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WORKING PAPER

Background Paper on New Institutional Arrangements to Address the Distributional Implications of a Transition to Healthy, Inclusive, and Sustainable Food Systems

José Antonio Ocampo

Angela María Penagos-Concha

Manuel Camilo Quesada-Jiménez

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CONTACT

Food System Economics Commission
contact@fsec.org

BACKGROUND PAPER ON NEW INSTITUTIONAL ARRANGEMENTS TO ADDRESS THE DISTRIBUTIONAL IMPLICATIONS OF A TRANSITION TO HEALTHY, INCLUSIVE AND SUSTAINABLE FOOD SYSTEMS

José Antonio Ocampo

Angela María Penagos-Concha

Manuel Camilo Quesada-Jiménez

1. INTRODUCTION

Global agri-food systems are facing one of the most significant challenges of recent times. The effects of the COVID-19 pandemic, climate change, and Russia's recent Ukraine invasion have led to a complex combination of elements that have consequences on production, distribution, and access to food that accentuate the regional gaps and inequalities in the world.

The 2008 crisis caused a significant price increase in the food process because of financial speculation resulting from a flow of capital that encouraged investment in securities based on raw materials, including food (Cascante, 2020). As it has been argued, between 2007 and 2008, a set of conditions favored what is traditionally known as the perfect storm: weakness in the price of the dollar, raise in the price of oil, increase in foreign currency reserves abroad, and expansion in demand for cereals, especially in the US, to produce ethanol. A significant drop in inventories of grains with low elasticity of supply implied a substantial increase in the prices of these raw materials, mainly affecting emerging countries with fewer possibilities to diversify their consumption (Campaña "Derecho a la alimentación. Urgente", 2011).

The situation faced by agri-food systems today has different elements but with similar effects in the significant increase in food prices, especially cereals, as well as an increase in the prices of fertilizers. However, it is necessary to underscore that both the operating model of agri-food systems and their governance have not facilitated the approach and management of the crisis in such a way that sustained price increases avoid deepening hunger, poverty, and inequality, especially in the poorest countries.

The solution to a possible food crisis must come from improving production levels through greater efficiency of global agri-food systems. This will only be possible if the diversity of

the effects of climate change at the regional level is recognized and included within the adaptation of production. In contrast, it is explicitly recognized that there are substantial imbalances between countries that imply that the effects of short-term crises, as well as longer-term ones, have irreversible consequences in terms of the expected results of agri-food systems.

This makes it necessary to address these challenges from the comprehensive perspective of what is today understood by agri-food systems and the results they should have in terms of food security, health, and nutrition for all. In that case, international food–system governance is a significant trigger in dealing with this problem. However, despite multiple efforts to create an institutional arrangement, the outcomes are weak, with fewer capacities to face more frequent food systems crises in a complex scenario.

This paper advances a short description of the main challenges of food systems in recent times, with an analysis of their international governance and some recommendations at the international level to improve their performance and institutional capacities to deal with the significant challenges. The main challenges are related to the vast concentration of the international food markets, the effects, and the weak institutional capacity of countries to manage climate change and food crises, and the low international commitment to generate institutional capacities to reach integral expected outcomes.

2. THE STARTING POINT: CURRENT SITUATION OF WORLD AGRI-FOOD SYSTEMS

Food systems[1] are key to the future of humanity, both for their role in food security and in the livelihoods of billions of people. Complying with 2030's Agenda will be possible if global food systems can guarantee the right to adequate food and improve the inclusion of the most vulnerable people in a nature-positive way. At the same time, population growth is one of the main challenges in the future of the food system: in 2050, there will be 9.7 billion expected inhabitants, and in 2100 there will be 10.4 (UN DESA, 2022), which implies the need to increase food production without compromising more significant pressure on natural resources. This complex panorama faces all world societies and requires the commitment of the global, regional, national, and local food systems and their stakeholders. The governance of food systems will play a leading role in managing the interests and resources of all their links, making better decisions that include the participation of all the actors involved, and seeking the benefit and the guarantee of the right to adequate food for all in all times and places.

In this sense, a sustainable food system is defined as one that "delivers food security and nutrition for all in such a way that the economic, social, and environmental bases to generate food security and nutrition for future generations are not compromised" (Nguyen, 2018, p. 1), which implies that production and commercialization are profitable (economically sustainable), brings benefits to society (socially sustainable), and has a positive or neutral impact on the natural setting (environmentally sustainable). Similarly, the transformation of the food system, beyond "elicit[ing] the biophysical and technical feasibility," must consider the potential trade-offs among multiple food systems objectives, mainly between goals[2] of

[1] In this article, agri-food system and food system are used interchangeably

[2] There is a wide discussion about the limits of sustainability and growth's concepts, for example, in a recent article, McGreevy et. al (2022) propose thinking beyond sustainability concept to change a post-growth context, in which these principles must be followed by food system: 1) efficiency for sufficiency, 2) extraction for regeneration, 3) accumulation for distribution, 4) the private ownership for commons, and 5) control for care. In this article, for simplicity, the focus is on three main objectives: food security and healthy food, social inclusion, and environmental sustainability.

health (food security), environment (nature-positive way), and inclusion (poverty) (Gaupp, et al., 2021)

Thus, there are five critical issues that agri-food systems face in their transition toward sustainability, inclusion, and food security. In addition, these factors generally show the gaps that exist between regions and countries in the global food system: 1) Agricultural Production is concentrated in some regions of the world due to differences in productivity, access to technology, and investment in Research & Development; 2) Climate change will have differentiated impacts on regions and compromise the world's food security due to the low adaptation capacity of food systems; 3) Food distribution and the configuration of global agri-food systems further accentuate inequality in the right to adequate food; 4) Food quantity and quality are uneven globally, and 5) Agri-food systems have limitations both in avoiding crises and facing them.

- **Agricultural Production is concentrated in some regions of the world due to differences in productivity, access to technology, and investment in Research & Development**

The value of agricultural production grows with fewer employees, with an increase in the use of agrochemicals –e.g., 36% in the use of pesticides (FAO, 2021b). Agricultural value added increased by 73% between 2000 and 2019 (around 3.5 trillion dollars), with its share in world GDP remaining stable (4% during the same period) (FAO, 2021b). However, agriculture has reduced its participation in the world's labor force from 1,050 million people to 874; by 2020, it represented 27% of the world's workers (FAO, 2021b). Even though there are fewer employees in agricultural production, which is consistent with the structural change in the growth of economies (McDermott & de Brauw, 2020), at least one in four workers is related to agricultural activity. Furthermore, regional differences are relevant in agriculture's share in added value and employment; for example, in Africa, the sector participates in about 16% of the GPD, but around half of employment (FAO, 2021b).

In this sense, there are wider differences between regions and countries in agricultural production. Specifically, Yuan et al. (2021) found that the world agricultural convergence has not occurred and shows that the high and upper-middle-income countries concentrate 60% of global production. The divergence of agricultural output is explained mainly because

the low-income countries' agriculture tended to be less productive and grow at a flat rate – with regional differences. Indeed, since 1961, the average yield of cereal grain has remained flat in Sub-Saharan Africa at around 1.5 tons per hectare, while in South Asia, it grew reaching 3 t/ha, and in East Asia, it increased to 6 t/ha (Fuglie, Gautam, Goyal, & Maloney, 2020).

Agricultural Economic Growth can be decomposed as an increase in the use of input for better efficiency in the use of the resources. In the first case, input intensification (capital and labor) and land growth are the main factors contributing to agricultural expansion. On the other hand, it is possible to measure the efficiency in the use of resources through the Total Productivity Factor (TFP). Both the TFP growth and input intensification contribute to yield growth. Still, given that the amount of land is finite, and the use of labor and input intensification has a significant environmental impact, TFP growth is central for agriculture and sustainable development. Indeed, the analysis should go beyond growth paths between "intensification" of "extensification", for that is necessary interdisciplinary research to examine the dynamic interplay of TFP growth, farming system sustainability, and resilience in terms of technology-based or ecosystem-based pathways for search links between them to achieve a heuristic framework about agricultural productivity (Coomes, Barham, MacDonald, Ramankutty, & Chavas, 2019).

