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Proliferation of the Corporate Agro-Industrial Model in Latin America

Irma Lorena Acosta Reveles

Introduction

This study is derived from a group research project¹ that explores the social implications of scientific work as it is linked to the larger processes of production and the exercise of democracy. In this context, the present work seeks to contribute to this general theme from the vantage point of observing agricultural production in the region of Latin America. This will empower us to learn more about the effects, the larger potential, and the socio-economic, political and environmental challenges that science and technology represent as applied in the agricultural sector.

A broad overview will reflect upon the widespread and heterogeneous penetration of the Corporate Agro-industrial Model (CAM) in all of its complexity and shortfalls throughout Latin America. It quickly becomes apparent that the technological paradigm that sustains this model has failed to adequately respond to the problems of social inequality, exclusion, and poverty that typify the region. Our examination can help identify the model's fissures, structural flaws, limits and excesses, as well as the possibilities it opens for organized social political action at the supranational level. It is a veritable collation of tensions that occurs, both at the outset as well as throughout its development, in which conflicts eventually result that go well beyond rural areas.

Both capitalist and peasant economies co-exist across the region of Latin America. Our focus on this occasion will be on the capitalist pole, since it is there where the use and abuse of technological processes in the exploitation of land resources now prevail. While we examine this capitalist pole of production, which is the fastest growing in microeconomic terms and in macroeconomic resonance, we will of course be unable to omit frequent references to

1 The title of the larger research Project is "Science for Development and Democracy," funded by the Mexican National Council of Science and Technology, Basic Science Fund (SEP-CONACYT). N. 0105181.

the social and natural environments that it cohabits. Our focus on the operations of the foodstuff and agro-industrial corporations is nevertheless justified because they have come to depend upon this scheme of productive organization, supported by the governments of the region, as the most promising avenue to deliver economic prosperity. It is also a central focus because the value and global market prices of agricultural goods are set as a function of their operations.

This study is organized into three sections. First, we provide some brief historical notes about the social changes linked to the introduction of new agricultural technologies in Latin America during the Twentieth Century. Then, we offer a working theoretical frame that helps conceptualize the defining elements of the CAM. Finally, we set out to analyse in two parts the conflicts being generated by highly profitable but rather absurd modes of production.

Agrarian Technology and Social Change

What we are calling the Corporate Agro-industrial Model (CAM), which encompasses all of agribusiness, of the agricultural exports apparatus and of the whole paradigm of industrialized agriculture, has its roots in the wave of capitalist expansion experienced at the end of the 19th and beginning of the 20th centuries during the rise of modern imperialism (Acosta-Reveles 2006). Thanks to the developing productive forces, the way was opened to a second industrial revolution based on the energy potentialities provided by fossil fuels. Machinery came into the field by 1892, and in the 1930s fertilizers were being mass deployed. The scientific-technological revolution that followed relied increasingly upon non-primary production inputs being applied in the field. Seen in perspective, the last century was more significant in terms of changes to the production processes of agricultural goods than the rest of human history combined.

Progress, however, was neither linear nor free of setbacks. Along the way, applied biochemistry (initially through military technology that after World War II became channelled into agricultural technology) brought with it extraordinarily high yields and unprecedented optimism about the possibility of solving the problem of world hunger. The “green revolution” was built upon three pillars that lasted for nearly two decades: machinery, non-organic inputs and hybrid seeds. Soon afterwards, the environmental consequences and financial costs began to undercut faith in that paradigm, coinciding with crises in state developmentalism and rising oil prices, thus leading to a search for alternatives and shifting foci based upon newer scientific developments.

Nevertheless, applied biochemical science, industrial agricultural inputs and fossil fuels all remained at the core of agricultural techniques. Emphases shifted from seed selection to genetic manipulation, from tractors and basic harvesters to precision combines, and from raw materials of generic industrial design to increasingly sophisticated technological packages that were more specific in objectives. This was largely made possible thanks to advances in molecular biotechnology and information technology.² The use of artificial climates, specialized laboratories, satellite communications, enhanced marketing techniques, traceability, state of the art computer applications, all in the service of agro-alimentary globalization, now positioned the capitalist entrepreneur as the central agent in the process. This heralded the era of neoliberal policies.

