 2020; Zaman et al., 2020).

Moreover, food safety – as an aspect of food security - is also an integral part of the SDGs (FAO, 2019a), given that FAO estimated more than 600 million cases of foodborne illnesses annually (FAO, 2019a; FAO, 2020) and 420 000 deaths caused by eating contaminated food (FAO, 2019a). Actually, SDG 2, which encompasses multiple issues such as: ending hunger, achieving food security, improving nutrition and promoting sustainable agriculture, can only be achieved when available food is at the same time safe for consumption. In this context, it is clear beyond doubt that unsafe food represents a global threat to both human health and economies.

An interdependent conceptual approach could look at food security and food safety as interrelated concepts having a profound impact on quality of human life. While food safety can be an “umbrella” term (Hanning et al. 2012), encompassing different aspects of food handling, preparation and storage, there are many external factors that affect both areas, such as poverty and climate change (Dragoi et al., 2018).

Agriculture represents, as an economic activity, the source of food production and livelihoods for any household and can be regarded as one of the most important resources of national development. Nowadays, in the context of trade globalization, this sector increasingly relies on international market for both raw, intermediate materials, and final food products (Voica & Panait, 2017; Andrei et al., 2020). The extent to which both food security and food safety can be ensured at all levels depends heavily on the management of the agricultural sector.

## **Food Safety and Food Security: Conceptual Framework, Implications and Correlations**

The two concepts - *food security* and *food safety* – are both conditions for normal functioning of our society at any level: global, regional, national, local and individual. At national level, each state should sustain its legitimacy by its ability to provide security, respectively to protect and maintain the rights of its citizens and to ensure the proper environment for meeting all needs (Ene et al, 2017). This consequently includes *both* food security and food safety.

*Food security* is a concept that received numerous definitions in different contexts, starting from the classic FAO (1992, 2002) and WHO (World Health Organisation) (1996) definition, in which food security is said to exist “when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”. The concept is closely linked to economic growth and social progress, as well as to political stability and peace, being regarded, in the opinion of many specialists in the field, as the most important dimension of national security (Bazgă and Chelmu, 2013).

Citizen’s food security represent a constitutional human right worldwide, and is approached as such by the international and regional fora.

Many international organisations and forums stated that the complex issue of food security encompasses four main components or dimensions (FAO, 2008b; El Bilali et al, 2019):

- availability: having sufficient quantities of food available, provided by production, trade and stocks, on a consistent basis;
- access: having adequate resources for access to nutritious food; food access integrates three elements: affordability (economic access: incomes, purchasing power), preference (sociocultural values), and allocation (food logistics);
- utilization: having an appropriate food intake and the ability to absorb and use food nutrients. Food safety plays an important role in this context, alongside with the food nutritional value. Good food utilization by the body depends upon multiple factors, such as

- (FAO, 2008a): general hygiene and sanitation, water quality, health care practices and food safety and quality.
- stability: maintaining consistent food availability, access, and utilization despite various challenges and crises.

At present, various influences threaten food security, such as (Bazgă and Chelmu, 2013): global warming and climate instability; desertification and land degradation; lack of use of agricultural potential to the detriment of excessive imports; lack of national strategy for food security; the global economic crisis; lack of independence of food security; development discrepancies between regions and countries; price volatility; lack of immediate action; lack of coherent policies; lack of control and traceability within the food supply chain; lack of global control and practical action. Vulnerabilities – identified as risks to food security – are very diverse, affecting the natural environment, infrastructure and technical resources, organization of farms, funds accession, investment etc.

Food security is also linked with critical issues concerning climate change, fossil fuel dependence, loss of biodiversity and biofuels production (Hanning et al., 2012).

Modern priorities regarding food security include: hygiene of water sources; promoting agriculture and rural development (especially in vulnerable areas); development of agricultural research; promoting new modern agricultural technologies; improving the management of natural resources; supporting international and national trade and macroeconomic policies; globalization in the support of the poor.

*Food safety* can be regarded also as a global concern, a component of food security as it refers to the fact that food is safe to eat and does not pose a risk to human health. The extended meaning of the concept exceeds the innocuity issues and includes the necessity that food has intrinsic and bioavailable nutritional value for the human body.

By complying with food safety requirements throughout the food supply chain, operators in this field of activity, as well as the competent authorities, ensure that agri-food products are safe for the final consumer, applying an integrated approach as a basic principle of food safety policy.

