Knowledge, identity and ideology in stances on GMOs:

The case of the Movimento Sem Terra in Brazil

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Various scientists and social movements are involved in the controversy over GM crops. This paper examines the controversy in Brazil, where the issue may in the future be defined internationally, given the expanse of the country's arable land. It focuses on a central actor in the dispute: the Movimento dos Trabalhadores Rurais Sem Terra (MST), a peasant organization that takes a firm and active public stand against GM crops. It aims to understand how the movement came to develop this stand against such innovations, and addresses the main events in the history of GM crops in Brazil, the actors in the debate and the arguments they deploy. A complex series of events and interactions in the MST's history is presented to explain the organization's commitment to agroecology and its opposition to GMOs, and to specific conditioning emerging from its own peculiar mode of social organization of agricultural production.

Keywords: GMO, Movimento Sem Terra, MST, transgenic crops in Brazil

Insect- or herbicide-resistant genetically modified (GM) crops have been sold in the international marketplace since 1996. The biggest producers have been the United States, followed by Argentina. More recently Brazil has moved into third place (James, 2006).[1] The social reaction caused by this technology has been uneven across the planet: while in 1998 EU authorities banned the production and importation of GM crops arguing that the health of consumers had to be protected and the environment cared for (Tambornini, 2003: 22-23), in the United States and Argentina GM crops spread fast without encountering any obstacles at the legislative level and with virtually no social opposition. The story in Brazil was different: social opposition to GM crops was apparent from the start and their legal status blew hot and cold.

Why do certain social actors reject GM crops? This article sets out the influences of a wide variety of factors, placing emphasis on the structural ones, in the analysis of the GM crops controversy in Brazil, where, given the vast scale of its arable land, the issue may in future be defined globally. After

reviewing the general context of the conflict, I focus on the Movimento dos Trabalhadores Rurais Sem Terra (MST)[2] and its stance against GMOs,[3] which has been crucial in the unfolding controversy in Brazil. The MST is a Brazilian peasant movement born in 1984 and, although its main goal is agrarian reform, it also promotes other principles, such as non-GM farm production, through "agroecology".

Information for the reconstruction of the events and stances in the GM conflict has been obtained from interviews and such documentary sources as institutional documents, newspapers and publications by social movements and other public interventions by actors. Interviews with the central actors in the controversy were held in Curitiba, Brazil, (and surrounding areas) in April 2006. This article covers the period from 1998, when GM crops first came onto the public scene in Brazil, to the recent past, though in some cases –the history of the MST, for example– an earlier period has to be examined.

GM Crops in Brazil

The incorporation of GMOs in farm production in Brazil was resisted from the outset by various different social groups, generating conflicts that were reflected at various levels of the State. On 1 January 1998 the Brazilian National Biosafety Technical Commission (CTNBio) issued a favourable technical report on genetically modified soya beans resistant to the herbicide, glyphosate. On 15 December CTNBio finally decided to allow commercialization of genetically modified soya beans. The Brazilian Consumer Defence Institute requested a precautionary measure in tandem with Greenpeace suspending the authorization given by CTNBio. In August 1999 Federal Justice allowed the request, forbidding its commercialization until more thorough environmental impact studies had been conducted, and standards and policy had been established regulating the use of GMOs. Their use was suspended accordingly until 2005, when the Biosafety Law was passed.

At the start of 2003 the administration of Luiz Inacio 'Lula' da Silva, who became Brazilian president on 1 January the same year, recognized that in the southern states of Brazil there was a considerable surface area of illegal GM crops, mostly in Rio Grande do Sul, where 4 million tons of GM soya was produced (65% of the total regional soya bean harvest).[4] He believed this was a "damned legacy" from the previous administration and introduced a provisional measure to confront the situation (Fernandes, 2005: 5-6). This measure authorized the commercialization of GM soya illegally obtained in the 2002/2003 harvest, and further provided that batches of at least 1% GM soya had to be labelled and that the seeds obtained from them could not be used for a new harvest.[5] The government announced it would soon prepare legislation to regulate GM crops on a permanent basis. However, a few months later in September 2003 it issued another provisional measure allowing GM crops for the 2003/2004 harvest.[6] President Lula insisted the measure was necessary because there were not enough conventional seeds to supply farmers in the south, while anti-GMO groups argued that allowing illegal crops was doomed to promote a situation where GMOs would be introduced into Brazilian agriculture "de facto" and that, once established, it would be extremely difficult to displace them (MST et al., 2003: 13; Fernandes,

2005: 28-29). They argued that such measures were trying to ensure the permanence of GM crops in the country's agriculture first and develop a regulatory frame later.

The Biosafety Law was finally passed on 24 March 2005.[7] Under this law CTNBio, dependent on the Science and Technology Ministry, was to have 27 members, all of whom had to have "renowned technical competence, distinguished performance and scientific background, PhD-level academic credentials and an outstanding professional record in biosafety, biotechnology or biology, human and animal health, or environmental sciences".[8] The Biosafety Law also approved the production and commercialization of glyphosate-resistant GM soya beans.[9]

Brazil's two main crops are maize and soya bean, totalling 74% of arable land.[10] Since the Biosafety Law was passed, besides allowing the production and commercialization of GM soya beans, the CTNBio has approved the farming of GM cotton and in August 2007 GM maize.[11] This tallies with the international cross-section of GM crops, as the most common GM crop worldwide is soya beans (60%) followed by maize (24%) and cotton (11%) (Muñoz de Malajovich, 2006: 240).