By the early years of the 21st Century, most countries in Latin America were pursuing national strategies that were broadly open to foreign investment and agricultural trade. These countries were somehow convinced that this liberalized path of growth offered their productive bases the optimal use of the best lands and water resources. In practice, the penetration of the CAM occurs at varying velocities (on account of political and institutional reasons as well as its investment capacity and the potential for alternative uses of its territory). But invariably, in each country they can easily identify the presence of poles in the use of advanced agricultural technology that is specialized in either tropical crops, oilseeds, fruits and/or vegetables (Acosta-Reveles 2010). In the same policy scenario, but with a different organizational logic, we find the peasant type of farming which either by conviction or necessity likewise incorporates certain elements of the model in its operation. In fact, there are different dimensions of agribusiness and various administrative levels where the state itself has set the guidelines for connecting farming households to the cycle of capital (i.e., vertical integration), including their supplying essential labour resources and assigning functional formats to their objectives (e.g., contract farming, leasing of peasant lands, and service contractors).

2 García Olmedo explains that the definition of biotechnology covers all technologies mediated by a living organism or parts of it, be they cells or isolated enzymes. Under this definition is included the process of agriculture itself, as invented ten millennia ago, practices such as brewing in ancient Mesopotamia, and technological discoveries such as the latest forms of human insulin. It is therefore not appropriate to use the term narrowly to refer exclusively to the very latest advances in molecular biology. For the latter, it is more appropriate to use the term molecular biotechnology: one that involves handling of cells and organisms through their genetic material, i.e., that of DNA in the test tube (García Olmedo 2009: 124).

Components of the CAM

Outlining the fundamental elements of CAM production as operated by corporations helps to expose some of the reasons why it became installed as the dominant system of production, such that it attains the ability to dictate the rules of the game to the rest of the participants:

1. With regard to the internal organization of work, the CAM operates based on wage relations (capital-labour) in that it purchases and utilizes purchased labour time (not necessarily legally, e.g., adults, etc.) from which it obtains surplus value.
2. The CAM operates on private property rights and private usufruct of productive resources under rights that states and international norms protect. Corporate ownership of the means of production includes goods and services, tangible and intangible assets (land, machinery, supplies, technology packages, seed patents, and expert advice). Operation of the model does not require the private ownership of land (e.g., leasing, possession) but enjoyment of the resulting benefits in the form of profits is private.
3. The use of the land and labour may be extensive or not, depending on the type of crop, but it tends to be intensive in the use of scientific and technological resources, i.e., it presupposes the organization and exploitation of general labour, not only immediate labour. This requires important investments in order to start-up. However investment in this resource is not always exclusively private in that it can rely upon publicly sponsored infrastructure, research and development among its aspects.
4. The six basic practices that constitute the vertebral column of this dominant system of agriculture are: intensive farming, monocrop cultivation, irrigation, application of inorganic or synthetic fertilizers, chemical pest control and genetic manipulation of crops (Gliessman 2002: 3).
5. The agricultural activity in its various phases of production is strictly planned and evaluated in terms of risks. The aim is to get further and further in control of the production process, overcoming climatic barriers (plasticulture and artificial climates), shortening the period of ripening, altering the natural stages of the plant being harvested, protecting crops from pathogens and foreign agents, speeding its growth, intensifying selected aspects of the crop and lengthening its post-harvest lifecycle. These were aspects largely not pursued during the earlier era of the "Green Revolution."
6. Decisions and the fate of participants' products are guided by market criteria, especially global markets. Their stock levels are such that they have

a determinate impact on global prices, and their margins of utility allow them to place their products around the world while continuing to invest in scientific developments in favour of their competitive advantages. All of this is conducive to low production costs that reinforce their traditional comparative advantages of cheap labour and land access, leading to extraordinary profits that are further elevated when they coincide with exceptional soil quality.

7. In the continual search for better investment opportunities, they resort to a pattern that resembles industrial relocation, i.e., a geographical mobility of agro-capital with different agricultural products based in flexible specialization, allowing movement across varied links of agro-industry and available inputs, the deployment of machinery, soft technologies, and movement across exceptionally cheap and docile sources of labour that are pushed and pulled into availability.
8. Linkages are established with other economic branches (supply inputs, agricultural machinery, transportation, refrigeration services, infrastructural networks, marketing, etc.) and their experiences in the field, providing feedback to research centres, the seeding, fertilizer and pesticide industries, and so on. This ultimately reaches into participation in financial markets, such as commodity futures that in turn fuels commodity speculation.

Such is the nature of the hegemonic model. The conditions for any optimal operation are supported by public policies that reflect their interests: operators receive privileged budgetary support, institutional considerations for investment, and facilities in the use of land and local labor. Their aims are projected as if they represent the general interest via the promise of trickle-down economic benefits by capitalizing on local land resources, creating jobs and contributing to a nation's gross earnings.

