The “food and agricultural transition” is ongoing

Nine changes tell us to what kind of world it is leading us

The media are full of narratives claiming the need to implement transitions[1] in fields as varied as energy, the environment or food and agriculture. In the best of cases, they are presented as required for the resolution of systemic crises resulting from human activities.

In the areas of food and agriculture, hungerexplained.org tried, in 2018, to define the key characteristics of transition [read] before analysing, in 2019, the main obstacles to be overcome to make food systems evolve towards economic, social, environmental, but also cultural and political sustainability [read].

In fact, food and agriculture are far from being static: they are in constant evolution, undergoing deep changes that are sometimes more like real revolutions[2] than simple transitions.

The advent of digital technologies and biotechnology, the development of ecological agriculture, bioeconomy and urban agriculture, the emergence of novel foods, the reorganization of research and investments and the financialization of the economy are among the major ongoing processes. They will be examined here.

[1] Transition : slow and gradual shift from one state to another, or the period between two different states.

[2] Revolution : a sudden, radical, or complete change.

These processes are often interlinked. They have reached variable stages of development - some are well under way, others have just started - but for each of them, it is possible to detect weak signals that help to imagine their consequences - some favourable, others disturbing if not altogether alarming - of their full development on sustainability of food systems and welfare of their main agents (farmers, traders, processors and consumers).

These changes are often not well known and they remain concealed by an illusion of inertia that hides deep transformations with considerable implications for the future.

The analytical framework used here integrates the dimensions of sustainability, complemented by considerations on changes observed in power relations within the global food system[3]. It should give a picture of the world towards which these processes are leading.

The analysis will provide links, when necessary, to earlier articles published on hungerexplained.org in which some of the ongoing changes have been analysed in greater detail, and to institutional and scientific references for those who wish to go more in depth into the topic.

The assessment of impacts of the processes examined will be mostly qualitative, as data are missing. It will have to be updated in the future, as more data becomes available.

Finally, the examples of processes reviewed here are far from being exhaustive, but they were selected for their relevance to the overall change occurring.

Analysis of ongoing processes

1. The advent of digital technologies

The growing importance of digital technologies in the economy as well as in private life cannot be challenged. It brings about considerable changes in behaviour, the structure of the economy and in the distribution of power and resources.

This trend is expected to accelerate further, given the enormous current and planned investments and despite recent drawbacks such as the bankruptcy of the Silicon Valley Bank or massive lay-offs in several large firms of the sector.

Estimates are that the digital sector will grow threefold between 2020 and 2030 [read] and that the volume of data used by digital applications will expand at an annual rate of 40%. The press is full of information on ongoing technological developments, especially on new artificial intelligence tools [read] relying on deep learning [read] and evolving very rapidly towards greater sophistication.

In the field of food and agriculture, digital technologies help to carry out real-time analysis of a staggering amount of very diverse data (soil condition, weather, plant and animal health, agricultural technology usage, agricultural inputs availability, market conditions,

[3] The variety of conditions existing in the immense diversity of food systems in the world will only be mentioned in a few cases, so as to limit the length of this text and make it more easily readable.

consumer needs and preferences, etc.). This, according to “big data” prophets, should allow increasing food systems’ efficiency and reduce their impact on the environment [read].

However, actually observed results are rather limited [read pp. 78-79] when compared to what would be required to improve food systems’ sustainability [read pp. 2-3]. Digital development is encouraged by governments, as is the case in China [read], but the adoption of its tools by farmers, even in rich countries like the US, is hampered by their initial cost, uncertain economic benefits and complexity [read].

Moreover, digital technologies are essentially in the hands of large multinational companies and of the start-ups that work for them and they have serious drawbacks regarding data security, ownership and privacy. They also reduce employment in agriculture by facilitating the use of robots, and they lead to hyperconcentration of firms and of economic power [read]. In addition, their development could cause the exclusion of an important proportion of farmers (especially the poorest) [read].

If, from an economic point of view, digital technologies appear to create growth at least in the short term, their environmental impact on food and agriculture seems slightly positive (but it must be recalled that the digital sector is a major emitter of greenhouse gases), and their social, political and cultural consequences look rather negative, particularly because of the power concentration, appropriation of knowledge and of decision that they accelerate, as well as the exclusion that they make possible, including through price-related processes [read p. 4] (see Table 1).

All these risks, some of which are not sufficiently put forward in scientific literature [read pp. 4-7], stress the need to establish a well-thought governance system in this key area [read].

