# Transforming food systems through agroecology: enhancing farmers' autonomy for a safe and just transition

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**Food systems contribute to multiple crises while failing to deliver healthy, nutritious food for all. A substantial amount of research suggests that the root cause of this issue lies in the complete integration of food systems within global capitalism and the consequent subordination of fairness and sustainability to profit accumulation. We draw on critical political economy to explore how the integration of food systems within global capitalism and their subordination to profit occur. Subsequently, we illustrate how this subordination erodes the autonomy of food producers, with strong environmental and social consequences for consumers and society at large. Lastly, we discuss how agroecology could transform food systems and enhance producers' autonomy, while mitigating environmental and social dysfunction. We stress how the transformative power of agroecology lies in its double nature: concrete (technical) and social (political). By acting in both dimensions, agroecology can help reorient food systems away from profit accumulation and towards better meeting community needs, in line with the tenets of food sovereignty.**

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## Introduction

Food systems are at the centre of a polycrisis.[1] They account for over a third of global greenhouse gas emissions,[2] they contribute substantially to biodiversity loss,[3] and they are involved in the emergence and spread of new infectious diseases[4] (particularly zoonotic ones).[5,6] Food systems are also tainted by human exploitation, including slavery,[7,8] and the direct drain of resources from countries of the Global South towards countries of the Global North.[9] Food systems mediate the satisfaction of a basic human right and need: food. The devastating reality today is that almost 800 million people are still undernourished,[10] while, according to WHO, over 3 billion people are overweight or obese. A widespread call for the transformation of food systems beyond technical solutions, which also addresses political and governance issues, has emerged.[11] Forms of protest against the existing organisation of food systems have appeared in the Global South (eg, the Landless Workers' Movement in Brazil[12] and the international farmers organisation La Via Campesina) and more recently in the Global North (eg, the 2019 and 2023–24 farmers' protests in Europe[13]). Any process of transformation requires, as a first step, an understanding of the status quo to identify strategies to transcend it. In this Personal View, we aim to accomplish this first step. Our objective is three-fold. First, we aim to draw on critical political economy (CPE) to explain the current configuration of food systems, allowing us to present the systemic roots of the polycrisis. Second, we wish to illustrate how food systems in their current configuration substantially reduce the autonomy of agricultural producers, with strong social and environmental consequences, both in the Global North and in the Global South. Third, we argue that agroecology as a technical practice and a political project can transform food systems while addressing the polycrisis and increasing producers' autonomy.

Agroecology is not only the "application of ecological principles to the design and management of sustainable food systems… by harnessing natural processes". It is also a social movement set "to build locally relevant food systems… based on short marketing chains" that "supports diverse forms of smallholder food production and family farming… food sovereignty, local knowledge, social justice, local identity and culture, and indigenous rights for seeds and breeds".[14] This double nature of agroecology—technical and sociopolitical—is crucial to its transformative potential.[15,16]

## Food systems and profit accumulation

A 2020 publication with the telling title of *Towards a Sustainable Food System* by the Group of Chief Scientific Advisors to the European Commission,[17] states that "for most people… food is considered predominantly a tradable good" and subsequently "[t]he current system's goals are aligned to this framing: maximising food production… while minimising costs. It is clear that feeding people healthily is just a subordinate goal in this framing, and that viewing food mainly as a commodity is not compatible with a sustainability focus."[17] Few people would dispute that the statement is referring to food systems as a salient element within global capitalism, organised according to capitalist logic. An important elaboration from the reported passage relates to the fact that in the absence of specific policy interventions, capitalism's primary goal remains expanding production to secure profit accumulation, with sustainability and fairness being at most subordinate objectives. Yet, there is abundant evidence that pursuing a continuous expansion of production is incompatible with sustainability and feeding the world's population a healthy diet.[18,19] We would like to clarify further what capitalism is, how (in its current configuration) it entails the subordination of sustainability to profit, and what its implications for food systems are.