With the CAM, peasant agriculture becomes ever more subordinated to agro-industry even while it adds value to its products. The paradox of the model is that agriculture is no longer the primary link in the chain of production, but instead just one more link in a complex system that articulates all of its branches right up to the consumer, that centre of gravity around which orbit the seed industry, agro-chemical production, agricultural biotechnologies, the processing sector, agro research centres, packaging industries, and supermarket chains.

The co-existing model of peasant agriculture, no longer in harmony with agribusiness, continues to operate under a different internal order of production, namely, a family-based household economy that conserves simple, non-

extended reproduction as the lynchpin of its decision-making. This system generally operates on a small scale with a precarious material and technological foundation.

Dwarfed in its overall economic impact, peasant agriculture achieves a vertical integration in the CAM where family farmers fit into the scheme as labourers, consumers and to some extent as suppliers provided they can manage to comply with the guidelines and requirements established by agro-business. Indeed, we can observe how in recent years, international agencies such as the FAO have increasingly incorporated initiatives into their support strategies aimed at linking family-based agricultural producers to global foodstuff chains:

Foodstuff processing industries add value while increasing the demand for agricultural products, thus contributing to the reduction of poverty and improving the food security throughout rural areas. They offer employment opportunities in off-farm activities, such as in the handling, processing, packaging, storage, transport, and marketing of food and non-food agricultural products.

The FAO works in consultation and collaboration with its state members to address their specific needs related to the development of foodstuff industries by sponsoring training and technical support. Our capacity-building activities are carried out through field projects and training programs. Informational materials and training activities comprise a wide variety of topics and are distributed by electronic or print media and target diverse audiences, such as public and private sector organizations, universities and technical institutes, NGOs, researchers, instructors and various other participants in the chain of post-production. The main beneficiaries of direct technical assistance that we provide in the field include micro, small and medium-sized businesses which are the main processors of food and agricultural products in developing countries.

DA SILVA et al. 2013

Cracks and Tensions

Regarding the virtues of the CAM as described, both regional data as well as figures from various countries have constantly alluded to the growth in the volume and commercial yields, the expansion of exports, and the development of new food products from the region that gain prominence due to their unique qualities or prices arising from specialization. There is no better evidence of this success than the magnitude of capital that transnationals have amassed under this paradigm of production, including companies such as Monsanto, DuPont, Syngenta, Nestle, Pepsico, Coca Cola, and others. While these large

transnationals have grown throughout the developed world there has been a similar development of large national firms, in virtually every Latin American country, that have arisen on the increasing volumes of exports or by virtue of their positioning products within key sectors of the gross domestic product. Examples of this include Expofrut in Argentina, Subsole in Chile, Gruma (Maseca Group) in Mexico, and Sadia in Brazil.³

As a whole, Latin America has achieved great success in dramatically advancing the use of its land for the production of grains and oilseeds under CAM parameters, using high-tech means of elevating productivity and export, and even contributing in some cases (especially Brazil) to innovation in this sector. Macroeconomic data demonstrates that the region continues to be a large exporter of primary commodities, and that its agricultural success is being spearheaded by several countries (e.g., Brazil, Argentina, and Colombia). The problem, in short, is that the economic benefits have remained highly concentrated, while in the social and ecological spheres the outcomes have not been positive. This system of development has not contributed to the reduction of poverty, national food security, containment of migration, generation of employment, or environmental sustainability. On the contrary, this regime of production has been responsible for territorial conflicts and violent confrontations over the control of natural resources, disruption of ecosystems, massive human displacement, and the widespread destruction of small producers. Nor has it helped to alleviate disease or extend life expectancies. In order to render these issues more manageable, we shall examine them more fully in two separate parts, namely, as social and environmental problems. We are mindful at the outset, however, that this separation is contrived given their intimate and permanent interconnections.

Agriculture and the Natural Environment

In principle, agriculture is a social activity. Shaped by culture, it is a conscious intervention of nature that seeks to domesticate it. But today as never before, it is subjected to what from the dominant view are seen as *human* necessities. In this moment of history, these needs are identified as the needs for development of the capitalist system. Only by manipulating nature through available technological means does it seem possible to respond to the challenges of an

3 Agro-foodstuffs companies present in Mexico include: Monsanto, Cargill, Archer Daniels Midland, Tyson Foods, Dow Chemical Company—and its subsidiary Dow AgroSciences, Bunge, JBS S.A.—and its subsidiary JBS US.

unprecedented population growth in an increasingly urbanized and interconnected world. This amounts to adequately feeding a world population that between 1960 and 2010 grew from three to seven billion people and which is expected to reach ten billion by 2045.