The TFP accounted for 44% of the growth in the agricultural output. However, in recent years, TFP has increased its importance, accounting for two-thirds of the production growth (Fuglie, Gautam, Goyal, & Maloney, 2020), meaning that productivity is the primary driver of the increase in global agricultural production. Nonetheless, the performance between countries diverges. For developed countries, the agricultural output decreased because of Engel's Law[3] until the 1990s, but since then, production has been growing entirely due to TFP, even by reducing the input intensification. In contrast, in developing countries, until the 1990s, growth production was associated primarily with more input use, but since then the TFP growth has doubled from 1% to 2% per year, while the use of inputs is still increasing.

[3] Engel's Law postulates that as income rises, the proportion of food expenditure falls. In developed countries, the Engel's Law implies a relative fall in the demand for food; as a result, there is a reallocation of land and labor to other sectors than agriculture (Fuglie, Gautam, Goyal, & Maloney, 2020)

Likewise, it is essential to note that emerging economies like Brazil and China have increased their agricultural productivity by around 2% per year between 1971 and 2015, even above some developed countries, as a result, the acceleration in TFP growth has been uneven between developing countries (Fuglie, Gautam, Goyal, & Maloney, 2020).

The agricultural productivity gap has tended to reduce among high income countries, but it has expanded among lower income ones. In the 1990s, the average annual growth in TFP in high and upper-middle-income countries was between 1.8% and 2.4%, while in low and lower-middle income, it was between 0.9 and 1.3% (own calculation based on USDA (2022) data). In turn, while in the 2000s and 2010s the lower middle-class productivity has grown at average rates between 1.5 and 2.1%, the lower class grew by 0.3% to 1.4%, respectively. At the other extreme, TPF growth has been driven by upper-middle income countries, which increased between 1.8 and 2.4%, while in high-income countries it did so at 0.5 to 1.4%.

The critical point is that differences in productivity are not necessarily due to geographical endowments. If countries were to produce current crops according to their potential level of yields defined at the cell level (as portions of land of 10 km x 10 km on average), the rich-poor gap yields would virtually disappear, going from 214% to only 5% (Adamopoulos & Restuccia, 2022). Thus, the differences are explained by factors that don't allow exploiting the potential at the geographical level. For example, improvement in capital quality is related to agricultural labor productivity growth "accounting for 21% and 35% of the productivity growth in poor and rich countries respectively"[4] (Caunedo & Keller, 2021).

The TFP growth is possibly based on three main channels, according to Fuglie et al. (2020): 1) reallocating factors of production toward more productive farms, 2) productive growth within existing farms, and 3) entry and exit of farms. In other words, agricultural productivity can increase by removing obstacles to reallocating factors of production, improving efficiency within the farm, or increasing the entry of more productive farms. Regarding the first way, recent evidence shows that the potential gains from removing the obstacles may

[4] Climate change is another important factor in explaining the difference between regions, accounting for up to 34% of the reduction in potential productivity (to be discussed later)

not be as significant as in the past because there is no optimal farm size in terms of productivity, and the macro-evidence about productivity has been recently challenged (about measuring nature's contribution and a better accounting for the actual time spent in different activities) (Fuglie, Gautam, Goyal, & Maloney, 2020)

The second potential driver is the technological change and the adaptation of innovation that allows the farms to a better use of inputs, adopt new crops, and improve the quality of products, which contribute to the pathway toward a sustainable food system. For this, agricultural productivity has a renewed focus on innovation, for which investments in Research and Development (R&D) play a fundamental role in creating technology and adapting available advances within and off the farm from a bottom-up perspective that considers the territorial conditions (Stads, et al., 2022).

In this sense, high-income countries and a few emerging economies like Brazil, China, and India concentrate the global agricultural research spending. Spending on agricultural R&D rose from $31 to $47 billion during 2000-2016, with China accounting for about half of the increase (Beintema, Nin Pratt, & Stads, 2020). Expenditure is concentrated in only nine countries that spent more than 1 billion, 122 countries invested less than $100 million in agricultural research in 2016, and 52 spent less than $10 million, according to the sample of Beintema et al. (2020).

As a result, the differences in global agricultural productivity also explained because frontier technology is adapted to the high-income countries, which develop innovations and invest more in R&D. Indeed, Moscona & Sastry (2022) provided evidence that "*inappropriate technologies*" (defined as mismatch in the presence of crop-specific pests and pathogens (CPPs)) reduces global productivity by 58% and increases cross-country disparities by 15%. Therefore, for productivity growth, it is not only sufficient to have frontier technology if it is not created or adapted to the local conditions of each country.

The adoption of beneficial technologies remains low, mainly in less developed countries. Farmers' education, size of land, access to credit, type of tenure, and access to extension services are factors that are related to greater adoption of new technologies in production; in fact, technologies of improved varieties and chemical inputs are more easily adopted by large

producers, suggesting that scale is not neutral to the implementation of new technologies (Ruzzante, Labarta, & Bilton, 2021).

In a nutshell, in some areas of the world, access to technology remains low, hindering production increases that are not accompanied by boosts in the area planted or the intensive use of production inputs. However, it is also essential to recognize that new technologies are not easily accessible to smallholders, and sustainable agricultural practices have limitations in their scalability. In any case, the supply solution would come from increases in agricultural productivity.

- **Climate change will have differentiated impacts on regions and compromise the world's food security due to the low adaptation capacity of food systems.**

Climate change has accelerated in recent years, and there is increasing clarity about the anthropogenic influence on the warming of the atmosphere, oceans, and land (IPCC, 2021). The Global Surface temperature was 1.09°C higher in 2011-2020 than in 1850-1900 (pre-industrial era), with a more significant increase over land (1.59°C) than over oceans (0.88°C). The estimated increase in global temperature is mainly due to warming between 2003-2012 (+0.19) and higher according to more recent estimations (+0.1°C)[5]. In all temperature projection scenarios, global warming of 1.5°C and 2°C will be exceeded during the 21st century unless there are deep reductions in CO_2 and other greenhouse emissions in the following years (IPCC, 2021).

In this context, the relationship between climate change and the food system has three sides:

1. Its current performance contributes to biodiversity loss and a significant share of emissions.

2. They are and will be highly affected by climate change.

3. They play a fundamental role in climate change adaptation and mitigation.

[5] This is an increase compared to the previous model estimated by the IPCC (AR5), which is due to methodological advances and datasets that allow a more precise estimate but are not specifically due to physical changes.

In these three scenarios, there are wider regional differences in both causes and effects of climate change related to food systems.

In the first case, the current trajectory of food systems has led to adverse outcomes such as biodiversity loss and degradation of terrestrial and aquatic ecosystems without delivering food security and healthy food for all (Bezner Kerr, et al. (2022) quotation of Steffen, et al. (2015)). In addition, food systems emit about 18 Gt CO_2 equivalent per year globally, representing 34% of total GHG emissions in 2015 –although their share of total emissions has decreased from 44% in 1990 (Crippa, et al., 2021). The most significant contribution comes from agricultural production associated with land use (71%); also, only 6 top economies (China, Indonesia, United States, Brazil, European Union, and India) accounted for 51% of aggregate emissions from food systems (Crippa, et al., 2021)

Climate change directly affects food systems, and its impact on production systems will be increasingly more significant (Bezner Kerr, et al., 2022). Indeed, climate change already affects all dimensions of food security through disruptions in the links of the food chain from production to consumption, with more pronounced effects on vulnerable populations such as small-scale food producers in low-income countries, indigenous communities, women, and the urban poor. Moreover, climate change impacts have a cascading effect on food supply because it is related to food prices, households' income, and food safety, which is evident in extreme climate events (Bezner Kerr, et al., 2022)

In terms of crops, the climate impacts over the last 20-50 years differ by crop and region. There are positive effects for rice and wheat in East Asia and for wheat in northern Europe. Still, the effects are primarily adverse in sub-Saharan Africa, South America and the Caribbean, South Asia, and Western and Southern Europe (Bezner Kerr, et al., 2022). For example, between 2000-2009, a 1°C warming in West Africa led to regional average yield reductions of 10-20% for millet and 5-15% for sorghum, with associated losses between 2.33-4.02 billion USD for millet and 0.73-2.17 billion USD for sorghum (compared to a non-warming counterfactual) (Sultan, Defrance, & Iizumi, 2019)

The anthropogenic climate change also affected agricultural TFP, accounting for about 21% of the reduction in productivity since 1961. This slowdown is equivalent to losing the last

seven years of productivity growth before 2021. The effect is more severe in warmer regions such as Africa, Latin America, and the Caribbean, with an estimated reduction of -26 to -34% (Ortiz-Bobea, Ault, Carillo, Chambers, & Lobell, 2021). Likewise, the regional TFP growth is associated with regional land expansion (except in sub-Saharan Africa and South and East Asia). However, such expansion is compensated for increased productivity in terms of the indirect use of land, implying that the TFP growth in regions well connected to world markets and trade led to further land expansion (Villoria, 2019).

