

The Triumph of Large-Scale Agriculture and Its Socioeconomic Impact

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Abstract. Large-scale farming that utilizes industrial methods to intensify production is becoming more significant worldwide. This study explores this phenomenon and sheds light on its consequences. Contingency factors serve as key drivers when determining the advantages and disadvantages of both large-scale and small-scale farming. Significant shifts in agro-production methods have fundamentally altered ownership and production structures in agriculture and had a disastrous impact on the livelihoods of people living in rural areas.

Keywords: large-scale agriculture, labor organization, green revolution, land grabbing.

Stambiųjų žemės ūkių triumfas ir jų socialinis bei ekonominis poveikis

Santrauka. Straipsnyje analizuojamas stambusis ūkininkavimas, kai taikomi pramoniniai metodai, kad būtų gaminama daugiau žemės ūkio produkcijos, ir jo socialiniai padariniai. Stambūs agrariniai ūkiai įgyja vis savaresnį vaidmenį pasaulinėje rinkoje. Nepaisant teorinių diskusijų apie smulkiojo ar stambiojo ūkininkavimo pranašumus ar trūkumus, tikrovėje dažniausi veikia atsitiktinio pobūdžio veiksniai, konkrečiu atveju nulemiantys, kuris iš būdų yra priimtinesnis ar atmetinas. Tačiau slinktis link stambaus ūkininkavimo iš pagrindų pakeitė nuosavybės ir gamybos santykių struktūrą žemės ūkyje ir turėjo pražūtingą poveikį žmonių pragyvenimo šaltiniams kaimo vietovėse.

Pagrindiniai žodžiai: stambusis ūkininkavimas, darbo organizavimas, žalioji revoliucija, žemės grobstymas.

Introduction

The expansion of trade and large-scale, export-oriented monoculture farming both contribute to a decline of agricultural diversity and can have disastrous impact on local communities. Trade agreements are considered to fuel sustained economic growth that may be the only solution to

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reduce rural poverty and income inequality. The authors of this study suggest that the advocates of free trade should consider not only the increase in total outputs and income, but that they should take the widening income and wealth inequalities into account as well. It is a major problem, however, that nations or companies engaged in global trade often neglect the environmental and social impacts of their activities – activities that might be beneficial for the various groups involved yet the overall impact of which would still be negative.

It might also be added that as long as decisions about trade and economic issues are made by an elite who have vested interests in changes, the environmental and social impacts will, quite evidently, be disregarded.

This study seeks to describe the social impacts of large-scale monoculture production and takes a historical glance at the two main types of farming practices – small-scale and large-scale farming. Contingency factors serve as key drivers when determining the specific characteristics of labor organizations in agriculture. The study points to the fact that large-scale monoculture production aggravates social inequalities and results in rural poverty and migration to urban areas.

A Short Historical Overview of the Two Main Farming Practices

The prevalence of small-scale and large-scale farming changed over time. Smallholder farms were the main type of farming practices during classical antiquity, whereas large-scale farming was more dominant at the time of the Roman Empire through the use of agricultural estates commonly referred to as the *latifundia* – large parcels of land specialized in agriculture and built on slave labor. The low labor costs made it difficult for small-scale family farms to compete with the larger agricultural estates.

A successor of the *latifundia* as a type of land tenancy, the so-called *colonatus*, emerged in the 2nd century AD. Due to the wars of conquest, landowners were not able to rely on free slave labor anymore. At the time, the slaves did not have any vested interest in production, and they were unqualified for producing labor-intensive crops or improving technology in farming. This resulted in agricultural land being leased to tenant farmers (*coloni*). Farming in the Middle Ages went through significant quality changes – the rights of the *coloni* were restricted and they were tied to the land; the type of employment with which they were bound by served as a stepping stone toward medieval serfdom.

Invented in the 16th century in England, the open-field system (where land belonged to the lord of the manors, and the serfs had obligations to produce for the lords) became the prevalent agricultural system in Western Europe. This system was gradually replaced by the practice of the enclosure of common lands. As a result of the gradual move toward enclosure, the traditional small-scale manorial system lost its significance, while the number of large estates increased.

In the Western world, capitalism opened the way for intensive large-scale production during the 19th century. Increased globalization, as well as the rapid expansion of domestic and regional markets, stimulated an unprecedented concentration, specialization, and the exploiting of economies of scale in agriculture.