The possibilities to continue increasing crop production from the land have historically developed along three tracks: (1) by expanding the area under cultivation; (2) by improving the use of cultivated land, e.g., by reducing the rest periods for soils, double cropping, etc.; or (3) by multiplying the crop yields per unit area of land under cultivation. In this scenario, the application of scientific technology seems the most promising route as it has proposed to surpass the limits otherwise imposed by nature. But does this scenario really open the way to the future? The domestication of nature has so far registered social advantages and profits, but at the same time, it has done so with certain costs. The attempt to subdue nature, adulterate it, and squeeze it past the limits is to effectively go against it and drag it headlong down a dead end route. After decades of technological advances, huge investments, and widespread geographical distribution of genetically engineered crop varieties, it is manifestly clear that modern agriculture has not delivered on the promise of feeding the planet's inhabitants. And what is equally well known is that the problem is not one of a technical nature or the lack of capacity, but rather one of politics, of decision-making and of vested interests.

If we observe how the CAM model outlined above works in practice, it can be seen that farming is not a trade or a means to sustain life, but rather one more link in the instrumental goals of the transnationals. Agro-industrial corporations that sponsor ongoing scientific development have subjected nature to their own ends thus diverting a once spontaneous vocation. They have been abusing soils with poisonous chemicals obtained from non-renewable resources while at the same time enabling the creation of weeds and microorganisms that are increasingly difficult to eradicate, disrupting the climate, depleting water reserves, and exterminating diverse forms of life through monocrop cultivation.

This is the case of forests that are being replaced by soy, rice, corn, and grain cultivation, all of which is of dubious quality for consumption, but which nevertheless is destined for consumption for cattle, foodstuffs, and even to produce energy via biofuels. The demand for these commodities continues to grow for which the natural environment must continue to produce ever more. Furthermore, industrial agriculture that is sustained through an increasing consumption of fossil fuels is expected to be capable of generating clean, inexpensive and large-scale energy sources that can come to replace precisely these fossil fuels. Such an energy challenge in this century could not be more absurd.

Another aspect barely spoken about is that large scaled agriculture and livestock industries are among the largest emitters of greenhouse gases such as carbon dioxide, nitrous oxide and methane (FUHEM Ecosocial 2013: 4). Water resources are likewise at the service of business and in Latin America there are serious shortages, pollution and conflicts over this precious liquid resource despite the fact that the region possesses the largest reserves of clean drinking water in the world. Since everything is now valorised in market prices, water is being registered in national accounts as “virtual water” and the “water footprint” as part of wider *water markets*.

Virtual water is regarded as the amount of water imported and exported in agricultural products and services, including amounts contained in products and additional amounts consumed in their production. The water footprint is calculated by the amount of water consumption needed to maintain a human hydrated through the goods and services consumed throughout his or her life (Garrido 2013: 145). Both indicators have emerged out of the well-founded fear of scarcity of this strategic liquid in the face of wasteful production practices by the CAM.

The two axes of greatest influence on global water resources revolve precisely around agricultural trade and global climate change, with the latter significantly affected by the former as a result of changes in the productive use of soils. With increased population and changing diets, more water is required to produce the additionally needed food and this can be expected, especially in some areas, to result in social conflicts. In the case of Latin America and the Caribbean, expert estimates suggest the possibility of further increases in the area under irrigation from 19 to 78 million hectares by 2030. As can be seen in Figure 9.1, such resources are available. What is not clear is whether there is sufficient land suitable for irrigation, sufficient capital available to transform those lands, or the possibility to avoid the kind of conflicts that may result in these rural areas given the existing populations and producers who presently use these resources.

Two additional practices typical of industrial agriculture operate at different rhythms than those of natural life cycles. Namely, “smart agriculture / high-velocity agriculture” and the production of grains, oilseeds and other products derived from genetically modified organisms, i.e., the GMOs that we have all heard so much about. These practices are most commonly employed in the cultivation of pumpkin, alfalfa, beets, cotton, soybeans, corn, tomato, papaya, poplar, canola, potatoes, and sweet peppers.