The risks of climate change are related to food security and healthy food, livelihoods of people, and ecosystem services, which are the desired outcomes of the food systems. Increased extreme weather events could generate strong food shortages and price spikes. This situation, in turn, increases malnourishment through direct impacts on food production and has cascading effects on food prices and incomes.

Climate change will transform some existing global crop and livestock areas, making them unusable due to precipitation, temperature, and aridity: 10% by 2050 and over 30% by 2100 in a high emission scenario (Bezner Kerr, et al., 2022) (Kummu, Heino, Taka, Varis, & Viviroli, 2021). The unfavorable impacts will increase if global temperatures rise by more than 2°C. Indeed, FAO (2018b) projected a 3-10% decrease of global mean crop yields of rice, maize, and wheat per degree of warming. Negative impacts on cereals are projected for Africa and South and Central America by the end of the century (Aggarwal, Vyas, Thornton, & Campbell, 2019) (Porter, et al., 2019)

Food security and healthy food also are affected by climate change. The number of people at risk of hunger will increase between 8 to 80 million depending on scenarios (compared with a world with no climate change) (Mbow, et al., 2019). Nearly 80% of them will reside in Africa and Asia, while regional disparities could increase under a high-emission scenario (Nelson, et al., 2018). In addition, climate change will reduce the livelihoods and health of people in the agriculture and food sectors affecting food security and healthy balanced diets. Another driver of diet-related mortality is micronutrition deficiencies and undernutrition, increasing the loss of years of total health by 10% in 2050 (Bezner Kerr, et al., 2022).

Despite the multiple adaptation measures implemented in production systems, on-farm adaptations are insufficient to meet Sustainable Development Goal 2. The adaptations implemented in crop production will be insufficient to avoid the adverse effects of climate change, and the regional effects will be faster for places where the temperature is already high, such as in low latitudes (Bezner Kerr, et al., 2022). However, the AFOLU (Agriculture, Forestry and Other Land Uses) sector can provide between 20-30% of the global mitigation needed for a 1.5 or 2°C pathway towards 2050. In detail, mitigation measures in forests and other natural ecosystems provide the largest share of the economic Agriculture, Forestry and Other Land Use (AFOLU) mitigation potential, followed by agriculture and demand-side measures (Nabuurs, et al., 2022).

In short, agri-food systems play a dual role in terms of climate change both because they will be one of the most affected sectors in terms of food production and consumption and because they have and will have a crucial role in global mitigation and adaptation to climate change to avoid exceeding the limits in the temperature increase. However, the current trajectory will not be enough to prevent the negative effects on world food production and consumption.

- **Food distribution and the configuration of global agri-food systems further accentuate inequality in the right to adequate food.**

The growth of agricultural production has increased the supply of food worldwide. However, demographic changes, rapid urbanization, and transition to healthy diets are drivers that agri-food systems must face to guarantee the right to adequate food for everybody. In this, food distribution will play a fundamental role in facilitating the mobility of products between countries with higher endowments of natural resources and those that are not or among more and less productive countries (OECD-FAO, 2022). In 2050, the efficiency in the mobility of agri-food systems may contribute to an increase of 50% of the projected production to meet the requirements of the food demand (FAO, 2018a)

Agri-food markets must guarantee an excellent distribution of gains in added value throughout the value chains. For the African case, Bergquist & Dinerstein (2020) find that traders manage to capture 82% of the total surplus production in Kenya. Similarly, in the midstream of value chains in developing regions, small and medium enterprises (SMEs) have

been in a quiet revolution, moving about 65% of the food consumed in Africa and South Asia (Reardon, Liverpool-Tasie, & Minten, 2021).

On the other hand, the growth of global value chains has benefited in a diverse way in different regions. In general, Africa, Central Asia, and Latin America have focused on producing commodities to be processed in other countries (World Bank, 2020), which is the same in food production and products derived from agriculture. In fact, in Africa, Latin America, and Asia, a revolution of supermarkets has been presented in terms of their growth and their ability to agglomerate markets (Reardon, Timmer, & Berdegue, 2004; Barret, Reardon, Swinnen, & Zilberman, 2020) for which technological innovation and innovation and development systems are necessary to achieve the transformation of agri-food systems for producers and segments outside the farm (Reardon, et al., 2019). Furthermore, this revolution has changed power relations within the food supply chains by moving the decision-making power from the producers to the intermediaries and governments to the participation of the private sector and multinational corporations (HLPE, 2017).

Trade in agri-food systems has grown significantly over the last 50 years, with an increase of eight times, while world production has barely tripled; for every 100 kilograms of food produced, at least 17 are traded at the international level (Global Panel on Agriculture and Food Systems for Nutrition, 2020). Trade has multiplied since the 2000s, partly due to the fall in food tariffs, reforms in support of producers in the Uruguay Round, and the signing of multiple trade agreements. Still, growth has stagnated in recent years (OECD-FAO, 2022).

Agricultural exports tend to concentrate in a few countries; in fact, the five largest exporters account for 70% or more of global export volume, with some products with a share that exceeds 95%, such as soybeans. For the less concentrated fish and beef, the participation of the five leading exporters ranges between 43 and 57%, respectively (OECD-FAO, 2022).

The world food trade has produced a growing differentiation between net exporting and importing regions. In that sense, Latin America is the region that is expected to become the largest net exporter in the world, with a similar pattern for North America and Europe, and Central Asia. However, in most African and Asian countries, imports have tended to grow considerably (OECD-FAO, 2022).

In the same direction, the regional pattern of dependence on imports in consumption shows that Near East and North Africa concentrate a dependence close to 60%. This situation has led many countries to rely too heavily on imports, accentuating their vulnerability to shocks in times of crisis like the current one. However, measures are still in place that do not primarily benefit developing countries and affect the efficiency of global food distribution.

There is a generalized agreement on the need to reduce trade costs. The gains of reducing cost trade could increase between 7.3 and 11.1% in the value trade depending on implementing the Trade Facilitation Agreement or removing agricultural tariffs (Beckman, 2021). Nevertheless, despite the profits that can be obtained from eliminating trade measures, it is essential to notice that many market barriers are still working as non-tariff measures.

- **Food quantity and quality is uneven globally, and the COVID-19 pandemic exacerbated the regional concentration of food insecurity, hunger, and access to healthy food.**

The inequality in food consumption is a notable outcome of the current food system. There are higher food access and utilization differences between regions, countries, communities, households, and inhabitants. The effects of the COVID-19 pandemic and climate change are already evident, which together with the recent Russia's invasion of Ukraine configures a scenario that threatens food security and global nutrition.

Gaps in food consumption are reflected in their importance as a proportion of per capita spending. The low-income countries spent, on average, 48.5% of their budget on food, beverages, and tobacco, the middle-income countries 31.1%, and the high-income countries only 20.4% (Muhammad, Seale, Meade, & Regmi, 2011). Also, there are significant differences in spending by type of food. For example, low-income countries pay 23.3% of total food expenditure on cereals, while the percentage is barely 8.6% in high-income countries (Muhammad, Seale, Meade, & Regmi, 2011)

The income elasticity of food demand, beverages, and tobacco varies significantly among countries and is the highest among low-income countries, going from 0.85 for the Democratic Republic of Congo to 0.71 for Armenia. It ranges between 0.71 and 0.57 for middle-income countries and from 0.56 to 0.35 for high-income ones. For instance, the income elasticity of

cereal demand in The Democratic Republic of Congo is 0.31%, while it is -0.015% in the USA. (Muhammad, Seale, Meade, & Regmi, 2011)

The low-income countries concentrated vulnerabilities to changes in food and grain prices. The per capita availability per day of calories in rich countries is about 3,500, which drops to 3,200 and 2,700 for upper and lower-middle-income countries and decreases significantly to 2,400 for low-income countries (OECD-FAO, 2022). The projections for the next decade are that these differences will continue.