The Brazilian and Argentine share in the international soya bean market has been on the rise since the start of the 1990s, with a consequent fall in the United States' share (Schnepf et al., 2001). Over 85% of soya bean crops in both Argentina and the United States are GM. The adoption of GM soya beans in Argentina came with the incorporation of a "technological package" comprising glyphosate – a broad-spectrum herbicide – and direct seeding, a technique that, with the right farming machinery, involves minimum tilling and significant time-saving.[12] Thus, a rapid drop in soya bean production costs brought a significant rise in farmers' profits to the point that, according to estimates, had GM soya beans not been adopted, the total surface area for soya bean cultivation in Argentina would have been just 60% of what it was in 2003 (Trigo and Cap, 2003: 89).[13]

The Movimento Sem Terra

Behind the GMO conflicts in the context of regulatory frameworks and legal and judicial approval, various different social movements permanently rejected the use of GMOs. These were articulated in the "Campaign for a GMO-Free Brazil", which brought together 85 distinct social organizations. The purpose of this network is "to disseminate information on GMO impacts and risks and to support the construction of a more sustainable agroecology-based agriculture model".[14] The campaign is a point of convergence for farmers' movements, trade unions, religious, human rights and ecology organizations, as well as other more technical ones such as bodies of agricultural scientists or academics. The main actors – those who took an active part during the conflict – are the MST, the NGO Asesoria y Servicios a Proyectos en Agricultura Alternativa (AS-PTA), the human rights NGO Terra de Direitos, the ecology NGO Greenpeace and the church-based Comissão Pastoral da Terra (CPT). These are very different organizations, but all have rejected GMOs individually and on more than one occasion jointly. In particular, the central actor, the MST, has been fighting persistently against GM crops since they appeared as a public issue.

To get a better grasp of this social movement a brief look at its history

is in order. There are three aspects determining the genesis of the MST: economic context, socio-political context and ideological context (Harnecker, 2002; Stédile and Mançano Fernandes, 2005).

By the end of the 1970s agricultural production in Brazil was being modernized, mainly in the South. This involved the large-scale introduction of soya bean crops and the advent of more mechanized agriculture, with the resulting mass expulsion of peasant farm workers. At first, encouraged by official propaganda, the people who left the fields due to the advance of mechanization moved to big cities or to farming colonies. But these migrations soon showed limitations: the farming colonies offered no adequate infrastructure and the peasants, used to a different type of crop such as beans, rice or maize, could not adapt to the region's conditions, which were more favourable to mining and forestry. Indeed by the end of the 1970s an industrial crisis had begun that brought rising unemployment to the big cities. For want of alternatives they therefore had to find land near where they used to live (Stédile and Mançano Fernandes, 2005: 15-16).

In socio-political terms Brazil was living through the final days of a twenty-year-long military dictatorship (1964-1984). With the slowing of the economy

Figure 1. Map of Southern Brazil

the military regime began to weaken and popular discontent to well up. In 1978 and 1979 workers' strikes resurfaced, the Central Única dos Trabalhadores (CUT) united all the trade union movements opposed to the government, and in the outskirts of São Paulo the Partido dos Trabalhadores (PT) was set up in the framework of a process of democratization.

The CPT's role was also extremely important ideologically speaking. Set up in 1975 as a branch of the Catholic Church linked to the National Conference of Brazilian Bishops, the CPT espoused as a doctrinal benchmark the kind of Liberation Theology expressed in the Second Vatican Council's directives. The priests and lay members of CPT travelled across the countryside preaching the need for peasants to organize and sort out their problems over land. CPT was also formed as an ecumenical movement, and its work with other churches (mainly the Lutheran Church) prevented the simultaneous emergence of various movements and helped to build a single nationwide peasant movement (Harnecker, 2002: 23-24).

Against this background there followed a series of specific events spurring the creation of the MST. In May 1978 in the state of Rio Grande do Sul the Kaigang Indians took over the lands in the Nonoai reservation, expelling about 1,200 peasant families that were settled there. Organized by CPT, roughly 500 of these families ended up occupying land in Macali near Ronda Alta, resisting the police and finally getting authorization from the governor in what was at the time the first successful peasant occupation. This was followed by other occupations not just in Rio Grande do Sul and Paraná but in Santa Catarina, São Paulo and Mato Grosso do Sul (see Figure1).

A significant core of peasants also organized themselves in the west of Paraná, where the Itaipú hydroelectric dam was built in the 1970s and over 12,000 smallholder families were evicted. Influenced by Lutheran pastors from the CPT, a group of workers affected by the building of the Itaipú Dam set up the Terra e Justiça movement, which rejected the compensation offered to owners of the land and demanded the right to swap land for land. The movement brought together thousands of farmers and gave rise to the MST in western Paraná.

Against this background and after a period of occupations in various different parts of Brazil the 'Movimento Sem Terra' was founded in January 1984, its first national congress being held in a Paraná diocese.