David Ricardo introduced the classical theory of Comparative Advantage as early as 1817. Following Ricardo's hypothesis, England can trade cloth for Portuguese wine so that both countries could obtain benefits from the trade of these two goods and make the most of its comparative advantage. A win-win situation is created: it is not a zero-sum outcome, where only one party benefits, but a positive-sum outcome, where the desires and needs of both concerned parties are satisfied.

The prerequisites of the capitalist transformation of agriculture in the 19th century were the pre-capitalist forms of dependence and the abolition of the former land tenure system. Serfdom ceased to exist, and serfs bound to the land were freed. They became free peasant proprietors, small farmers, or landless workers.

Max Weber emphasized the difference between traditional farming and "rational farming controlled by the spirit of capitalism." According to Weber, the aim of traditional farming is to provide labor opportunities and livelihood for people on a given land area, whereas the aim of rational farming is to produce the highest possible quantity of crops on the smallest possible land area with the least labor force (Weber 1950). Therefore, from the point of view of rational farming, traditional rural areas are overpopulated. Traditional farming focuses on human labor, while rational farming focuses on maximizing profit and expansion. Land used to be the main source of income for farmers and critically important to rural livelihoods. Small-scale family farms were self-sufficient and provided labor opportunities for the family members (Kovács 2010).

The number of farmers is continuously declining in developed countries, while the exported proportion of agricultural products is increasing; production is, therefore, becoming more specialized (Hobsbawm 1975). Because of confiscation and enclosures, farmers became landless wage workers, or they migrated to urban areas in seeking employment. Many landless people migrated to the New World – North America, Australia, or Africa – and many of them became paupers. Migration in the 19th century was not only the result of a booming global population, but it functioned like a safety valve after the transformations in agriculture (Grigg 1974). In the second half of the 20th century, the explosion of large-scale intensive farming methods has fundamentally altered agricultural production. Due to these changes, biological (natural) resources have been replaced with industrial (artificial) resources at a growing pace. This development has triggered a massive increase in production efficiency in sectors that heavily rely on industrial inputs and mechanization. The logic of industrial production (a closed space regulated by man; processes based on functional relationships) appeared as an ideal in the realm of intensive agricultural production. Its main goal is to become independent from determining environmental and biological factors, to implement artificial/mechanical regulation and to replace natural resources with artificial ones. Industrial agriculture is characterized by high use of inputs (energy, machinery, fertilisers etc.). The size of industrial farms increased rapidly; agricultural production was becoming more and more concentrated.

Besides the changes in technology, the growing popularity of large-scale farming was facilitated by the implementation of an-export driven structure. This entailed a change in labor organization as well, since the technical changes fundamentally altered the life of people employed in

agriculture. The transformation of agriculture, the massive development of production, and the exploitation of market advantages have all contributed to a dramatic decrease of employment in agriculture. In addition to this, workers of big farms were mostly involved in routine-like mass production (Beke and Schlett 2014).

In line with these changes, family farms involved in multifunctional (sustainable) farming were pushed into the background. Family farms are agricultural units located on leased or family-owned land where people involved in the production process are mostly family members. Unlike profit-oriented agricultural enterprises, family farms are not primarily interested in maximizing profits but rather in fulfilling their needs, as they only sell less than 50% of what they produce. The means of production, land, and the workforce are controlled by the families themselves (Raup 1986). In this case, property and leadership intertwine and are both ensured from generation to generation by family ties and marriage. The family itself lives on the farm and, along with the leader (manager), are responsible for the whole production process (Gasson and Errington 1993).

Farm Management and Labor Organization

Many scholars of the subject agree that from the point of view of agricultural production, any farm size can fit into the production process. The ideal size is most often a matter of forms of cultivation, climate and soil conditions, or whether the cultivation of the land is intensive or extensive. Small-scale production is ideal for manual work and for products requiring a big amount of labor. As to large-scale farms, production is more economical if the advantages of scale and technology can be fruitfully exploited. Thus, large-scale farms take the advantage when it comes to producing grain, while small farms are more profitable when the production process requires more intensive care, a considerable amount of manpower, and specific skills, such as growing fruit and vegetable crops, herbs and culinary herbs, viticulture or growing specific seeds in a garden.