Thus, there is a triple burden of food consumption from malnutrition, obesity, and micronutrient imbalances that underlies many diet-related diseases (Masters, Finaret, & Block, 2022). Although all deprivation is related to food security and poverty, income growth at the country level does not necessarily lead to improved diet quality, partly because consumers do not directly observe the consequences of their food choices (Masters, Finaret, & Block, 2022). There is an interesting pattern in terms of nutrition since obesity tends to be more concentrated in rich countries while malnutrition is in the poorest (FAO, 2018a). However, there is evidence that income level determines the quality of the diet that households can access –i.e., rich countries have a more diverse consumption in their diet (Clements & Si, 2018).

There is a hunger crisis in the world. Global hunger has been growing sustainably since 2015, accentuating the effects of the COVID-19 pandemic: in 2020, about 690 million people suffered from hunger (FAO, IFAD, UNICEF, WFP and WHO, 2021). This situation has been maintained during 2021, despite the reactivation of most of the world's economies. In fact, according to several international organizations (FAO, IFAD, UNICEF, WFP and WHO, 2022), there were between 702 and 828 million hungry people. In other words, 9.8% of the world population does not have access to a minimum food basket that guarantees a good life. So, one in ten people worldwide is not guaranteed their right to adequate food.

Similarly, the prevalence of undernourishment shows a marked regional pattern in Africa, Latin America, the Caribbean, and Asia. The most significant number of hungry people is found in Asia, with 425 million, followed by Africa, 278 million, and Latin America and the Caribbean, with 56.5 (FAO, IFAD, UNICEF, WFP and WHO, 2022). Despite this, Africa has the highest proportion of undernourishment: one out of five persons (20.2%) suffer from

hunger. In other words, world hunger has wide regional gaps that, which contrary to closing have been widening in recent years (FAO, IFAD, UNICEF, WFP and WHO, 2022).

The panorama is similar in hunger and the possibility of having sufficient and stable food. In 2021, about 2.3 billion people were moderate to severely food insecure, while 923.7 million were hardly food insecure, equivalent to 29.3 and 11.7% of the world population, respectively (FAO, IFAD, UNICEF, WFP and WHO, 2022). In other words, almost a third of the planet's inhabitants encounter some obstacle to accessing food, while a tenth can spend entire days without eating. Again, Africa, Latin America, and Asia are concentrating the food insecurity, where the prevalence of moderate to severe food insecurity is 57.9, 40.6, and 24.6%, respectively (FAO, IFAD, UNICEF, WFP and WHO, 2022). The figures are similar for severe food insecurity, with a higher prevalence in Africa at 23.4%, with a lower percentage but no less worrying in Latin America and the Caribbean, where it reaches 14.3%, and in Asia, with 10.5% (FAO, IFAD, UNICEF, WFP and WHO, 2022).

The situation is further accentuated in terms of access to healthy food. In the world, almost 3.1 billion people did not access a healthy diet during 2020, representing an increase of 112 million compared to 2019. Asia concentrates about 70% of this increase. In fact, in Asia, the number of people in this situation is 1,890 million, followed by Africa, with more than 1,000 million (FAO, IFAD, UNICEF, WFP and WHO, 2022).

- **Agri-food systems have limitations both in avoiding crises and facing them.**

Food crises are periodic (HLPE, 2011). In fact, since the last century, at least four past commodity booms have been recognized in which there has been a significant change in food prices: 1915-17, 1950-57, 1973-74, and the North Atlantic Financial Crisis[6] and its succeeding years (2007-2012)[7] (Clapp, 2022). Likewise, it should be noted that the periods between crises are increasingly shorter and with more significant impacts, which will increase in a scenario of food scarcity and competition with natural resources, which can increase the possibility of conflicts (FAO, 2017)

[6] This crisis is generally called the Global Financial Crisis, but we will call it the North Atlantic Crisis because it is concentrated in the United States and Western Europe.
[7] The commodity boom started in 2003, but the period of the food crisis took place between 2007 and 2012, in the middle of the North Atlantic Financial Crisis (Clapp, 2022)

In this sense, the global food crisis in the middle of North Atlantic Financial Crisis was the tip of the iceberg (McMichael, 2009), there were many factors behind the hunger, and food crises seem to be a repeated problem in history. Indeed, as Horton (2009) shows, a quote from Time recalls the similarities between situations:

> Then came 1972. Bad weather started to plague so much of the world's cropland that many experts conclude the climate is changing… Harsh winters, droughts, or typhoons cut output in the Soviet Union, Argentina, Australia, the Philippines, and India. The weather improved in 1973, but a new set of problems threatened food output… Fertilizer was in short supply, and its price started to climb. Then came the devastating impact of the quadrupling of the market price of petroleum (Horton (2009), quoting Time (1974))

Horton (2009) thus points out several similar factors between the 1972 and North Atlantic crises, among them the drop in grain stocks, the increase in the price of energy, the increase in demand, the role of speculation, and the countercyclical response of food aid. In response to the 1974 crisis, there was a World Food Conference that emphasized three solutions: 1) increase food production in developing countries, applying more agricultural inputs and improving policies to encourage agricultural production; 2) the responsibility of the FAO to promote a better food security system worldwide, including better information on stocks, and increased food aid; and 3) trade was considered necessary (Hathaway (1975), quoted in Horton (2009)). However, the essential point is that these solutions could be considered relevant for both North Atlantic and, possibly, the current crisis.

Despite the similarities, the North Atlantic crisis has some specific characteristics, which could be considered as short-term causes and long-term structural factors behind the Food Price Crisis. The short-term factors included the decline of growth of agricultural production, the decrease of the global stock of grains, the increase of energy costs that directly impact the production cost, the increased demand from emerging economies, speculation in financial markets, and the growing production of biofuels. In turn, the long-term structural factors encompassed the decline in investment in agricultural productivity, reduced state regulatory role in agricultural production, removal of agricultural tariffs, and resulting import surges and shift to export crops that resulted in the specialization in a few commodities. Likewise, developing countries increased the demand for food, transforming these countries from net

food exporters to net food importers. In the same way, Clapp & Cohen (2009) argue that the food crisis of 2008 shed light on the critical factors of the global food systems as underinvestment in developing countries' agriculture and the unequal trading system.

However, it is necessary to mention that the characteristics of the current crisis (2020-2022) are different from those of North Atlantic Financial crisis. Most likely, the duration and magnitude of the effects will depend more on the global governance of agri-food systems.

At present, the drivers of the current crisis could be summarized in the effects of the Russian invasion of Ukraine, climatic shocks that affect people's ability to feed themselves, the economic consequences of the pandemic, and the increase in the costs of production (WFP, 2022). Consequently, there was a historic increase in the *agricultural price index* of the World Bank by April, but the decrease in the following months eased fears about a food shortage during 2022 (World Bank, October 2022). Overall, the *Commodity Markets Outlook* indicates an increase of more than 13 per cent in 2022 for agricultural prices but is expected to fall by nearly 5% in 2023, before stabilizing in 2024. However, there are many risks in this outlook related to the deterioration of global macroeconomic conditions, adverse weather patterns and restrictive and inadequate trade policies (World Bank, October 2022).

Similarly, by the end of 2022, it was expected a marginal decline in global grain inventories relative to project demand; during the 2022-23 season, the stocks-to-use ratio fell to 0.27 from a high of 0.31 in 2017, but it is still adequate by historical standards (World Bank, October 2022). On the other hand, the global biofuel market is expected to grow by 11.02% in 2022 with an annual growth projected rate, in the mean, of 7.12% until 2026 (ReportLinker, December 2022). This means that it is possible to expect an increase more than anticipated by policymakers in previous years. The changes in global biofuel markets could have important implications for food commodity markets. Still, currently, biofuels account for 3-4 per cent of global land but only 0.7 per cent of global energy consumption (World Bank, October 2022).

Therefore, there have been a few falls in grain stocks, and the current and project demand for biofuels is lower (OECD-FAO, 2022), also it is not yet clear that there is speculation in financial markets that directly affects commodity prices in agriculture. Instead, what has

happened is that the average annual growth of agricultural production has been reduced in the last decade between 2011-2019, standing at 2.1%, which leads to the lowest growth rate since 1961-70, since data are reported (Fuglie, Jelliffe, & Morgan, 2021).What is certain is that the long-term factors of the North Atlantic crisis remain, even with even more pronounced changes, especially given the growth of global value chains and the corporate sector's participation in the agri-food systems (Clapp, 2022).