The MST made "three priority demands: land, agrarian reform and general societal change" (Stédile and Mançano Fernandes, 2005: 34):

> The MST fights for land in Brazil to belong to those who work it and live in it. The MST considers that those who speculate with land are using it to exploit other peoples' labour and those who do not work it have no right to own it. But also aware that it would be impossible in today's capitalist society to carry out a radical agrarian reform, the MST is fighting to build a new society and a new economic system. (Harnecker, 2002: 255)

But as well as fighting for agrarian reform the MST waged an intense public campaign against GMOs, believing that "it has begun to be more and more apparent that it was not just a question of occupying and distributing land; it was also necessary to think about the way land would be used, what would be produced,

for what purpose and in what way" (GEMSAL, 2006: 58). In this sense, the MST sought to rid itself of a dependence on modern technology (Harnecker, 2002: 123):

> Peasant agriculture is therefore characterized by its degree of self sufficiency, by the predominance of family labour with a minimal use of external supplies […] many families in the countryside have been victims of an inadequate model of consumption, mainly inasmuch as […] the peasant is tempted to introduce the same technological model as large-scale ownership and the large-scale market in his own property: namely, agribusiness… Thus, *to remain on land as a peasant is an act of social resistance*. (IEEP, 2006: 3. My italics)

Accordingly, the MST defends peasant agriculture, which it associates with agroecology, and rejects agribusiness, in which it includes GMOs.

The rejection of GMOs

As different actors mobilize different arguments, the MST's own anti-GMO discourse does not fit a single argumentative mould but is instead heterogeneous, referring to various different types of arguments in play. I classify these arguments under four categories: *uncertainty*, *'proven' risk*, *economic control* of GMOs and *technical control* of GMOs.[15]

Regarding the first type of argument, the MST claims that GM crop use could have unexpected effects on the environment and health, effects that may become uncontrollable and irreversible. These are the arguments about GMO *uncertainty*[16]:

> Still, there are no assurances about the effects GM products may have on consumers' health […] about the effects on the environment given the fact that these new living organisms have never existed in nature and are the result of lab experiments […] about the effects on the health of farmers coexisting with the seeds and products. (MST, 2003)

> The effects GM products may have on human health and the environment are still unknown. (MST, 2006a)

Second, they also mention concrete problems arising from the use of GMOs, such as the release of GMOs causing allergies, resistance to antibiotics or genetic contamination. The fact that they mention specific aspects does not mean that the scientific community would recognize them as real problems but does indicate that the organizations are seeking precise arguments to question this technology. They thus deploy discourse acquired from certain scientists, in which the risks of GMO use are pointed out with a greater degree of certainty – in particular those of the *Independent Science Panel*. This type of argument refers to *'proven' risks*:

> The amount of agrotoxic residue in GM maize is, as has been proven, much higher than conventional grain. There are documents pointing to the risk of the appearance of harmful agrotoxic-resistant grasses as well as the possibility of GM maize contaminating conventional crops. (MST, 2006b)

Third, this technology is considered to serve the interests of multinationals and the control of farm production. This type of argument centres on seed patents, and the technological package of glyphosate

and glyphosate-resistant GM soya beans. This is an argument stressing the *economic control* that comes with the use of GMOs:

> GM products and seed research undertaken by corporations only aim to increase their profits and not the population's welfare […] The dominance of biotechnology and the use of GMOs is moving towards a world seed oligopoly controlled by just eight major economic groups […] Farmers will completely lose control of seed use and will be totally dependent on multinational corporations. (MST, 2003)

Last, another series of arguments centres on the type of regulation of this technology. For example, there is talk of the need to label products obtained from GM plants. Also, that the government bodies responsible are not effectively in control of the circulation of GMOs or single-crop farming practices. Above all, the fitness and ability of those in charge to enforce regulations is questioned. These arguments address the *technical control* of GMOs:

> CTNBio is also being questioned over its lack of transparency. Meetings and hearings are carried out behind closed doors and the conclusions of debates are never made public. (MST, 2006c)

It is important to remember that, although I classify the arguments under four different groups for the purposes of analysis, all are used by the social actors opposing GMOs, often in combination. Overall, these arguments are used to support the notion of "technological risk" embodied by GMOs. In other words, they are used to point out that GMO technology is a technology whose effects escape any kind of control imposed upon it and become unpredictable (Pellegrini, 2007). The risk therefore becomes polysemic in nature in that it is used with different meanings. This polysemy is developed within a social controversy over GMOs and this grants it a particular meaning. Accordingly, the groups that reject GMOs address different sectors of society and seek legitimacy not just in terms of scientific knowledge but collective beliefs. Apart from being a sound discursive tool in the social controversy, the polysemic notion of risk also presents a further rhetorical advantage for those opposed to GMOs: it is flexible enough for different social groups to be able to use it and uphold common demands. Although all groups rejecting GMOs use all four types of arguments relating to the discourse of technological risk, each one eventually develops or stresses one type of argument in particular. This is in response to the needs and interests characterizing each social actor. Therefore, within this polysemy, the specific balance between the arguments employed by each social movement in its risk-related discourse can be analyzed as the result of the links, interactions and interests singling out each social group.

The roots of knowledge

The MST's stance on agroecology has been consistent since it began to consolidate it at national level at its 4th National Congress in 2000 (See MST, 2007a; Borsatto et al., 2007). In 2001 it joined forces with other organizations to disseminate agroecology, ultimately leading to the formation of the Agroecology Conference, an event that has been held annually since 2002. In 2003 its anti-GMO stance took a new step with

the MST's occupation of a biotechnology corporation.