Within the European Union (EU), food safety represents a main objective of European authorities, based on controlling quality while strengthening, modernizing and simplifying the current EU rules in this field (European Commission, 2014; Stancu., 2012; Ene & Matei, 2012).

According to European regulations, each food operator is responsible for food quality and certifies this by compliance documents issued by laboratories, under the supervision of veterinary sanitary and food safety authorities network (Pentea, 2017).

In the same time, EU contribution to global food security is significant, helping developing countries to build efficient food systems using instruments like expert advice, training programmes and funding to promote health. Different EU initiatives aim to directly assist these countries in order to help them take advantage of regional and international trade (European Commission, 2010; European Commission, 2014).

Regardless of approach, food safety is considered as a parameter that affects the consumer and in its assurance all the processes of production, processing, transport and distribution of food are involved. Its importance also results from United Nations General Assembly proclaiming, in December 2018, the day of 7 June as World Food Safety Day, which had, for its first edition, the motto: “*food safety is everyone’s business*” (UN, 2019).

Once more underlining its importance, FAO stated that “food safety stands as the foundation of a healthy diet and life” (FAO, 2019a).

Another relevant connection of both food security and food safety links them to nutrition security, which has a strong impact on people’s health. Since “the importance of food safety in

this relationship is often overlooked” (WHO, FAO, 2014), during the *Second International Conference on Nutrition* held by the WHO and FAO in 2014, it was stated that improved food safety also enhances the nutritional status and contributes to reduction and prevention of non-communicable diseases.

The relevance of food safety issues has led to the organizing of global events (conferences) regarding the future of food safety, in 2019, at Addis Ababa (UNSCN, 2019a) and Geneva (UNSCN, 2019b).

While the Addis Ababa event had the objective of addressing key food safety issues and strategic actions for global challenges, the Geneva Conference mostly explored the trade-related aspects of food safety, underlining the importance of coordinated advancement of the ‘food safety’ and the ‘trade facilitation’ agendas and the implications of digital innovation in these fields.

## **Connections between Food Safety, Food Security and Agri-Food Trade**

The two concepts – food safety and food security and their practical meanings and implications are strongly connected, and this idea is significantly rendered by the expression “there is no food security without food safety” (FAO, 2019a), or “food safety is food security” (UNSCN, 2019a). In other words, it is not enough that all people have access to enough food if safety requirements are not met. Globalization of food supply can exacerbate local issues to the extent that they become worldwide hazards. Also, consumers fearing such risks – which can rise due to climate change - may turn to unhealthy dietary patterns.

At the Second International Conference on Nutrition held by the WHO and FAO in 2014, it was pointed out that social and economic costs generated by unsafe food are practically transposed into loss of income and reduced market access (WHO, FAO, 2014).

The importance of international cooperation in relation to food safety and trade has been repeatedly reaffirmed on numerous occasions; as a result, in 2015 the World Trade Organisation (WTO) and FAO launched their agreement to collaborate on the issue of trade and food safety (WTO, 2015).

As the FAO noted in 2019 about food safety impact on trade, “unsafe food costs lost productivity annually and can curtail trade” (FAO, 2019a).

Ensuring food safety in the context of regional and global trade requires the use of food quality standards so as to trade become an instrument that produces benefits for all parties involved. As it was stated during Geneva Forum (Jost & Pletziger, 2019), the lack of compliance with food quality standards and technical protection regulations results in marginalization for the least developed countries, as such food products pose risks to consumers health. Though, food safety systems and trade facilitation should not become antagonistic; using food safety requirements in order to eliminate trade competition is an unfair practice. Food safety measures and standards need to be science-based, more transparent and integrated in order to ensure consumer protection and facilitate international trade in the same time.

Besides, while the link between food security and trade is undeniable, various implications of global trade should be taken into consideration, mostly for developing and poor countries. Most authors noticed that there is a need to define and use food security indicators in order to assess the actual situation at a certain level (global, national, household) and the consequences of changing domestic production structure, export portfolio and sometimes relying on food imports (FAO, 2003).

Martin (2017) identifies five channels through which trade can impact food security: income changes resulting from opening to trade, impacts on food price volatility, productivity gains from trade, and changes in dietary diversity and quality.