In other words, many of the causes and expected actions of the 1972 and the North Atlantic crises seem to continue over time. This situation shows that the governance of agri-food systems has not made sufficient progress in solving the long-term factors that tend to generate crises or imbalances between supply and demand, and it is still not clear what the response will be in terms of dealing with the immediate consequences of hunger during the current crisis. In this order of ideas, global agri-food systems do not guarantee the right to adequate food for a significant part of the population, and regional gaps have increased over time.

Thus, the panorama of food in the world is critical hunger is growing, there are problems with access to food for a significant percentage of the population, and about half of people do not manage to consume a healthy diet.

Even though agri-food systems were resilient during the confinements and the measures taken during the COVID-19 pandemic, guaranteeing global agri-food trade and production (OECD-FAO, 2021) (ECLAC, FAO and IICA, 2021), the dramatic drop in income and employment affected access to food in most countries of the world. However, the economic recovery after the pandemic has not been reflected in improvements in nutrition: on the contrary, forecasts by FAO, IFAD, UNICEF, WFP and WHO (2022) indicate that if recent trends continue, the world is not on track to achieve the Sustainable Development Goal 2, of zero hunger in 2030, since the number of people affected by hunger would exceed 840 million for that year.

One of the factors that will be most relevant in the dynamics of agri-food systems in the coming years will be the behavior of food prices. During the pandemic and the subsequent recovery, there were already worrying increases in prices. For example, in 2020, the cost of a healthy diet increased in Asia by 4%, in Oceania by 3.6%, in Latin America and the

Caribbean by 3.4%, in North America and Europe by 3.2%, and in Africa by 2.5% (FAO, IFAD, UNICEF, WFP and WHO, 2022).

The Russian invasion of Ukraine further accentuated the rise in the price of food staples. Market conditions, high prices for energy, fertilizers, and most agricultural services have further pushed food inflation (FAO, 2022).

As the FAO (2022) shows, Russia and Ukraine are leading players in the world food trade. In 2021, wheat exports from both countries accounted for around 30% of world market. Together they represent about 19% of corn exports, with 16% of them from Ukraine, which places it as the fourth largest grain exporter in the world. The situation is dramatic in sunflower oil exports, where these two countries contribute with 78% of the world supply. Similarly, Russia is a crucial exporter of fertilizers: in 2021: it was the first in nitrogenous fertilizers, the second in potassium, and the third in phosphate fertilizers worldwide.

The risks of a food emergency are becoming more significant. This means that effective and forceful responses are needed to improve food supply in the short term and close the gap between countries in access to food. Thus, FAO (2022) proposes joint and coordinated policy responses and financial aid to address the urgent challenges in agri-food issues that the countries of the world are currently facing to mitigate the possible repercussions on global food security.

3. INSTITUTIONAL FUNCTIONG OF CURRENT AGRI-FOOD SYSTEMS

The relationships inherent to agri-food systems worldwide generate power imbalances that favor access to healthy food in countries with higher incomes, greater market power, and better agricultural performance. Emerging countries face multiple vulnerabilities that limit the performance of their agri-food systems, implying that the expected results of the systems cannot be met. This situation is because of weak governance that does not permit the outcomes of the food systems, which are food security and healthy food for all the inhabitants of the planet in a nature-positive way (Hospes & Brons, 2016) (Gaupp, et al., 2021)

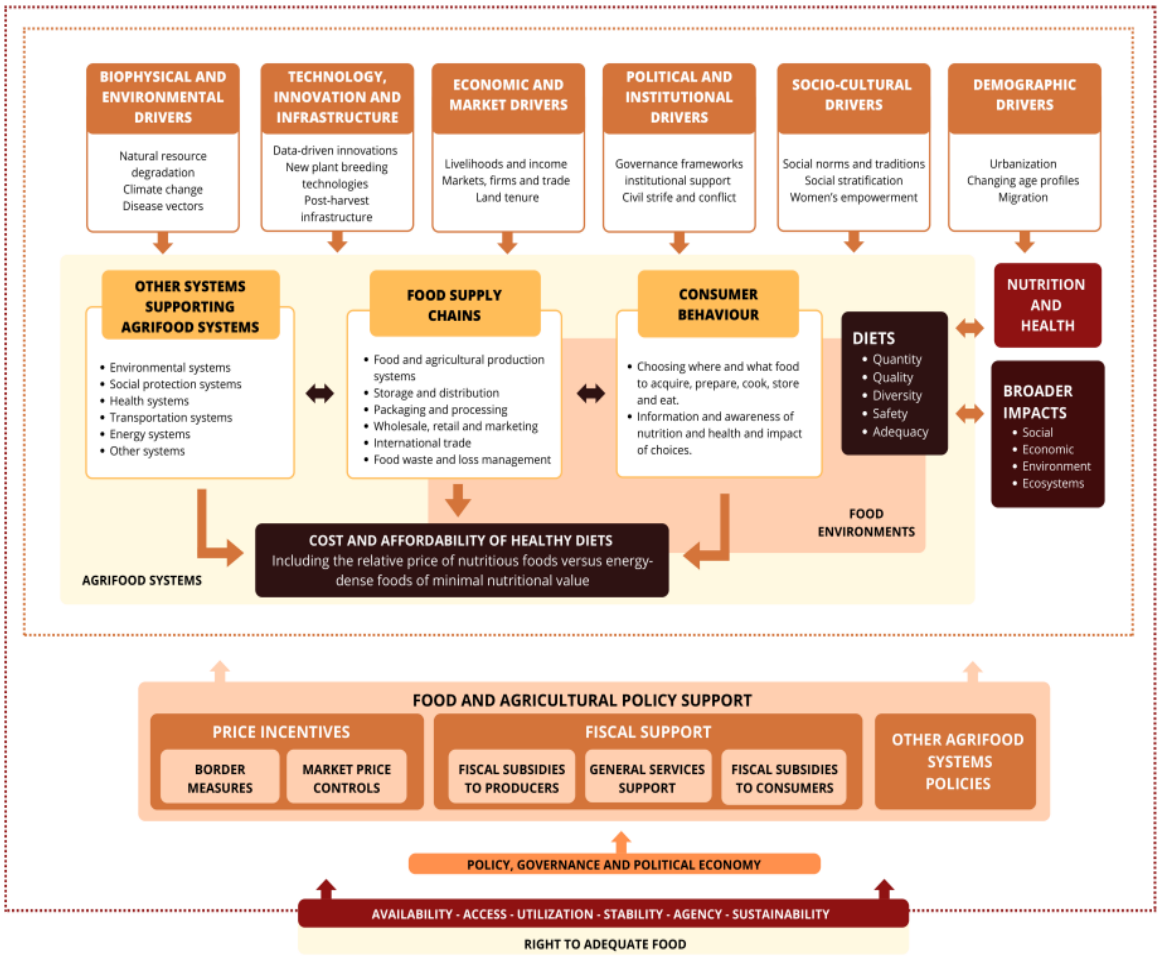
That is, governance is understood as "the process through which state and non-state actors interact to design and implement policies within a given set of formal and informal rules that shape and are shaped by power" (World Bank, 2017). In other words, governance is not strictly limited to state institutions or actors. Still, it encompasses a range of interactions and formal and informal rules related to power, directly related to the outcomes of agri-food systems, food availability, access, utilization, and their stability over time (Candel, 2014).

It is essential to recognize that agri-food systems have evolved and become increasingly complex: they are facing more significant risks and drivers that shape their behavior, such as biophysical and environmental, economic and market factors, sociocultural and demographic, a such related to technology, innovation, infrastructure, and political and institutional environment (HLPE, 2020). There are more stakeholders in the arena represented through international and civil society organizations, the private sector, and corporations (Candel, 2014). Likewise, more interrelations exist between other systems like health, ecology, climate, and energy (von Braun J. , Afsana, Fresco, Hassan, & Torero, 2020), and a more extensive dependency on the international market (Clapp & Burnett, 2014). Hence, this complexity[8] shapes access, affordability, safety, and food preferences (HLPE, 2020). Given the above, understanding the governance model of global agri-food systems

[8] Food system governance is thought as a "wicked problem", a problem that is not only complex but ill-defined, ambiguous, contested and highly resistant to solutions (Candel (2014) citing to (Rittel & Webber, 1973), (Head & Alford, 2013) and (Termeer C. , Dewulf, Breeman, & Stiller, 2013)

requires starting by recognizing its complexity, with many actors and relations between them (Graph 1)

Graph 1. Diagram of the challenge of governance associated with the complexity behind food systems.