Table 1: Summary of the analysis of the impact of digital technologies on food systems

Process	Economic	Social	Environ-mental	Cultural	Political	Power distribution
Digital technologies						

Legend : (-) (+)

2. The advent of biotechnologies (genetic engineering)

Expectations raised by the advent biotechnologies[4] in the field of medicine, food and agriculture have made the titles of the press for decades.

[4] According to the definition found in the Convention of Biological Diversity, “the term ‘agricultural biotechnologies’ encompasses a suite of technologies from low-tech ones, such as artificial insemination, fermentation techniques, biofertilizers and nuclear techniques; to high-tech ones, involving advanced DNA-based methodologies, including genetic modification (GM), gene editing, whole genome sequencing and multi-omics technologies”, ‘omics’ being “the generic term for the study of large-scale data of a biological class, such as the total complement of genes or chemical metabolites present in an organism. Examples of omics technologies include metabolome, ionome, microbiome and phenome, as well as integrated informatics” [read pp. 168-171].

At first, genetic engineering was mainly meant to help develop more productive crops, and later animals, in order to feed the world at an affordable price. In particular, it was to make crops more resistant to pests and diseases so as to reduce the use of toxic pesticides [read].

The development of digital genome sequencing and gene-editing technology created the possibility to identify links existing between genes and specific properties of organisms (e.g. drought and flood resistance, resistance to excess salt, nutrient deficiency, pests and diseases, organoleptic characteristics and storage life) and implant them into living organisms. These technologies can also help fortify food by increasing its content in certain elements, in particular vitamins [read].

These possibilities are increasingly being used to modify microorganisms and use them in precision fermentation producing the so-called “novel foods” (see below a more in-depth analysis of this topic). This sets the basis for moving from an exploitation of animals and plants to that, industrial, of microorganisms, a process that would be equivalent to a real revolution [read]

The emergence of these technologies generated ethical and environmental concerns. It raises the issue of privatization of the living, as the technologies and modified organisms they produce are patented. This limits access to them by the mass of small farmers throughout the world and, if they are able to afford paying for them, it makes them dependent on the firms producing and providing them.

These technologies also make biopiracy easier. Biopiracy is an illegal activity through which some private companies make billion dollars profit by appropriation of the sequenced genome of living organisms selected by indigenous and farming communities during millennia, and this in spite of the Nagoya Protocol (signed in 2010 and into effect since 2014) that defines the modalities protecting the interests of communities in case of access to genetic resources by private corporations [read], and despite the International Treaty on Plant Genetic Resources for Food and Agriculture [read].

Biotechnologies are of interest economically (increased productivity, lower cost of production, in particular), but intellectual property rights are likely to lead to the appropriation of benefits created by the minority who control them, at the expense of the mass of farmers.

The environmental impact could be positive on one hand (reduced application of pesticides - but this is contested by some scientists [read] -, use of microorganisms instead of plants or animals that could help diminish agricultural area required to feed the world), but negative, on the other hand (e.g. aggravated loss of agricultural biodiversity, possible disequilibria in some ecosystems, creation of pesticide resistance [read]).

The impact is also rather negative in the social and political domain, as the use of biotechnologies will contribute to exclusion, particularly because they are strongly dominated by large private businesses that hold rights on living organisms at the expense of rural communities (see Table 2).

As in the case of digital technologies, biotechnologies create risks that call for the establishment of an appropriate governance system.

Table 2: Summary of the analysis of the impact of biotechnologies on food systems

Process	Economic	Social	Environ-mental	Cultural	Political	Power distribution
Biotechnologies						

Legend: (-) (+)

3. The development of agroecological approaches

The High-Level Panel of Experts of the Committee on World Food Security defines agroecology as “a science, a set of practices and a social movement” [read]. As a science, it “draws on many locally derived concepts and practices” to provide “a response to the social and ecological impacts of the so-called ‘industrial’ agriculture model”. It is a quite active domain within scientific research. It applies “ecological concepts and principles to farming systems, focusing on the interactions between plants, animals, humans and the environment”. It “integrate[s] transdisciplinary knowledge, farmers’ practices and social movements while recognizing their mutual dependence” and encompasses “whole agrifood systems, not only farming systems” [read p. 31]

Agroecology is generally understood to comprise a set of approaches aiming at developing sustainable food systems, including organic agriculture, agroforestry, permaculture and food sovereignty, to which sustainable intensification, climate-smart agriculture, nutrition sensitive agriculture and sustainable food value chains are sometimes added.

