Agriculture and Food Problems and Solutions: Challenges and Capacity of the Capitalist System in the Twenty-First Century

Murat Çetin and Murat Öztürk

Abstract The many problems of and linked to the hegemonic capitalist agro-food system—such as world hunger, price fluctuations, unsustainability of production, decline in biodiversity, and climate change—have become more pressing in recent years. The system cannot offer satisfactory solutions to these problems, but alternative approaches are not yet sufficiently strong to replace it. Thus, there is a multiplicity of agro-food problems and an ongoing search for solutions within the present system that brings different approaches to the agenda. This study first presents some special characteristics of the current agro-food system and its problems. Then, it reviews the history of policies introduced within the framework of the hegemonic system by its actors to mitigate the food problem through the perspective of food security and sustainability. Finally, it concludes that a solution to the food problem and related issues demands a radical choice between either profitability and national policies or a global approach to food and nature rights. What is required is a thoroughgoing reset of the agro-food system.

Keywords Food security · Global food crises · Commons · Agro-food system reset

1 Introduction

Agro-food systems have specific characteristics that make them different from other economic and political phenomena, even within the framework of the capitalist economic system. First, they use natural sources converted into food, foodstuffs, and other products. Thus, agro-food economies have established a reciprocal bond with nature and society. Then, the main actors of the system—farmers, food

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manufacturers, transporters, and other intermediaries—aim to secure a livelihood by producing food items within the framework of the natural resources. These activities must be carried out by considering the laws of nature and society, on the one hand, while, on the other hand, they themselves have a strong impact upon nature and society. Finally, agro-food systems must reproduce natural resources, labor force and the material, and cultural patterns that govern the consumption of food and the production of knowledge about the food system (van der Ploeg, 2016, p. 1).

As a result of all these factors, food systems need to reproduce the natural resources and ecosystems that are employed in order to maintain ecological balances—or to secure sustainability. The specific needs in this respect vary according to the ecosystems and the technological repertoire. Also, the necessity of agro-food systems to enable to secure livelihoods for their actors is not an optional objective, and this, too, needs to be sustained or reproduced. Typically, it involves a variety of skills and decentralized loci of control. In summary, agro-food systems are based on living nature and produce food—they involve the conversion of one into the other. Thus, farming implies a double exchange, an ecological exchange and an economic one, and these two need to be balanced carefully.

This double exchange means that farming cannot be seen as a "simple extension of the general economy" (van der Ploeg, 2016, p. 2). However, today's primary agro-food system has become controlled by exchangeable elements in the global process of capital accumulation under complex forms of corporate control, while the sciences conventionally conceptualize agro-food economies as basically governed by markets and technology. Inevitably, this system is not effective, as is evident from the litany of negative impacts and poor results.

The current agro-food system is manifestly ineffective. Moreover, the various environmental and food-provisioning crises appeared in the present system are manifesting not only a crisis of the model but also a huge philosophical and ethical challenge. For example, the iniquitous distribution of wealth increasingly reconfigures the world in the service of short-run profit, which constitutes a crisis in the institutions of governance (McMichael, 2000, p. 31). At both global and national level, societies currently face a major problem with food supply (production and distribution) and the sustainability of natural resources. When we look at to the history of attempts to deal with these problems, we cannot say that solutions have been found and that the problems will end; on the contrary, we can say the opposite. But there are some solutions in the human knowledge and experiences. Before discussing alternative solutions in the following sections, we first review, in Sect. 2, the current system based on the three main features of agro-food systems (natural resources, food production, and the relationship between the two, i.e., conversion of resources to food) and review, in Sect. 3, current issues of the capitalist agro-food system. Then, we consider, in Sect. 4, mitigation strategies, while in Sections 5 and 6 we present reform strategies directed at the current problems in the agro-food system. Section 7 discusses those contesting approaches and Sect. 8 concludes with some policy recommendations.

2 Features of Agro-Food Systems

2.1 Natural Resources

As D'Odorico et al. (2018, p. 457) note, "Anthropogenic pressure on the Earth system has reached a point where abrupt environmental change is feared with global sustainability becoming a mere utopia." Food production brings environmental costs involving land conversion and deforestation, topsoil and biodiversity loss, aquatic and terrestrial ecosystem pollution, water resource degradation, and the production of greenhouse gases (GHGs). Here, a brief note highlighting just the last two of this list may suffice for further detail.

Despite limited replenishable water sources, countries continue to increase dam construction, which has many kinds of environmental and social consequences on this vital resource for agriculture—which itself places pressure on water sources through, for example, animal production methods, bio-fuel production, and food waste. Meanwhile, agro-food system activities taken as a whole—agricultural production, transport, storage, processing, packaging, and retail along with food loss and waste have a huge impact on man's contribution to atmospheric GHGs. The Intergovernmental Panel on Climate Change (IPCC, 2019, p. 13) "Report on Climate Change and Land" states with "medium confidence" that the "estimated share of food systems in global anthropogenic [GHG] emissions is between 21 and 37%."

2.2 Food Production

In recent years, supply- and demand-based problems manifesting as issues with food production, distribution, and food access have become a growing concern. As a result of rapid economic development, such as in China and India, immense pressure has developed on the demand side with the increased consumption of all foods in excess of the continuing population increase worldwide. Although economic theories generally accept food demand as relatively inelastic, the rise in population and disposable income and changes in the composition of food consumption (notably, demand for meat) have significantly raised food demand. As a result, huge and increasing inputs are devoted to agriculture (see Fig. 1).

