

**THE STRATEGIES SUPPORTING AGROECOLOGY IN SETTLEMENTS
MANAGED BY THE LANDLESS RURAL WORKERS' MOVEMENT (MST) IN RIO
GRANDE DO SUL STATE, BRAZIL**

Flora B. Piasentin

Federal University of the Recôncavo of Bahia, Bahia, Brazil

fpiasentin@ufrb.edu.br

Guido Ruivenkamp

University of Humanistic Studies, Utrecht, The Netherland

guido.ruivenkamp@wur.nl

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Abstract:

This article examines the strategies devised by the Landless Rural Workers' Movement (MST) and by Rio Grande do Sul (RS) State government orienting the agricultural practices at three land-reform settlements in RS State, Brazil. These strategies are examined in light of the notions of the production of locality, agroecology, endogenous development and industrialization of agriculture. The article aims to contribute to the discussion regarding the existing opportunities to create social space for agroecological technologies and practices leading to endogenous styles of development. Strategies implemented by MST organizations and RS State government attempted to create a locality more conducive to endogenous styles of development in the settlements. By promoting agroecological images, inputs and practices and discouraging those connected to industrial agriculture, these organizations aimed to stimulate settlers to re-appropriate their agricultural activities, improving their autonomy in the food chain. Despite these strategies, the industrial/modern agricultural model was widely disseminated among settlers, who adopted its associated images, inputs and practices, undermining the MST political ideal of an agroecological production in the localities of the settlements in RS State.

Key words: milk production, genetically modified soybean, endogenous development, industrialization of agriculture.

Introduction

Brazil is known for its extreme levels of inequality in land tenure (Meszaros, 2000). The Brazilian State of Rio Grande do Sul State (RS State) is no exception, being also affected by an unequal distribution of land. In RS State, *latifúndios* (large farms with more than 875 hectares) abound in the southern part of the state while in the northern part of the state there is a high number of small farms (Governo do Estado do Rio Grande do Sul, s.d.). The problem is increased by the further fragmentation of these small farms by inheritance until it reaches such a level that no longer all sons and daughters of small farmers can have access to a piece of land. Moreover, sons and daughters of small-scale farmers often cannot afford to purchase their own land parcel and are converted to landless rural workers.

Within this context, joining the movement of the MST represent for most of these rural workers the best solution to obtain a piece of land. These conditions form often the background of persons in RS State who join the national social-political movement for the land reform, known as *Movimento dos Trabalhadores Rurais Sem Terra* (Landless Rural Workers' Movement - MST).

The MST was created with the objectives of obtaining land for landless rural families and eliminating the surviving forms of agrarian feudalism, economic power concentration and the unequal land structure, characterized by the presence of few large farmers (*latifundiários*) on one side and a large number of landless farmers on the other (Ferreira, 1994). To date, the MST has settled approximately 400 thousand families over 7 million hectares of farmland in Brazil (Karriem, 2009).

The MST organizes land occupations within those rural farms judged to be unproductive or abandoned as a form of exerting pressure on the public administration to implement and advance the land reform in the country. The MST can refer to constitutional clauses calling for the Brazilian state to expropriate unproductive land, which does not fulfill its social function, to redistribute this land to the landless rural labor force and to finance the new rural settlements (Petras, 2000). Once the settlements have been set up, MST cooperatives and credit projects are set up for the settlers to organize their agricultural

productions.

Opposing the dominant industrial agricultural model, the MST supports sustainable agriculture forms such as agroecology to be adopted in the settlements, since these are more compatible with the goals of promoting local food security, local agricultural technologies and the autonomy of farmers in relation to multinationals (Landless Workers' Movement, s.d.; Karriem, 2009).

In this article, we examine the strategies devised by the MST and RS State government to promote agroecological practices and technologies in three land-reform settlements in RS State. We will also examine the local dynamics concerning the disputes between agroecological and industrial agricultural models promoting the adoption of distinct practices and technologies. This article is based on fieldwork carried out by the first author between April and July of 2002 in RS State as part of the Master thesis of the first author. Although the data is not new, the analysis sheds light on some important dynamics within land-reform settlements for the construction of agroecological production systems.

