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THE “GREEN REVOLUTION”, AGROECOLOGY AND AGROECOLOGICAL EDUCATION IN THE MOVEMENT OF LANDLESS PEASANTS (BRAZIL)*²

Keywords: *Agroecology, Education, Associated Labour, Landless Workers' Movement (Movimento dos Trabalhadores Sem Terra, MST).*

Ключевые слова: *агрэкологія, образование, ассоциированный труд, Движение безземельных крестьян.*

Расширенная аннотация статьи на русском языке³

Цель данной работы – обсудить опыт Движения безземельных сельских рабочих (MST) Бразилии в области агроэкологии и образования. MST явилось плодом реструктуризации сельских земель в период военно-гражданской диктатуры, а также и действий рабочих, захватывавших земли. В этой борьбе возникло множество других проблем: школы, организация производства в коллективной или индивидуальной/семейной форме, гендерные вопросы, политическое оформление и, в последнее время, борьба в сфере продовольствия за питание без агротоксичных и трансгенных продуктов, а также за продовольственный суверенитет.

Первая часть статьи дает краткий исторический подход к пониманию ассоциированного труда в революционном и неревolutionном контексте, а затем анализирует организацию труда в MST. Мы подтверждаем, что преобладающей тенденцией является семейное производство и связанная с ним коммерциализация. Как контртенденция приводится и некоторый опыт коллективного труда. Приведены во внимание многочисленные факторы для того, чтобы понять этот низкий уровень коллективного труда в MST: а) сила неолиберальной идеологии в сознании каждого человека; б) крестьянская культура семейного труда, в) отсутствие общих условий для сопутствующего производства, в основном в нынешнее время, когда Бра-

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³ **Перевод расширенной аннотации с англ. яз.:** Абрамсон Иосиф Григорьевич, доктор технических наук, главный научный сотрудник Научно-испытательного центра «Гипроцемент-Наука».

зильское государство непрерывно корректирует условия кредита и техническую помощь государственным университетам и государственным исследовательским институтам агробизнеса, с1) блокирование аграрной реформы и криминализация социальных движений и d) теоретический кризис социальных движений.

Во второй части статьи обсуждаются агроэкология и школы агроэкологии MST. Что касается агроэкологии, то с начала 1990-х годов MST произвело множество акций по осуждению Зеленой революции: а) выпуск фильмов, включая документальные, книг, буклетов, проведение курсов и встреч, а также научные исследования с выводами, осуждающими агрохимикаты, тракторную индустрию, синтетические удобрения и трансгенные продукты; б) стимулы к переходу на производство, имеющее в качестве парадигмы агроэкологию, и к борьбе, цель которой – обязать государство пропагандировать агроэкологическое производство; с) создание курсов профессиональной подготовки и распространение агроэкологии в школах базового образования. Статью завершают несколько заключительных соображений.

Introduction

The purpose of this article is to debate the experience of the Landless Workers' Movement (MST) (Brazil) in the field of agroecology and of education. The MST is fruit of the restructuring of the rural land during the Brazilian civilian-military dictatorship and the actions carried out by workers who occupied lands. In this struggle numerous other struggles appeared: for schools, organisation of the production in an associated or individual/family form, gender questions, political formation and more recently, struggles in the field of food production without agro-toxic and transgenic products and for food sovereignty.

Part I is a short historical approach of Associated Labour in revolutionary and non-revolutionary contexts and afterwards it analyses the labour organisation in the MST. We verified that the predominant tendency is that of family production and associated commercialisation. In the countertendency, some few experiences of collective labour. Numerous factors have been taken into consideration to understand this low incidence of associated work in the MST: a) the power of the neoliberal ideology of every man for himself; b) the peasant culture of family labour, c) the absence of general conditions for associated production, mainly in a moment in which the Brazilian State has more and more adjusted credit, technical assistance, the public universities and the public research institutes to agribusiness, c.1) the blocking of the agrarian reform and the criminalisation of social movements and d) the theoretical crisis of the social movements.

The part II of the article debates agroecology and the Schools of Agroecology of the MST. As far as agroecology is concerned, since the beginning of the 1990s the MST has produced numerous actions of denunciation of the Green Revolution: a) production of films, documentaries, books, course booklets, courses and meetings and scientific studies which condemn agro-toxics, tractor industry, synthetic fertilisers and transgenic products; b) the stimulus to the transition of production having agroecology as a paradigm and struggles the aim of which is to oblige the State to induce agro-ecological production; e c) the creation of professional training courses and the diffusion of agroecology in its schools of basic education. We close the article with some final considerations.

Associated labour face to the advance of social barbarism

In the modern era, it is possible to emphasise numerous social movements which fought for the emancipation of labour. The defence of Associated Labour, the fight for the overcoming of good production and of capital accumulation, the criticism of the alienated/estranged labour, and the fight for the end of the State appear in diverse parts of the world (Hobsbawm, 1996).

In the twentieth century, there were many attempts to construct an emancipated society. We could emphasise the 1917 Russian Revolution and the short Hungarian, German and Italian revolutions. In Latin America the *Revolta de Canudos* [*Guerra de Canudos*/War of Canudos (1896–1897): a federal war against Canudos, a poor settlement of inlanders, considered monarchist and anti-republican], the Mexican Revolution, the Cuban Revolution, the Chilean Revolution, the formation of workers' councils in the nascent industry in that region, the formation of consumption cooperatives, the peasants' struggles in the middle of the twentieth century, the fights for the formation of a republican educational system, among others, formed embryos of a Latin American revolution.