These methods are characterized by a special attention to regenerative production, to biodiversity, economic diversification, climate adaptation and mitigation, knowledge generation and technology transfer, equity, human and social values, social connectivity, rights, democratization and participation, and they seek a more efficient use of resources, resilience to shocks, and greater equity and social responsibility [see Table 4, p. 63].

The development of agroecology accelerated with the growing awareness by a larger part of world population of the degradation of environmental conditions within which food is being produced [read for example pp. 1-2]. The development of organic agriculture illustrates this process: its area jumped from 11 million hectares in 1999 to 76 million in 2021. It, however, remains marginal at global level (around 1.6% of total agricultural area in 2021) [read] even if, in some places, it covers an increasing share of the area (10% in France and 36% in the Provence-Alpes-Côte d'Azur Region in 2020) [read in French].

From the economic point of view, agroecology seems to be of interest for producers who adopt it and see their income improve. It also leads to the creation of more jobs as it requires more labour. Yet, there is no consensus regarding its productivity [read in French on the case of organic agriculture in Africa]. It usually (but not always) relies on a social, cultural and political movement, and it is more inclusive than other types of agriculture. Large private firms have a relatively lesser role in it.

Its environmental impact is positive as it pollutes less because it does not use agrochemicals, and it is favourable to biodiversity, particularly because of its greater respect for wildlife and wild plants habitats [read]. Some, however, believe that if its productivity is less, it will require more agricultural land, if consumption remains unchanged (see Table 3).

Table 3: Summary of the analysis of the impact of agroecology on food systems

Process	Economic	Social	Environ-mental	Cultural	Political	Power distribution
Agroecology						

Legend: (-) (+)

4. The development of bioeconomy

Bioeconomy is rapidly gaining importance.

It covers three different visions and approaches. The first is centred on biotechnologies (already mentioned in 2. above), the second is focused on the exploitation of natural resources drawn from agriculture, fisheries or forests, and the third aims at optimizing and protecting ecological processes (with similarities with agroecology discussed in 3.) [read].

The two first visions, led by powerful private firms, tend to exert an additional pressure on biological resources by using them in the area of food, chemical, pharmaceutical, wood, paper and garment industries, as well as in construction and in energy production, particularly through biogas production [read].

In 2017, bioeconomy represented almost 5% of EU GDP (600 billion euros) and was growing at a rate of 10% per year, much faster than the economy as a whole [read]. Its current dynamism can largely be explained by efforts made to cut greenhouse gas emissions.

The development of bioeconomy creates new opportunities for investment in more efficient uses of bioresources. It should also be a source of employment. Its economic impact appears therefore to be positive.

From the environmental point of view, the impact is mixed. On the one hand, by producing biomass to make energy, bioeconomy could reduce greenhouse gas emissions, but there is not consensus on this [read]. On the other hand, it contributes to place more pressure on natural resources, particularly on land and water.

By increasing demand for bio-resources, and especially on food products, it is likely to cause higher food prices with considerable social implications on the poorest population groups [read].

Its industrial models (the two first visions, here above) create conditions of greater concentration of power of private firms on bioresources, at the expense of actors operating in traditional uses of agricultural, fishery and forestry products (see Table 4).

Table 4: Summary of the analysis of the impact of bioeconomy on food systems

Process	Economic	Social	Environ-mental	Cultural	Political	Power distribution
Bioeconomy (1 & 2)						
Bioeconomy (3)						

Legend: (-) (+)

5. The development of urban agriculture (controlled environment agriculture)

In addition to traditional forms of urban and peri-urban agriculture such as workers' gardens and peri-urban farming, new methods of food production have developed during the last decades such as controlled environment agriculture (CEA) farming established on rooftops or in vertical production units [read].

CEA (for which there are several variants) is quite intensive. Crops are being cultivated on inert substrates (instead of soil) and fed with liquid solutions (with a mix of fertilizers mostly synthetic[5] provided by the chemical industry) in which plants find the nutrients necessary to their growth. This method can be used at various scales.