The increased demand in combination with supply issues has caused continuous changes since the 1970s resulting in food price volatility (see Fig. 2). The main reasons for the fluctuation of food prices on the supply side are natural disasters and climate change, increases in energy and input costs, and bio-fuel production, along with war and internal conflicts. The increase in food prices and the fragilities within the context of the capitalist food system have provided profit opportunities leading to an increase in investments; speculative behavior on food products in financial markets has also caused food prices to rise and fluctuate artificially. These negative developments contribute to increases in the welfare gap between the richer and

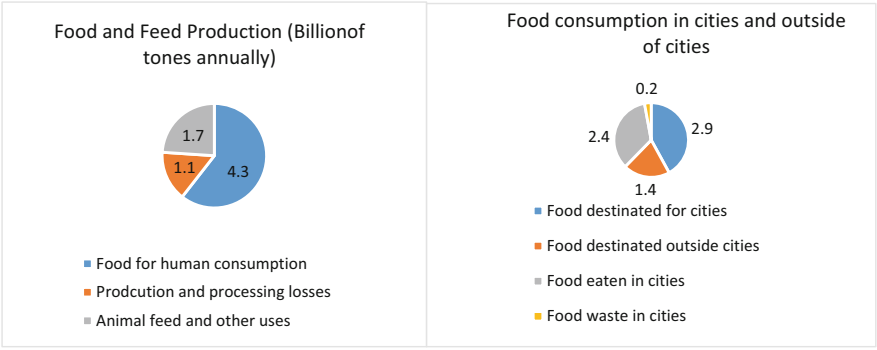

Fig. 1 Food, feed production materials, and consumption (billions of tons per annum). Source: Authors' calculations based on Weforum, https://www.weforum.org/agenda/2019/01/how-to-build-a-circular-economy-for-food

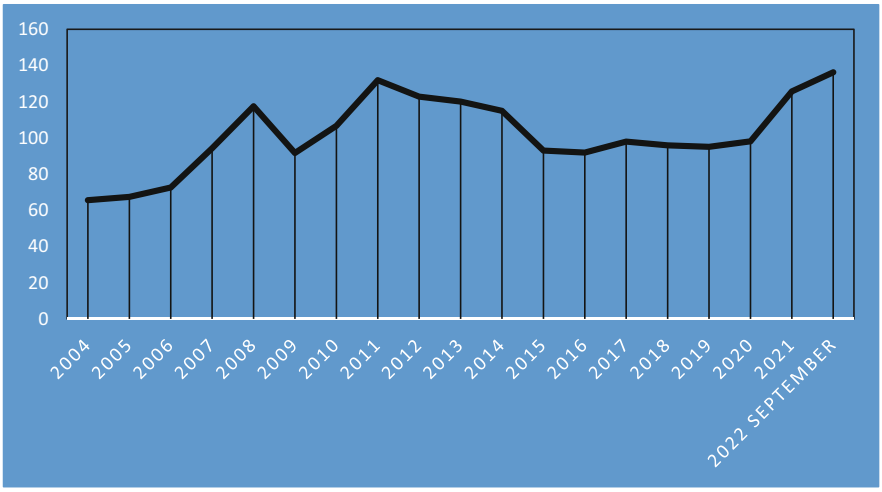

Fig. 2 FAO food price index, 2004–2022. Source: Authors' calculations based on FAO data, https://www.fao.org/worldfoodsituation/foodpricesindex/en/

poorer parts of the world, which, in turn, have devastating consequences on small and medium-sized agricultural enterprises in developing and underdeveloped countries.

Some 10% of the world population currently lives in conditions of hunger. Basic needs are not met on a massive scale even though world food production and crop supply have more than tripled, and animal production has increased 2.5-fold in the recent past. Even though dairy and meat production are expected to increase by 65% and 76%, respectively, by 2050 (D'Odorico et al., 2018, p. 460), in addition to the increasing wealth-based demand, UN world population projections estimate a continued rise to some 10 billion people by 2050 (UN, 2019). These numbers only

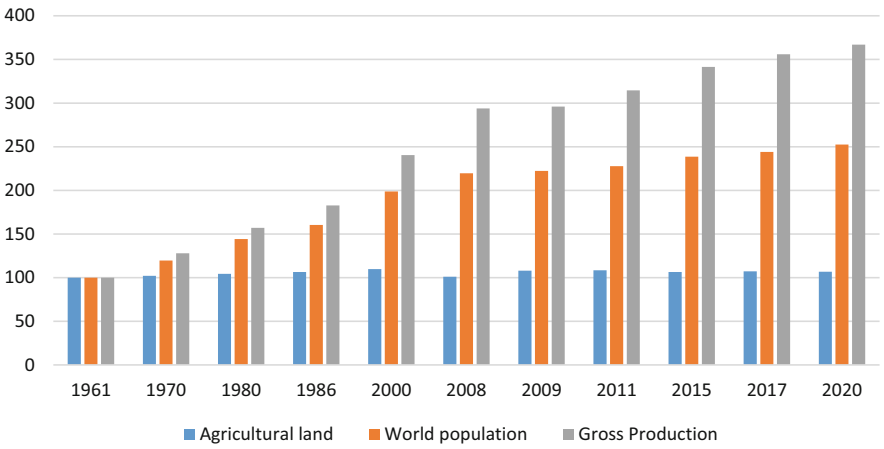

Fig. 3 Changes in food production, population, and agriculture land 1961–2020, (1961 = 100). Source: Authors' calculations based on FAOSTAT data

continue the recent historical trends in which per capita food production has risen faster than population (Fig. 3). Overall, the current failures and increasing pressures alone are enough to show that the global agro-food system as a whole will face immense difficulties in the near future.