In the years between 1970 and 1980, after a construction which was interrupted by the military coups d'état in the region, within a context of structural crisis of the capital and the world counterrevolution, the practices and the debate of the Associated Labour appear. In general lines, we can say that we are experiencing the exhaustion of the "civilising" phase of capital (Mészáros, 2002; Lima Filho, 1996).

From this viewpoint, the historical present of Associated Labour at a world level becomes patent when we observe the structural unemployment and sub-employment in the present phase of capitalism with financial hegemony. In Spain, unemployment affects circa 40% of the young people, who will have difficulties in finding a decent job in this new century. In Ireland, Greece and Portugal we see a brutal debt crisis. In France and, to a lower extent, in Portugal and Spain, pension reform strikes. In the banlieues, the suburbs around Paris, the sons of immigrants of the French ex-colonies and the people of other regions of the country and even of Europe, who live in precarious conditions, do not succeed either in constructing a worthy life. What is the future of these young people within the marks of the capital?

In the 1980s, misery increases due to Brazil's low growth, to the crisis of the external debt, of the refinancing of the economy which does not generate employment, etc. As for the State, it became a "minimum State for the workers and a maximum State for the financial capital" (Novaes, 2012).

Even face to the limits and contradictions the cooperatives and workers' associations experience in capitalism, our researches in the *Fábricas Recuperadas* [Recovered Factories] (Novaes, 2014) showed us that there are embryos of the overcoming of the alienated labour which will be able to be potentialised in a more profound transformation of society.

On the contrary to that which Margaret Thatcher's famous phrase "there is no alternative" to the crisis says (Mészáros, 2002), parts of the social movements, although without visibility, are constructing new alternatives and therefore the Associated Labour has become fundamental.

In the course of the 1980s-90s, workers' movements with innovating characteristics appeared, be it with respect to the new constructed spaces, such as, for example, the

social and thematic forums, be it the initiatives which congregate the political struggle with the organisation of the associated production. In this case, the experiences of the recovered factories, the factory commissions in Brazil and Argentina, the production and consumption cooperatives of the Landless Workers' Movement, the associations of other rural social movements, the Zapatist caracoles, the agroecological fairs that are self-organised by the workers, the collective efforts and the housing labour cooperatives, the restoration of the Bolivian ayllus, the resurgence of the debate of the communal power in Bolivia, Venezuela and Ecuador (Rodrigues, Novaes, Batista, 2012. E 2013) are elucidative.

Mészáros (2004) affirms that one of the challenges of the twenty-first century is exactly to combine the immediate needs with the encompassing needs, which have more to do with long-term transformations beyond capital. According to him, self-management is fundamental in this twenty-first century, which is permeated with unemployment crises, the increase of revenue concentration and with the increase of labour exploitation.

In the same line, Nascimento (2013) affirms that the workers must experiment forms they experience and, which, at the same time, point to a society that is governed by freely associated producers. According to Nascimento (2013), the historical self-management experiences reveal that the appropriation of the production means is not sufficient to combat the fragmentation and exploitation of labour; it is fundamental to articulate the labour knowledge which is fragmented by the capital and to appropriate the theoretical-methodological tools which allow them to understand the meanings of labour and to go on constructing a new labour culture and a new type of society (Alaniz, Novaes, 2013). Beyond the appropriation of the production means the control of the vital decisions in the productive microcosm and in the social macrocosm are fundamental pieces in the political and economic disalienation in the twenty-first century.

Associated Labour in the Landless Movement

In the article "Agricultural Cooperation", Christoffoli (2012) makes a long retrospective of the cooperation in the course of history. He emphasises the numerous experiences and attempts to implement the principles of cooperation and of communitarianism in Brazil, including Quilombo dos Palmares [Quilombos; fugitive slave settlements, the largest of which was established in Palmares, in the State of Alagoas], Canudos, Colônia Tereza Cristina and Colônia Santa Cecília. He reminds us of the *faxinais*¹, service exchanges, collective effort, among other strategies the rural workers adopted. In the 1960s, the Catholic Church, the Ligas Camponesas [Peasant Leagues] and the Brazilian Communist Party stimulated actions in the field of agricultural cooperation, according to this researcher. In the more recent period, Christoffoli (2012) emphasises the cooperation and association experiences of the MST, Movimento dos Pequenos Agricultores (MPA [Movement of Small Farmers], Confederação Nacional dos Trabalhadores na Agricultura (CONTAG) [National Confederation of Agricultural Workers] and Federação Nacional dos Trabalhadores e Trabalhadoras na Agricultura Familiar (FETRAF) [National Federation of Family Agriculture Workers].

They gain the form of cooperatives and associations of collective labour, cooperatives and associations of commercialisation, initiatives for the creation of fairs and service-

¹ Small rural villages with silvopastoral activity in common areas and with a subsistence poly-culture. The breeding and planting areas are separated by fences.

rendering, among others. Face to this it is possible to conclude that the experimentation of the Associated Labour is recurrent in Brazil's history and has penetrated in the agenda of social movements in the past 30 years.