While the general opinion is that, historically, international trade has helped dealing with food insecurity, many researchers underline the potential downsides that may lead to loss of revenues, mostly concerning developing countries. These countries need to adopt adequate agricultural policies to support domestic agriculture and to deal with other risks related to poverty, water and energy use, climate change, as well as unsustainable production and consumption (Kwame Sundaram & Chowdhury, 2018), otherwise food insecurity may worsen.

In fact, one of the most prominent current food safety challenges is the increased pressure for the food safety systems of exporting countries to demonstrate their ability to ensure adequate levels of food safety protection (Humphrey, 2017), which can contribute to increase difficulties especially for smallholder farmers.

As a recent FAO report shows, developing countries are increasingly participating in international markets, but for least developed countries, agricultural imports have grown faster than exports (FAO, 2018), which may hinder or negatively impact food security in vulnerable areas.

In the same time, improving food safety according to western standards generates considerable costs that may be unaffordable for the developing countries (Stancu, 2015). That is why - without compromising food safety at any stage of the food chain - there is a need to simplify and adapt safety requirements while improving skills and infrastructure (Schillhorn van Veen, 2005).

Lastly, the influence of trade on food and nutrition security dimensions seems to be very complex, and as a result, it is difficult to identify the exact effects of trade policies (Diaz-Bonilla, 2013; FAO, 2016).

Due to its complex connections and consequences, international trade might strongly influence the balance between different social and economic goals related to agriculture and food security (Clapp, 2015), so that the question “Is trade a threat or an opportunity for food security?” requires a deep analysis that takes into account all the generated effects.

As regards the WTO contribution, Smith (2012) suggests that international agricultural trade rules “do not purport to be a panacea to all the worlds’ ills in every aspect of food security” and that, actually, liberalizing international agricultural trade could have potential adverse effects on food supplies. Thus, the power to control food security does not belong to international trade regulation, which implies that each country should to address food security through its national policies according to domestic circumstances.

In this context, it is important to evaluate - especially in developing countries - the impact of improving food safety upon food security, income generation and poverty alleviation, as there is a need to assess all policy tradeoffs implied (Unnevehr, 2003).

It can be said with confidence that trade has a significant influence on food security and hunger and - if adjusted properly - could act as a stimulant in terms of raising incomes, reducing volatility and enhance nutrition.

## **Tackling Food Global Issues – Ways and Solutions**

In 2019, *The State of Food Security and Nutrition in the World 2019* report by the FAO showed that “2 billion people do not have regular access to safe, nutritious and sufficient food, including 8 percent of the population in Northern America and Europe”. The report (FAO, 2019b) underlines that it is important to act on two directions: (1) safeguarding food security and

nutrition through economic and social policies; and (2) tackling existing inequalities at all levels through multisectoral policies addressing insecurity and malnutrition.

Solving both food security and food safety issues involve a careful management of resources implying all factors used in agricultural production and taking into account elements which are relevant in terms of food safety, such as (Rabontu, 2010): adequate risk management; food traceability; harmonization of applicable regulations, but also sustainable development of the agri-food sector.

Ensuring food security in the long run by mitigating the effect of factors leading to food crisis occurrences means taking into account several elements which threaten global and local food security (Rabontu, 2010):

- increasing food availability through small farmers high quality production;
- extending coverage and efficiency of social protection systems;
- improving food risk management;
- improving access to international food markets;
- avoiding unfavourable policies and practices regarding biofuels.

A sustainable food system which addresses both long-term food security and food safety should bring resilient, and efficient solutions for many issues, ensuring:

- adequate food production, trade, and stocks;
- proper food and nutrition education;
- consistent food access (prices, incomes, and markets);
- improved nutritional status of individuals;
- efficient dealing with crises brought by political, economic and environmental factors.
- improved household level food security.

Stating repeatedly that “ensuring food safety is an essential step to achieving food security”, in response to the need to address global food safety issues, FAO created a special department - Food Safety and Quality Unit - whose main function is to supports the strengthening of food safety and quality control systems at all levels, whose activities involve (FAO, 2020):

- strengthening national food control regulatory capacities and global trade facilitation;
- supporting development of institutional and individual capacities for food control and food safety management;
- supporting science-based food safety governance and decisions;
- enhancing food safety management along food chains to prevent diseases and trade disruptions;
- providing food safety platforms, databases and mechanisms which support networking, dialogue and global access to information;
- developing food safety intelligence and foresight;
- evaluating new technologies to improve food safety and protect public health.