Although large agricultural enterprises can benefit from technological innovation, tasks are automated to a large extent, which leads to routine-like mass production. Large-scale farming with a relatively low amount of workforce and capital is inefficient in an economy where the workforce is abundant. In this case, efficiency can easily be increased by applying more workforce and capital compared to the given land size. This strategy can also be carried out by resizing large-scale farms into smaller, more effective ones. However, creating small units can also prove to be ineffective. Such is the case in many developing countries, where overpopulation, capital scarcity, and the specificity of some social institutions (inheritance laws, for example) have all led to the proliferation of small-scale farms (Fertó 2002).

As we have seen, the real advantage of family farms resides in the workforce, while large-scale farms have the benefit of using capital more efficiently. With regard to market relations, large farms have better procurement and selling options, except for the case when a small farm is backed up by a high-quality network of cooperatives. As a conclusion, it can be said that no optimal theoretical land and farm size can be determined. It is always a matter of the interplay between many such factors as environmental conditions, ecological capacities, the actual farming

system, the availability of living labor, capital and technological options. Agroecological analyses and environmental impact assessments are gaining more and more importance as well.

Based on farm size, two different traditions of labor organization have emerged. One is related to family farming, while the other one is connected to the *latifundium*. In family farms, interest was split equally, the division of labor was transparent, and members could replace each other when needed. In the era prior to intensive agricultural production, *latifundia* also tried to profit from the advantages of the family farm model: servants (and waged workers) were family members as well. A big disadvantage of the *latifundia* was that servants and waged workers were not financially interested in how well the farm performs. The efficiency of this kind of labor organization could only be guaranteed by permanent supervision, which often involved control and command by phases of production.

The most important functions of small-scale peasant farms were to provide the household with food and to keep the family members busy. This kind of production could guarantee work for every member of the household. In every stratum of peasantry, agricultural activity meant autonomous production for each and every family. The husband, the wife, and their children, who had got familiar with this kind of activity at a very early age, all worked together. This was a patriarchal kind of labor organization, usually managed by the eldest active male member of the family. Peasant farms were characterized by mixed farming. Commons (shared agricultural lands) were not privatized, as all decisions related to them were made by the whole community that they had belonged to (Kovács 2010). In order for peasants to get by, they needed broad cultural and professional knowledge, and they had their own specific folk art and cottage industry. As opposed to industrial workers, peasants were genuine polyhistorians (Schlett 2015).

In terms of labor organization, the advantages of small-scale (family) farms were obvious. As the land ownership belongs to the farmers themselves, no supervision or incentives are necessary to make them work hard. Their devotion to effective production is complete. However, family farms suffer from some disadvantages, which stem from the fact that in the absence of specialization, the farmers are forced to be familiar with and also keep a close eye on all the phases of the production process. Such general skills cannot compete with the specific skills of those who are specialized in a given phase.

The expansion of a family farm is strongly limited by its size and fortune, a fact which prevents these units from taking advantage of the economic benefits of expanding production. In terms of how the means of production operate, this will entail higher unit costs. A bigger, more powerful tractor, for instance, can cultivate a larger lot of land within the same amount of time. However, family resources do not allow for expanding the property. When it comes to large industrial farms/capitalist enterprises, shareholders not only share their profits, but their costs as well. Most often, they are not directly involved in the production process, as the workforce is provided by skilled workers. Their advantages stem from the high productivity of specialized waged workers and lower unit costs. On the other hand, workers need incentives to work efficiently, which often inflicts additional costs on the company.

Intensive agricultural production systems aim at increasing productivity and rationalization. The new biological, technical and organizational components need to be constantly coupled and moulded into efficient economic activity. These preconditions are the key to safe and massive production. Activity within a given farm needs to be based on a coherent program. Managing the specialization and the concentration of the production process and the need for fast adaptation require massive amounts of data, quick, adequate and well-prepared decisions, and a multifaceted analysis. Despite the presence of up-to-date technology, a lack of information can result in higher costs (Schlett 2012).