2.3 Conversion of Natural Resources into Food Requirements

The problems of the current agro-food system are not only rooted in the human-nature relationship. Rather, this system works in the context of policies related to, in addition to agriculture, those concerned with finance, trade, and other institutional arrangements that involve the cultural, educational, and economic dimensions of food consumers (D'Odorico et al., 2018, p. 458). Crucially, however, these largely neglect to take properly into account considerations of natural and social justice, while the socio-economic structure of the system is also the root of many problems. These problems do not only subsist in the social and ecological contradictions of capitalism but are also represented through price and credit relations leading to "accumulation through dispossession" (McMichael, 2005, p. 269), which is a kind of primitive capital accumulation.

Additionally, many foods are consumed in their natural state—that is, as fresh produce. This brings specific issues with perishability, supply and demand uncertainty, and GHG emissions produced throughout the supply chain due to the cooling, transportation to producer and retail markets, and disposal of fresh produce. Perishable-foods markets operate under time limits determined by the life of the products. Because of the short product life, storage costs, and costs of transportation

and storage, the market period is reduced. Such products need to be sold as soon as they are harvested and consumed as soon as possible. This, thus, constitutes another problem particular to agro-food systems—in this case, one that is inherent in the product itself. Shorter-time supply lines are beneficial, but this is commonly not what the capitalist system provides due to the impact of other cost-related factors.

3 Today's Capitalist Agro-Food System

The major structural development in the contemporary agro-food system is corporate concentration in the global input and distribution markets. Input monopolies set limits to farmers' choices about what they produce and how to produce it. Giant transnational producers, such as Monsanto, Bayer, and Syngenta, have monopolistic power in the input markets. These companies aim further to gain control over the genetic material of seeds and use this monopoly power to limit other producer activities and product choices. On the other side, the concentration of the retail markets determines which foods are available, accessible, convenient, and desirable for consumers. Giant supermarkets also have the power to control food supply chains and directly affect production by developing own brands as well as by managing food safety and quality standards (Dörr, 2018, p. 200). In this economic environment, farmers and suppliers are subject to the double price squeeze of both input and retail markets (ibid, p. 205).

The structure of the world food and beverage industry is fragmented. Companies in the EU, the US, New Zealand, China, Brazil, and Australia have market dominance. Along with the US, France and the Netherlands are the home countries of 45 of the top 100 large food and beverage companies and realize 57% of the total food and beverage sales (TÜSİAD, 2007, p. 44). According to food regime scholars, corporate concentration and private standards-setting are directly linked with a global governance deficit.

The neoliberal approach of the Washington Consensus is to advocate freedom of trade and enterprise for market efficiencies. Experiences in the recent past, however, have refuted this strategy. When global food crises emerged in 2008 and 2011, crop prices and commodity speculation rose. Some poor people and countries could not access to enough food, and some exporting countries imposed measures like export bans, which led the import-dependent countries into a state of food insecurity.

As can be seen in this example, the globalization of food trade and the intensification of trade dependency can reduce the resilience of the agro-food system because markets sporadically fail for a variety of economic and political reasons (D'Odorico et al., 2018, p. 498). Thus, there are deeper structural roots linked to the globalized agro-food system with its scaling of food trade, trade channels between countries and topological properties of the trade network, and its financialization and facilitation of capital transfers linked directly and indirectly to agriculture (food production, distribution, and markets). Indeed, according to the UN Food and

Agriculture Organization (FAO), the system itself has become increasingly vulnerable (FAO, 2013).

Another important tendency in today's agro-food system is that of globalization. Some 23% of food is currently traded internationally, and about 85% of countries rely on food imports to meet domestic demand (D'Odorico et al., 2018, p. 460). The globalization of food is not limited to trade since it also extends to investments and acquisition of agricultural lands (ibid, p. 494). Global arable land acquisitions since 2008 are estimated to have exceeded 40 million hectares (Anseeuw et al., 2012; Nolte et al., 2016). Foreign agribusiness companies, national corporations, mixed ventures, and foreign governments, as well as retirement funds, are all involved in such land-acquiring investments (Cotula, 2013a, 2013b; Kugelman & Levenstein, 2013; Robertson & Pinstrup-Andersen, 2010). Land acquisition investments lead to many problems, in developing countries particularly. Corporations may turn farmers into employees and increase their vulnerability to food price volatility (e.g., De Schutter, 2011), or they may force the dispossession of traditional users and populations and with various violations of human rights and negative impacts on women and rural livelihoods generally (D'Odorico et al., 2018, p. 496).