Source: adapted from HLPE. Food Security and nutrition: building a global narrative towards 2030 (2020) and FAO, IFAD, UNICEF, WFP and WHO (2022). The State of Food Security and Nutrition in the World. Repurposing food and agricultural policies to make healthy diets more affordable

According to FAO (2011), food insecurity results from the relationship between different factors, many of them beyond the control of governments. Likewise, there is a growing agreement "that institutions, rules, and political processes play an important role in enabling or constraining particular pathways" (p. 4) to guarantee food access for all. Despite this, the governance of agri-food systems is a relatively recent research area that has grown significantly since the North Atlantic crisis and its succeeding years (2007-2012) (Candel, 2014; Hospes & Brons, 2016). In other words, the food price crises of 2007/2008 and 2010/11

served as catalysts for deep reflection on structural causes of the situation from academia and the public and private sectors.

According to von Braum & Birner (2017), the rationale for global action in the food system is based on two types of reasons: 1) an economic reason, that is, address market failures, and 2) social reason, welfare, and ethical goals. It is possible to consider a third reason: 3) crisis management due to its transnational nature, increased frequency in recent years, and global impacts. The current governance of agri-food systems does not adequately address these challenges because it is not fair and equitable for all countries due to its dysfunctionality and fragmentation. The previous is partly explained by the lack of binding agreements in the institutions that govern global agri-food systems and their ability to implement concrete actions that improve results, in addition to the lack of civil society participation and regulation—private power in decision making.

One thing is clear: in this pathway, the governance of the food system is not sustainable and does not contribute to the expected outcome of the global food system. Considering that, this document goes inside each elements trying to bring some evidence that permits to advance in policy recommendations.

- **Economic Reasons and Market failures: Trade, Market concentration, value chains, and food systems trade rules**

The governance of agri-food systems does not adequately address the market failures from the concentration of markets, the expansion of global value chains, and unequal trade participation, partly because of the assignment of common standards and rules that are not fair for developing countries. Moreover, they are not easily attainable by all countries. This situation creates power imbalances between countries and actors that limit the ability of the agri-food systems to meet their primary objectives.

Market concentration has grown significantly in agri-food systems. In fact, between the 1980s and 1990s, mergers and consolidations were taking on a larger scale. As a result, in 2010, six of the largest companies and major players controlled 75% of the 54 US$ billion pesticide industry and 62% of the global seed market. In 2010, six of the largest companies and major players controlled 75% of the 54 US$ billion pesticide industry, and 62%: of global seed market. From 2015, there was a new round of mergers in the sector completed between

2017-2018, only four companies survived controlling 70% of the pesticide, and 67% of the seed markets (Clapp & Purugganan, 2020). However, the concentration of market power is maintained for other markets such as agrochemicals, animal pharmacies, commercial seeds, and farm equipment (Hendrickson, Howard, Miller, & Constance, 2020).

In the same direction, the concentration in downstream markets in global value chains has tended to increase in the food and beverage sector, which is explained mainly by the low segmentation of the markets that allow concentration in few companies (Abdulsamad, Frederick, Guinn, & Gereffi, 2015). The business organization has reinforced power asymmetries along the chain because small firms in developing countries cannot compete with high-value activities. In other words, in the producing countries many companies and producers compete for market access but face oligopolistic markets led and coordinated mainly by large buyers. The most important result is that added value is concentrated mainly outside production. For example, in the case of the cocoa-chocolate value chains, the upstream segments (producers and raw materials) went from keeping 60% of the value in 1970-92 to 28% between 1998-2000 (World Bank (2008), quoted in Abdulsamad et. al (2015))

In this sense, the concentration of power and the growth of the participation of the private sector can influence governance, directly or indirectly, affecting the fulfillment of the critical objectives of agri-food systems (Clapp & Fuchs, 2009; Clap, 2021). Even, as Clapp (2021) shows, in the case of the seed and agrochemical market, most of the investment in Research and Development comes from specific companies. Partly, this is because governments assign less importance to this vital task, which can directly affect the research's expected objectives and scalability.

Additionally, despite the potential of international trade as a tool to face climate change and the volatility of domestic production, in addition to allowing better food distribution mechanisms between countries, the previous analysis on food security indicate that it has contributed to imbalances between countries. Mainly due to the use of subsidies and tariff and non-tariff measures that tend to benefit developed countries more (Clapp, 2014). Attempts to improve the Agreement on Agriculture (AoA) in the World Trade Organization have not been successful in taking decisive measures to level the playing field between

countries, despite the progress expected at the Doha Round in correcting the imbalances of the trade rules established in the Uruguay Round (Clapp & Burnett, 2014)

Similarly, the standards and labels that guarantee the differentiation of products between agri-food systems have been implemented mainly through non-governmental organizations and private businesses, which do not necessarily benefit small producers or are fair to all countries. Despite the importance of guaranteeing the coordination of standards that facilitate trade, current governance has not been able to ensure the implementation of seals and measures that allow developing countries and small producers to access these certifications (Fuchs, Kalfagianni, & Arentsen, 2009)

Therefore, the governance of agri-food systems needs to adequately manage the failures associated with the market concentration and expanding global value chains. Similarly, trade rules are not fair or guarantee the participation of all countries and actors in the international system. On the contrary, they tend to benefit developed countries more, related to the quality standards required in the international scenario that have managed to exclude some countries and players from global competition.

- **Social goals: Healthy food for all. Humanitarian principal and global fairness and equity**

The global governance of agri-food systems should include strict humanitarian, global justice, and equity principles (von Braum & Birner, 2017). Likewise, the global narrative on food security requires prioritizing the right to food (or the right to adequate food) as a legal framework that is essential to ensure food and nutrition security and sustainable agri-food systems (HLPE, 2020).

In this sense, the concept of food security has evolved to recognize the centrality of agency and sustainability, in addition to the other four dimensions of availability, physical and economic access, utilization, and stability enunciated at the World Food Summit. The inclusion of the concept of agency as the ability of individuals or groups to make their own decisions about what they eat and the idea of sustainability without compromising the food security of future generations are essential advances in having a legal and conceptual framework that guarantees the right to adequate food (HLPE, 2020)

Thus, civil society, including non-governmental organizations (NGOs), are key players in achieving fairer and more equitable governance for all countries. Moreover, their active participation is fundamental to guarantee the human right to adequate food, as a complement to the action of both the governments of the world and the private sector.

On the other hand, the transformation of agri-food systems contributes directly to the fulfillment of most of the Sustainable Development Goals (FAO, 2018c), which is probably the broadest and most inclusive agenda of social goals in world history. However, the progress reported in nutrition shows that, in most indicators, the world has seen a significant setback (FAO, IFAD, UNICEF, WFP and WHO, 2022)

The transformation of agri-food systems cannot be done with the backs of the rural poor. The sustainability of the expected results must have to improve the livelihoods of the rural poor and guarantee the measures that can transform their lives; indeed, inclusiveness must be a key objective in terms of achieving healthy diets worldwide (Davis, Lipper, & Winters, 2022). In fact, interventions in agriculture are between two and four times more efficient in the fight against poverty (World Bank, 2015). In addition, according to the FAO (2018c), 80% of the food produced on earth comes from family farmers. However, despite the complex situation, the current governance does not have the institutional capacity to move national governments to prioritize policy instruments to deal with these challenges. Additionally, in the international arena, the outcomes are only statements.

The distribution of hunger and malnutrition in the world in all its forms is rooted in inequalities of social, political, and economic power (Hossain, 2017). Poverty, inequality, and hunger go the same way. For this reason, governance must address the differences in power between agri-food systems and, above all, seek to meet the social objectives of preventing food and nutrition emergencies and ensuring respect for human rights, including the right to adequate food.