Technical and organizational changes, as well as an increased level of specialization and the division of labor, resulted in the hollowing out of work and the decreasing of workers' autonomy. Intensive production systems created tensions between the strictness of technological discipline and the workers' readiness to work. Tensions often stem from the fact that enforcing and monitoring work performance has different possibilities in agriculture than in the industry sector. As to agriculture, production is more dispersed in space, which means that supervising all the employees is more costly and less effective. However, organized production is based on discipline, on adapting to the conditions imposed by the content, time, and the modalities of work. Even though the costs of supervising standardized work are relatively low, agricultural machinery is used in the open field, far from supervision. With the introduction of modern machinery, workers have become responsible for machines ten times more valuable than before. The human factor thus plays a central role, since the amortization of machinery is closely linked to whether its reparation or replacement is paid by the operator or by the employer (Kuczzi 2006). Centralization has had a negative impact on employees' work motivation in agriculture. Labor organization has forced employees into a role of passive executors and only made use of their specific knowledge to a small extent. Such sectors as viticulture, fruit growing, horticulture, gardening – those requiring human labor, agility, and attention – have been pushed into the background or have remained dominant only in family farming (Schlett 2012).

Factors in Determining the Optimal Organization of Labor

The contingency theory, known from the sociology of organizations, can be of great use if one intends to compare different ways to organize labor that are typical for different farm types. This theory has shown that even though the formal organizational structure has a massive impact on efficiency, there is no general structure that could be applied to every organization, since organizations have to adapt to the actual conditions and to their specific environment. The contingency theory puts emphasis on the organizations' ability to adapt to their environments, and it is one of the most common approaches in organization theory (Lawrence and Lorsch 1967). The optimal structure is calculated on the basis of different factors (such as organizational size or planning strategy), which are called the contingency factors. In the interest of efficiency, an organization's structure has to be adapted in accordance with the contingency factors (Child 1973; Pfeffer 1982). The most important contingency factors are (1) strategy, (2) size, (3) the contingency level of tasks, and (4) technology.

Besides the abovementioned aspects, some other particularities also play an important role in agriculture. It is without a doubt that agricultural production is characterized by long production cycles that tend to increase economic risks and the contingencies of production. Weather can also increase the level of risk. As it is bound to nature, agriculture presupposes a specific lifestyle, even in agro-industrial complexes that are characterized by integrated production, where no internal change can be solely based on economic rationality, since it would disturb the normal balance between biological and production relations. Consequently, it is reasonable to take into account some other contingency factors, such as (1) a stable or unstable environment, (2) the timing of tasks, and (3) the controllability of tasks.

Based on the contingency theory, stable and unstable environments require different organizational solutions. A mechanical structure is effective in stable environments, while an organic structure is ideal in dynamic ones. Industrialized agriculture aims at eliminating contingency factors from the process of production – that is, its dependence on biological and environmental determining factors. In contrast, family farming is based on the assumption that soil is used in a way to prevent its deterioration. Big farms can thus be linked to mechanistic organizational

Table 1. Contingency factors serving as key drivers when determining the features of labor organization in large-scale industrial farms and small-scale family farms.

Contingency factors	Large-scale farm	Small-scale farm
Dominant type of property	predominantly legal ownership	private property
Method of cultivation	monoculture	crop rotation
Workforce	wage-worker	owner
Organizational structure	mechanistic	organic
Definition of tasks	exact and restricted	flexible and extended
Relation between individual performance and corporate objectives	vague	clear
Execution of tasks	predetermined	flexible
Rights and obligations	clearly determined	vague
Means of control	hierarchical	self-monitoring
Communication channels	vertical	horizontal, based on needs
Means of vertical communication	regulations and orders	advice and information
Loyalty expected	to the organization	to the project and workgroup
Nature of skills required	limited, adapted to tasks	global, professional
Personal prestige	stems from the position	stems from individual performance
Adaptation to the environment	adjusts the environment to production	adjusts production to the environment
Production cycles	longer	shorter

Source: compiled by the authors (based on Naylor 1999).

structures, while small farms can be related to organic organizational structures. The former are more effective in stable environments, while the latter are more adapted to constantly changing environments. Organic organizational structures remain open to their environment and are always ready to seize new opportunities. Most often, their structure is “flat” and only slightly hierarchical. Table 1 shows the characteristics of industrial as well as family farms based on the different contingency factors.

The forces of nature play a distinctive role in agriculture. Although subsequent technological revolutions generally entail an ever-bigger independence from environmental factors, agricultural production still shows differences from industrial production in many respects. Effects of seasonality preclude the possibility of carrying out different phases of agricultural production at the same time. The division of labor, which would assume ploughing, sowing and reaping at the same time, is impossible. Seasonality thus reduces the profit which would otherwise stem from specialization.