We could also cite the *quilombolas* (groups of descendants of ex-slaves, who still live and produce collectively) and indigenous, who, although, in formal terms, they do not fit in the legislation of cooperativism and associativism, have practices and principles which are near to those of Associated Labour.

In the more advanced MST cooperatives – the so-called Cooperativas de Produção Agropecuária [Agricultural Production and Stockbreeding Cooperatives] – the fundamental decisions are made in the assemblies, labour is collective, there is a work shift in the strategic posts of the administration so that all can learn to manage work, to coordinate and to be coordinated (Christoffoli, 2000; Gonçalves, 2007; Pagamunici, 2001; Verderio, s/d; Dal Ri And Vieitez, 2008).

Other few advanced experiences succeed in combining the search for practical solutions for the production of healthy food, without the use of agro-toxics, the overcoming of the woman's subordination in the rural land and the construction of associated labour (Pinassi e Mafort, 2012).

Besides the more advanced cooperatives, at an intermediate level of development of associativism, numerous MST associations and cooperatives appeared, be it for the acquisition of machines, service-rendering, but mainly for the commercialisation of the production.

Scopinho (2010) differentiates the institutionalised cooperation from the non-institutionalised. She observes that in the MST encampments – i.e., in the struggle for land – there is much cooperation between the workers. The decisions are collective, the kitchen tends to be collective, so does work. However, after having conquered the land – i.e. in the struggle on the land – the collective spaces tend to be fragilized, cooperation tends to occur due to questions of affinity constructed in the camps and the institutionalised cooperation tends to happen in the field of commercialisation.

In a few lines, it is possible to affirm that the tendency in the MST is that of family production – with some kind of service exchange between neighbours and associated commercialisation. In the countertendency, some few experiences of collective work¹.

Numerous factors have been taken into consideration in order to understand this low incidence of associated labour in the MST: a) the power of the neoliberal ideology of every man for himself; b) the peasant's culture of family work, c) the absence of general conditions for associated production, mainly in a moment in which the Brazilian State has more and more adjusted credit, technical assistance, the public universities and the public research institutes to agribusiness, c.1) the blocking of the agrarian reform and the criminalisation of the social movements and d) the theoretical crisis of the social movements.

The Offensive of Capital in Agriculture and Destructive Production: Political Economy of the "Green Revolution"

Since the 1960s there has been an offensive of capital in the countryside which its ideologues denominate *green revolution*. Novaes (2012) denominates the same phenomenon *political economy of the green putsch*. The political economy of the green

¹ For a historical approach to cooperativism in the MST, see Christoffoli (2000).

putsch is configured a) by the new cycle of primitive accumulation (theft and land grabbing, leaders' murders, theft of indigenous knowledge); b) by the concentration or domination of the land by transnational corporations¹; c) by the fusions and acquisitions in the area of seeds and agro-toxics, with the almost complete domination of the production and distribution of seeds and agro-toxics of some of the big corporations of the Northern countries; d) by a bio-technological "revolution" (new agro-toxics and transgenic seeds); e) by the absence of autonomy on the part of the small producers, who are working more and more for banks and companies which are linked to agro-industrial corporations.

According to Costa Neto (1999), in the past 40 years there was a drastic re-structuration of the production sectors of inputs and of industrial transformation, of the institutions and mechanisms of financing and credit, of the circuits of commercialisation and of the market structure. The institutions of teaching, research and technical assistance were progressively adapted to this model, with a view to the training of agronomists, researchers, specialists, extensionists and other professionals within the philosophy of the *green revolution*.

From a historical perspective, Pinheiro Machado (2009: 1) observes that: «... since Liebig, 1848, the capitalist industry has seen an excellent source of capital reproduction in agriculture, and from then on, the schools of agronomy of the whole world only teach the students to apply synthetic fertilisers, agro-toxics and to use heavy machines».

Gonçalves (2008: 20) defines the green revolution as a «... technological package which resulted in the industrialisation of the Brazilian agriculture and, consequently, in the increase in the agricultural and stockbreeding production, in the increase in the exploitation of the social surplus-value and the concentration of capital in its various fractions, above all the commercial, the agro-industrial, the industrial, the financial and the agrarian. The organisation and the diffusion of the 'Green Revolution' was widely 'watered' by significant amounts of resources deriving from public and private funds and from multilateral development agencies, the implementation of which 'blew up' and goes on 'blowing up' with the so-called 'traditional' economic and organisational logics, among which there are the peasant, indigenous, *quilombolas* and *faxinal*-based communities, etc. Thus elements, such as the agricultural motor-mechanisation (tractors, harvesters, processing machines ploughs, harrows, ignition motor-bombs, pulverisers, agricultural planes), petrochemical inputs (fertilisers insecticides, herbicides, maturing products, antibiotics, micro-nutrients, plastics of agricultural use in irrigation and farming protection), 'improved' plants and seeds (hybrid, reengineered and transgenic ones), and agro-industrial companies became structural elements in an agrarian space which is involved in mutation. [...] Besides this, [...] it subjugates the rural producers' work to the dictates of the agro-commercial companies, which are more and more organised and participants of a world agrarian commerce oligopolized and dominated by the 'trading companies'» (Gonçalves, 2008: 20).