The MST's stance over GMOs is not limited to expressing rejection in the public sphere but is based on a search for arguments to give this stance meaning. It organizes workshops, and in-house publications and conferences to discuss the subject of GMOs. It also runs an agroecology school in Paraná state, where militants are educated through principles in which GMOs are not accepted. The rejection of GMOs cannot therefore be explained as a mere rhetorical strategy of public reaffirmation but as part of a deep-rooted conviction in the movement's vital force. Within the MST, there is a collective belief about the characteristics, role and effects of GMOs, a belief that ends up conceiving GMOs as a homogenous entity that must be rejected by every means possible.

Nevertheless, a common approach when studying public perception of biotechnology is the *cognitive deficit model*, i.e. the assumption that the public *does not understand* biotechnology (Davison et al., 1997). On the other hand, efforts to show that a public attitude towards biotechnology is *valid* can also be common. I develop neither of these perspectives here because explanations of the social causes behind a belief do not simply rely on declarations of evidence supporting it and so "we should not explain why some people believe *p* by saying that *p* is true, or corresponds to a fact, or the facts" (Hacking, 2000: 81). In other words, if the reader is expecting this article to support evidence that agroecology is more valid or more convenient than agrobiotech or vice versa they will be disappointed: not just because the dichotomy seems to me an unsatisfactory one but because the purpose of this article is to explore the social causes that support one form of knowledge about GMOs. Specifically, I intend to explain which social causes have been decisive in the MST adopting a particular stance towards GMOs. Therefore, since GMOs encroach upon the MST's set of representations about nature and society, I will analyze the construction of the ideology behind this position as the medium through which a certain awareness and meaning of the world operates for the MST.

Agroecology: agricultural technologies in the MST's ideology

If opposition to GMOs is spread across a wide variety of actors, agroecology is particularly deeply-rooted in the MST and its immediate environment. What is agroecology for the MST? It is a mode of agricultural production founded on two matters. In its most *technical* aspect it restricts farming strictly to the family core, while also using resources available locally in their own plot or their surroundings. The other aspect defended by the MST in agroecology is its politico-ideological dimension. In this sense it believes that agroecology enables peasant families to attain a greater capacity for autonomy against capital while increasing their chances of remaining on the land (IEEP, 2006).

Looked at like this, agroecology differs from other options put forward in response to the technological modernization of the countryside, such as 'sustainable agriculture' and 'organic agriculture'. According to the MST, the concept of *sustainability* (developed during the United Nations conference in Rio de Janeiro in 1992) allows different levels of technological impact on nature. The use of synthetic herbicides and fertilizers, for example, is accepted

by sustainable agriculture provided their impact on the environment is not excessive. In agroecology, on the other hand, there are no 'impact levels'; the logic is that the peasant family keeps farming the way it traditionally has been doing, without resorting to modern technology. Organic agriculture does not use agrotoxics but its strategy replaces them with organic ones. Agroecology, on the other hand, does not call for large volumes of manure to be used as fertilizer but instead organizes production with locally available elements. Moreover, these ways of organizing agricultural production lack the politico-ideological differential that the MST defends as the nub of agroecology. Thus, agroecology distinguishes the MST from other actors with whom it shares the fight against GMOs insofar as they defend sustainable agriculture.

Besides these differences with sustainable and organic agriculture agroecology identifies the technological modernization of agriculture as its main antagonist. This nevertheless has various facets. The pamphlet 'A natureza do agronegocio no Brasil' (MST, 2006d), written by the MST's Training Sector, defines agribusiness as the model under which agriculture is organized in Brazil in the form of huge farms devoted to a single crop, with a small workforce, intensive use of agrotoxics and high technology, in particular GM seeds. This mode of production is opposed to the "way workers organize food production, the rural population welfare and its link to the rural environment." Thus a "dispute between two political projects" is established: "one that subordinates our economy and our society, our very culture to international capitalism, to banks and transnationals, the agricultural version of which is *agribusiness*; and another national development project that puts labour, welfare and income distribution top of the list of economic priorities, the agricultural version of which is the implementation of agrarian reform and the predominance of peasant agriculture." The MST believes a new technological model is developing as a result of the dominance of agribusiness, a model bequeathed by the green revolution – characterized by the use of insecticides, herbicides and chemical products in general – to give way to one that boosts farming productivity still further. This model is based on the techniques developed by biotechnology. The MST's training pamphlet describes several aspects of "the biotechnology problems". These can be summarized as follows:

a) It believes biotechnology is used by certain economic conglomerates to hold farmers hostage to their seeds thanks to patents that allow corporations to register any plants developed as private property, thus increasing the exploitation of farmers.

In this scheme of things, biotechnology is used for corporations to boost their profits: "all GM research and seeds already available in the marketplace either in Brazil or elsewhere are seeds that were genetically altered solely to withstand the application of certain poisons produced by the same corporation, either fungicides (in the case of Bt-maize), or herbicides (in the case of RR soya beans)".

In my classification of the rejection of GMOs this reasoning comes under the *economic control* arguments.

b) The problem with "GM seeds, developed by biotechnology [is] that they never existed in nature." It follows

that "nobody knows the consequences of this new GM product for nature, the environment, or the health of consumers and producers."

The opposition to GMOs accordingly avoids "other nasty surprises, like the story of 'mad cow' disease in Europe, which apparently boosted milk output but ended in tragedy, with dozens of casualities and the disease running rampant" (MST, 2006d: 23). This is where the notion of *uncertainty* develops when people start talking about the lack of certainties, coupled with arguments about *'proven' risks*, at least insofar as it is linked to a specific case like "mad cow" disease (and even when it is not directly linked to GMOs).