In high velocity agriculture, cultivation takes place under a regime of strict control and planning where practically none of the processes involved are left to chance. This is the case with hydroponic tomatoes and green leafy

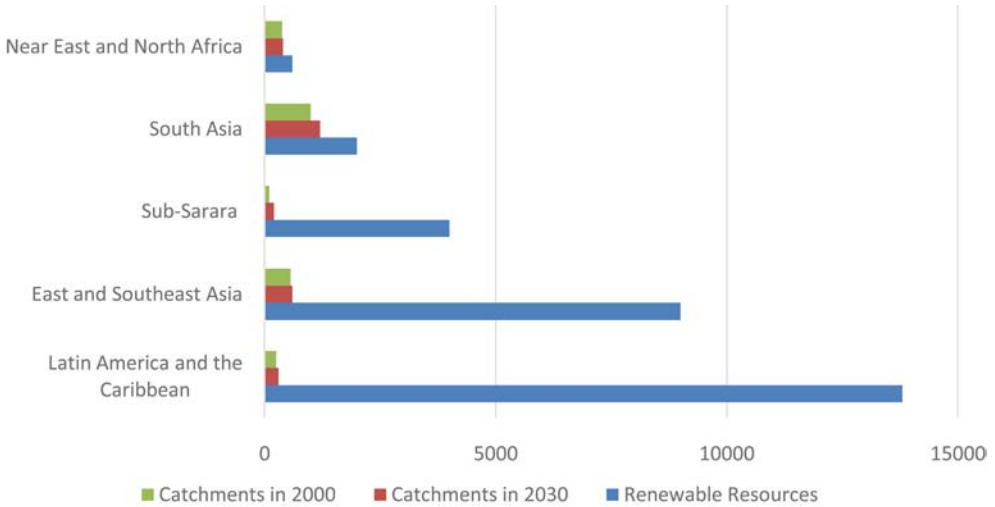


FIGURE 9.1 *Use of water and renewable resources in various regions of the world (in cubic Km)*
 SOURCE: GARRIDO (2009) WITH DATA FROM THE COMPREHENSIVE
 ASSESSMENT OF WATER MANAGEMENT IN AGRICULTURE (CAWMA) (2007)

vegetables fed essentially with nitrates. Here we may speak of virtual factories of vegetable production.

GMOs have meanwhile invaded the Americas extensively. The United States has taken the lead with more than 73.1 million hectares planted with transgenic crops in 2014, followed at a considerable distance by second place Brazil with 42.2 million hectares under transgenic cultivation. These giants are followed by: Argentina (24.3 million), India and Canada. In the case of Brazil, the figures cited had sharply increased from only 11.9 million hectares over just a three-year period (AGROBIO 2015). Notably, the exceptionally fertile lands of the Amazon Basin and the plains of the Pampas regions have been facing the threat of erosion of their resources over the course of three decades, per expert estimates (see Table 9.1).

After Argentina and Brazil, the Latin American countries that follow suit in extensive GMO use are Paraguay, Uruguay, Bolivia, Colombia, Chile and Honduras. Given the social and political resistance to the proliferation of transgenics, precisely because it threatens and contaminates native crop varieties, it is supposedly the case in Mexico that genetically modified corn varieties are being grown only for experimental purposes. Transgenic soybeans and cotton, however, are being openly cultivated. According to the Association of Agricultural Plant Biotechnology (AGROBIO), Mexico ranks sixteenth among global producers in the practice of GMO planting, or in sixth place in Latin America, having placed 0.2 million hectares under cultivation by 2014. AGROBIO,

TABLE 9.1 *Data on global transgenic cultivation (2014)*

Principal producers		Products in the region	Latin American country / products
1. United States	11. Bolivia		Brazil: corn, soy and cotton.
2. Brazil	12. Australia		Argentina: corn, soy and cotton
3. Argentina	13. Philippines	Soy	Paraguay: soy
4. India	14. Myanmar	Corn	Uruguay: soy and corn
5. Canada	15. Burkina Faso	Cotton	Bolivia: soy
6. China	16. Mexico	Canola	Mexico: soy and cotton
7. Paraguay	17. Spain		Colombia: cotton
8. Pakistan	18. Colombia		Chile: corn, soy and canola
9. South Africa	19. Chile		Honduras: corn
10. Uruguay	20. Honduras		

SOURCE: ASOCIACIÓN DE BIOTECNOLOGÍA VEGETAL AGRÍCOLA

itself a leading developer of this type of GMOs, describes itself as a non-profit association dedicated to inform, educate, disseminate and promote modern agricultural biotechnology, and works closely with organizations interested in research, development, production and marketing of these resources:

We believe in the rights of every citizen to be informed, to access the benefits of biotechnology and to decide upon their acceptance. For this reason, we provide accurate, timely and scientifically substantiated information in an ethical manner.