### The capitalist mode of production: a CPE perspective

A popular definition of capitalism characterises it as a system in which private ownership of the means of production, wage labour, and decentralised market

For more on **La Via Campesina** see https://viacampesina.org/en/

coordination prevail.[20,21] Although good as a broad approximation, this definition has its limitations. The majority of agricultural production today still relies on family (ie, non-wage) labour, while at the same time being completely integrated within global capitalism. To capture these nuances, we draw on CPE. We begin with the concept of the mode of production. Within CPE, a mode of production reflects the dialectical interaction between the so-called relations of production (eg, conditions of access to the means of production and relations between producers, processors, distributors, or financiers) and productive forces (eg, technology and forms of organisation of labour). The productive forces reflect the concrete side of production. The relations of production reflect the social relational side. A specific configuration of these two elements defines capitalism.

Capitalism is a mode of production centred on the accumulation of capital, sustained through the reinvestment of profit. "Profit [is] the veritable bottom line of capitalism itself."[22] The realisation of profit, in turn, requires the production of commodities exchanged in the market. Under capitalism, markets acquire a special importance. As historian Robert Brenner highlighted,[23] within capitalism, producers must engage in market exchanges to survive, as they cannot exist outside of commodity relations. The peculiarity of capitalism with respect to other modes of production is not the mere existence of the profit motive or of market exchanges. Commodities, markets, and the drive for profit pre-date capitalism. For example, Roman slaves were employed on *latifundia* (large, landed estates), and a part of what they produced was sold as a commodity.[24] The specificity of capitalism lies in the fact that the dependence on markets, profit, and commodities is generalised. Under capitalism, for the first time in history, all social production and reproduction (ie, survival) is mediated by the market and is tied to profit and hence to capital accumulation. Generalised market dependence is achieved by establishing capitalist-specific relations of production. Establishing these relationships in turn requires the separation of producers from the means of subsistence, although not necessarily from the means of production (as we discuss later). The establishment of capitalist relations of production (ie, generalised market dependence) implies a (competitive) quest for profit, which engenders technological and organisational dynamism to reduce costs. Capitalism therefore also has a propensity to continuously revolutionise the productive forces.

## The integration of food systems within global capitalism

Capitalism has agrarian roots. Capitalist social relations originated in England in the 15th century, through the emergence of a market for tenancy.[25,26] In spite of its agrarian origins, the integration of food systems within global capitalism was not instantaneous. Yet, given its very nature (ie, generalised market dependence), capitalism must control food production. If substantial areas of food production, consumption, and distribution remain outside of commodity relations, the grip of capital on social reproduction can only be weak, and generalised market dependence cannot take hold. The study of food regimes, which looks at the set of institutional arrangements related to food production and trade prevailing at different times,[27] explicitly recognises this aspect by focusing on "the role of agriculture in the development of capitalist world economy".[28] The development of global capitalism occurred through the establishment of capitalist relations of production within food systems worldwide and through revolutions in the forces of food production. A brief account of the food regimes literature can help clarify this element. The first food regime (1870–1914) was characterised by imports of cheap grains and meat from the neo-Europes (ie, North America, Argentina, Australia, and New Zealand) and the import of tropical products from Asian and African colonies. The purpose was to keep wages low in the developing European manufacturing sector, favouring capital accumulation there. In this phase, we note the initial expansion of capitalist relations of production on a global level.[27] The second food regime (1945–73) coincided with the emergence of global agribusinesses and the diffusion of capital-intensive agriculture in the Global North and in regions of the Global South via the Green Revolution.[27,29] This period is the one most commonly associated with environmentally damaging agriculture, iconised in Rachel Carson's *Silent Spring*.[30] During this regime, rising wages in the Global North fuelled capital accumulation through the consumption of durable foods and animal proteins (fed with excess US grains). Additionally, the diffusion of the Green Revolution in the Global South and the shipping of food aids from the USA helped depoliticise the countryside and mitigate the risks of socialist revolts. In this phase, we note a deepening of the capitalist social relations and a strong dynamism of the productive forces.[31] The third food regime (1980–present) marks the further internationalisation of agro-food systems. The inclusion of agriculture in the World Trade Organization promoted further intensification of global trade in agricultural products and resulted in a starker international division of labour, with a greater influence exerted by transnational corporations. Transnational corporations directly employ workers on their estates or subcontract peasants in the Global South to convert large tracts of land to produce high-value crops (eg, horticultural crops and off-season fruit and vegetables) for affluent consumers in the Global North, posing severe social and environmental risks.[32] Land and farming have increasingly become investment outlets pushing a global land rush.[33,34]