Globalization enables dominance and the hegemony of a single agro-food system. Intimately linked to worldwide trade and transnational corporations in this regard is the capitalist imperative of scale. Extensive as well as intensive large-scale farming is rising and causing severe problems in agro-food production. The default to scaling-up gains driven by capitalism, however, ignores the claims of smallholder and medium-size (traditional, family) farms, which are—actually, still—responsible for most of the global calorie and nutrient production (Herrero et al., 2017; Samberg et al., 2016). In fact, smaller farming units can be very productive (D'Odorico et al., 2018, p. 503). There is presently additional competition for land between food and fuel crops (Borras Jr. et al., 2011), and accelerated land grabbing (White et al., 2013)—but also a growing awareness of ecosystem degradation resulting from large-scale farming practices (monocropping, chemical input usage, etc.) (Millennium Ecosystem Assessment, 2005). In other words, we are at a juncture at which the capitalist agro-food hegemony is under pressure for its failures and the future in doubt.

4 Mitigation: UN-FAO Approaches to Food Systems

The biggest representative of the international community for food issues, the UN-FAO organized a summit, United Nations Food Systems Summit (UNFSS), convened by the UN Secretary-General in late 2021. This, however, was much criticized: Although few people will dispute that global food systems need transformation, it has become clear that the Summit is instead an effort by a powerful alliance of multinational corporations, philanthropies, and export-oriented countries to subvert multilateral institutions of food governance and capture the global narrative of food systems transformation. (Canfield et al., 2021, p. 1).

The determination of a system in need of transformation and the opinions expressed at the end of the summit also provide a good indication of the UN-FAO's approach to world food problems—as supported by other international agencies, both in the UN and the World Health Organization (WHO), and managing trade and supplying capital, like the World Trade Organization (WTO), International Monetary Fund (IMF), and World Bank (WB), and overseeing the system as a whole, such as the World Economic Forum (WEF)—and how this reflects the current trends of the capitalist economic system on food issues at the global level. The approach proposed in 2021 can be more clearly understood when considered in the context of the events and policies followed since the establishment of the FAO after World War II (Table 1).

The number of food-insecure people have risen since 2014. According to the FAO, 746 million people were suffering from severe food insecurity in 2019, and an additional 1.25 billion people experienced moderate food insecurity (FAO et al., 2020), These two figures combined reach to a quarter of the world's population. Meanwhile, the Covid-19 pandemic is anticipated to add between 83 and 132 million more people into food insecurity (FAO et al., 2020).

Change to a country's food security status varies according to different insecurity measurements involving not only national food supply and demand and human health, but also agricultural land supply and off-farm income urbanization, economic growth, and capital resources (including social capital), and literacy and access to information (internet connectivity).[1] If a country has low-income levels, and agricultural production is the major source of GDP, for example, economic growth and higher literacy increase food availability. According to the FAO's resilience index measurement and analysis (RIMA), access to sanitation and safe drinking water and schools, hospitals, and agricultural markets provide important support enabling household resilience, particularly in very arid zones and in pastoralist households.

Contrary to the neoliberal promotion of free trade, market openness has not had a meaningful effect on food security (Dikshit & Gopinath, 2021). According to the advocates of free trade in agriculture and food, the efforts to protect small, local producers are barriers to trade that need to be eliminated. Therefore, the agreements made, and measures taken to curtail such supports benefit the multinational corporations that already dominate the world production and exchange of goods. Food system crises are a part of and generally a result of the current crisis of the world political economy that began with the dismantling of the Bretton Woods system established to regulate the world economy, including trade. In the absence of rules governing international trade, Northern countries raised agricultural protections, and

[1]The main measures of food security used by the FAO are (1) the traditional measure, which considers food supply and consumption needs of a country's population—first, production, stock changes, and net imports of food (including food aid) are calculated, then, domestic product and estimated demand or calories per person are assessed, referred to as the minimum dietary energy requirement (MDER)—and (2) the alternative method, which uses anthropometrics, such as body mass index (BMI) and stunting or wasting, especially among children (Dikshit & Gopinath, 2021, p. 1).

Table 1 Post-WWII developments in the world food system and its governance

Date	Developments	Actors	Aims	Actions/policies
Mid 1940s	Food shortages	FAO-UN	To stabilize and manage food security on a world scale	Food, an essential of life rather than primarily merchandize Food, a human right in UN declaration, 1948
1963	End of shortages Food surplus of the US and the EEC (later EU)	FAO world food congress	Worldwide hunger campaign	Food, a development issue Bilateral aid programs Extension of green revolution techniques
1974	Big rise in grain and oilseed prices Famine in India, Bangladesh, Ethiopia, the Sahel Global food crisis.	FAO, UN conference on trade and development (UNCTAD): UN world food conference	To mitigate rises in food prices and famine To reduce hunger	Universal declaration on the eradication of hunger and malnutrition FAO's public vision of food security Food production and distribution linked to explicit humanitarian food aid via grants Adopted green revolution program
1986	Uruguay round started	World Bank US secretary of agriculture US Department of Agriculture (USDA)	To introduce neoliberal policy changes and comparative advantages	Ability to purchase food Food security seen as best provided through a smooth-functioning world market
1995	Uruguay round ended	WTO, 123 states	Free trade regime	Removal/reduction of custom barriers on food trade
1996	UN-FAO world food summit	FAO, 185 states	To reduce world hunger by half by 2015	Food security conceptualized but no plan implemented Global south farmers lost price supports Large-scale grain farmers in the west retained huge subsidies Food dumping in southern markets Second half of the 1990s: Up to 30 million peasants dispossessed in the south