It is a kind of cropping that requires considerable infrastructure and very intensive care when it is being applied at a large scale. In that case, it generally relies on a very precise control of light and temperature that can be made automatic by investing in infrastructure (greenhouses are often necessary), sensors and specialized digital apps. It is supposed to use less water and, in some occurrences, it can even involve water recycling systems. This type of agriculture is particularly popular for fresh vegetables (whose nutritional quality is quasi programmed) and for flowers. Great care is especially important as crops become quite vulnerable to diseases (a large number of genetically homogenous organisms are confined in a limited and closed space) and may require a massive use of pesticides.[6]

[5] Mixes made of organic fertilizers also exist, but many believe that they may imply a risk of transmission of diseases or parasites.

[6] Some very sophisticated models, comparable to breeding in a sterile environment, aim at operating without any use of pesticide and at emitting less greenhouse gas emissions [read].

The institutional framework may vary: individual, collective (e.g. supported by associations or municipalities) or industrial. The collective model requires a strong individual involvement, particularly in terms of time, which may be challenging for poorer population groups who, increasingly, lack time even for preparing their own food [read]. The industrial model relies on a higher capital intensity, uses a great deal of energy and is dependent on fertilizer and seed providers and, sometimes, on digital services companies. The analysis of this process is made difficult by the multiplicity of institutional and technological models it involves (see Table 5).

Table 5: Summary of the analysis of the impact of urban agriculture (controlled environment agriculture) on food system

Process	Economic	Social	Environ-mental	Cultural	Political	Power distribution
Collective urban model						
Industrial urban model						

Legend: (-) (+)

6. The emergence of novel foods (alternative proteins)

A variety of novel foods appeared recently[7]. Among them, some are the result of what can be called synthetic biology and that consists in using simultaneously biotechnology and digital technologies.

For example, precision fermentation means programming microorganisms to produce complex organic molecules such as proteins, enzymes, aromas, vitamins, pigments, but also growth factors for the production of meat by cells rather than by animals. This is what some have been calling “Food as Software” [read].

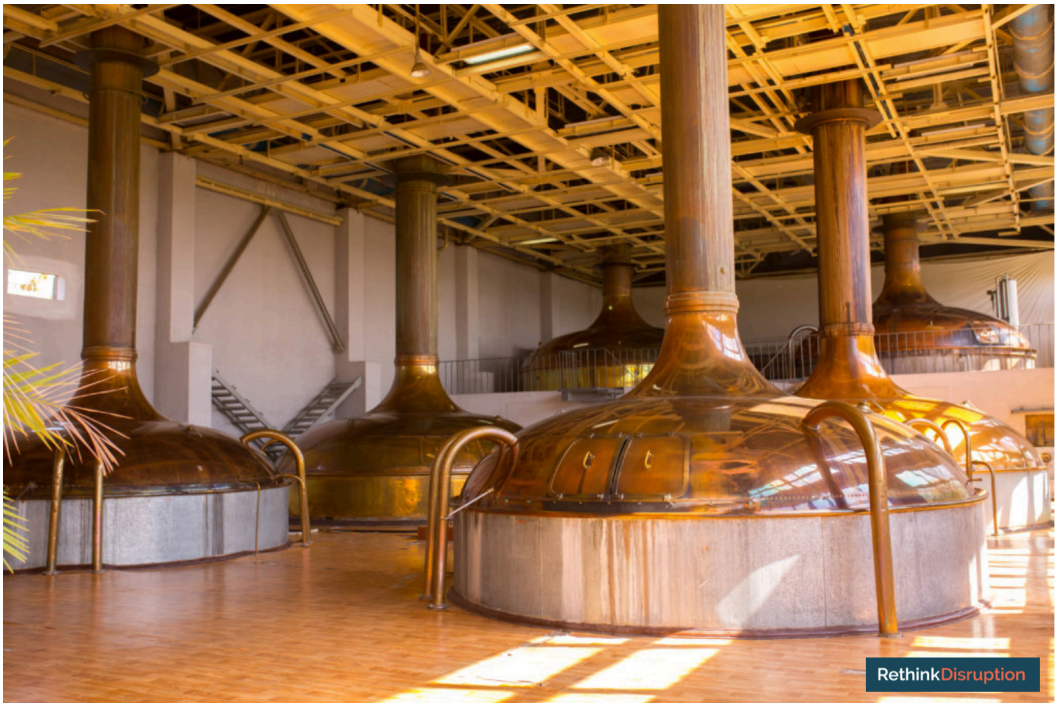
This family of products is still quite new and they have not yet been authorized for marketing in most countries. However, investments in precision fermentation have boomed, rising from almost zero in the middle of the past decade to close to $1 billion in 2021 [read].