## Forms of food system subordination to profit accumulation

The historical process of the integration of food systems within global capitalism corresponds to the various

phases of capital accumulation on a global scale. Here we reflect on how this integration was accomplished. We noted that a generalised market dependence is achieved by establishing capitalist relations of production. According to CPE, these relations of production are put in place by separating the majority of people from the means of subsistence. This separation can happen in two ways. First, by separating people from the means of production, primarily access to land, and converting them into wage workers. In this case, under the direct control of capital, workers produce commodities. They also generate a profit for the capitalist enterprise. Second, by allowing people to retain access to some or all of the means of production but forcing them to produce commodities that are sellable in markets or obtain part of the necessary elements of production (eg, seeds, tools, or credit) through the market. In this case, workers or producers still formally control production. However, indirectly, the production becomes subsumed to profit and capital accumulation. Although formally independent, direct producers are now strongly conditioned by profit-oriented input providers, financiers, processors, distributors, and retailers. These actors appropriate a share of the income, the magnitude of which depends on their contractual power. For example, during the colonial occupation of Africa in the 19th and 20th centuries, administrations often introduced hut and poll taxes that were payable in cash.[35,36] Besides raising revenues for the colonial administrations, these taxes served the purpose of forcing local populations to engage in the production of cash crops for export (eg, cocoa, coffee, and groundnuts). These cash crops represented cheap inputs for industries in the mother countries, where large profits were ultimately realised.

In contemporary food systems, subordination to profit continues to occur both directly and indirectly. An important difference exists between the upstream sectors (eg, agricultural inputs production and finance) and downstream sectors (eg, storage, processing, distribution, and retailing) on the one side, and farming on the other.

In the Global North (but also in large parts of the Global South), the production of agricultural inputs, from seeds to fertilisers, and the immediate storage and processing (plus of course the distribution and retailing) of agricultural produce and food are under the direct control of private capital and rely on wage labour, a process known as appropriationism.[37] However, farming is (for the most part) not directly controlled by capital. In fact, in the Global North, family farms with prevalent family (ie, non-waged) labour are still the prevalent organisational form. For example, in the EU, data from the Farm Accountancy Data Network show that, in 2020, family farms accounted for 85% of all farms and paid labour represented less than 30% of all labour input. In the Global South, peasant agriculture, in which producers retain some form of access to land and family labour is primarily employed, is still prevalent. Family farms and peasant agriculture do not entirely conform to the capitalist enterprise, with its clear division between ownership (ie, capital) and workforce (ie, labour). In family farms and peasant farming, the two elements are mingled. Family farmers in the Global North, generally characterised by a higher level of capitalisation, retain a focus on profit accumulation jointly with other social, cultural, and environmental goals.[38,39] Peasants in the Global South, generally characterised by low levels of capitalisation, tend to focus more on survival, through the production of commodities, than on profit accumulation.[40,41] The reality of family farms and peasant farms, the way in which they operate, and the objectives they pursue, are in stark contrast with the way in which the upstream and downstream sectors of food systems are organised, under the direct control of capital and with a clear orientation towards profit accumulation. Importantly, the direct control, on the part of capital, of the upstream and downstream production processes within food systems represents a form of indirect control of farming in the Global North and in the Global South.[42–44] For this reason, in spite of retaining access to land, both peasant farmers in the Global South and family farmers in the Global North are not completely free to produce what they want, but end up producing to sustain profit and capital accumulation both upstream and downstream.

## Dire consequences: the polycrisis and loss of farmers' autonomy

The capitalist relations of production within food systems, established through the direct control of the upstream and downstream sectors and the consequent indirect control of farming by capital, imply the subordination of food production, distribution, and consumption to profit and capital accumulation. In the interests of the large corporations operating upstream and downstream, production is mainly oriented to flooding the market with cheap calories, fuelling the obesity epidemic.[18,45] As different capitals upstream and downstream collide with each other in the struggle to maximise profit, they exert an increasing pressure on farming. The high levels of concentration in the upstream and downstream sectors exacerbate these issues.[46,47] This pressure on farmers is manifest in the value distribution along the supply chain. For example, according to Farm Accountancy Data Network data in the EU, interests, rents, and agricultural inputs absorbed almost 30% of farm income in 2020. This share has been steadily increasing over time. Globally, farmers receive a small and declining share of the total value added.[48] To absorb these pressures and stay competitive, farmers (like any other business) must reduce unit costs. This reduction can be done by increasing the productivity of land, via land-saving technology (eg, improved seeds, fertilisers, and pesticides), or the productivity of labour, via labour-saving technologies