One major advantage of family farms is that they can flexibly adapt to production capacity, while employing wage laborers can be a source of conflicts potentially provoked by fixed wages or employment regulations. Since the transaction costs of monitoring wage labor (monitoring costs) are important, an increased employment of wage labor results in increasing transaction costs. It is also clear that if there are only a few production cycles, phases are short, and the number of tasks per phase is limited, employing wage labor does not have any significant advantages. On the other hand, if production consists of many cycles, phases are long, and the number of tasks per phase is high, big industrial farms can benefit from specialization and intensive capital investment. If farmers manage to ease problems related to seasonality and to the unpredictable fluctuation of the output, agricultural production will evolve toward massive, industrial production (Fertő and Fogarasi 2007).

The disadvantages of too big farms are related to their poor economy of scale on the one hand and to their inefficient factor usage on the other. The reason of the latter stems from difficulties in coordinating and monitoring large numbers of agricultural wage laborers. These problems are further increased by the peculiarities of agricultural production, namely by heterogeneity, seasonality, dispersion in space and fluctuation of prices, and weather conditions (Rosenzweig and Binswanger 1986). These effects are further intensified by problems stemming from information asymmetry (such as moral hazards or counter-selection). As a result of all these, costs related to the coordination and monitoring of wage labor – which does not take a share of the profits – are extremely high (Binswanger and Deininger 1997). This can be explained by the fact that in agricultural production, during the period between ploughing and reaping, it is very difficult to assess responsibility if a mistake was made in the early stages of production. These problems related to monitoring could be easily overcome if owners were to switch to less labor-intensive technologies.

The Triumph of Large-Scale Monoculture

From the mid-20th century, large-scale production became even more widespread as a result of technology transfers and crop productivity growth, also known as the Green Revolution. The

aim of the agricultural sector was to produce cheap and marketable products using the most developed technology and farming methods on the largest possible land areas. Large-scale farming and wage employment can only be profitable if it does not pay much attention to social and environmental needs. The production of new hybrid crops requires a lot of capital, and farming becomes less labor-intensive. Farmers in developing countries did not have capital at all while being ready to work on farms. Following the Green Revolution, the children of the farmers did not have to work on farms anymore, since with the more developed technologies, fewer people could produce enough crops for the families (Magdoff 2013). Advanced technologies replaced labor with (fossil) energy sources and caused a loss of rural livelihoods, which resulted in depopulation and migration.

Heavily indebted countries considered agricultural exports to be a breakthrough, and they neglected environmental standards and the social aspects of agriculture. The International Monetary Fund and the World Bank provided loans to the governments of developing countries, but a clause was added in which farm gate prices were set and, at the same time, the subsidies for important inputs were terminated. These programs promoted free trade and the liberalization of agricultural markets as a condition of their lending. Subsidies given to local small-scale farmers decreased significantly or were terminated, while industrial, intensive, export-oriented monoculture farms received greater incentives and export subsidies (IAASTD 2008).

The export of agricultural products in the heavily indebted countries was a necessity to maintain the current account balance (Schlett 2015). Instead of growing subsistence crops for food, several countries started to grow cash crops (often referred to as profit crops), such as tobacco or cotton – for exports. Economic Partnership Agreements (EPAs) were aimed at the removal of trade barriers and the restriction of long-term investments. In these partnership agreements, environmental regulations and consumer protection regulations were considered to be trade-distorting instruments.

By the end of the 20th century, land that used to be owned by strong, small family farms in Argentina has become the property of a few large landowners, and monoculture production became the dominant form of production. Thousands of farmers were deprived of their land, and GMO seeds were begun to be grown on 50% of the agricultural land, which has severe social, economic and environmental consequences.

In the past 15 years, developing countries have been attractive to foreign investors, although the economic and political instability in these countries raises a major risk. The demand for land has been increasing significantly. Domestic and foreign investors bought or rented huge areas of agricultural land. Total land transactions have amounted to several hundred millions of hectares.