(continued)

Table 1 (continued)

Date	Developments	Actors	Aims	Actions/policies
1996	Opposition to UN-FAO world food summit	International NGOs and La via Campesina (LVC)	Food sovereignty	A vision of democratic, territorially controlled food systems not subject to the market-control of the global north and its transnational food corporations
2000	Hunger and negative impacts on southern agriculture from Uruguay round	International planning Committee for Food Sovereignty (IPC)	To encourage FAO to convene a multilateral forum to address issues of food security	This vision came to pass following "food crisis" of 2007–08
2008	Food crises, Serious legitimacy crisis for the UN	UN-FAO-UN industrial development organization (UNIDO), UN agencies, funds and programs, international financial institutions, and other international organizations WTO, WB	To establish a high-level task force (HLTF) on global food and nutrition security	Reflected the coalescing of a market-based vision of food governance Held the line against the food sovereignty movement
2009	Food crises, rising world hunger, and unacceptable poverty	Committee on world food Security (CFS)	To reform CFS to enhance its capacity to govern global food security To create greater inclusivity and evidence-based decision-making	Stated four pillars of food security (availability, access, utilization, and stability) Established civil society and indigenous peoples' mechanism (CSM) and a private sector mechanism (PSM), both self-organized. Established a high-level panel of experts as a science-policy interface to provide scientific evidence on issues affecting food security and nutrition
2021	Food crises, rising food prices, world hunger, and poverty Covid-19 Green consensus	FAO	To reformulate agro-food system governance	Five aims: (1) to ensure access to safe/nutritious food (2) to shift to sustainable consumption patterns

(continued)

Table 1 (continued)

Date	Developments	Actors	Aims	Actions/policies
				(3) to boost nature-positive production (4) to advance equitable livelihoods (5) to build resilience to vulnerabilities, shocks, and stress

Source: Authors' calculations based on Canfield et al. (2021)

chaotic competition built in agricultural commodity markets. Thus, there was a reconstruction of North-South relations that resulted in the hegemony of the Northern agro-food companies and Southern countries' rising food dependency.

Centralization, the monopolization process of Northern agro-food companies, and the governance of the agro-food system under the auspices of the IMF and the General Agreement on Tariffs and Trade (GATT), become the two main pillars of the world agro-food system. In this system, the primary strategy for food security was to increase food production for greater food availability. Fertilizer, pesticide, and water usages were raised to boost production, but this approach also saw food security reduced for billions of people (de Raymond et al., 2021, p. 5). The system produced much more of some products but at the same time led to many fluctuations and shocks that affected both consumers and producers. The most affected groups from these shocks and fluctuations are small-scale farmers, fishers, pastoralists, landless rural workers, urban poor's, women, and indigenous people. The food security of these households is the main indicator[2] of the agro-food system resilience and efficiency (FAO, 2021, p. 61).

Another aspect of the hegemonic agro-food system is regional specialization in certain products and animal husbandry. Specialization in industrial agro-food production (monoculture herbs and single-animal production) provides an ideal space for the spread of parasites, diseases, and pests. As can be seen from recent viral spreads, zoonosis is a rising and major global risk (de Raymond et al., 2021, p. 4).

Food shortages and rising food prices have brought in their wake rising popular revolts in many countries of the Southern hemisphere and politicized food movements worldwide, including in the US. While a sixth of the world's population is now hungry, the same proportion in the US is deemed "food insecure". The dimensions of the hunger and insecurity show that the root causes are in the political economy of the global, corporate food regime (Holt-Giménez & Wang, 2011). When we look at the root of the problem, the contradictions of agricultural capital accumulation and the WTO agricultural policies targeting subsistence agriculture become clear, and the increasing influence of transnational corporations and their various lobbying mechanisms become a cause for deep concern. In this context, it should be

[2]For a detailed discussion on food securiy indicators, see Poudel and Gopinath (2021).

noted that the funds that are a part of the world's economy-political structure, circulating between countries to earn income from interest rate differences, speculating on energy, minerals, and food products as well as securities are a major cause of the fluctuations in the market prices of agricultural products. These realities indicate that food security is not just a food problem but, on the contrary, is intimately tied to all economic, cultural, and international relations and institutions.

5 Approaches to Reform of the Agro-Food System

Proposals to reform the agro-food system can be grouped into two. In the first approach, linked to food security, the agro-food system is handled only as an economic sector that produces food, while in the second, linked to food sovereignty, it is handled in the context of the integrity of the human-nature and human-human relationships. Although these two perspectives may be similar to each other insofar as they seek solutions not only to food but also to related climate and ecological problems connected to agriculture and share many suggestions for ways to go about this, the fundamental distinction remains important.

The differences between the proposed policies of approaches to the bundle of food and environmental issues reveal the difference between whether they support a radical change to the system, as well as the ideological and political positioning of defending or criticizing the capitalist system in general. In other words, the political perspectives expressed as differences between reformist efforts for food security and radical efforts for food sovereignty characterize the direction demanded of food-systems change. Different approaches to the food justice concept, definitions, and practices either express structural changes to resource redistribution or blur its political meaning by focusing on food accessibility (Holt-Giménez & Wang, 2011).