For more on the **Farm Accountancy Data Network** see https://agridata.ec.europa.eu/extensions/FarmEconomyFocus/FADNDatabase.html

(eg, machinery) and scale expansion. The penetration of capitalist relations of production revolutionises the productive forces on the farm, further increasing the subordination of farming to the upstream and downstream sectors. The pressure to stay competitive leads to a treadmill effect[49] with strong social (eg, labour exploitation and slavery) and environmental consequences.[50,51] Moreover, this pressure imparts a strong expansionary drive to food systems. As each production unit strives to conquer larger market shares, the result is overall expansion. According to the Food and Agriculture Organization Statistical Database, over the period 1991–2021, the global gross value of food production passed from US$1·8 trillion to $4·2 trillion (constant 2014–16 $), whereas the value of global food trade (excluding fish) passed from $253 billion to $1485 trillion. Over the same period, cropland at the global level increased by 94 million ha (from 1486 million ha to 1580 million ha). This increase was particularly pronounced in Africa (which gained 88 million ha), South America (which gained 32 million ha), and southeast Asia, (which gained 38 million ha). This expansion also resulted in farming encroaching into natural habitats.

For more on the **Food and Agriculture Organization Statistical Database** see https://www.fao.org/faostat/en/#home

The direct and indirect control of capital on food systems have important consequences in terms of farmers' autonomy. Autonomy can be conceptualised at two levels at least. On one level, it refers to the ability of individuals to pursue their own objectives according to their values, inclinations, and capabilities. On the other level, autonomy refers to the aspirations of a collective (ie, society) to achieve self-determination, to choose and decide about their destinies.[52,53] Autonomy is ultimately a relational concept[54] in the sense that it reflects the quality of prevailing social relations (rather than their absence). The penetration of capitalist relations of production, subordinating production to profit and capital accumulation, therefore logically has an effect on autonomy. We focus particularly on the loss of autonomy among farmers, the foundation of food systems, because farmers' loss of autonomy also has consequences for consumers and society at large. In the case of direct control by capital, the loss of autonomy on the part of producers is obvious. Wageworkers have no say in what to produce and how to produce it. Their wage labour is directly functional to the accumulation of profit. However, farmers' autonomy is also eroded in the case of indirect control. Financial intermediaries, input producers, retailers, and distributors operating in the upstream and downstream sectors of food systems condition the production process on farms. The role of increasing rural indebtedness, as a disciplining mechanism in agricultural production, provides an important example of this process.[55] Indebted farmers are less free, and must strictly produce what is most profitable to service debt. The dependence on specific technologies is another example. Certified seeds respond not only to the quality specification of processors and distributors downstream. They also require the application of specific inputs, from fertilisers to pesticides, thus matching the needs of upstream operators. Even the dependence on specialised machinery can be problematic. The software in John Deere tractors allows them to be repaired only by authorised traders.[56] More recent developments, such as some forms of digital agriculture, go as far as to overrule farmers' decision-making processes, which are replaced by algorithms.[57] The power of upstream or downstream actors can be so strong as to virtually eliminate any real space of autonomy for producers. Farmers producing under strictly specified contracts with distributors, while formally retaining access to their land, have very little control of the production process.[58]

In summary, the integration of food systems within global capitalism and their subordination to profit accumulation occurs by establishing capitalist relations of production. Capital directly controls the upstream and downstream sectors of food systems, whereas farming is mostly indirectly controlled. The establishment of capitalist relations of production within food systems and the consequent competitive quest for profit induces changes in the productive forces to reduce unit costs of production, while imparting an expansionary drive. This overall process is associated with the loss of producers' autonomy and environmental and social dysfunction in food systems. As these processes are tightly coupled, they must be addressed together.