The logic of productivism, i.e. maximum profit in minimum time, which is always present in the story of capitalism, has exacerbated itself during the past 40 years. Guided by the three elements, which are transgenic seed, synthetic agro-toxics/fertilisers and

¹ The political economy of agribusiness significantly altered Brazil's land market and landscape, by means of land purchase or lease by refinanced foreign corporations (Oliveira, 2010).

heavy machines, the agro-industrial corporations consolidated a power and dominance structure in the rural environment.

Shiva (2001) denominates this new phase of the commodification of capitalism by using the terms *new colonialism*, *bio-piracy* and *bio-colonialism*. According to the author, biodiversity and the indigenous systems of knowledge satisfy the needs of millions of people, new patent systems and systems of rights of intellectual property threaten to appropriate themselves the resources and knowledge processes which are vital for the peripheral countries and to convert them into an advantageous monopoly for the Northern companies. This is the reason why the patents are in the centre of the *new colonialism*. Besides this, the increase in the productivity of the agro-industries gave rise to illnesses such as for example, mad cow disease, avian influenza and swine flu, among others.

It is true that the offensive of the green "revolution" has not yet lost its hegemony, but it is also true that its progress did not happen without resistance. In Argentina, at the end of 2013, a struggle appeared in the small city of Malvinas, in the province of Córdoba. Monsanto Company – multinational industry of agriculture and biotechnology and world leader in the production of genetically modified seeds – intended to establish one of the biggest transgenic seed production plants of the world in Malvinas. Social movements, NGOs and environmentalist groups are trying to prevent the construction of this plant.

There are many consequences of the political economy of the green putsch: land concentration; increase in unemployment in the countryside; soil degradation; endangerment of the quality and quantity of the hybrid resources; devastation of the forests and native fields; impoverishment of the genetic diversity of the cultivars¹, plants and animals; contamination of the water and of the aliments the population consumes; increase in the allergies, deaths or invalidity²; and increase in the commodification and proletarianisation of the countryside, besides the small producers' indebtedness and the closure of the rural schools, among others.

Bayer, Basf, Syngenta, Monsanto, Dow are some of the big corporations which control the transgenic seed and agro-toxic market in Brazil. According to Folgado (2013: 1), since 2008, Brazil is the biggest agro-toxic consumer of the world. "The quantities which are thrown are equal to circa 5.2 litres of poison per inhabitant a year, but nonetheless Brazil only represents 5% of the agrarian area among the 20 world's biggest agricultural producers". This means that Brazil's productivity does not justify the leadership position in the ranking of poison use. According to data of the Instituto Brasileiro de Geografia e Estatística (IBGE) [Brazilian Institute of Geography and Statistics] and the Agência Nacional de Vigilância Sanitária (Anvisa) [National Health Surveillance Agency] the inappropriate or excessive use of this kind of input can cause serious damages to human health and to the environment.

The specificity of the Latin-American case resides in the fact that the restructuration of the land was implemented during the military dictatorships, which recomposed the

¹ See, for example, the case of the *terminator* gene, a gene which acts so that the seed the farmer harvests *commits suicide* when he tries to sow it again.

² See, for example, the case Sevin. The production of Sevin (pesticide) in Bhopal, India, gave rise to the disaster caused by the gas leak which provoked the deaths of thousands of people and incapacity of more than 400,000. Besides this the advance of the hybrid seeds already led numerous Indian producers to suicide.

power of the dominant classes, especially that of the large landed estates forces of the past, in association with the foreign capital and parts of the army and national industries (Novaes, 2012). In other words, together with the military, with parts of the industrial bourgeoisie, middle classes, Catholic Church and the Central Intelligence Agency – CIA-USA the big landowners commanded coups d'état, which restrained the progress of the struggles of the workers in that region.

In more general terms, in the 1970s the first symptoms of the capital accumulation crisis appeared. As an answer to this crisis, capital promoted an offensive which could be synthesised in the following way:: a) pressure for the free financial capital circulation; b) productive restructuration of the countryside and of the city; c) technological innovations which intensify the production and the diversification of the merchandises; d) expansion towards sectors and fields which were not yet subject to full commodification, such as health and education, with a wave of privatisations, which raised the commodification cycle to a new level; e) implementation of processes of localisation changes and outsourcing of the companies which practically dismantled the power of the combative trade unions of the era of the Taylorist-Fordist capitalism; f) theft of the land which belonged to small producers, Indians, *quilombolas*, etc.

However, from the 1970s on, the dynamics of capitalism starts to be the destructive super-production, linked to the maximum expansion and to correspondent benefit and it engendered its alienating self-reproduction in a broader way (Mészáros, 2004). That is to say, profound alterations occur on the objective level (economic) of production as well as in the reproduction of class relationships, on the level of subjectivity¹. In this sense, we can verify that from the destructive progress of capital on, its “civilisational” facets”, so propagated by the liberals, exhausted themselves. As far as the social movements and the transformations on the political level are concerned, there is a crisis of the traditional class expressions and representations, which culminated in the appearance of the so-called “new social movements”, the objective of which is no more the criticism of the destructive logic of capital and the articulation of its specific flags to class struggle, but the demand for the broadening of the status of “citizenship”.

According to José Paulo Netto (2008), the flags of the “new social movements” restrict themselves to the fight for the insertion into the bourgeois State and for its overcoming, as an instrument of class oppression. According to him: «The imperialist corporations implement the erosion of the State regulations. With “deregulation” being presented as “modernisation” which valorises society as “civil society”, by freeing it from the tutorship of the “protecting State” – and in this ideological construction, there is a place for the defence of “freedom”, of “citizenship” and of “democracy”» (Netto, 2008: 17).