The pamphlet also mentions the impossibility of *controlling* such biotech products:

c) GM seeds "eliminate the biodiversity of nature due to the fact that most GM seeds are unable to live alongside natural seeds, mixing and transforming what was once natural into a GMO".

These arguments (which coincide with my four categories, with a clear leaning towards *economic control* and *uncertainty* arguments) make up the MST's stance on *biotechnology problems*. But its main concern seems to be shifting to another aspect. The MST's training pamphlet ends by saying that agribusiness will "affect the future of peasants, so-called family farming, our eating habits, the rural exodus and migration." That is to say, it will affect their way of life, their condition as peasants:

> The dependency resulting from the expansion of GM soya beans clearly shows the social and environmental incompatibility of GMOs and family farming due to the fact that they tend to increase technical problems and ignore the most important economic factor in family farms: the availability of labour. (MST, 2006e)

Agroecology, aside from being viewed as a model of agricultural production, also functions as an ideology to support the MST, enabling it to articulate different meanings about nature and society, and its objectives within them. On this ideology a collective identity is constructed that supports the MST's social tissue.[18] In schematic terms there are two *moments* in the MST's history that mark the construction of its identity. First, an identity emerges that is in the main defined negatively, arising out of a refusal to accept their condition as having been driven off their land, an identity that absorbs the very name of the actors: the *sem terra* or 'landless ones'. Following this rejection of an objective condition – their having no land – they reassert themselves as peasants or farm workers and legitimize their need to occupy land.[19] A second *moment* emerges later, which in the main positively constructs an identity. This is when agroecology makes its appearance via the statement that the MST's way of production is the only fair, correct and necessary way to work the land. From this statement emerged the rejection of any scientific-technological object or discourse that comes into conflict with agroecology.

MST and its model of agricultural production

One of the main elements conditioning the MST's ideology and reflected in the way it conceives of agroecology is its own particular way of organizing agricultural production. The peasants, who ultimately

form the ranks of the MST, work the land on the basis of family agriculture: in other words, production is based on each family's work on a small plot. When joining the MST, families with no land to work soon occupy unused and unproductive fields and go back to family agriculture. Accepting GMOs is not a simple act of will or, as *cognitive deficit* discourse claims, being better scientifically formed (and informed). Using these technologies – from heavy machinery to GM seeds – would lead to the break-up of the MST's production model, as it would involve the use of a technological package that would modify the organization and the division of labour. To put it another way, accepting GMOs would undermine its very foundations as a social group.

Links with other social actors

Religious discourse pervades much of the anti-GMO movement with stances close to the *uncertainty* arguments, starting with the argument that the problem is scientists 'playing God' and that through GMOs "totally unexpected new diseases, allergies, forms of cancer [and] bodily change" may emerge, since "only God knows what might happen in this crazy race to tamper with the mysteries of existence." Even Pope John Paul II said that "using GMOs to increase production is against God's will" (Campanha Nacional 'Por um Brazil Livre de Transgênicos', 2001: 4-5). A religious stamp is clearly apparent in the CPT, which has close links to the MST.

> Agribusiness defiles the sacredness of the earth, of the waters and of all creation insofar as it poisons, its aim being profit and the exploitation of workers. It is necessary to recognize the riches of creation as God's work and not as any individual's property. And this is only possible by supporting a different model of agriculture: so-called peasant agriculture. (CPT, 2005: 16)

The CPT has kept up links with the MST since its creation, and they also meet up at anti-GMO campaigns. On the other hand, the CPT organizes the annual Romaria da Terra, a religious feast related to the earth that combines catechesis and agroecology in a virtuous syncretism:

> "Doth the plowman plow all day to sow? Doth he open and break the clods of his ground? When he hath made plain the face thereof, doth he not cast abroad the fitches, and scatter the cummin, and cast in the principal wheat and the appointed barley and the rie in their place? For his God doth instruct him to discretion, and doth teach him." (Isaiah 28, 23-29). We might say that the Farmer God of the prophet Isaiah is an Agroecological God: he teaches him to plant the soil, to protect it with forage crops, to till different seeds, thus guaranteeing diversity and greater productivity, without fences or agrotoxics, without chemical fertilizers, without GMOs. These are the rules of God's farming. (CPT, 2004.)

A clear example of the importance of the relationships between social actors in the construction of discourse and of the importance of their position over GMOs in the political sphere is seen in the *Manifesto das Americas em Defesa da Natureza e da Diversidade Biologica e Cultural* (MST et al., 2006). This is opposed "boldly to the introduction of GMOs into the environment; the introduction of GMOs into the environment is not acceptable either in agriculture, plantations, cattle farming or any other crop, for, apart from being unnecessary, they are of no use

whatsoever, other than the profit they bring to a few transnational corporations; they are potential health risks to people and bring about modifications to nature and ecosystems that are permanent and irreversible." This manifesto was signed, among others, by MST national leader João Pedro Stédile, the Paraná state governor and President Hugo Chávez of Venezuela.[20] The link between the MST (and other organizations that reject GMOs in general) and the Paraná government (which identifies itself as a government that rejects GMOs) is an extremely close one.[21]

The other kind of relationship that conditions the discourse of GMO rejection comes from organizations with a technical profile. These include: the AS-PTA, a Brazilian organization consisting mainly of agricultural engineers; the ETC Group (Action Group on Erosion, Technology and Concentration), considered by the MST to be a "prestigious international civil society organization, based in Ottawa, Canada, which has been acting since 1970 in the areas of biotechnology and nanotechnology" (Via Campesina, 2006: 14); or the Independent Science Panel, which brings together scientists from diverse disciplines and whose book on GMOs was published in Brazil by the MST's press in tandem with the Paraná government.[22] Direct connections with other academic agroecology supporters are also frequent, as in the case of Altieri (MST, 2007b).[23]

The link with these organizations is fundamental because the MST also wants a scientific component to be recognized in its discourse. The MST is ready to rely on this technical discourse precisely because it is consistent with its own general idea of what GMOs are: in other words, because the social structure of its own agricultural organization already predisposes a way of perceiving these technologies as a threat to what so-called agroecology.