## Agroecology, autonomy, and sustainable and fair food systems: theoretical aspects

One of the key arguments put forward in this Personal View is that agroecology represents an important strategy to reduce the subordination of food systems to profit accumulation, thus simultaneously increasing farmers' autonomy and addressing social and environmental dysfunctions.

Agroecology can be defined as "the application of ecological principles to food and farming systems that emerge from specific socioecological and cultural contexts in place-based territories... and a social and political process that centres the knowledge and agency of Indigenous peoples and peasants in determining agri-food system policy and practice".[59] The double nature of agroecology (concrete or technical and social or political) is in fact crucial to understanding its potential to transform food systems.[15,16] The subordination of food systems to profit and capital accumulation occurs through the penetration of capitalist relations of production and the consequent revolution in the productive forces. Analogously, the transformative potential of agroecology can only be activated by simultaneously changing the production methods (ie, the concrete or technical dimension) and reducing the penetration of capitalist relations of production (ie, the social or political dimension).

Agroecology, through its alignment with food sovereignty, strongly resonates with autonomy. The concept of food sovereignty, put forward by La Via Campesina, calls for the democratic control of the process of food production, distribution, and consumption.[60] Food sovereignty openly challenges the existing relations of production within food systems, in which financiers, input producers, processors, distributors, and retailers both upstream and downstream strongly condition food production, distribution, and consumption.[61] The autonomy of producers and food sovereignty matter because they are essential to reorienting food systems towards democratically determined goals, compatible with social justice and sustainability, and away from the mute compulsion of profit accumulation. In the definition of food sovereignty, two elements are tightly coupled. The social or political element (ie, democratic control) and the concrete or technical element (ie, the process of production, consumption, and distribution of food).

The High Level Panel of Experts on Food Security and Nutrition proposes a set of 13 principles informing agroecology (figure).[14] The principles of agroecology span the entire cycle of production, distribution, and consumption, including waste and recycling (figure). Most of the principles of agroecology directly refer to implementing concrete or technical practices of production on the farm (eg, reducing external inputs, promoting recycling, activating synergies within agroecosystems, and enhancing biodiversity). There is sufficient evidence showing how agroecological practices have positive effects on soils and biodiversity, while promoting resilience to climate change.[62,63] These concrete or technical transformations also have social and political implications. For example, reducing external inputs and relying on the activation of synergies within agroecosystems can help reduce dependency on upstream industries, thus reducing the penetration of capitalist relations of production. Yet, other principles (eg, institutional arrangements empowering peasants; the active participation of all actors in shaping food systems; promoting culturally appropriate, diverse, and healthy diets; increasing connectivity by promoting local markets; and promoting the diffusion of local knowledge) have a predominantly social or political nature, which aims to strengthen the democratic control of production, distribution, and consumption within food systems, directly challenging the prevailing capitalist relations of production. To an extent, such principles will also act to transform the concrete or technical dimension. Increased democratic participation of all the actors involved in shaping food systems can promote some concrete or technical forms of production, consumption, and distribution. Establishing alternative, local distribution networks, even in urban contexts, facilitates the adoption of agroecological practices.[64] Promoting the diffusion and generation of local knowledge, in a farmer-to-farmer fashion,[65] will transform current subaltern (ie, top-down) relationships to both public (eg, extension services) and private (eg, agricultural input suppliers) providers of agricultural knowledge, and will help decolonise food systems. Modifying land governance by facilitating peasants' access to land can be highly transformative in terms of concrete production. For example, improving women's access and control of productive resources strongly correlates with the production of more diverse food crops in Burkina Faso and in India.[66] We see a dialectical interaction between the concrete or technical and social or political elements of agroecology, which can set in motion a virtuous transformative cycle. The result of these emancipatory steps will be the weakening of the prevailing capitalist relations of production, the reshaping of the forces of production, and the reappropriation (by producers) of upstream and downstream sectors of food systems. Consequently, food production, distribution, and consumption will be reoriented away from profit accumulation towards democratically identified goals. In short, they will bring increased autonomy at both the individual and the collective level, essential to food sovereignty, while addressing the environmental and social aspects of sustainability.