During the Second International Conference on Nutrition, held by WHO/FAO in 2014, under the motto “Food Safety: a Right or a Privilege”, global food safety issues were emphasized, and several actions on food safety were recommended at national level. This all countries should (WHO, FAO, 2014):

- develop adequate food control systems;
- review national food safety regulations;
- implement internationally adopted standards at national level (from Codex Alimentarius Commission);
- participate in international networks to exchange food safety information,
- raise awareness about and implement internationally recognized standards and appropriate multisectoral measures to address antimicrobial resistance (AMR).

Working in partnership with national and international bodies, FAO's Food Safety and Quality Unit is the main actor in implementing FAO's Strategy for Improving Global Food Safety, which relies on a scientific/ multidisciplinary approach of food safety management and specific solutions.

Many researchers emphasize the role of new technology on food-related issues: security, safety and quality. Given the actual context, food products should provide not only sensory attractiveness but also real nutritional benefits. Some ideas of obtaining nutritious food (Enne et al., 2010a) refer to traditional technologies, such as fermentation, extraction, encapsulation, fat replacement, and enzyme technology, to produce a large series of desirable effects, as follows:

- reducing/removing undesirable components;
- adding specific nutrient or functional ingredients;
- modifying food composition;
- masking undesirable flavours;
- stabilizing ingredients.

Possible solutions that need to be further investigated include (Vågsholm et al., 2020):

- changing consumer food demand to more plant based diets;
- increasing the quantity of seafood produced through farming and circular systems;
- reducing food waste or loss, thus making appropriate food available for human consumption.

Although controversial, modern biotechnology is often mentioned, alone or in combination with traditional technologies such as bio-fermentation, as a method for manipulating components in natural foods, at a low cost and with little environmental impact (Enne et al., 2010a).

The application of innovation in food technology also refers to using bio or nano materials to detect quality and safety attributes in packaged foods or biosensors to measure parameters affecting foodstuffs safety and quality (Enne et al., 2010b).

## Conclusions

Worldwide, numerous forums, organisations, specialists and researchers are primarily concerned with finding ways to address both food security and food safety in the context of current and future challenges.

World's sustainable future cannot be designed without the complementing elements of food security and food safety. The common objectives of both must be rightfully aligned, taking into consideration the imperatives imposed by public health, in order to achieve long term sustainability.

Improving global food security requires significant changes in global food systems. Consumers and food businesses should adapt their quality requirements and specifications and modern technology must be largely used to support these goals.

Furthermore, food safety is a shared responsibility requiring widespread collaboration and contributions of all actors across the food supply chain (FAO, 2019a).

Making a decisive shift towards sustainable practices across all sectors, "farm to fork" and beyond, obtaining safe and qualitative foodstuffs and finding better use of food already produced by reducing food waste require concentrating all efforts throughout the food supply chain (agricultural production, food processing and transport, consumer behaviour).

At national level, each country should consider both food security and food safety as main components of national security, thus designing and implementing adequate and systematic

development strategies and policies for better exploiting agricultural potential, for sufficient and safe agri-food production while enhancing population's access to it.

There is an obvious need to achieve a right balance between trade facilitation and food security in order to respect objectives linked both to trade growth and protection of consumers' safety and health.

While ensuring food for all is a must, investments in food safety tools and systems are also necessary. Trade, at all levels, should become an optimizing tool for domestic food security and food safety, based on local circumstances and thorough cost-benefit analysis, in the context of international cooperation.

Finding solutions to both sustainability and future food security requires policy makers to integrate food safety considerations as the starting point, followed by the design of sustainable food systems as a means to achieve future food security (Vågsholm et al., 2020).

At all levels (global, national, local and household), food systems should pass through a relevant metamorphosis, moving from an agriculture-centered model to a food systems policy and research framework (El Bilali et al, 2019), thus providing the basis for long-term food and nutrition security.

In a systemic and integrated approach which addresses global and local health and development goals, food safety and nutrition should appear as intrinsic parts of mainstream food system policies and measures; at national level, countries must prioritize and implement recommended actions in this field (WHO, FAO, 2014).

In the context of ensuring food safety and security, the role of the scientific community is, more than ever, of crucial importance so that creating and maintaining sustainable food systems would be the result of close collaboration and co-designing research and practice programs and agendas between industry and scientists.

Delivering high quality foodstuffs should become a research priority for food and nutrition science, so that combining the existing knowledge base with future strategic research (Enne et al., 2010b) could have a relevant impact on improving human health.

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