The position of scientific knowledge towards GMOs is something the MST feels is controversial and it explicitly claims that in agroecology it has part of the scientific community on its side: "Scientists basically fall into three groups: one that backs transnational corporations, another that backs only GM research and the rest, who are convinced genetic mutations harm biodiversity" (MST, 2004).

For the MST (MST, 2006g) agroecology "is a way of farming based on two fields of knowledge: traditional and scientific", where traditional knowledge is "the one that farmers, communities and indigenous peoples have developed for centuries." Then there is the field of "biological science, knowledge developed in recent years in Biology, Botany and Chemistry, that helps us to understand the ecological processes of life and nature a little better." Hence, "agroecology brings together such traditionally and scientifically-based knowledge and develops a new agriculture model." Finally, "the Social and Political Sciences are also incorporated, working towards raising the awareness of farmers" (MST, 2006g).

The result is that these organizations act as mediators between scientific discourse and the MST. They are usually placed in what Collins and Evans (2002) have dubbed the group of scientists who are not specialists in the controversy but who are part of the scientific community and bring the technical aspects and scientific arguments of the problem closer to the public. In our case the MST adopts them as its own or hails these groups as its 'scientific yardsticks'.

Conclusion

Knowledge, identity and ideology

I have tried in this paper to show that it is difficult to explain the rejection of various different technologies by given social groups due to the lack of scientific knowledge potentially available to these groups. On the contrary, a closer look at the reality of the groups opposed to these technologies exposes the complexity and multiplicity of factors in the development of their position.

In the MST's case agroecology is conceived as family agriculture where farmers work small plots using only traditional tools. GMOs thus emerge as elements hostile to agroecology, threatening the model whereby the MST represents itself in both nature and society, indeed attacking its very existence as a social movement.

The MST is consolidating its knowledge about the risks of GMOs through interactions with other actors, including scientists. This notion of risk covers several different meanings, which I classify in arguments about *uncertainty*, *'proven' risks*, *technical control* and *economic control*. This knowledge embodies a particular conception of the role and effects of GMOs. According to Ludwig Fleck, when an idea strongly permeates collective thought and penetrates its daily life, it is immediately evident and questioning it becomes unthinkable (Fleck, 2008 [1935]: 56-57). This may be valid in every stance over GMOs. In this particular case I intended to go beyond Fleck's description to find the possible influences on the MST's conception, its ideology about the meaning of nature and society, and the role GMOs play in them.

There are various different influences in the development of the MST's ideology, at least where agroecology is concerned. The first is the MST's own particular way of organizing production. Its social structure consists of peasant families that essentially practise subsistence farming. Production is based on the work done by each settled family. Moreover, above all at its inception, the MST was very much shaped by the sudden emergence of major technology projects in Brazilian society, in particular the Itaipú Dam and agricultural mechanization during the 1970s, in the wake of which there was a mass expulsion of peasants. This allows us to suppose that the MST has developed a particular sensibility towards projects that present themselves as "technological modernization", especially when they claim to transform rural production dynamics.

A concrete obstacle faced by the MST in gaining access to GMOs is that it is expensive technology. Developing its own GM crops is not a viable alternative because the capital needed is out of a peasant movement's reach. However, why did they not try to appropriate GMOs instead of rejecting them? The question is counterfactual and uncomfortable, but it acquires relevance due to the MST's idiosyncrasies. Indeed, the MST was formed as a social actor on the basis of the refusal to naturalize its social reality, appropriating what it lacked: namely, land. So why not use GMOs too for working the land? The answer lies in the above account: the fact that the MST was built out of scattered groups with only the appropriation of land for settlement and farming in common has been a foundational and identitarian element. It has been a constant throughout its history because it allows the MST to keep on growing, incorporating new peasants. The deep-rooted model of family farming, coupled with the MST's anti-

GMO discourses (due to its links with scientific bodies, religious and ecology movements, and government sectors), has constructed an ideology in which agroecology stands for an image of nature and agriculture that GMOs would distort.

GMOs also affect the MST's collective identity very differently from the way land occupation does. While land occupation springs from peasant families' need to work and dwell, the way agroecology is conceived, with the consistent rejection of GMOs, boosts the value of its own production model: "Agroecology is the new goal of agricultural technology and it can only be practiced by peasant communities… Therein lies one of the pillars of peasant hope. [Agroecology] will be necessary for all humanity and not only for the peasants." (Görgen, 2004: 87)

Land occupation and GMO rejection are two sides of an identitarian reaffirmation: they express the need to take what one does not have –land– and demonstrate what one does have – agroecology. But apart from acting as an internal agglutinating force, agroecology also acts as an external legitimizing force in its claim that the MST produces food without resorting to controversial technologies.