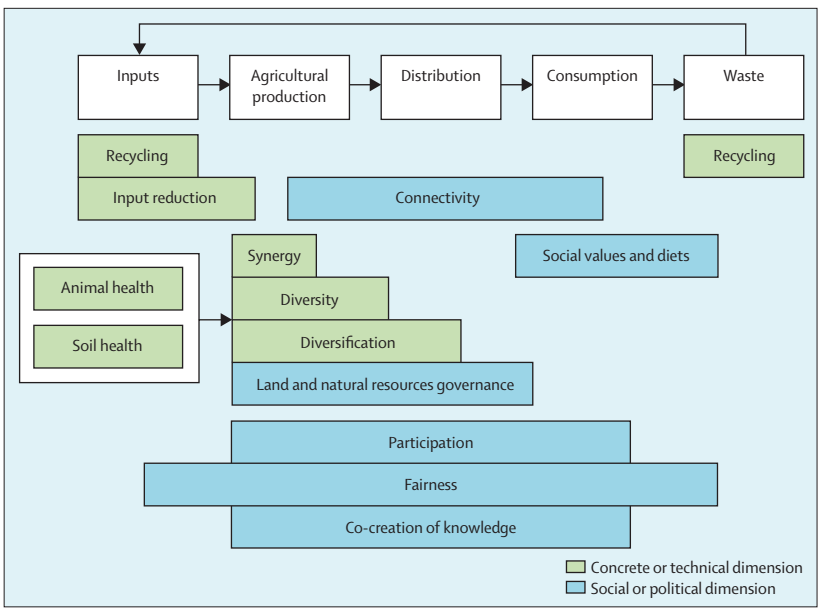


***Figure:*** **The principles of agroecology**
Most of the principles of agroecology reflect concrete or technical aspects of production on farms (green; eg, reducing external inputs, encouraging nutrient recycling, promoting diversity and ecological synergies, and sustaining soil and animal health). The remaining principles (blue; improving connectivity by establishing local market networks of producers and consumers, promoting fair diets, improving land and natural resources governance, and increasing the participation of local actors in food systems, fairness, and the co-creation of knowledge, particularly local knowledge) have a prevalently social or political dimension. The principles extend beyond the farm to cover upstream and downstream elements of food systems. Reducing external inputs on the farm, promoting recycling, and activating synergies all allow for the reappropriation of parts of the upstream sectors by farmers. The creation of local distribution networks allows farmers to better control downstream sectors. In this way, producers' autonomy is also increased.

## Practical experiences

We would like to present some non-exhaustive experiences of agroecology to illustrate its effects in terms of

both increased autonomy and improved environmental and social conditions. We present two cases of agroecological transformation, one from the Global South and one from the Global North.

### The Rede Ecovida in southern Brazil

The Rede Ecovida was founded in 1998 as an alternative to Green Revolution agriculture and markets and is a regional network in the southern states of Brazil.[67] The Rede Ecovida brings together different value chain actors and non-government organisations. Membership involves participatory certification (a participatory guarantee system) through their own label and a small payment from the product sales for a teaching and extension programme in agroecology.[68] Among the participatory guarantee system rules are commitments to refraining from using chemical inputs and genetically modified organisms; providing healthy and non-exploitative working conditions; encouraging family farming, food processing, and women and youth empowerment; and increasing self-sufficiency and solidarity, fair prices for farmers and consumers, and product diversification, with a focus on local and Indigenous varieties. The Rede Ecovida has been expanding steadily. In 2019, it was present in more than 350 municipalities and hundreds of local organic markets, including more than 3000 agroecological families in 27 regional nuclei.[69]

The Rede Ecovida has several important characteristics. First, it complies with food sovereignty principles defined in the Nyéléni Declaration of 2007. It focuses on food for people, localises food systems, builds knowledge and skills, and works with nature through agroecological methods that minimise external inputs.[70] Second, through the participatory guarantee system, the Rede Ecovida has enabled members to control distribution more directly, by creating various distribution networks, such as the well known network The Circuit.[71] To participate in these distribution networks, farmers groups must agree to: prioritise the circulation of food among members of the network; buy (not just sell); and adopt fair prices, which do not necessarily follow prevailing market prices.[72]

In short, the Rede Ecovida operates jointly on the concrete or technical and social or political dimensions, transforming food production, distribution, and consumption. In so doing, it fosters the autonomy of producers and communities and enhances food sovereignty.