Mainly from the 1980s on, with the destructive advance of capital and, consequently, the mercantilisation of all the spheres of life, diverse conflicts start appearing in Latin America with respect to land, water, seeds, electric energy, petroleum, gas, education and labour, among others. In the South of Brazil, for example, the destruction of the Aracruz vivaria (eucalyptus) and the struggles of Via Campesina [the Peasants' Way] against *Syngenta Seeds* (Swiss multinational), can be interpreted as confrontational tactics of

¹ According to Mészáros: “Capitalism, as a mode of social reproduction, is characterised by the irreconcilable contradiction between production for use (corresponding to necessity) and production for exchange, which, at a certain development stage, becomes a purpose in itself, subordinating all the considerations of the human use to its completely perverse logic of alienating self-reproduction.” (Mészáros, 2004: 297).

the social movements in the new offensive of capital. These struggles mainly occur as a reaction to the destruction of the native seeds, to the role science and technology play in the socio-metabolism of capital and because of the control the multinationals exert in all the dimensions of the workers' lives. Due to its contradictions, the political economy of the restructuration of the countryside, which industrialises it and raises the capital accumulation to a new level, causes the apparition of various social movements which attempt to indicate forms and to tread paths which are antagonistic to those presented by agribusiness.

Agroecology for MST: beyond the green agenda

According to common sense agroecology is associated with care for nature, with ecology, environmental protection, vegetable and fruit production and low scale. But this form of consciousness of social reality tends to be the form which is necessary for the maintenance of the dominance relationships (Mészáros, 2004). According to us, the agroecology the MST theorises is not reduced to the mere environmental agenda.

Caporal and Costabeber (2002) observe that no product will actually be ecological if its production is being carried out at the cost of the exploitation of workforce even if it does not use certain inputs, such as agro-toxics, or if it utilises new forms of soil exhaustion or of degradation of the natural resources.

According to Gonçalves (2008) that which mobilises MST is the negation of the agricultural development pattern which exists in Brazil, by emphasising the necessity to preserve and reconstruct the peasant agriculture by means of the agrarian reform and by proposing forms of management and of the participation of the peasantry cooperative-like and agro-ecological production systems.

Guhur and Toná (2013), members of the Escola de Agroecologia Milton Santos do MST (Maringá – PR) [Milton Santos School of Agroecology of the MST (Maringá – State of Paraná)], observe that a more recent and broader conception of agroecology, which has the popular social movements of the land as political pillar, is being elaborated. This bias does not see agroecology as a merely technological solution for the structural and conjunctural crises of the economic and agricultural model. Agroecology is understood as part of the struggle strategy and the confrontation with agribusiness, with the workers' exploitation and with the depredation of nature. In this conception agroecology includes the care and the defence of life, food production, political and organisational consciousness as *Via Campesina* and MST observe it (Guhur, Toná, 2012: 66).

The authors still affirm that agroecology is seen as inseparable of the struggle for food and energetic survival, for the defence and recovering of territories, for the agrarian reform and for the cooperation and alliance of the peoples of the countryside and of the city. This way agroecology inserts itself into the construction of a society of producers, who are freely associated for the maintenance of life, a society in which the final objective is no longer profit and turns to be *human emancipation* (Mazalla Neto, 2014).

The entry of the agro-ecological agenda into MST occurred in a progressive way. According to Gonçalves (2008), the renovation of the technological matrix of agricultural and stockbreeding production gained strength from 2000 on, when the Movement initiated the diffusion of the idea that the encamped and settled should first

guarantee the family's food security with quality products, diversity and, above all, free of agrochemicals and transgenic products¹.

Still according to Gonçalves (2008), for the MST the changes in the families' social, ecological and above all technical rationality would help the new dynamics of capitalism in the countryside, which is based upon extremely severe dominance relationships, such as the presence of transgenic seeds and the articulations between the agro-commercial transnational capitals (chemical, alimentary and financial), which put the farmers *na lona*² under canvas.

According to the MST (2010: 50-51) agroecology means the stimulus to «... agricultural practice with the utilisation of inputs, which are external to the plot, without the utilisation of agrochemicals. In the course of the years we will have to adjust this way of production and avoid spending money with fertilisers and poisons, with machine hours and seek to utilise more and better available workforce and develop techniques which are adapted to our reality, thus avoiding intoxicating ourselves and poisoning nature. We will have to open the way for the comrades' creativity and produce a new technological matrix».

In August 2013 the permission to use transgenic products in Brazil completed 10 years. In the 2000s numerous campaigns were carried out against the use of transgenic and agro-toxic products in Brazil, which included actions such as the occupation and destruction of vivaria, denunciations in the mass media, production of films and documentaries, occupation of the headquarter of corporations, propagation of scientists' reports against transgenic products, synthetic fertilisers, heavy machines and agro-toxics, campaigns between social movements, researchers of public universities, sectors of Embrapa – Empresa Brasileira de Pesquisa Agropecuária [Brazilian Agricultural Research Corporation] and NGOs. It is convenient to stress that the MST conducted the numerous actions we described above or participated in them.

