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Opinion

Food Security and Agri-Food Transition: No Time to Lose

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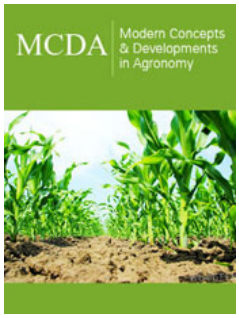
ISSN: 2637-7659



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Submission: July 15, 2022

Published: July 26, 2022

Volume 11 - Issue 2

How to cite this article: Georges Flexor. Food Security and Agri-Food Transition: No Time to Lose. Mod Concep Dev Agrono. 11(2). MCDA. 000757. 2022. DOI: 10.31031/MCDA.2022.11.000757

Opinion

The state of food security - one of the goals of the 2030 Agenda for Sustainable Development adopted by the United Nations - faces intense challenges both in the short term and in the long term. In the short term, the variable that most directly affects the food security of billions of people is the rapid rise in food prices. The recent behavior of the FAO Food Price Index (Figure 1) signals worsening food security conditions for the poorest individuals and families, those who spend a high proportion of their income on food. Food inflation that starts in 2020 as a consequence of Covid-19's impacts on the organization of food chains worsens in 2021 with the conflict between Russia and Ukraine, two major exporters of wheat and sunflower oil. As can be seen in Figure 1, food inflation concerns have grown sharply since early 2022, a sign of food insecurity-related distress not seen since the 2007-2013 commodities super cycle.

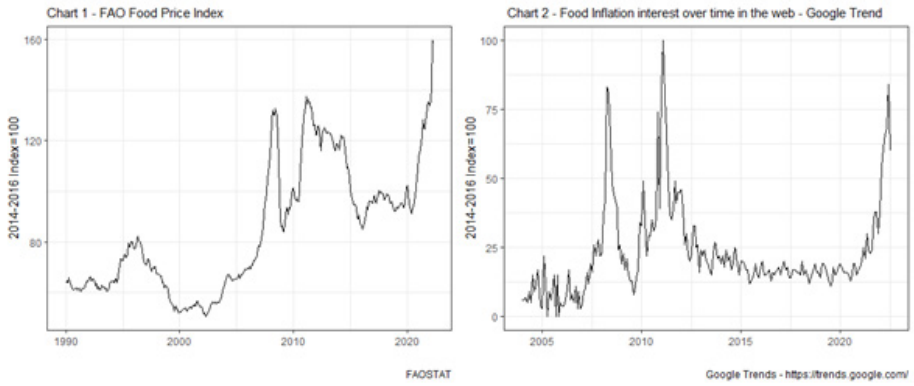

Figure 1

Besides creating tensions on global agricultural commodity markets, the conflict in Ukraine negatively impacts the supply of gas and oil exports, two strategic inputs for fertilizer production and food transportation, which ends up raising production costs and lowering supply prospects for the coming year. Due to the increased integration between energy and agricultural commodity markets observed since the 2000s [1,2], the rise in hydrocarbon prices stemming from both Covid and the war in Ukraine is also a factor fueling food price inflation.

In the medium and long term, the main challenges to guarantee adequate food security are:

A. to increase the amount of food and nutrients necessary to respond to demographic growth, and

B. to develop sustainable production methods and to significantly reduce the environmental and social costs of the agri-food system.

Demographic growth represents a challenge for the agri-food system as the world population is expected to reach almost 9 billion people in the coming decades. To avoid an increase in food insecurity and its negative effects on the health of billions of individuals, economic development, and political instability, world food production needs to increase by 70% to feed the world population by 2050 according to FAO (Food and Agriculture Organization of the United Nations, 2009) [3].

All experts agree that this increase in production must be accompanied by a drastic reduction of the environmental impacts of food production. Although estimates vary widely, it is certain that food production accounts for more than a quarter of greenhouse emissions [4]. The main drivers of this cause are land use modifications (e.g., deforestation, fires, emissions from cultivated soils), mainstream agricultural production with its intensive use of fertilizers and fossil energy, methane emissions from livestock, and the organization of the food chain (e.g., processing, transportation, refrigeration, packaging, etc.). In other words, the challenge to be faced is to avoid the Malthusian trap in a sustainable way.

To achieve this goal - to increase the supply of food in a sustainable way - some technological solutions are taking shape. The first is sustainable intensification. According to Cassman et al. [5]. Sustainable Intensification (SI) seeks to boost agricultural production without negative impacts on soil, water resources, or ecosystems. The idea is to "do more with less" by maximizing yields and minimizing the use of agricultural inputs. The authors argue that this strategy is possible with an acceleration of the use of green technologies for the cultivation of major crops in regions with better agricultural potentials as well as the diffusion of irrigated agriculture in water-abundant regions of Sub-Saharan Africa and South America. Maximizing the gains from this strategy requires a substantial growth in investments in research and development as well as the implementation of land use planning policies that are able to reallocate resources quickly and efficiently.