More concretely, reform and solution proposals in the agro-food system manifest themselves as giving priority to the laws of nature, profitability, and industrial agriculture or to traditional small production and agroecological agriculture methods. In this context, we can see the differences and intersections between two approaches more clearly by looking briefly at the policy recommendations and justifications.

5.1 Food Security

The fundamental injunction of the food security perspective can be expressed as the following: to increase domestic production and improve food supply chains and physical access to food through transport networks and thus the livelihoods of agro-food systems' actors. It supports enhancing human rights, including the right to food and inclusiveness in systems, and asserts that agro-food systems need to adopt agroecological farming and other resource-conservation practices. Sustainable subsidies, the involvement of government institutions, investments in public goods that

reduce risks, such as in irrigation and drainage systems, and high-yielding, high-resistance crop varieties are promoted.

The food security approach advocates development of the nonfarm economy for household resilience and improvements to risk management and resilience capacities, including interventions directed at food supply chains, governance, and institutions, as well as the infrastructure necessary to support them. It encourages diversity, connectivity, and flexibility; promotes dialogue, transparency, and collective learning in food supply chains and networks; and seeks to ensure that vulnerable households have access to healthy diets, even when incomes are affected by a shock. Public policies should focus on helping small-scale producers, small and medium enterprises, and vulnerable households to gain access to the business tools they need to enhance their resilience (FAO, 2021, p. 94).

What the food security approach does not involve is a rejection of the hegemonic agro-food system. This is capitalist, global, monopolistic, and increasingly controls the production, processing, distribution, and consumption of food. Now, agro-food corporations aim to gain control of genetic material, too. The corporate regime of the monopolistic agro-food system has five basic food-security-oriented claims in this respect: biotechnology's potential for feeding an increasingly hungry or food-deficient world population, sustainable agriculture, efficient agriculture, moving government out of business, and leveling the playing field (although the latter is quite belied by the lopsided relations between North and South (McMichael, 2000).

Overall, the assumption is that the current track of biotechnology is toward greater food security—yet, aiming for complete dominance, the primary drivers of the hegemonic system, the transnationals, seek to monopolize even the capacity to do agriculture (through genetic modification and associated proprietary rights). Given their primary and bottom-line motivation of monetary profit and the record of food insecurity to date; however, it is apparent that we certainly cannot expect the benefits of biogenetics developments to be well shared, let alone fairly. In other words, we should not place much faith in the emerging future of the current system to deliver food security for all, with biotechnology offered as a promissory note, a Green Revolution-type silver bullet, which is already badly tarnished.

In the face of the mounting pressures on food-provisioning linked to population growth and increased consumption coupled with climate change with its somewhat unpredictable trajectories and unexpected shocks, the agro-food system needs to be particularly resilient. The promise of resilience may be regarded as another key feature of the development of biotechnology for food security. However, resilience also involves the economic and political dimensions of agricultural trading, price dynamics, and only finally, the availability, accessibility, and adequacy of food. Thus, a more radical analysis is implied.

5.2 Food Sovereignty

In the recent past, individuals, states, and social movements have tried to introduce public regulatory institutions with the capacity to promote food security and the

human right to food. However, public global food governance has been sabotaged by powerful actors. These actors have forced and enforced the introduction and maintenance of industrial agriculture, productivism, and trade liberalization. The cost of this effort has been a weakening of food self-sufficiency and the impoverished livelihoods of small-scale farmers and agricultural workers. Indeed, industrialized agricultural methods using synthetic inputs and proprietary technologies bear a major responsibility for the crisis that is now unfolding and threatens ever-greater food insecurity.

The very structure of the hegemonic agro-food system causes the over-use, misuse, and abandonment of natural resources. Against this, the food sovereignty approach focuses on socio-ecological crisis and aims at a "re-specialization" of social and economic relations (McMichael, 2005, p. 298). The main initiator of the food sovereignty approach, La Via Campesina (LCL), upholds the "independence and food sovereignty of all of the world's peoples" and "advocates that food to be produced through diversified, farmer-based production systems":

"Food sovereignty is the right of peoples to define their own agriculture and food policies, to protect and regulate domestic agricultural production and trade in order to achieve sustainable development objectives, to determine the extent to which they want to be self-reliant, and to restrict the dumping of products in their markets. Food sovereignty does not negate trade, but rather, it promotes the formulation of trade policies and practices that serve the rights of peoples to safe, healthy, and ecologically sustainable production" (Via Campesina, 2001).

Food sovereignty is not the antithesis of food security but rather represents an alternative principle to food security as currently defined by the corporate food regime. Food sovereignty is a premise for genuine food security since "food is first and foremost a source of nutrition and only secondarily an item of trade" (Via Campesina, 2001). The six pillars of food sovereignty listed by the European Coordination Via Campesina (2002) state that it

- Focuses on food for people.
- Values food providers.
- Localizes food systems.
- Puts control locally.
- Builds knowledge and skills.
- Works with nature.

As an alternative to the corporate food regime, the main views expressed from the perspective of food sovereignty build on the global peasant and human rights movement spearheaded by the LVC. The LVC is a broad-based social conglomerate made up of activist peasants, farmers, fisher peoples, farmworkers, women, environmentalists, and indigenous peoples committed to social justice and human rights. It directly challenges the globalization project and protests at the WTO and other international forums. It rejects the WTO food security approach based on free trade and corporate rights and instead seeks to develop coalitions for improving agro-food self-sufficiency using the traditional, grounded, and responsive capacities of indigenous knowledge and initiatives—or indigenous food-ways.