- **Governance of agri-food systems and Crisis Management: dysfunctional and fragmented.**

One of the most relevant conclusions of the Food Systems Summit 2021 was that “Food systems at the global level and in many countries and regions are failing to end hunger, provide adequate nutritious foods for healthy diets, or deliver safe foods” (p. 17) (von Braun,

Afsana, & Fresco, 2021). This situation reflects perhaps the greatest failure of global agri-food systems, because they do not meet the main objective of being able to guarantee food security and nutrition for all. However, since The Lancet report in 2008, it has been warned that one of the most relevant reasons for this result is that the governance of the international system is “fragmented and dysfunctional”.

In fact, Candel (2014), based on a literature review on food security governance, finds that the main criticism is that “there is no truly an authoritative and encompassing body or institution with a mandate to address food security concerns across sectors and levels” (p. 592). The Committee on World Food Security (CFS) was created between 2008 and 2009 to respond to this big challenge which has advanced as a complex marketplace of ideas and action proposals like never before. However, the process concentrated into seeking solutions through consulting at the global level, leaving the governance structures as they are (von Braum & Birner, 2017). The previous concern is even recognized in the High-Level Panel of Experts (2020) report, created as a mechanism to provide evidence for decision making: "Weak and fragmented FSN [Food Security and Nutrition] governance has resulted in policy inertia at different scales that threaten[s] progress." (p. xvii).

Complementary, there is a significant drop in the importance of agriculture, forestry, and fisheries in the Official Development Assistance, as it went from 19% in 1985/87 to 6% just before the North Atlantic Crisis (2008) (Islam (2011), quoted in von Braum & Birner (2017)). This trend has been accentuated in recent years; according to the (FAO, 2021a), the development flows committed to the agriculture sector amounted to USD 17 billion in 2019, a decrease of 9.5% compared to 2018; indeed, agriculture accounted for 5.1% of the total flows development commitments in 2019. According to von Braum & Birner (2017), the main challenges of global governance lie in the high coordination costs associated with a worldwide organization that can exacerbate the free-rider problem in collective action and inefficiencies.

The weakness in the governance system of agri-food systems is mainly reflected in crises. As Clapp (2013) argues: “a key reason for the weakness in the global response to the 2007-08 food crisis is that the governance of food security at the international level is highly fragmented”. In the case of food aid, multiple arrangements and agreements have separate

rules, reporting mechanisms, and norms. Nevertheless, there is little collaboration between these arrangements showing that food-systems governance is not working correctly, as demonstrated by Von Braun & Islam (2008):

> "Incoherent or inadequate responses to exploding food prices; the slowdown in agricultural productivity growth; looming water problems; a disorderly response to higher energy prices; rapid concentration in multinational agribusiness corporations without the necessary institutional innovation to guide them; lack of progress in addressing scarcity; adverse impacts of climate change on agriculture; widespread nutrition problems, including hunger, obesity, and chronic diseases; and agriculture-related health risks, such as avian influenza" (quoted in (Hospes & Brons, 2016)).

In fact, despite the coordination efforts that were adopted during the North Atlantic Crisis, they kept at a consultative level without implying essential changes in the governance structure –including the G7 and G20, the High-Level Task Force on the Global Food Crises, and the high-level conferences that gave rise to the Committee on World Food Security (CFS) (von Braum & Birner, 2017).

The current food price crisis will affect most of the world's population. The North Atlantic crisis clearly showed the vulnerabilities of global agri-food systems and governance weaknesses. Given this context, it is critical to advance an agenda that, beyond the consultative level, takes clear and decisive actions to face the overwhelming growth of hunger in the world by prioritizing the human right to food with positive impacts on nature. This effort will require starting from a clear and determined global agreement among all countries to ensure that no human being goes hungry.

In any case, it is important to mention that national and territorial agri-food systems are the primary policy response given the heterogeneities present in countries and regions, without neglecting international spillovers such as the contribution to climate change (OECD, 2021). Governance is also essential to increase the capacities to adapt to climate change; it is even possible that by 2050, 30% of the world's population will live in countries characterized by weak governance (Andrijevic, Crespo-Cuaresma, Muttarak, & Schleussner, 2020), which may affect the response of food systems to current and future challenges

The rapid transformation of national and local food systems opens a window of opportunity for the inclusion of small producers and the world's poor (Davis, Lipper, & Winters, 2022). However, policies vary according to the stages in which each of the agri-food systems are found: in the traditional ones, the policy should focus on guaranteeing food security and the supply and production of cereals; in the transitional ones, the measures expand to consider the intake of micronutrients, the diversity of diets, and the transformation of agriculture; in the last stage, modernization, the policy focuses on the food systems' transition toward food quality and safety (McDermott & de Brauw, 2020)

The approach to policies of national and local agri-food systems should be guided by 4Ds recommended by Leach et. al (2020): clear goals (*Directions*), to respond to various contexts and values (*Diversity*), with a clear relationship of winners and losers (*Distribution*) and a broad understanding of voice and inclusion opportunities for all sectors (*Democracy*). Similarly, the implementation requires both the creation of an intersectoral platform to share information, knowledge and experience that guarantees coordination and the creation of guidelines or procedures that allow the participation of non-state actors such as civil society and the private sector (Kushitor, et al., 2022). In this sense, Table 1 compiles some of the experiences and initiatives at the national and local levels of agri-food that advance understanding of better governance mechanisms and policies.

Table 1. National and local experiences and initiatives for better governance of food systems

Regions	Case study	Policy/Iniciative
Latin America and the Caribbean	Brazil	Between 2003 and 2010, "The Fome Zero Program" was implemented to end hunger in the country. It involved a combination of immediate and structural actions accompanied by a Food Acquisition Program (PAA) to buy from local producers and donate to food insecure families. The PAA model influenced the National School Food Program (PNAE), which managed to feed more than 40 million students in municipal and regional schools. In addition, the strategy was strengthened with the National Council for Food and Nutrition Security (CONSEA), which allowed the participation of government actors, civil society representatives, business, and community leaders (Del Grossi, 2021)
	Peru	The political leadership allowed the implementation of the 5x5x5 strategy (reduces stunting for the under 5s by 5 percentage points in 5 years) that was built together with civil society and that was part of the monitoring of government actions (Gillespie & Nisbett, 2019)
South Asia	India, Bangladesh, Nepal,	The Leveraging Agriculture for Nutrition in South Asia (LANSA) research consortium made progress in understanding the importance of political commitment to achieve far-reaching action and results at the territorial level through leadership, capacity, coherence, and coordination (Gillespie, et al., 2019)
East Africa	Ethiopia, Kenya and Uganda	Leveraging Agriculture for Nutrition in East Africa (LANEA) is a collaboration between the International Food Policy Research Institute (IFPRI) and FAO to investigate stakeholder perceptions of governance in countries with high-burden nutrition problems. In general, leadership at the country level has been key to maintaining programs such as the Productive Safety Nets Program (PSNP) and the Agricultural Growth Program (AGP), which provide food security and are a channel for improving agricultural technology in Ethiopia. (Gillespie, et al., 2019) (Gillespie, van den Bold, Hodge, & Herforth, 2015)

Source: Own elaboration based on secondary sources

4. GOVERNANCE MODEL PROPOSAL FOR WORLD AGRI-FOOD SYSTEMS

According to the above, global agri-food systems are dealing with one of the most significant crises in decades, limiting them from fulfilling their primary function of ensuring healthy food for all. At the same time, it prevents them from giving the conditions for a transition toward a model that contributes to mitigating climate change and producing the requirements to sustain healthy food production for all.

One of the facts that emerge from this situation is that the current global governance of food systems does not have the conditions and capacities to handle the problem, not giving mechanisms and solutions to correct the global imbalances with consequences in food access, poverty, and inequality. That means that developed nations do not have the political interest to act according to these challenges because it could mean dealing with strong economic forces, affecting privileges and arrangements that favor existing market structures. Therefore, the field of action of international governance is strictly oriented to provide recommendations to countries.

Moreover, this situation is more intense in some regions and communities, particularly in those countries with less institutional capacities and larger productivity gaps. This means that the current governance does not create capabilities, especially in the weakest countries, to confront shocks and crises which will be more frequent and intense shortly and to regenerate conditions for food systems to work and achieve a sustainable transformation. National efforts are oriented toward creating capabilities to understand international rules and governance instead of creating capacities to address the problem at the level required.