The article is structured in four sections. The first part describes the study area; the methodology, and the conceptual framework adopted. The second part examines the MST political structure within the settlements and beyond this level. Third, the main strategies devised by the MST and RS State's government towards the promotion of agroecological technologies within the settlements are described in light of the hegemonic productivist paradigm and the adoption of inputs and activities aligned to the industrial agricultural model. Concluding remarks are discussed in the last part.

Study area

In this study, three land-reform settlements managed by the MST in two different regions of the RS State (Brazil) were studied. The first two settlements, Ceres and Rondinha, were located in the small municipality of Joia in the northwest region of RS State while the third one was located in the municipality of Charqueadas, next to the capital city of the RS State, Porto Alegre (Figure 1).

Settlements Ceres and Rondinha

Several MST settlements have been established in Joia. The first settlement in Joia dates back from 1988 when the settlement *Botão de Ouro* was established. The families from

this settlement originated partly from one of the first MST land occupations in the South of the country (*Fazenda Annoni*). In the settlement *Rondinha* 233 landless rural families organized by the MST received individual land plots of in average 18 hectares in a total of 4.125 hectares while in the settlement *Ceres* 114



Figure 1. Map of Rio Grande do Sul State. Numbers indicate the places where field research was done. 1: Porto Alegre; 2: Joia, 3: Charqueadas.

families were settled in a total area of 2.210 hectares with single plots of an average of 13 hectares. These settlements were implemented in 1995 and 1996 respectively with the financial resources provided by the federal government through the national institution responsible for the land reform, the *Instituto Nacional de Colonização e Reforma Agrária* (National Institute of Colonization and Agrarian Reform – INCRA). During the first years, investments were done for the housing, basic infrastructure and agricultural production.

In the following years, other two MST settlements (*Barroca* and *Novo Horizonte*) were implemented. There were approximately 500 families living in the settlements administered by the MST in this area. However, several families living in these settlements did not accept the political administration and leadership of the MST. Settlements *Ceres* and *Rondinha* were both managed by the MST and that is why they were chosen as study areas.

Settlement *Trinta de Maio*

The third settlement researched, the settlement *Trinta de maio*, was located in the municipality of Charqueadas, a small industrial municipality closer to the capital city of RS State; Porto Alegre. This settlement was implemented in 1990 with 46 families. Contrary to the previous settlements, the RS State implemented this settlement but did not provide for the financial resources required for the basic infrastructure. This basic infrastructure had to be financed by settlers themselves.

MST agricultural cooperatives

Cooperativa Agrícola Terra e Vida (Agricultural Cooperative Earth and Life - COOPERVIDA) served the MST settlements in the region of Joia, by organizing the transportation and commercialization of milk produced by settled families. The twenty-eight families in the settlement *Trinta de maio* opted to organize the agricultural work in a collective form through a cooperative. In the *Cooperativa de Produção Agropecuária dos Assentados de Charqueadas* (COPAC) the land and others factors of production was under the control of the settlers' group.

Both cooperatives sold the milk to large processing industries. COOPERVIDA commercialized the milk to the multinational PARMALAT, while COPAC to a national milk processing industry called IVOTI. These two cooperatives were administered by settlers themselves and coordinated by MST central cooperatives at state and national level.

Technical assistance was provided in the settlements at Joia by the *Cooperativa de Prestação de Serviços Técnicos Ltda* (Cooperative of Technical Services – COPTEC), a cooperative of technicians administered by the MST movement and supported financially by the RS State government. COPTEC assisted exclusively the MST settlements in RS State.

In the settlement *Trinta de maio* the official state extension organization *Empresa Estadual de Assistência Técnica e Extensão Rural* (State's Company of Technical Assistance and Rural Extension– EMATER) was responsible for assisting the milk producers. EMATER was the main private extension institution in the state.

Methodology

The field research was conducted from April to August 2002 in different regions of RS State. The first part of the fieldwork was dedicated to the research of the institutions supporting the MST in the city of Porto Alegre. The second part was carried at the settlements

Rondinha and Ceres while the third phase was done at the settlement Trinta de Maio (Figure 1).