AGROBIO 2015

The deforestation that accompanies the concerted search for opening new fields for growing grains and oilseeds is effectively another factor in the loss of biodiversity and the generation of climate imbalance and water shortages. Deprived of any possibility of participating in agro-industry given its costs, the regional peasant economy incorporates some of its practices (seeds, machinery, biochemicals) that in turn further erodes and adversely affects their natural resources. The accumulated knowledge and human intellectual work done through science and materialized in these sophisticated means of production have established a pattern wherein the goods that nature provides are no longer the sole material and tangible starting point of the agricultural production process. Instead, the very same products that have been processed,

adapted and transformed are now those being sought after and appropriated for buying and selling.

In short, the environmental issues regarding the manipulation of nature that arise within the framework of the application of the CAM has yielded the contamination of water, the depletion of groundwater, widespread deforestation, and overspent and eroded soils that have been domesticated to serve purposes other than those dictated by their natural vocation. This has created a world of pest resistant plants, genetically mutated microorganisms, a damaged and deteriorated biodiversity, and a depletion of non-renewable resources.

Agrarian Economy and Social Deficit

Just as in the realm of nature, the spread of CAM has been a source of tensions in different fields of social life. In some cases, it has resulted in simmering conflicts that gradually build to a head, provoking organized responses that have resonated and echoed in distant places. We will proceed to discuss some of the most significant cases.

First at the macro level, we can see the disequilibria in national accounts that have resulted from the need to systematically import primary agricultural goods. Indeed, one might think that with the CAM and all of its technological potential, the problem of ensuring adequate foodstuff supplies would be completely overcome. But this is not the case. The regional agricultural trade balance remains in deficit as agricultural trade surpluses can be found only in a few countries. On the other hand, even if one assumes an adequate, timely and accessible supply of foodstuffs to be in place for the population of a given country, albeit thanks to imports or the substantial increase of crop yields, the matter is not resolved with the simple presence of products in the market. This leads to the classic question of social redistribution of national income.

Secondly, we can see at the micro level that with the rise of agribusiness comes the loss of profitability of many other productive units and their expulsion from the business cycles in which they once participated. It is well known that the farms across the region are quite heterogeneous in size and type. Hence, the price dynamics set into motion by the CAM, based on its technological and organizational practices, places the less efficient producers in crisis, first by reducing profits and ultimately with their resignation from farming as a livelihood. Expanding the amount of land under cultivation, improving the quality of inputs, gaining access to better services and innovations, or other measures aimed at reducing costs are simply unavailable as options for many producers.

Third, the prevailing technological schemes in place today have placed small farming businesses in a precipitous decline on a global level (Garcia 2012: 401) and Latin America has proven to be no exception. Nor has the quality of agricultural work improved under the CAM. On the contrary, the precariousness of agricultural labourers has become accentuated (Acosta-Reveles 2010). It is an activity that continues to be marked by high levels of risk of illness and physical injury of workers who chronically suffer from a lack of unionization, high instability of work, a need for frequent relocation, illegal status, and overt forms of repression.

Fourth, we must consider the social conflicts that arise from land expulsions and the hoarding of the resources of production such as land, seeds, water, forests, and the native genetic materials of plant or animal origin. With regard to land resources, neoliberalism and its support of CAM has resulted globally in the trend towards a re-concentration of rural areas, especially of the best quality lands, those accompanied by the best infrastructure and/or those found in the most propitious locations. Cultivation of areas that enjoy access to water, minerals and biodiversity, are being steadily absorbed, although not necessarily in ownership, for the benefit of private farming that is specialized in export items. This farming is extensive, when merited by the type of crop and intensive in its use of technology. In this process, the most vulnerable sectors of family farmers retreat or are expelled from the areas deemed most desirable for new uses, including for speculative purposes.