Land grabbing – seizing an area of agricultural land by force and often illegally – puts affected rural communities at risk. In many cases, land is seized by force or intimidation. The land is acquired by private or public actors, companies, or governments on investor demands. Serious violations of human rights are often mentioned in reports: local individuals and families (sometimes more than 100 000 people) lose access to their land, becoming dispossessed and often left without the means to sustain their livelihoods. The scale and number of such land

acquisitions have increased dramatically in Africa and in South-East Asia. The occupation of indigenous territories (land theft), land grabbing, and violent attacks have received a great deal of attention in Brazil.

As a consequence of land grabbing, together with large-scale, monoculture-based, export-oriented agriculture, traditional land users are left without any means to continue to produce income. This is due to the fact that they either are pushed out of a secure job or forced into seasonal, insecure and underpaying jobs. Payments are usually much lower than the income of small-scale family farmers, and most of them eventually begin to lead marginal lives. In other words, the projects that offer a solution to these problems themselves increase rural poverty and rural-to-urban migration (Murray-Li 2012; Polet 2011).

Besides, the process of concentration and integration is already ongoing in the processing and trade of agricultural products. The creation of oligopolies aims at achieving economies of scale and economies of scope (Bálint and Gál-Berey 2009). This enables capitalized companies in the agribusiness to intervene in agricultural production by providing inputs. In the framework of increasing level of integration in several sectors, integrators developed the so-called system of precontracts, where farmers – whether owners or not – commit themselves to the same organization when buying inputs or selling outputs. However, farmers have full responsibility in taking the risks of the production and prices (Ángyán 2001).

The oligopoly of a few giant companies takes control over important resources. Farmers are becoming dependent on multinational companies that sell seeds; therefore, they need to buy developed and expensive machinery if they want to eliminate the infestation of their cultivated plants. Farmers are forced to use imported (often GMO) seeds, which is much more expensive than traditional (or saved) seeds. The main aim of genetic technology is profit-making. Small-scale farmers cannot sow saved seeds that were grown by them in the previous year, but they must buy seeds sold by giant seed patent holder companies. Consequently, farmers became extremely vulnerable and fall into a credit spiral (Takács-Sánta 2010; Beke and Schlett 2016). This is what happened in India in 2016 as well: in the Indian State of Maharashtra, cotton is grown on small family farms. Farmers must sow different species of the GMO seeds each year to maintain pest resistance. Since the government in India decided to reduce the GMO licence fees on genetically engineered seeds by 70%, in 2016, Monsanto, the giant chemical company, decided not to sell pest-resistant cotton seeds in India any longer.

There were profound changes in ownership and production structures in agriculture. Structural changes, however, adversely affect farmers' lifestyles, and the number of farmers has decreased drastically. Modern, export-oriented, large-scale agricultural production is capital-intensive and requires significant energy inputs (oil). Since it is less labor-intensive, large-scale production can take a toll on local and surrounding communities. In rural areas, only a few small-scale farmers can make a living, most of whom are wage workers or have no other choice than to migrate to the cities. The populations of the cities are rising steadily because of intensive rural-to-urban migration, which is not welcome in modern economies (Korten 2007).

Conclusions

In principle, Ricardo was right. Countries are better off if they partake in trade and are able to produce goods and services at a lower opportunity cost. There are many theoretical restrictions on Ricardo's hypothesis, and we tend to ignore some of them. One such example is the free movement of labor, trade, and capital; however, fewer and fewer barriers are found to these in the global economy. More importantly, though, rural areas have economic functions and play a fundamental role in agricultural production, and they have environmental and social functions as well. If production becomes motivated only by directly boosting efficiency, local communities are put at risk, and intensive monoculture production becomes a primary threat in a given region or country. Intensification, large-scale land acquisitions, and agricultural investments are often considered as charitable investments (support for poor countries, encouraging environmentally responsible behavior); however, they all have a negative impact on local communities. Agriculture is not only an economic activity that secures rural livelihoods – it is a way of life, a special bond shared between farmers and the world. This lifestyle has cultural, religious and economic significance for farmers but not for the proponents of the Green Revolution, who support intensive monoculture production and the facilitation of cash-crop exports (soy, rape, cotton, palm oil) in order to address famine. In reality, a rural exodus risks accelerating the economic and social decline of rural areas. In the meantime, global agricultural integrators, while claiming to serve the people and the common good, transform public goods into private goods and put private interests before public ones.

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