In the sense to combat the restructuring of the land and the green revolution and to propagate the theory and the practice of agroecology, the MST has organised thirteen Conferences of Agroecology up to now; it created numerous technical courses of agroecology, integrated secondary education, specialisation, graduate and even master courses. It also propagates the flag of agroecology in the primary and secondary schools.

The MST's concept of agroecology is complex and differentiated from the analysis which reduces the term to the mere environmental protection, because it introduces or encompasses various elements which have an impact on the phenomenon. Carter and Carvalho (2004) cite additional questions, such as cooperation, gender, education, youth and environment.

We can formulate the hypothesis that the struggle for agroecology is coupled with that which Mészáros (2002) calls substantive equality. If capital promotes formal equality, the anti-capital social movements are fighting for the construction of the equality of gender, ethnicity, generation, and, mainly for the overcoming of class exploitation. It is not out of mere random that the MST women organise struggles for the economic independence, non-subordination to their husbands; at the same time questions of

¹ Seeds which were cultivated in a clandestine way in Brazil and fetched in Paraguai and Argentina.

² The expression refers to the precarious form of the shelters which were built in the camps that are made of a resistant fabric called *lona* [canvas]. In Portuguese the expression *na lona* means a state of rupture or emotional, physical or economic loss, mainly due to the small producers' indebtedness and fencing.

class, gender and environment were involved in an interesting imbrication (Pinassi, Mafort, 2012; Tait, 2013).

Nonetheless, although the members of the MST are organised into a Movement, which provides a struggle practice and political awareness, they continue being members of society and, as such, they suffer the influences of the hegemonic ideology.

In the specific case we discuss here, they also suffer the influence and the pressures the big transnational corporations, which dominate the agro-industrial commercialisation and production, exert. Thus not all the MST settlements are grounded on agroecology. By means of direct or indirect mechanisms, such as advertising, which creates the fetish of green "revolution", the influence of technicians and agronomists, or by means of more subtle instruments, for example, the linkage of credit to the acquisition of the green revolution package, capital creates the general conditions for the production which is structured in the moulds of the green "revolution". The result is that the *habitual* form of agricultural production, which is based on the use of agro-toxics, synthetic fertilisers and heavy tractors, is used in part of the settlements of the social movements. However, we could verify that, even in these settlements, there is already an effort to progressively move towards other production forms. Nonetheless, being inserted in the capitalist market and in a moment of the offensive of capital, it is not easy to oppose oneself to the hegemonic form.

The State provides the agribusiness with low-interest credits, subsidies, seeds, privileged technical assistance, development of scientific research and applied technology, among other mechanisms and stimuli for the production, the patterns of the green revolution require. At the same time, the big corporations and the State tend to disfigure and hinder the general conditions for the collective and associated production of healthy food.

Various studies emphasise the difficulties of the "technical" assistance for family agriculture, which lives together with precarious professionals, few "technicians" for the settlement, very bad working conditions of the "technicians", damaged equipment absence of specific training for agroecology and of stimulus to the commercialisation networks, etc. This situation depicts one of the faces of the minimum State for the workers and of the maximum State for the financial capital. In Marx' s terms (1996), the State and the Governments create the general conditions for the production and reproduction of capital and they annihilate, subordinate and hinder alternative forms of production which can give rise to a new way of production¹.

From the viewpoint of consumption, in spite of the existence of agro-ecological commercialisation networks, one of the challenges of agroecology is the fact that its products are available, mainly to the middle and upper classes of the Brazilian society. According to information provided by the responsible for the scion vivarium of the Milton Santos School, the costs of the production of organic vegetables and fruit are not much higher than those of the production of plants which are cultivated with agro-toxic. The technician can be right, when there are small plantations. But doubtlessly

¹ Sampaio Jr. (2013) establishes a good balance of the military governments' actions for the strengthening of agribusiness, from the "democratisation" period until the *lulismo* [from Lula, nickname of Luiz Inácio Lula da Silva, one of the founders of the Workers' Party (Partido dos Trabalhadores – PT) and former Brazilian president from 2003-2011; a period characterised by social reform coupled with economic growth and a strong private sector] in the section "institutionalisation of the counterrevolution and liberal adjustment".

the much greater productivity of the plantations, which are treated with inputs, and the general aspect of the products and the services of the mediators who work with the niches of organic products immensely raise the prices the consumers pay. It is also necessary to remember that the final price of the food, which is cultivated with agro-toxic, transgenic and synthetic fertilisers, only represents the tip of the iceberg. If we take into consideration all the costs which are generated by agribusiness for SUS – Sistema Único de Saúde [Unified Health Service] to the consumers who must buy medicines at the pharmacy because they were poisoned, the subsidies given to agribusiness, the final price of the agribusiness products is very high, although they seem to be “cheaper” on the shelf”.

Any way the denunciations and pressures exerted by the social movements, allied with a greater ecological awareness ended up resulting in public policies which are involved in the purchase of organic food for schools, day nurseries, hospitals, sanatoria, etc. It is the case of the Programa de Aquisição de Alimentos (PAA) [Food Acquisition Programme Programa Nacional de Alimentação Escolar (PNAE) [National School Feeding Programme]. But even in the municipalities in which this policy is being applied, the purchase volume does not achieve 10% of the total.