The research methodology was qualitative, based on secondary data and semi-structured interviews with settlers, MST leaders and extensionists. In some cases interviews were tape-recorded and then transcribed, but most of them were written down directly on paper. Interviews were held with officials from the state's research institution *Fundação Estadual de Pesquisa Agropecuária* (FEPAGRO), the extension institutions EMATER/RS and COPTEC, the MST central cooperative COCEARGS, and COOPERVIDA and COPAC. Group discussions were also carried out during the fieldwork with different settlers' groups.

The directors of the cooperative COOPERVIDA acted as key-informants by indicating names of associated settlers in order to be interviewed. In order to avoid bias, other settlers were chosen by a snowball sample. The sample was chosen trying to represent the diverse socioeconomic realities present in the settlement that ranged from higher technological to lower technological production systems, and from collective to individual working systems.

Conceptual Framework

The data gathered during fieldwork was analyzed through a conceptual lens consisting of different notions that are interconnected to each other. The conceptual framework has been built up around the notions of production of localities (Appadurai, 1995), endogenous developments (Ploeg and Long, 1994), agroecology (Altieri, 2000), and the industrialization of agriculture (Goodman et al., 1987).

Appadurai (1995) describes the creation of a certain locality as a dynamic process that is constantly changing as contingencies of history, environment and imagination shape local actions. Local actions are seen not only as a product of a certain context but also as producers of a set of contexts in which other meaningful social actions can be generated and interpreted (Appadurai, 1995).

A locality is subject to different types of influences, which can originate at local, regional, national, and global levels. The relationship between local and global contexts can be interpreted as a dialectic one rather than a mutually exclusive one. In this way, local actions respond to contexts wider than itself (global) while simultaneously contributing to their creation by promoting or challenging them.

The influence of organizations such as the national government, multinationals or

social movements on local actions can be related to the mobilization of two types of resources. Firstly, allocative resources, such as land, capital, machinery and manpower and secondly, administrative or authoritative resources, as entailed in ideologies, information and devices that structure geographical space and social time (Reed, 1992).

An endogenous style of development respond to the claims of local communities to determine the development options by making decisions on how the locally-available resources - such as natural resources, labor force, knowledge, and institutions - will be used (Ploeg and Long, 1994). It also emphasizes the strengthening of endogenous elements in reaction to the presence of exogenous elements and the returning of benefits into the locality.

Sustainable agriculture is more connected with the notion of endogenous development than modern/industrial agriculture. It is widely recognized that the latter, although having increased food production, has brought environmental, social costs (rural exodus) (Pretty, 1994) and a general impoverishment of farmers due to increasing dependence on agricultural industrial inputs and activities. On the other hand, the regenerative and resource-conserving technologies of sustainable agriculture has been reported to offer good results in ‘resource-poor’ parts of the world (Pretty, 1994).

Within the different forms of sustainable agriculture, agroecology is advocated as relying most of all on local available resources as a starting point for generating endogenous styles of development. It is considered to be adapted to small family farmers as it builds upon their local skills, resources and knowledge, while considering the complexities of the local environment and the social-economic context (Altieri, 2000). Agroecology, contrary to industrial agriculture, emphasizes the diversification of crops (Altieri, 2000). By following this principle farmers can be less dependent on the market oscillations affecting the prices of products and inputs.

On the other hand, within the industrial agricultural production model, agriculture is increasingly integrated into the capitalist mode of production through the processes of industrial appropriation and substitution of rural activities (Goodman et al., 1987). In the former process, certain parts of the agricultural production are transformed into industrial activities, and then subsequently reintroduced in the form of industrial inputs (Goodman et al., 1987). Thus, it is able to weaken “the constraints of nature” (Bowler, 1992) to the capitalist production model, leading to a disconnection of agriculture from its locality (Ruivenkamp, 1989, 2003). An example is the use of chemical fertilizers replacing the use of organic fertilizers in farms where animal-crop production is integrated, an agroecological practice.