This situation implies that hunger, poor nutrition, poverty, and inequality persist in modern societies, and even more profoundly in some countries: Ethiopia, Nigeria, South Sudan, Yemen, Afghanistan, and Somalia, which are at the highest level of alert for acute food insecurity according to Hunger Hotspots Outlook of FAO & WFP (2022). Other countries, such as The Democratic Republic of Congo, Haiti, the Sahel region, Sudan, the Syrian Arab Republic, and Kenya, are also deeply concerned. Likewise, there are countries in hunger

hotspots[9] like Angola, Lebanon, Madagascar, and Mozambique, and those recently added to the list such as Sri Lanka, Benin, Cabo Verde, Guinea, Ukraine, and Zimbabwe (WFP and FAO, 2022)

This situation is untannable, and making policy decisions that foster the required changes is necessary. The food systems governance must focus on managing global public goods from a deep perspective and creating capabilities in countries and regions at different levels and actors. It is commonly accepted that food systems must change, and this transformation process needs to privilege ending hunger and guaranteeing the right to adequate food, favoring new forms of sustainable production, including participation by civil society and the private sector, not only from an observer perspective but also from an active one. In addition, this governance must deal with power imbalances and conflicts between different stakeholders. Therefore, the new system must consider compensation mechanisms and scenarios of negotiation in addition to specific commitments from the developed countries in terms of adopting specific instruments that favor facing global imbalances in terms of food systems productivity and unfair markets.

Based on the analysis in the previous section, food systems governance should handle the challenges that trigger these imbalances in at least three critical topics (von Braum & Birner, 2017):

1. Market failures cannot be addressed at the national level because of the magnitude of the problem beyond national boundaries.
2. Welfare, ethical and sustainable goals involve capacities beyond national institutional capabilities.
3. Cooperation between nations and sectors to deal with environmental challenges and crises must be the entry point to get better and faster results.

This ongoing situation implies that looking for the new expected outcomes is necessary to look for a better model that considers the scales and mechanisms that allow food systems to achieve their main proposals and provide the capabilities to advance in their transformation.

[9] Hunger hotspots are places where WFP and FAO warn that acute food insecurity is likely to deteriorate (WFP and FAO, 2022)

In this sense, it is necessary to review the fundamental principles of these systems and where they should go. Key elements such as sufficiency (substituting for efficiency), regeneration (substituting for extraction), distribution (substituting for accumulation), commons (substituting for private ownership), and care (substituting for control) become central when advancing a more comprehensive vision that privileges the eradication of hunger, the ability to regenerate agri-food systems, and above all, the strengthening of the right to adequate food (McGreevy S.R., et. al, 2022).

Considering the above, the main objective of the new governance should be that the primary outcome of the modern food systems is to guarantee the capacity to give healthy food to everyone, no matter where the people are living, beyond a space for coordination and for giving information to take decisions. Likewise, food production and distribution must consider the ability of the ecosystems to regenerate, and access to food should be consolidated as a human right. The nations must have sufficiency in providing food to everyone, mitigating adverse effects from international markets' performance.

Therefore, the entry point should simplify the current institutional arrangement where there are too many bodies with different tasks without real commitment and cooperation mechanisms (Braun & Birner, 2017), creating high transaction costs that limit the action capacities. For that, **global food-security cooperation should be built from the bottom up, creating a solid sub-regional and regional collaboration that can eventually be matched at the worldwide level.** The international institutions mentioned above must support such regional cooperation in specific areas of expertise. In that sense, it is crucial to advance in a reflection of the actual capacity of the CFS to foster the changes required to handle the current crisis and the new food systems' international governance. It is the duty and responsibility of international governance to simplify its way of acting. However, above all, to have the capacity to achieve significant changes, especially in the rules and models of world food trade. Likewise, the international arrangement must guarantee access to better technologies, especially to those nations with low capacities to improve productivity for healthier and more accessible food. That is to say; productivity gaps are not a barrier for agri-food systems to fulfil their fundamental purpose.

Improving productivity must be one of the most important tasks of this institutional arrangement, as well as getting over market failures that limited the adoption of technologies in equitable conditions between nations and sectors. For that, it is necessary to foster technology transfer vehicles between countries that increase productivity through adopting practices with the required innovations oriented to those countries with significant limitations for innovations without endangering the natural capital and facilitating climate change adaptation and mitigating emissions.

In that sense, **this governance must operate in a global platform for managing global public goods that facilitate the adoption of solutions**. This platform must have a financial instrument that favors adopting technologies that, for example, prefer climate adaptation or GHG mitigation. The developed countries must assume part of the adoption cost of sustainable technologies. In addition, this global platform must favor regional-scale arrangements between countries that allow the development of smaller-scale agri-food markets with more players. FAO, CFS, and IPCC should enhance their activities of analysis and support for the effects of climate change on agriculture in different parts of the world. They should support the development of alternatives to chemicals, fertilizers, and other inputs.

In terms of medium to long-term financial support, particularly for the poorest countries, the Global Agriculture & Food Security Program (GAFSP) should be expanded and more actively used. FAO must support technical assistance and give criteria to finance projects facilitating innovations and low-cost adoption considering the recommendations of the HLPE and CSA. Likewise, it is required to promote national policies that strengthen the food industry, generating incentives for small and medium-sized companies that can serve food market processes. Developed countries must support with funds on a regular and mandatory basis derived from an international agreement that could come from implementing the carbon tax worldwide.

On the other side, the private sector, particularly the most prominent food companies, should support this program, assuming the commitments in terms of funding and sharing technological capabilities with small and medium companies in countries facing the biggest

challenges. This support must be visible and acts as a redistributive mechanism that could be articulated with the New IFC's Global Food Security Platform.

The WTO must consider the imbalances in capacities, productivity lags, and the effects of biodiversity loss and global warming in the development of trade measures. The critical issue is that in such a heterogeneous global scenario and as the impacts of crises are more profound in some areas than in others, the traditional trade measures that favor transparency, factor mobility, and free trade in goods are insufficient. Indeed, WTO should treat emergency food supplies to exempt them from rules that limit trade subsidies. It should also consider broader exceptions to intellectual property rights concerning agricultural inputs (fertilizers, fungicides, and pesticides).

Considering the critical role of food systems in achieving better welfare conditions and reducing inequalities between peoples and regions, in the short run the World Food Program must lead a support strategy for the most vulnerable countries (mentioned above) to manage climate risks, restrictions on the distribution and storage of food, and contamination of water sources, among others. In addition, it should support the development of rapid response capacities with mechanisms that compensate for deprivation and avoid massive food insecurity, strengthening networks between institutions, companies, and civil society organizations to mitigate the effects of the crisis, for example, by strengthening Food Banks with the civil society and implementing monetary transfers only for purchasing food.

For the medium and long term, the Food Systems Platform must foster healthy diets for everyone. Developing countries must have the institutional capacities to promote healthy diets through better consuming habits and make the prices of these products affordable. This purpose implies the transformation of food consumption patterns toward healthy and sustainable food. Food consumption is an essential innovation for public policy due to its links with production, value chains, the environment, nutrition, and health. Therefore, enabling food environments must support sustainable and nutrition-sensitive food consumption patterns through enabling food environments.

This action is strictly connected with the improvement of productivity in agriculture, and in addition to health and environmental considerations, dietary changes might entail inclusion

benefits. Reduced pressure on land, such as saving agricultural water use, eliminates food price increases.

Finally, in a scenario of more significant crises, cooperation instruments allow for dealing with emergencies that result in limited access to food, especially by the poorest population, women, and children, based on the creation and institutional capacity building to manage risk and rapidly mitigate food deprivation. Global food-security cooperation should be built from the bottom up, constructing a sub-regional solid and regional collaboration that can be eventually matched at the worldwide level. Such regional cooperation must be supported by the global institutions mentioned above in the specific areas of expertise. Likewise, FAO should create global capacities at the regional level to monitor the outcomes of the new international arrangements and enforce domestic reforms in each nation. Learning the good and bad experiences related to the efforts made to mitigate and adapt to climate change is essential. The food crises are recurrent, and despite their terrible effects throughout history, it seems like humanity doesn't learn about them, and every so often, there are making the same questions and responding to them with insufficient reforms.

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