The food sovereignty movement or perspective proposes to remedy the global metabolic rift through a repossession and regionalization of the agro-food system. The food supply problem, it argues, can be solved through ecological modernization and sustainable intensification. Its land sovereignty ontology views land through an ecological, cultural, and multifunctional lens rather than the commodity lens. It recognizes small-to-medium-scale agroecological farming as more resilient to climate shocks than conventional agriculture and domestic-based production as the better path to food security than global commodity chains. It internalizes the environmental costs of farming and advocates for a rights-based rather than market-centered framework, where rights are defined as collective rather than individual (Constance et al., 2014).

While food monopolies control markets, peasant and smallholder movements look to create new local markets based on the principles of food sovereignty and defending the democratic access to living nature. Thus, the food sovereignty movement presages an ontological alternative to neoliberal capitalism. It stands for how the world and its inhabitants might be organized according to ecological principles emphasizing equitable human relations and sustainability instead of the economic principles of commodification, efficiency, and private interest (McMichael, 2016). Essentially, the argument from food sovereignty against food security as an agro-food system philosophy is that the former naturally incorporates the latter; sovereignty is a basic principle while security is just an outcome and thus easily compromised (as currently witnessed). With the Covid-19 exacerbating food insecurity and malnutrition, global social movements demanding public global food governance see an opportunity to further their cause.

6 Postcapitalist Futures: Agroecology

There is not yet an answer to the question of how to sustainably meet the food, energy, and water needs of the rising demand, but the answers must include technology, water, energy, and cultural and institutional dimensions. One approach that incorporates all these is that of agroecology. Agroecology is effectively an efficiency in production, but for peoples' movements and civil society organizations that are struggling for food sovereignty, its meaning is more inclusive.

One focus of agroecology is on the soil. While more than 90% of our food production depends on the soil, soil is itself coming under increasing pressure, and fertile land is becoming scarce. Therefore, healthy soil is very important for food sovereignty. A transformation of the global food system is also related to climate impacts, to which agroecology presents solutions, and agroecology also has a potential trade-off by building resilience through diversification.

Second, advocates of small-scale agriculture argue that it has many advantages. Small-scale farmers can be competitive and resilient, employ sustainable production practices, and have capacities to adopt and adapt to resource-conserving practices—in short, tend to practice agroecology. There are many research results that do not

justify the conventional assumption that small-scale agriculture is less productive than large-scale agriculture. If the small-scale farmer is supported, that support yields improved food production, technology transfers, secures poverty alleviation, and enhanced food system resilience. The FAO (2021: pp. xiv-xv) remarks that household supports in areas such as health services, education, and training can strengthen livelihoods and incomes, with positive impacts on agro-food systems, too.

Since smallholders are the primary food producers globally, for an end to hunger and malnutrition and to increase food production, it is necessary to support them and enhance their role in national food provisioning under the liberal trade regime; however, they have generally lost price supports and food subsidies, which have disproportionately harmed the global South. In the same period, large-scale farmers in the US and Europe have retained huge subsidies, leading to cheap food dumping in Southern markets. Currently, therefore, we observe the incongruence wherein cheap food relations result in dispossession and displaced small-scale farmers even as it is this group that is still feeding the majority of the world's population and cultivating the larger part of its land.

7 Discussion: Contesting Approaches

It is possible to reach some clear conclusions by discussing the approaches to the agro-food system in the context of the pro-capitalist corporate food regime represented by the major international organizations and the food sovereignty movement represented by LVC. The WEF is trying to seek to redesign multilateral global governance as part of the "Great Reset." However, the multistakeholder approach undermines the responsibilities of governments and does not have sufficient political participation or clear rules of participation, and it (further) subverts traditional means of political representation and erases mechanisms of accountability.

The partnerships of the WEF does not only allow corporations to set the agenda but also serves as a "path to value" for corporations that sense they are losing their public legitimacy (Canfield et al., 2021). Meanwhile, the UN's Millennium Goals (MGs), now expanded and refitted as the Sustainable Development Goals (SDGs), are a gift for agro-business because the economic rewards for delivering them are probably worth at least $12 trillion and can generate up to 380 million new jobs each year up to 2030 (ibid.). It seems that, via the Great Reset approach, the WEF aims to promote the interests of the world's largest corporations and allay the growing opposition to neoliberal globalization, including opposition to the hegemony of capitalism as the world's agro-food system.

In the food security perspective, there is a consensus that transforming the agro-food system to achieve efficiency, resilience, inclusiveness, and sustainability is necessary for realizing the 2030 Agenda for Sustainable Development. For example, the UNFSS call to action in September 2021 aimed at building resilience to

vulnerabilities, shocks, and stresses to ensure the continued functioning of healthy, sustainable agro-food systems. Peoples and movements struggling for food sovereignty, however, wonder whether the outcomes of the UNFSS are baked into its structure and actions to date. They wonder about the policies of the FAO and WEF that focus on handling food system transformation as a technological change, diminishing the role of international intuitions, blurring democratic participation and inclusivity, excluding the voices of producers and workers, undermining accountability for violations of human rights and eco-health degradation, and supporting the illusion that a single global food system based on trade and the "economic integration" of smallholders into global markets will ensure sustainable food security. They defend the need to strengthen the vision of public global food governance to end hunger.