With the global rise in food prices of the 2007–2008 period, the issue of land re-concentration increasingly took centre stage, drawing attention to the purchase of vast parcels in developing areas by Middle Eastern or Far Eastern countries. These countries included Saudi Arabia, China, India and South Korea, perhaps due to a climate of fear about an eventual shortage. However, the context in which these inclinations for land grabbing should be read is one of geopolitical confrontation where the accumulation and control of strategic resources is key. This is coupled with the fact that a position of technological dominance for private interests allows for production with significant advantages on the world market. A synthesis of various critical studies on the subject suggests that rather than focusing on the concentration of ownership per se or on the scale of the phenomenon, the political component of domination stands out at the root of the process and its impact on the economic, social, environmental and cultural dimensions:

Land grabbing therefore epitomizes the change that is increasingly occurring and what it signifies for the use of land and associated resources (such as water) by family farmers who produce on a small-scale and in

a labour-intensive manner for their own domestic consumption and for local markets. The land is being appropriated for use by large scale, capital intensive and resource draining agriculture, such as monocrop industries, the extraction of natural resources and in service of major infrastructures for the generation of electricity, the likes of which are integrated into ever expanding infrastructures that link the zones of extraction to metropolitan and foreign markets.

FUHEM Ecosocial 2013: 2–3

Fifth, it can be seen in strictly social terms that the spread of the CAM and its high-cost technological pattern tends to deepen the productivity and income gap within agriculture. The fact that the model becomes imitated in some of its aspects such as the use of certain inputs, techniques or organizational schemes does not imply that the benefits are becoming shared or that progress is socialized. In the current socio-economic order where the welfare state has been reduced to a minimum expression, the effective exercise of social rights in the countryside or in the city increasingly becomes reduced to the purchasing power of consumers. In turn, the level of individual consumption, of family consumption, or of the small scale units of production implies a status of economic inclusion, be it either by work in the form of wages or otherwise, or by incorporation in regular economic cycles, i.e., when a domestic or capitalist enterprise operates and becomes profitable. In the region, however, the imprint of the neoliberal era in agriculture is one of increasing exclusion and of reproduction in ever more precarious conditions that ultimately threaten basic subsistence. A virtual mosaic of various historical deficits, there are two critical issues that particularly emerge out of the deployment of the CAM, namely, basic nutrition and sanitary levels.

Regarding the issue of food and basic nutrition, the debate as well as the problem itself has gone through several transitions. From the beginning the institutional posture put forth (by the FAO) referred to the priority to protect food security in the face of insufficient supplies. Then the institutional posture focused on social and nationalistic reaffirmations of food sovereignty (around 1996) that included issues beyond hunger, mapping adequate supplies as a problem and referencing social variables such as nutrition and infant mortality rates. The positioning of the issue on the political agenda of the 21st Century likewise reminds us of the food crisis situation that has been anticipated since 2005.⁴

4 Up through 2007, the concept of food security continued to broaden and become further

By that time, the penetration of agribusiness and the CAM had extended throughout all countries of the region, altering conventional agro-production structures, including those producing foodstuffs and especially basic grains production and transforming them into a specialization oriented towards foreign markets. Severe changes in the use of land, the incorporation of industrial inputs, mechanization and dismantlement of sustainable practices had all taken place. As these changes converged with the changes of the Western diet towards meats, cereals, and industrialized food products, particularly in the higher-income countries, the fall in international grains reserves and the increased demand for biofuels all conspired to produce instability in the global grains trade. The speculation on cereals in futures markets based on the abundance of non-productive capital, put nations and producers alike on alert. In the first decade of the 21st Century, a historical counter trend developed where food prices experienced increases, with spikes in 2007–2008 and 2010–2011.

The uncertainty that at the level of governments and businesses led to land grabbing and territorial control has at the social level led to greater collective action being organized to protect food rights. This has produced struggles to recover organic production, to preserve biodiversity, to improve local markets and facilitate access to productive resources, to move away from the use of GMOs, and to abandon food production for biofuel purposes. These movements seek an inclusive and sustainable agriculture that can likewise alleviate the problem of climatic change.

The other critical focal point of conflict that will just be touched upon here revolves around the issue of sanitation. The demands for increased production and productivity that should lead towards a successful model of farming today have miscalculated and underestimated the importance of creating safe products. Likewise ignored have been the rights of rural dwellers to have a clean environment, free of pesticides and other agro-contaminants, and the rights of labour to be free of the ongoing risk of illness and injury in the fields. Industrial agriculture, with its technological packages, has been told repeatedly that fumigation practices are poisoning rural people, polluting their rivers and lakes, and causing illnesses. So it is that amidst the abundant bonanza of highly productive territories there exists widespread discomfort and bitterness. Also proliferating are organized actions of protest and advocacy for health, denunciations

refined. The more recent proposal in the Nyéléni Forum held in Mali presented a notion that goes well beyond accessibility or availability in order to incorporate issues of rights and decision-making regarding the food system itself.

of the pollution of water, soils and air, claims of damage to the environment and health, and protest against occupational diseases and the harmful effects of aerial spraying.