Although being limited and tending to become islands in the capitalist market, the experiences of the diffusion of the agro-ecological products and of fair trade must be recognised and propagated by the social movements, as it is the case, for example, of Bionatur of the MST, which is located in the South of Brazil. Bionatur must be understood as a practice the basis of which is the decommodification of the native seeds. According to information, which was obtained on the MST site, Bionatur is a cooperative of agro-ecological seed production. The experience of Bionatur, “which began on the MST settlements in Candiota and Hulha Negra, in the South of the State of Rio Grande do Sul, represented the end of the dependency with respect to the enterprises and the entry of the system of agro-ecological production. At the beginning, before the foundation of Bionatur, the settled families sold their vegetable and fruit seed production to the enterprises of the region. Since very often the farmers did not succeed in selling to the enterprises, they began to pass the seeds to other farmers. Bionatur is an instrument to show to society that the Agrarian Reform works¹. Besides this, for the settled farmers, Bionatur is «the front door» of the agro-ecological model. Bionatur counts on at least 230 families who produce seeds, which are free of agro-toxics, in 20 municipalities of the South of Brazil and in the State of Minas Gerais. The network already developed a technique to produce 117 vegetable and fruit varieties, 15 of green fertilising and 10 cultures which are essential for the families’ self-subsistence. The seeds have the certificate of agro-ecological production of the Ministério da Agricultura [Ministry of Agriculture] and they are commercialised in practically all the States of Brazil. Bionatur has now been coordinated by the Cooperativa Agroecológica Terra e Vida (Conaterra) [Agro-ecological Cooperative Earth and Life], since June 2005” (MST, 2010)².

¹ For further information about Bionatur see the video: <https://www.youtube.com/watch?v=wGTmm9xU7LA>

² It would be important to emphasise the agreement which permitted the genetic improvement of the native seeds in the States of Paraná and Santa Catarina. Torres-Rego (2015) and Luzzi (2007) synthesised the works of greater repercussion of AS-PTA (Agricultura Familiar e Agroecologia – Family Farming and Agroecology) of the Contestado [region of the Centre-West of the State of Santa Catarina] and of the Centre-South of the State of Paraná: rehabilitation and multiplication of varieties of seeds of maize, beans, manioc, rice and potato; establishment of native germplasm database in 2003 and of a laboratory of genetic improvement →

The creation of the Schools of Agroecology

Agroecology indicates a new way of producing, as we already exposed it. This way, MST decided to create schools, alternatives to the State schools, which train "technicians" according to their needs. In order to create the schools, the Movement based itself on its educational proposal and on the years of experience, but it was necessary to count also on its educators' involvement for the elaboration of a new agroecology curriculum.

Thus the entry of agroecology into the MST agenda led to the creation of various Schools of Agroecology in different States of Brazil. Today there are circa 30 Schools of Agroecology in Brazil, most part is concentrated in the South of Brazil, mainly in the State of Paraná. In Paraná there are five training centres and /or schools of the MST which present the debate on agroecology and agroecology training: the Escola Iraci Salete Strozak, which is located in the municipality of Laranjeiras do Sul and the Escola Ireno Alves dos Santos in Rio Bonito do Iguaçu; they are interlinked to the Centro de Desenvolvimento Sustentável e Capacitação em Agroecologia (CEAGRO) [Centre for Sustainable Development and Agroecology Qualification]; the Escola José Gomes da Silva, which is located in São Miguel do Iguaçu; the Escola Milton Santos in Maringá; and the Escola Latino Americana de Agroecologia [Latin-American School of Agroecology], in the municipality of Lapa. In these spaces, the Cursos Técnicos em Agroecologia [Technical Agroecology Courses] are offered in the modalities: Agroecology Technician; Integrated Secondary Education; Agroecology Technician - Young People and Adult Education; Stockbreeding Technician with emphasis on Agroecology; Agroecology Technologist; Agroecology Technician with emphasis on Agroforestry Systems and Agroecology Technician with Qualification for Milk Production. The courses are carried out in partnership with public teaching institutions, with resources of the Programa Nacional de Educação na Reforma Agrária (PRONERA) [National Education Programme in the Agrarian Reform], certified by the Instituto Federal do Paraná (IFPR) [Paraná Federal Institute] and by the Instituto Nacional de Colonização e Reforma Agrária (INCRA) [National Institute of Colonisation and Agrarian Reform].

The Document of the MST-PR (2004 *apud* Lima, 2011: 87) presents the main objectives of the Training Centres/Schools of the Movement in the State of Paraná.

- To be a training space for the working class organisations;
- To be a meeting space for the Landless Workers' Movement and other organisations, which seek the same objectives of social transformation;
- To be a reference in the development of experiences in the area of agro-ecological production by presenting concrete results for the he/she farmers;
- To be a space of the development of humanistic socialist values, which are being developed through collective life;
- To improve the method of technical and political training and schooling from primary

→ in 2004 at the Universidade Estadual de Londrina (UEL) [Londrina State University], which subsidised the carrying out of experiments of the evaluation of native maize cultivars by the farmers together with the UEL researchers; organisation of native seed fairs; experiments in ecological soil manipulation in partnership with the Instituto Agrônômico do Paraná (IAPAR) [Agronomic Institute of the State of Paraná] and the Empresa Brasileira de Pesquisa Agropecuária – Agrobiologia [Brazilian Company of Agriculture and Stockbreeding Research – Agrobiology]; creation of agro-ecological product fairs; commercialisation of ecological yerba-mate with the brand Sombra dos Pinheirais [Pine-forest Shadow] by a farmer association; creation of a consortium of five communitarian organisations for the processing and commercialisation of ecological grains with the commercial brand Alimento Sagrado [Sacred Food] (Luzzi, 2007).