The process of substitution instead is concerned with substituting the outputs from the farm sector by industrial semi-products and eventually by chemical and synthetic raw materials within the food processing industry (Bowler, 1992). Substitution aims at opening the way for the elimination of the rural production process, as a way to reduce the many constraints (land, space, labor and biological reproduction) of the agricultural activity for the capitalist production system (Goodman et al., 1987). Thus, substitution can be interpreted as the last stage for a denial of endogenous local development, in which the consumption of food products is completely disconnected from agricultural production (Ruivenkamp, 1989, 2003).

The major agro-industrial bio-technological developments have reinforced these two developments, enhancing the separation of the traditional links of farming from its locality (Ruivenkamp, 1989). These have resulted in a dissemination of industrial agriculture and a loss of autonomy of farmers over their production (Ruivenkamp, 2003). These powerful technologies can be seen as contributing to a reorganization of the agro-industrial food chains (Miele, 2001), creating new contexts that affect several farming localities towards exogenous inputs, practices and styles of development.

Land-reform settlements will be considered in this study as localities constructed through the interactions between settlers and its wider context composed of MST organizations, RS State government and industries. Based on this theoretical framework, it is asked how the MST and RS State organizations are attempting to promote agroecological practices conducive to endogenous developments in the locality.

MST political structure and MST norms

A description of the political structure of the MST organization at the settlements' level and beyond that level (state and national level) is particularly relevant in view of the influence of this organization over the practices carried out by settlers. The MST settlement showed a political hierarchical organization of its own. Its smallest political units are called the *núcleos de base*, which are the primary political spaces in which settlers are expected to participate once a month to discuss and take decisions that can influence the coordination of the settlement. This space is also used to meet with the extensionists to discuss credit projects and technical issues. These meeting spaces are considered the basic units of the MST organization. Each *núcleo de base* has a coordinator and was generally formed by a group of 5 to 10 settled families, who lived close to each other in the settlement (MST, 2002).

In the *núcleos*, each settler should be engaged in one of the *setores*, which are teams who take the responsibility for developing issues important for the community life such as production, religion, leisure, health, gender, youth, etc. (MST, 2002). Above the *núcleos de base*, there was the *direção regional* (regional direction) formed by settlers denominated *dirigentes regionais* (regional directors). Each *dirigente regional* represented 25 settled families in the settlement (MST, 2002). They were active within the settlement and responsible for representing settlers' interests and transmitting settlers' demands together with cooperative directors to the technical team of COPTEC.

The *direção regional* (regional direction) at the settlement level interacted with the *direção estadual* (state's direction) located in the capital city of RS State. Every group of 500 families was clustered by the MST organization under the same region. For every region of the MST, consisting of 500 families, one *dirigente estadual* was chosen among the settlers. Above the *direção estadual* there was the *direção nacional* (national direction) formed by 21 settlers from settlements from different Brazilian States. The *direção nacional* was responsible for discussing and proposing the political guidelines for the movement at national level. However, these decisions had to obey the general guidelines formulated by the *coordenação nacional* (national coordination), a collective composed of 90 persons from whom many had a BSc degree. Finally, the highest hierarchy of the MST is the *congresso nacional* (national congress), a kind of general assembly, which meets every five years (Azevedo, 1996).

The MST's intricate political organization linked the *núcleos de base* at the settlements to its national administrative spheres. At the settlements' level, the strengthening of the participation of settlers in the local MST political spaces was seen as a very important part of the MST internal structure. As stated by N., a MST national representative: "Everybody has to do something, because everybody has to be part of the movement".

In order to stimulate and ensure the participation of settlers in the MST political spaces in the settlements, the MST organization linked this to settlers' access to the resources under their control such as credit, as verified during fieldwork. The MST political organization in the settlements (*direção regional*) was able to control the access of settlers to public credit through the influence over the work of the technicians of COPTEC, responsible for executing the credit projects. In fact, settlers' participation in the MST local meetings (*núcleos de base*) was a required condition to have access to public credit. Nevertheless, this situation made many settlers to attend MST meetings only when credit projects were involved. Quoting a co-

ordinator of a *núcleo de base* “Many settlers give up participating (in the MST) when credit projects stop coming...”.