From countryside to city

If the problem is agribusiness, why is rejection focused on GMOs and not on other technologies that disrupt agroecology? Part of the answer is that GMOs have high levels of rejection in cities, and the MST and its allies are aware of this: "Research done in Brazil in 2003 proved that 93% of urban consumers prefer non-GM products" (Terra de Direitos, 2005: 9).

On the other hand, the MST is a mass organization with strong roots among the Brazilian peasantry and this influences the peasant movement at a global level.[24] However, its intention is not to limit its hegemony to the countryside but "to make society and the already urbanized sectors aware that agrarian reform is everybody's battle" (MST, 2000), in the process becoming a socio-political movement that is endeavouring to extend the peasant-based social struggle implied by agrarian reform within a global class struggle (Harnecker, 2002: 259-260; Moura, 2000: 139-140). But to expand the MST's influence in the cities is no simple task. This is not because the MST provokes rejection in the cities, but because its main problem – agrarian reform – is a typically peasant problem. By opposing GMOs the MST is expressing an ideological conviction but manages at the same time to make its voice heard in cities. A dual property of GMOs takes on relevance here. Given their controversial dimension, where – science aside – moral, religious and political considerations also come into play, GM crops are big news in the cities. They only exist in their concrete or material way, however, in the countryside. This duality does not apply to any other agricultural technology. GMOs are only farmed in the countryside but are becoming visible in the cities.

The MST's most visible political action since its inception – action that has allowed it to grow – is land occupation. But this changed in 2003: after an "Agroecology Conference" the MST occupied a Monsanto research centre. This action reflects a break in it's the movement's mode of public intervention. Until then the MST occupied unproductive fields and make them productive. That way, it could settle peasant families while publicly demonstrating the importance of land distribution. But in occupying biotechnology corporations the MST's logic of public intervention has changed:

> Since this action the MST has more explicitly incorporated in its political action the opening of more radical confrontation with those huge corporations that present themselves to society as the expression of everything modern and sophisticated, as cutting-edge technology. These actions show society the truths hidden behind the hoardings… These actions instil in the public-at-large the need for greater awareness of the presence of these big corporations within the national territory and of how they control and exploit natural resources, the workforce and the country's natural wealth.[25]

In March 2006, the MST (within Via Campesina) occupied an experimentation field of the Syngenta biotechnology corporation, which was breaking the law by sowing GMOs close to the Iguazú National Park. The Paraná governor finally expropriated the fields from Syngenta, and over 60 peasant families settled there to farm agroecological crops (MST, 2007c).

As the MST occupies fields and research centres belonging to biotechnology corporations it becomes visible to the cities, its discourse gets heard, its mode of production is taken into account and its problems take on new relevance. For the MST reaching the urban public-at-large is a political necessity and it could therefore never stay aloof of controversy. Biologically speaking, GMOs have the property of expressing the specific trait for which they were designed but, sociologically speaking, GMOs have the capacity to amplify everything around them.

The struggle between peasantry and machine

Marx points out that numerous workers revolts in the seventeenth and eighteenth centuries were against early industrial machinery like sewing and shearing machines. At the start of the nineteenth century due to the arrival of the steam loom the Luddite movement, a figurehead of technology rejection, performed mass destruction of machinery in English manufacturing districts (Marx, 2000 [1867]: 354-355). I have avoided the comparison between the MST's rejection of GMOs and the Luddites' actions throughout this text for two reasons: first because it is difficult to compare the attitude of an incipient workers' movement facing the novelty of the first machines in the early stages of the Industrial Revolution with the situation of a peasant movement at the start of the twenty-first century; second because the reference to the Luddite movement is usually used to stigmatize a social actor by constructing an image of the hatred of progress and the desire for a preindustrial past (Randall, 1997: 57). On the contrary, I have tried to explore the reality in which the MST is immersed, its development proper, its arguments and the controversy surrounding GMOs in order to describe the density of social forces shaping the MST's stand against GMOs. However, there is an observation by Marx about the Luddites that echoes throughout this text:

> It took both time and experience before the workpeople learnt to distinguish between *machinery* and its *employment by capital*, and to direct their attacks, not against the *material instruments of production*, but against the *mode in which they are used*. (Marx, 2000 [1867]: 355)

This is linked to the above counterfactual question about why the MST refuses to appropriate GMOs and design its own GM crops. Although I have shown all the factors that have appeared over the MST's history and that place it squarely in the context of the mass rejection of GMOs, there is another dimension to the answer in light of these observations – one conspicuous by its absence. The lack of a tradition dissociating the criticism of machinery from its social mode of exploitation undoubtedly contributes to the closure of the MST's unambiguous stance on GMOs, and adds a disturbing amount of uncertainty to Marx's equation of the workers' movement, time (or experience) and its stance on technology.

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Notes

[1] According to a report by the International Service for the Acquisition of Agri-Biotech Applications, the United States in 2006 led the production of GM crops with 56 million hectares of farmland, followed by Argentina with 18 million, then Brazil with 11 million (James, 2006).

[2] Although in this text I keep the original Portuguese, the MST is also known in English as the 'Landless Workers' Movement'. The MST is a mass movement with, according to its own estimations, 1.5 million landless members organized in 23 out 27 states in Brazil.

[3] The term 'transgenic' is far more commonly used in Portuguese than 'genetically modified organism' (GMO).