- education to secondary and superior education;
- To be a development space of scientific and technological experiences, which involve the peasant's reality;
- To be a space of stimulus to popular culture and its experience by particularly rehabilitating the farmers' culture.
- To be a space where people can live together by educating themselves, working, entertaining and constructing perspectives for the future.

According to Lima (2012), the theoretical and methodological foundations of the Centres/Schools of Agroecology Training of the MST/PR is linked to the philosophical and pedagogic principles of the Movement's education and pedagogy, the systematisation of which is fruit of the reflection about its political educative praxis, which is based upon three fundamental sources: the socialist pedagogy, the popular education and the dialectic historical materialism.

Lima *et al* (2012: 4) also presents the Proposta Pedagógica dos Centros/Escolas de Formação do MST/PR [Pedagogic proposal of the MST/PR Training Centres/Schools], among them that of the Escola Milton Santos and he emphasises that this proposal «.. is based upon the accumulation of the work and the experience in the training of the militants and cadres in the MST, which is based upon elements of the Projeto Político Pedagógico da Escola Nacional Florestan Fernandes (ENFF) [Pedagogic Political Project of the National Florestan Fernandes School] and upon the educative experiences which are carried out in the Instituto de Educação Josué de Castro (IEJC) [Josué de Castro Institute of Education]. For the training of the Militant-Technician-Educator in Agroecology it is necessary to appropriate the political lines and the organisational principles of the MST in articulation with technico-scientific, political and organisational knowledge».

We observe that, for the MST pedagogy, education has the political commitment with the social, in consonance with the organisation and the educative action. Thus being, the landless' training and the educative practices in agroecology are not limited to the activities, which are developed at school, but they are also forged in the matrices of human training, among them, "[...] the educative principle of labour, social praxis and history" (Caldart, 2004: 42).

Lima (2011: 76) adds that «The educative practices in agroecology have as political and pedagogic intentionality an educative project, which, for the reality of the countryside, is associated with the right to school and technical education. We understand that on the settlements the landless families conquered collective alternatives can be constructed within the political organisational praxis of the MST, which inhibit the reproduction of the capitalist social relationships».

From the principles and actions of the agro-ecological education of the Movement germs of non-capitalist relationships can arise. Lima *et al.* (2012: 9) affirm that "[...] the organic structure and the management process, through the mediation of the subjects' self-organisation is the basis which enables the planning, the organisation and the carrying out of the work, which is developed by means of cooperation relationships". This way, agroecology is understood in the MST as an educative principle which guides the subjects towards a cooperate project, which goes beyond capital and in its

construction. Roseli Caldart (2013) signalises that today agroecology is the productive matrix of the movement, at the side of cooperation and it serves as a landmark for all the MST schools.

Agroecology in the curriculum of the MST Technical Colleges. In the same way in which it occurs in other types of MST schools or in schools in which the movement exerts an influence, in the schools of agroecology the school organisation, as well as the curricula, are implemented in a heterogeneous way. The MST Schools of Agroecology tend to have an organic curriculum and in the State schools, in which the Movement exerts an influence, this agenda can appear in a less substantive way.

The agroecology course and those of similar nature are not only technical, which is typical of hard sciences, with a heavy workload in the disciplines of the area of exact and biological sciences, because no course is only *technical*, not even the technical courses the State propagates are neutral and without ideology. Each and any course is political and every technique bears in itself politics, ideology, and class interest (Novaes, 2012)

The courses of the Schools of Agroecology are not different, because they disseminate a determined ideology in the technique they propagate. They intend to carry out a criticism of the green revolution and, in a more general way, of the socio-metabolism of capital. At the same time at which they criticise the green revolution by propagating researches, critical documents of destructive production, criticism of the patents, agro-toxic, transgenic products, etc. The MST courses collaborate in constructing the theory and the practice and contribute to the propagation of the principles and foundations of agroecology.

Whereas the courses of the State and Federal Technical Schools are conservative, with many technical disciplines, which do not problematise the relationship Sciences, Technology and Social Classes, there are few humanistic contents and with a pedagogic project, which involves the training of the workforce within the paradigm of the competencies/flexible accumulation; in the MST Schools of Agroecology, in spite of some contradictions, it is possible to find a more integrated curriculum between social sciences and hard sciences, an attempt to appropriate the historical materialism and a useful relationship between theory, with scientific foundations of agroecology and scientific criticism of the green revolution, and practice, with agro-ecological experimentation.

However, there are also difficulties in the MST Schools of Agroecology. Guhur *et al.* (2012) observed that the theoretical appropriation by the students is still low. Besides this, the Schools of Agroecology face many contingencies: not all the teachers belong organically to the MST; there are problems in the integration of the disciplines, with relative knowledge fragmentation, few resources for the maintenance of the schools, few researchers of the Universities and Research Institutes who are developing agro-ecological researches, among others.

Final Considerations

Despite some limits and contradictions, the experience of the MST in the field of Associated Labour, of Agroecology and of Education serves as a lighthouse to the anti-capital struggles in the twenty-first century. According to us, the structural crisis of capital requires the experimentation of alternatives to the alienated/estranged work and a radical criticism of destructive production.

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