Millions of farmers and their supporters all across the region have declared legal and political war on corporations such as Monsanto and in some cases judgments have been won, such as in France, Argentina, Brazil, Mexico, Chile, Canada, and Ecuador.⁵ Most of those who dare to take on the transnational giants find themselves mired in a fight where the legal, political and economic system has been designed to protect corporate rights. While there have been some cases won, they are relatively few in the face of the large numbers of legal cases actually filed. Large agro-companies can cope with these actions given the magnitude of their profits. It has become standard practice for these transnational corporations to budget in the cost of litigation, indemnification, legal fees, insurance and so on.

The types of companies like Monsanto, DuPont, Syngenta, etc., have also been charged on account of their continued claiming of privileges on the use of seeds. They seek to establish patents over all new varieties and other previously unregistered native varieties. One of these transnationals puts it best on their corporate website:

Monsanto invests more than US\$ 2.6 million a day in research and development, something that ultimately benefits farmers and consumers. Without the protection of patents, this would not be possible (...) no business can survive without being paid for the products it generates.⁶

As for the consumer, the debates about the safety of genetically modified organisms (GMOs) are seemingly endless, including about the need to accurately label their use in products. The scientific doubts that exist are effectively used to protect producers. Nevertheless, some countries have said no to the market-

5 These protests continue to intensify. In 2012, a movement of 300,000 US farmers launched a suit against Monsanto. More recently, five million Brazilian soy farmers were litigating against the same transnational corporation, not just against the health problems being caused by the pesticides being used by the Company, but also to decry the impact that its practices were having on farmers who have lost or are losing their lands on account of debts they hold to Monsanto for royalties that they have been obligated to pay for the use of their patented seeds, even though they had not purchased them directly but had instead garnered them from harvested plants grown with the seeds.

6 See the website of Monsanto: www.monsanto.com/global/es/noticias-y-opiniones/pages/porque-monsanto-demanda-a-agricultores-que-reutilizan-las-semillas.aspx.

ing of GMO-produced goods (such as Spain and Germany). French and Austrian research has documented negative effects of GMOs on human health, not only by the variety of adulterated seed, but also by the use of bio-chemicals and growth-inducing hormones.

Conclusion

There are conflicts brewing in the regional landscape that are far from being insignificant. The substance of these conflicts reflects points of contention that are inherent in the CAM and which are not amenable to technical solutions. There is obviously substantial rancour in the population involving the disputed use of patented seeds or resources, regarding expulsion from their lands or over the threats to native patrimony. There is also protest over the effects of the CAM on human health, as well as on the part of those who are losing their livelihoods.

The legal actions taken against agro transnationals have from time to time resulted in victories. Thousands of farmers in Brazil, Chile, Mexico, and Argentina have taken up this cause. Some governments have also promoted developments that are being challenged by their citizens and this offers greater latitude for democratic actions against the use of such technologies (e.g., in Germany). Struggles over water resources, food sovereignty, movements demanding a halt to pesticide spraying, others protesting in defence of biodiversity and for the adoption of alternative (agro-ecological, biodynamic) practices and the preservation of family farming are all observable in the region. There are instances where cases have taken decades to adjudicate and charges have been openly made against a model seen as predatory and genocidal.

International norms often reflect established interests such as the Cartagena Protocol which calls for flexibility in the sense of “the technology is there, so whoever wants to, can use it.” In any case, Latin American agriculture is a minefield with the growing discontent that is present, and a time bomb is being produced by the hyper exploitation of nature. If the potential opposition does not emerge from the organizations of those most affected (which are considerable in number), there also exists the possibility of change on the horizon via the loss of profitability due to the depletion of energy sources. The energy matrix that sustains this model rests upon fossil fuels.

There are reports circulating that the existent technological developments of today may no longer be profitable in the context of future energy crises. The relevant fact is that the global deployment of agribusiness has generated scenarios of contestation, and problem areas for the profitability of global capital. Since the scope of the system enables it to transcend the nation state, the chal-

lenges of social movements and organized collective agency may also reach a point of a regional or global movement as suggested by the transnational social movement organization *Via Campesina*. Theorizing suggests that the overall scenario should return to that level. I believe that at this time there is a commitment to do so by critical social science, to lay bare the truths that are hidden and to render visible that which matters. Unfortunately, the science that has been specifically applied to agriculture has been commandeered and financed by the private sector and as such is little more than a rentier science.

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