[4] See Fernandes (2005: 6). According to Vara, the Southern Brazil producers favoured GM crop profits over the risks of going against the legal system. Vara argues that this independence and tenacity in their attitude is what finally tilted the scales in favour of adopting GMOs in Brazil (Vara, 2004: 122).

[5] MP 113, published in the *Diario Oficial de la Union* on 27 March 2003; it was voted in as Law 10,688 in 2003.

[6] MP 131, voted in as Law 10,814. This measure provides that farmers could use seeds from the 2003 harvest provided they did so before 31 December.

[7] Law 11,105 providing for a regulatory framework for the use of GMOs.

[8] According to the biosafety law, CTNBio's decisions should be approved by at least two thirds of its members (18 votes). But through MP 327, voted in as Law 11,460 on 21 March 2007, the CTNBio quorum was reduced to absolute majority (14 votes in favour are needed).

[9] In spite of this law, the conflicts at legislative level continued, in particular in Paraná State. There, the governor (Roberto Requião, who claims Paraná to be "a state that rejects GMOs"; see *Dia T pela Rotulagem dos Transgênicos vai mobilizar todo o Parana nesta quarta-feira*, Agência Estadual de Noticias, 06/13/2006) had passed a state law in 2003 (Law 14,162/03) prohibiting the farming and commercialization of GM products, a law that was rescinded by federal justice (Direct Action of Unconstitutionality 3,054 of

the Supreme Federal Court). In 2005 it passed another state law providing that products obtained from GM crops should be labelled (Law 14,861/05) and in 2006 the Paranaguá and Antonina Port Administration, headed by the governor's brother, Eduardo Requião, had a federal court prohibit the shipment of GM soya in Paraná's ports, a measure that was rapidly reversed by a higher court.

[10] Over the past few years, soya has accounted for 20 million of the more than 45 million hectares farmed in Brazil. Maize, with two annual harvests, accounts for about 13 million hectares. See *Indicadores da Agropecuaria 2008*, Ano XVII, Nº 1, Companhia Nacional do Abastecimento, Ministerio a Agricultura, Pecuaria e Abastecimento. This government institution, which produces farming statistics, does not however provide information on GM farming.

[11] Monsanto currently has five GM crops in Brazil commercially approved by CTNBio: three herbicide-resistant crops (soya bean, maize and cotton), and two insect-resistant ones (maize and cotton). Bayer has two herbicide-resistant crops (maize and cotton). Syngenta has one insect-resistant maize and one herbicide-resistant maize. Dow Agrosciences has one insect-resistant maize and one herbicide- and insect- resistant GM cotton. All of them have been commercially approved in Brazil by CTNBio and other GM varieties of soya bean, rice, cotton and maize are expected to be up for examination soon.

[12] Glyphosate use in farming areas eliminates all weeds (thus avoiding the simultaneous use of a group of herbicides for different weed species) and leaving the GM soya beans free to grow.

[13] According to Trigo and Cap (2003: 88-90), glyphosate-resistant soya bean in Argentina brings a reduction in production costs of US$20/ha. Moreover, producers may have kept back over 80% of profits, with the rest going on seed and glyphosate vendors (Trigo and Cap, 2003; Vara, 2004: 106).

[14] See Campanha Nacional... (2004).

[15] I have based this classification on the discourse of MST and other actors close to it. For other classifications of the GMO controversy, see for example, Lacey (2005: 125-132). It is also worth noting that MST's discourse regarding GMOs is fairly stable, as it did not change significantly during the controversy over GM crops in Brazil.

[16] These arguments contain a (sometimes indefinite) plea for a moratorium related to the Precautionary Principle presented in the Rio Declaration and provides that "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation" (United Nations, 1992).

[17] The Independent Science Panel was founded in 2003 through the coming together of scientists from different disciplines who wrote consecutive reports on GMOs.

[18] In Gouldner's terms, "ideologies are precepts centred in projects that try to reconstruct a corroded, fragmented totality", and in this sense ideologies are attempts "to integrate parts before separated, to reconstruct an undone tissue" (Gouldner, 1978: 310).

[19] Fanelli and Sarzynski (2003) suggest that the name "sem terra" provided the MST with a concept that allowed them to incorporate a varied set of rural actors, all of them related to the struggle for land.

[20] The manifesto was signed on 20 April 2006. The day before, Hugo Chávez met with Paraná State governor, Roberto Requião, and they signed trade agreements totalling US$300 million (See *Presidente da Venezuela visita Brasil para firmar acordos milionarios no PR*, Agência Noticias do Planalto, 04/19/06).

[21] "The 4th Agroecology Conference took place in Cascavel, on 25-28 May 2005. The central mobilization was marked by various issues, such as state governor Roberto Requião's public support for homegrown seeds and against GMO farming." (MST, 2006f)

[22] See Grupo de Ciência Independente (2004), *Em defesa de um mundo sustentavel sem transgênicos*, São Paulo, Expressão Popular. Also the webpage of the Independent Science Panel: http://www.indsp.org, and the ETC Group: http://www.etcgroup.org.

[23] An entomologist at the University of California, Miguel Altieri has published several articles and books in support of agroecology (see Altieri & Nicholls, 2005).

[24] The MST also participates in Via Campesina, an association that since 1993 has brought together peasant movements from various continents.

[25] Interview with MST leader, a farming technician and professor at the Escola Latino-Americana de Agroecologia (April 2006).

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