The adoption of this technology is being promoted simultaneously by some radical ecologists like activist and writer G. Monbiot and by the World Economic Forum of Davos (WEF), often mentioned on hungerexplained.org.

The former wishes to see agriculture rapidly replaced in order to produce food “without devouring the planet”, while naively believing that intellectual property of technologies used will not be a problem and that they will be made available for free to all [read].

[7] The EU regulations consider in particular as novel foods, those food items with a new or intentionally modified molecular structure; those consisting of or produced from microorganisms, fungi or algae; those isolated from or produced from cell culture or tissue culture derived from animals, plants, microorganisms, fungi or algae; and, those made of engineered nanomaterials [read].

WEF, on the contrary, thinks that alternative proteins will represent by 2035 a $290 billion market that will establish the basis for a more sustainable food system, through a massive reduction of greenhouse gases emitted for producing our food of animal origin [read]. The Forum uses projections made in a report [read] that forecasts that consumption of alternative proteins will rise from 13 million tonnes in 2020 to 97 million tonnes by 2035, or 11% of proteins expected to be consumed in that year in the world, while their price will fall considerably [read].



Neither Monbiot nor WEF seem to care much about the perspectives that this change would offer to farmers and livestock breeders. The same goes for further market segmentation that would result between quality food products for consumption by rich elites and cheap ultra-processed industrial food for the vast majority of world population.

Massive use of this technology would certainly be profitable to companies controlling and using it, but it would, as certainly, be at the expense of the hundreds of millions of people working in agriculture and livestock production, even if the technology is applicable locally at a small scale, as claimed by its promoters. Social implications would be dramatic for the rural areas where activities traditionally linked to food and agriculture would be seriously disrupted.

In terms of environment, rural landscapes, particularly in livestock breeding areas, would be radically modified: the real impact would depend on what would be done with the land “freed from agriculture” (abandoned, converted or developed for some other use?).

Finally, this technology would reinforce the control over food by a limited number of increasingly powerful companies (Table 6).

Table 6: Summary of the analysis of the impact of novel foods (alternative proteins) on food systems

Process	Economic	Social	Environ-mental	Cultural	Political	Power distribution
Alternative proteins						

Legend: (-) (+)

7. The reorganization of research

Another important movement is the profound reorganization of research in which, like in other domains, the private sector - in particular large transnational companies - is playing a growing role.

Simultaneously, research also redeployed geographically. Historically dominated by rich countries in which it was mostly concentrated, it recently developed rapidly in emerging countries such as China and Brazil, and earlier in the Republic of Korea.

These circumstances further aggravate the technological gap and dependence of poor countries. They perpetuate and even reinforce technological, economic and social inequality worldwide [read]. They can also be a source of various potential tensions [read pp. 4-5].

Research as a producer of knowledge, innovations and potential profits is also a key matter of power. In this sense, rapid expansion of private research, often funded by large multinational companies, tends to give them more power. In the agriculture sector, private funding of research and development grew threefold between 1990 and 2014, reaching double-digit growth rates (15.5% in 2020). The budgets of 5 multinationals active in this field was more than $1 billion per year!

On the contrary, the volume of public resources going into research may decrease, as was the case for the EU where it dropped from 35% of total research spendings in 2010 to 30% in 2020, while the private sector share rose from 55% to 58% [read].

It is worth noting the important role played by public funding in the mobilization of private resources for research. According to a 2020 study, in OECD countries, one pound sterling invested in research by the public sector mobilized between 1.21 and 3.16 pounds of private funding, depending on countries [read].

The increased weight and power of the private sector do influence the orientation of research towards applicable technologies that support commercial activities made of sales of machinery, equipment and various other products that generate profits for businesses, but which are only accessible in a limited way by the mass of poor farmers who lack sufficient cash [read pp. 3-4].

Table 7 sketches out the possible consequences of these changes.

Table 7: Summary of the analysis of the impact of the reorganization of research on food system

Process	Economic	Social	Environ-mental	Cultural	Political	Power distribution
Reorganization of research						

Legend : (-) (+)

8. The reorganization of investments

Investments shape the future [read]. What does the analysis of the evolution of investment in the area of agriculture reveal?

It tells us that:

- Since the middle of the 2000 decade, and particularly after the price surge observed during the 2007-2008 period, agriculture (and more broadly food) has become a sector where investments are on the increase. India and China were the main players in this trend, while Africa was lagging.
- New profit-oriented actors have started to be involved in agricultural investment: financial operators like pension funds, impact investors and digital firms joined the more traditional private companies, traders, public organizations and farmers.