### The northern Frisian woodland in the Netherlands

The northern Frisian woodland is a territorial cooperative for agrarian landscape management, operating in the north of the Netherlands, with over 1000 members and covering about 50 000 ha.[73,74] The origin of the cooperative dates back to the 1980s, as a reaction to the designation of the area as acid-sensitive, and consequent restrictions on farming to prevent soil acidification. Local farmers made a counterproposal. They committed to maintaining biodiversity in the area and to reducing ammonia emissions in exchange for the area being classified as non-acid-sensitive. Through self-initiated, on-farm research, farmers experimented with reducing nitrogen inputs on farms, both via feed concentrates and as soil fertiliser. By changing the diets of their cows (switching from protein-rich feed concentrate to grass), they changed the quality of manure, with a higher carbon to nitrogen ratio, thus reducing leaching and soil acidification. Moreover, better quality manure enabled the reduction of chemical fertilisers in the soil, thus further improving the effects on soil acidification. High milk productivity was maintained, while reducing external inputs, in what is known as closed-loop agriculture. This farmers-led research involved cooperation, first among the farmers themselves and then with scientists. Farmers in the area are still directly involved in the production and dissemination of knowledge. They initiate scientific research, which is carried out on their own farms, and they engage in training and dissemination activities. The case of the northern Frisian woodland cooperative exemplifies the operation of various agroecological principles, from the production and dissemination of knowledge, including local knowledge, to the establishment of cooperative forms of governance with respect to landscape management. The reduction of external inputs and the activation of synergies among the various environmental processes reduce the influence of input providers and the penetration of capitalist relations of production. By acting on both concrete or technical and social or political aspects, the northern Frisian woodland has had positive environmental impacts while creating spaces of autonomy and self-governance for the participating farmers.

## Conclusions

The complete integration of food systems within global capitalism and their subordination to profit accumulation represents the principal systemic driver behind the current polycrisis and the loss of food producers' autonomy. This integration is achieved through the penetration of capitalist relations of production within food systems, the appropriation by capital of the upstream and downstream sectors of food systems, the indirect control of farming, and the consequent revolution in the forces of food production. Transforming food systems to address the polycrisis and increase farmers' autonomy will require a weakening, if not dissolving, of the prevailing capitalist relations of production within food systems and a reshaping of productive forces. Agroecology could represent an important strategy in this direction, which would allow producers to reappropriate portions of the upstream and downstream sectors of food systems. The transformative power of agroecology lies in its double nature: concrete or technical and social or political.

The two dimensions of agroecology stand in dialectical relationship to each other. By acting on the concrete or

technical dimension, agroecology also alters social relations of productions. The reduction of external inputs on the farm increases the autonomy of producers from upstream operators, weakens the penetration of capitalist social relations, and helps emancipate producers from the compulsion to pursue profit accumulation. By acting on the social or political dimension, agroecology can enable the adoption of new production methods that respond to local social and environmental conditions. By improving access to resources and by directly controlling distribution, through cooperatives and local markets serving both rural and urban areas, the production and consumption of agroecological products is also promoted. The two examples discussed in this Personal View illustrate concretely how agroecology can work. Expanding agroecology will require two types of efforts. At the international level, this expansion will require a common struggle (eg, coordinated through international organisations such as La Via Campesina) on the part of producers (and consumers) to weaken the penetration of capitalist relations of production by exerting a stronger control on the production, processing, and distribution of food. At the local level, it will require the ability to develop democratically controlled solutions adapted to different social and ecological contexts.[75] These final considerations therefore stand as a warning against attempts (by transnational corporations, opportunistic non-governmental organisations, foundations, and some international agencies) to reduce agroecology to a purely technical intervention.[76] Unless social or political elements are engaged, and the penetration of capitalist relations of production is weakened, the subordination of food systems to capital accumulation will persist, and so will environmental and social dysfunction.

**Contributors**

MGC was responsible for conceptualising and writing the original draft of this Personal View. All authors contributed equally to revising the draft. All authors also contributed equally to preparing the final draft. MGC led the final editing process.

**Declaration of interests**

We declare no competing interests.

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