Presently, there is an ongoing reduction of governmental support for agriculture that supports unsustainable patterns of production and consumption, along with GHG emissions, and is economically inefficient. Policy conditionality that ties support to the adoption of environmental-friendly but lower-yielding farm practices could potentially reduce emissions. However, national policies should not focus solely on the impacts of reforms on GHG emissions; international coordination is vital for achieving reductions in global emissions from agriculture. Meanwhile, definitions of sustainability and inefficiency need to be closely interrogated.

The promotion of food sovereignty and indigenous food-ways, identifying pathways to facilitate agroecology and regenerative approaches, and accepting food as a public good hold the promise of a future postcapitalist approach to agro-food systems. Relatedly, five priorities for a transformative research and action agenda involve philanthropy, multilateral donors, researchers, and policymakers playing a uniquely impactful role when working in partnership with farmers' and indigenous peoples' organizations, civil society, the private sector, and others. The transformation envisaged needs to create a future of food that is sustainable, inclusive, equitable, and resilient.

Other recommendations of the food sovereignty approach, agroecology, regenerative approaches, and indigenous foodways, represent a continuous source of knowledge that can inform a repaired relationship between people and nature to accelerate systemic transformation and build equitable, sustainable food systems, decolonize, and democratize knowledge systems for education, research, and innovation. Participatory, transdisciplinary research, and action agendas that bring together farmers, researchers, policymakers, donors, consumers, and other actors across food systems are key to leveraging food systems transformation (GAFF, 2021).

In general, it is accepted there is a huge potential for agroecology, regenerative approaches, and indigenous food-ways to contribute to transformative change. On the other hand, although the weaknesses and failures of the corporate food system have been exposed, the future remains highly contested. Efficiency comes first among the criticisms of ecological farming methods. It is argued that the ever-increasing world population will make them insufficient to meet consumption.

However, there are many studies that show the advantage of the regenerative, agroecological farming (McMichael, 2013).

Although agroecological approaches to agriculture and food security offer similar solutions on many issues, the food system issue is basically political. The interests of capital groups and transnational companies, the main actors of the current system, do not match the interests of poor farmers and people, the requirements of capital accumulation, sustainability, and the measures needing to be taken against climate change. Undoubtedly, there are different groups, interests, and policy proposals on both sides, but still one can talk about the interests of capital, on the one hand, and nature, poor farmers, and people, on the other. In the current situation, it would be naive to expect institutions such as the FAO and WEF to put forward an approach that contradicts the requirements of capital accumulation. The great reset discourse is currently ideological.

Therefore, if the food-system changes, it will come from powerful and sustained social pressure that forces reformists to roll back neoliberalism in the agro-food system. Much of this pressure could come from the food movements. These are not a single bloc, of course. While some may adopt more radical attitudes, others are more reformists. Yet, this may be a strength since their strategic alliance may go a long way toward overcoming the hurdles necessary to shift away from the hegemonic twentieth-century model toward a multiplicity of postcapitalist agro-food systems for the still-new millennium.

8 Conclusion

It is clear that the problems of hunger, environmental degradation, global warming, sustainability of production, and food security urgently require solutions. Unforeseen developments, such as the current Russia-Ukraine war, only magnify and worsen the situation. The hegemonic agro-food system and its representative institutions acknowledge the problems but are unable to find deep and permanent solutions. Such solutions necessarily involve setting priorities and making fundamental policy choices regarding the allocation of resources in a context where motivating interests differ among different segments of society and countries. The dilemmas faced require principled, policy-level choices in determining attitudes toward the use of food and natural resources. Will nature and food be used and (re)produced in line with the needs of humanity (the commons), or will it be (re)-produced according to the profitability principles of the current system?

In this context, one observes that issues related to nature, the climate, and the environment, as well as food sovereignty, poverty, and the situation of agricultural villagers cannot be addressed and resolved on a national scale. The world is a single system, as has recently been graphically revealed by the Covid-19 pandemic. We are increasingly interdependent, including in respect of food products. Poverty and hunger in one part of the world can spread across the world with migrations and wars. Thus, there is a need to choose between national and international approaches

to agro-food and related issues. Nature and food must be treated as a global concern, not a national one.

Within the framework of this basic choice, the ideal for all humanity to live in a sustainable world without hunger is waiting to be adopted and defended as a primary and basic universal goal. The dazzling measures of the current food emperors, the "midcourse guidance" attitudes of international institutions, are insincere approaches that avoid permanent, radical solutions, even though they express ideas that sound good at first. In fact, there is an abundance of tools and a wealth of experience for the realization of agroecological approaches that promise alternative solutions. The problem is actually one of fundamental principles and political choices. Thus, what is required is a thoroughgoing reset of the agro-food system.

Under the present capitalist system, one cannot imagine that the necessary solutions will be adopted. Rather, the fundamental transformation needed by humanity will have to be developed through the struggle of all the peoples of the world, farmers, the poor, and activists for and supporters of a just and healthy future. Without waiting for a total economic and social system change, an important step will be to accept the rights to nature and to food as basic human rights and to gain institutional and legal guarantees for this.

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