- Simultaneously to this process, there was a relative withdrawal of public authorities, particularly in agricultural research, Asia - and especially China - being an exception. Also, there was an awareness that public spendings have encouraged goods with negative consequences for health and the environment and that reinforced inequalities in the world [read].
- These three processes, by combining, risk to create a disconnect between capital intensive, market-oriented commercial farms, on the one hand, and small farms with

little surplus and limited investment capacity, on the other, with dramatic implications for large population groups.

It is therefore possible to expect, were these processes to continue, that:
- The spread between rich and poor countries will certainly grow, while it will decrease with some middle-level income countries.
- The domination of research and development by rich countries, by some middle-level income countries and their private companies will likely amplify technical backwardness and dependency of poor countries.
- Within countries, disparities will probably grow and dangers of marginalization of weak producers and actors will increase.

Table 8 sums up the possible consequences of these processes.

Table 8: Summary of the analysis of the impact of the reorganization of investments on food systems

Process	Economic	Social	Environ-mental	Cultural	Political	Power distribution
Reorganization of investments						

Legend: (-) (+)

9. The financialization of food systems

The weight and role of financial markets[8] in the world economy has continued to grow since the 1970s. In 2017, MarketWatch estimated that the volume of funds invested in derivatives alone represented between $544,000 and 1,200,000 billion, to be compared to the total amount of money owned in the world ($215,000 billion) [read] and to global GDP ($81,000 billion).

In food systems too, finance is increasingly present. First it is found in investment, as has been mentioned earlier, including for the purchase of land to produce biomass to be processed into agrofuel or for carbon sequestration [read]. It is also active in speculation through derivatives[9] that are largely used by financial operators as well as large agrifood multinationals (traders and processors). The latter increasingly have their own specialized units for finance and harness their excellent knowledge of the sector. This further reinforces their position over their smaller competitors.

[8] Financial markets include mainly stock markets, bond markets, money markets, derivatives markets, foreign exchange markets, commodity markets, CO_2 quota markets and cryptocurrency markets [read]. In the field of food and agriculture, some financial products such as Commodity Index Funds (dealing with a basket of commodities), or Real Estate Investment Trusts are particularly used.

[9] Financial products whose value fluctuates as a function of future evolution of the price or rate of another asset (commodity, stock, bond, exchange rate, etc.). They had been initially created to help businesses to protect themselves against financial risks, but they were widely used to speculate. They include different types of goods, in particular forward contracts and options [read]. They are often accused to amplify price variations and thus generate more instability, particularly since they are now frequently governed by algorithms. For example, spot and future prices of wheat rose by 54% in the week following the invasion of Ukraine by Russia [read].

By creating more uncertainty and variability in the area of food, climate change probably was a major cause of the development of finance in food systems. However, governments themselves contributed to the financialization of food by encouraging farmers to purchase private insurance that do not protect them well, for example, against meteorological event or pest attacks [see the case of France and that of the US].

Financialization is a threat to social and environmental sustainability of food systems as it aggravates power and wealth disequilibria, and increases environmental vulnerability. Indeed, it disseminates in this area typical financial values (priority to immediate profits at the expense of long-term considerations, productive investments, sustainable practices, job security, etc.) and deepens inequalities by attracting into the sector new and powerful actors whose expertise and interest is purely financial, aroused by higher prices and security traditionally attached to land. It also produces instability as their capital can withdraw as fast as it arrived, as soon as an event suggests a future drop in profits, to seek other more remunerative activities.

Within agricultural production, financialization facilitates the progressive grabbing by external actors of resources (particularly land), while leaving all the risks linked to agriculture to be borne by farmers who progressively turn into tenants living in greater precariousness [read].

In value chains, financialization accelerate the development and concentration of corporations and consolidates the industrial agrifood model. It makes the system more complex and more difficult to change by “non-experts”, sealing the alliance between the state technostructure and the private sector (Table 9).

Table 9: Summary of the analysis of the impact of financialization on food systems

Process	Economic	Social	Environ-mental	Cultural	Political	Power distribution
Financialization of food systems						

Legend: (-) (+)

Two worlds with very different orientation, actors and resources

To which world do these changes lead us?

Table 10 provides a general view of the impacts on food systems of the nine processes examined.