Decreasing animal protein consumption and replacing it with plant-based proteins or lab-grown meats is another strategy highlighted by several authors. Mazac et al. [6] state that incorporating novel foods (plant-based, fermentation, fungi, lab-grown meats) into the diet of European families has the potential to reduce the effects of agricultural production on global warming by 80%. As Figure 2 show, animal protein production - from beef and mutton in particular - is an energy and environmentally very inefficient way of producing protein. Substitution with plant-based proteins could result in consequent environmental benefits.

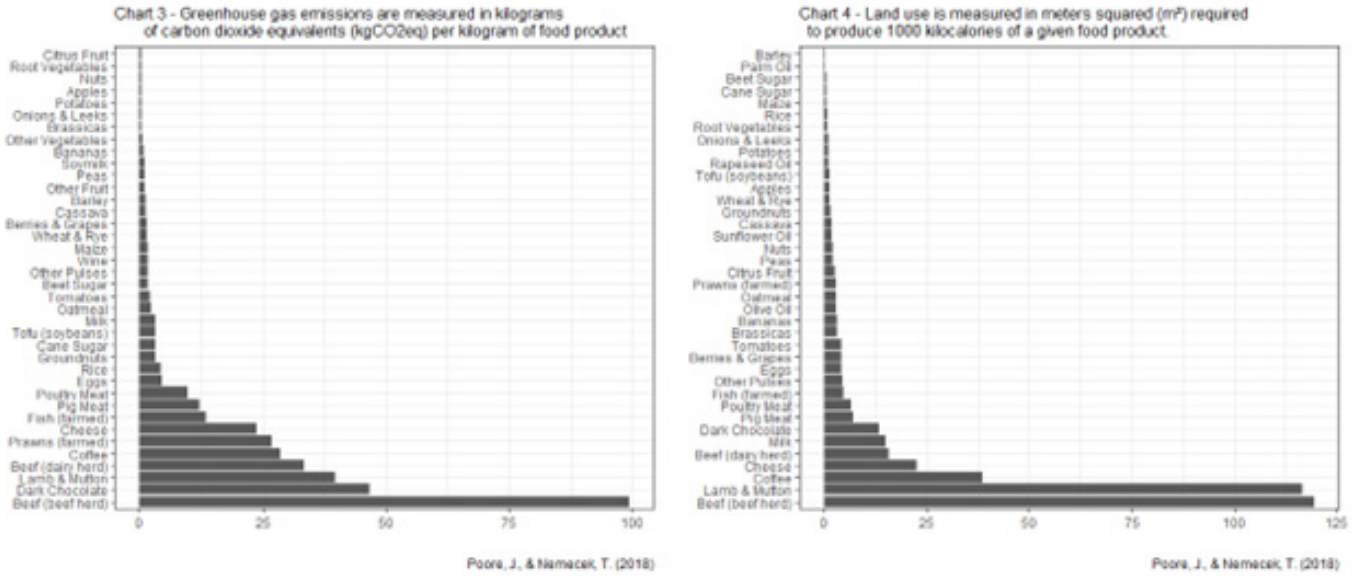

Figure 2

The third technological strategy to bring food production in line with sustainable development goals is regenerative agriculture (agroecology, agroforestry, intercropping, etc.). According to the Food and Land Use Coalition [7], regenerative agriculture has the main advantages to improves soils and their ability to fix carbon, to enhance the quality of water and air resources, to incentive the diversity of food and nutrients produced, and, because it is labor-intensive, to promote the economic inclusion of small farmers, precisely those who are most often food insecure.

Achieving sustainable development goals will probably require a combination of these different strategies. It needs urgent action from public and private actors. Governments must creatively engage in land and water use planning policies, stimulate the financing of investments in green technologies, support the institutionalization of mechanisms to effectively internalize negative externalities (pollution, biodiversity loss, etc.), promote payment for ecosystem services, and lead the transition of diets. It is essential to institutionalize policies capable of guaranteeing

access to nutritional diets for the most disadvantaged populations, especially for the poorest mothers and their children. Without these mechanisms, sustainable development goals such as the elimination of poverty and hunger or the improvement of health, equal opportunities and gender will not be possible. Private actors cannot remain in the status quo. They need to take the risks of the transition by providing large amounts of capital, investing in sustainable and nutritious technologies and products, as well as improving the management of the agri-food chains to reduce waste, food loss, water pollution, and energy consumption. The adoption of more transparent and socially inclusive modes of governance is also necessary to lower the cost of monitoring and managing the agri-food system strengthening consumer rights. The agenda and the necessary efforts are not few, but they are urgent and there is no time to lose.

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