From this table, it is possible to identify two types of processes with very distinct characteristics:

- Those where green is dominating (agroecology, type 3 of bioeconomy resting on optimization and protection of ecological processes, and collective urban model) who have positive outcomes in all dimensions of sustainability and in power distribution.
- Those, in greater number, where nuances of red dominate, particularly in terms of their social, cultural, political and power impacts that appear clearly negative.

The areas in yellow are those where the impact is weak, uncertain or complex.

The first group of processes is characterized by:
- A clear priority given to sustainability, with a particular importance attached to the environmental and social dimensions.
- Processes where the main role is played by the population and/or its organizations (associations, municipalities).
- A stronger link between consumption and production which can, in some cases, rest on joined activities, agreements or alliances between producer and consumer associations.

The second group of processes is characterized by:
- A clear priority given to the economic dimension of sustainability, now wrapped in the climate mantle in order for their promoters to benefit from a better public image and earn some kind of moral authority.
- Processes where the lead role is played by private interests, large corporations and financial businesses, as well as by governments.
- More inequality and exclusion, a quality life for the elite and a harsh life for the rest.
- A breach between production and consumption, and an alliance between, on the one hand, economic interest (corporations, financial businesses) and on the other, the state technostructure. The World Economic Forum (WEF) is probably the most representative arena where this alliance is most visible, but it exists in many other alliances and groupings, and the Food Systems Summit was for many an eye-opening event [read].

Table 10: Summary of the impacts on food systems of the nine changes analysed

Process	Economic	Social	Environ-mental	Cultural	Political	Power distribution
Digital technologies						
Biotechnologies						
Agroecology						
Bioeconomy (1 & 2)						
Bioeconomy (3)						
Collective urban model						
Industrial urban model						
Alternative proteins						
Reorganization of research						
Reorganization of investments						
Financialization of food systems						

Legend: (-) (+)

Here we see signs of the possible emergence of two very distinct worlds, with differing (opposite?) objectives. The levels and nature of resources mobilized for their emergence are quite different. On one side, there is the mass of the population, its hopes and its capacity and energy to invent. On the other, there is the power of financial and technological capital, and the political weight of institutions (including laws).

Clearly, for hungerexplained.org, the former of these two worlds appears more desirable than the latter. It seems much more on the way towards a society where all can live decently and sustainably. On the contrary, the second of these two alternative worlds is one of inequalities, divisions and antagonisms, and it is unsustainable: a frightening caricature of the future.

Today, these two worlds are present simultaneously. But the second is taking every day more importance, creating more imbalance and inequality.

Evidently, it will not be easy to orient events towards the world that appears desirable. Many obstacles will have to be overcome [read]. To do this, it will be necessary to break the alliance between governments and big private interests, and bring government on the side of producers and consumers to impose rules for managing private sector activities and orient them towards sustainability in all its dimensions, while protecting the rights of all [read].

If not, the ongoing processes leading to the second world will continue because of the strength of the allied powers that propel them (laws, finance, knowledge and technology) and give them an increasingly dominating position. They will then project the world on the path of an economically, socially, environmentally, culturally and politically unsustainable world.

Materne Maetz
(April 2023)

To know more:

- FAO, The future of food and agriculture – Drivers and triggers for transformation, The Future of Food and Agriculture, no. 3, FAO Rome, 2022.
- Mattson, N., Controlled Environment Agriculture, CornellCALS, 2023.
- HLPE, Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome, 2019.
- Clapp, J. and S.R. Isakson, Risky Returns: The Implications of Financialization in the Food System, Development and Change, Volume49, Issue 2, 2018.

Selection of past articles on hungerexplained.org related to the topic:

- Science, what science ? A problem or part of the solution? When the industry doctors science for profit, 2023.
- Bioeconomy - Its development likely to cause higher food prices, 2022.

- Synthetic biology: solution or dangerous delusion? 2022.
- Investment in agriculture, 2022.
- The digital revolution in food and agriculture - Exciting promises, mixed results and risky bet, 2021.
- Sustainable food systems: 2021 may be a turning point for food, … or it may not, 2020.
- Obstacles to transition - Why is it so difficult to make our food system more sustainable and climate-friendly? 2019.
- Turmoil in the world of seeds, 2019.
- Policies for a transition towards more sustainable and climate friendly food systems, 2018.
- Researchers show that organic agriculture generates more economic value than conventional agriculture, 2015.