As a result, it was noticed in the field that settlers who did not comply with MST norms were prevented access to public credit and other resources mediated by the MST representatives, giving rise to tensions between the MST *direção regional* in the settlements and those settlers excluded from public credit. These settlers challenged the local authority of the MST, arguing that they had the right to receive public credit.

Thus, settlers were in a way supposed to follow MST norms in order to be considered part of the movement and to continue having access to certain resources under the MST control. These norms, according to the *dirigente regional* N., were the following: participating in the political space of the MST at the settlement level (*núcleos de base*), participating and supporting the MST political struggles, not smuggling or planting genetically modified (GM) soybean seeds, not renting or selling the land, supporting left-wing political parties, and not harming the MST image.

These norms aimed at producing contexts in the locality of the settlements that valued the strengthening of the MST organisation and its political visions and the fight against the neoliberal project and the ever-increasing control of seeds by multinational industries.

The promotion of agroecology by RS State government and extension institutions

A relevant actor supporting endogenous local developments in the locality of the MST settlements analyzed was the RS State government. The RS State’s government supported activities strengthening family agriculture and agroecology. One such activity was the creation of programs providing credit at very low interest rates that benefitted MST cooperatives and settlers. The MST cooperative COOPERVIDA, for example, received financial support from the RS State government through the credit program *RS Rural*. This program financed projects for the generation of income and infrastructure for family farmers and their communities in the State. Further, the State government created a credit program called *Mais Alimento - Crédito para a Agricultura Familiar* (more food-credit for family agriculture) which financed only agroecological inputs to qualify the milk production of family farmers. Projects of intensive systems of animal production and purchase of equipment for the application of agro-chemicals were not financed by this project.

With the financial resource provided by this credit project, most settlers in Joia aimed to invest on items related to their milk production activity, such as cows, seeds for the

implementation of pasture, organic fertilizers for pastures, material to improve the stables and for implementing rotational grazing systems. Besides, this program delivered higher credit amounts to those small farmers who produced certified agroecological milk. Although settlers were adopting some agroecological practices, a completely agroecological milk production was not yet achieved in the settlements studied. The access to this credit by the settlers in the settlements Ceres and Rondinha in Joia was mediated by MST local organizations, as stated earlier.

However, one activity promoted by RS State government that did not challenge the reliance of farmers over exogenous inputs produced by agro-industrial companies was the program of hybrid maize exchange called *Troca-troca*. Through this program settlers could have access to hybrid maize seeds by exchanging 11 kg of their hybrid maize seeds of second generation by 1 kg of first generation hybrid maize seeds. Settlers in large part preferred these seeds, since these achieved higher grain production levels compared to local maize varieties.

RS State government had an important linkage with EMATER. This institution was the main executor of the state's policies destined to the development of the agricultural sector and focused its activities on family agriculture and agroecology (EMATER/RS, 2002).

In order to face the challenge of promoting agroecological practices in the State a great effort was done by EMATER to qualify its technicians. Courses for technicians on agroecology explored not only the technical dimensions and general principles of agroecology but also the participatory methods that were needed in order to involve the rural population in the construction of local agroecological knowledge. Despite these efforts, according to EMATER agronomist S.:

“... the majority of the professionals (extensionists in EMATER) are still locked in the dominant paradigm of the Green Revolution which incessantly searches for increments in yields that often result in the accelerated destruction of natural resources.”

The predominance of the Green Revolution paradigm can be attributed, according to the EMATER/RS agronomist S., to the fact that:

“The education of extensionists occurs at schools and universities, which still adopt an authoritarian working methodology and a technical content non-compatible with

the reality of family farmers.”

Another difficulty in stimulating these practices according to EMATER/RS official M. was that there was still a limited amount of technical knowledge accumulated in agroecology. In addition to that, technicians often find resistance from small farmers when they suggest agro-ecological techniques, because farmers themselves have to a great extent internalized the dominant modern paradigm which stresses that in order to be modern, they should import industrial inputs and technologies into the farm.

Another extension organization supported financially by the RS State government was COPTEC. This was a cooperative of technicians administered by the MST organization that assisted exclusively the MST settlements in RS State. COPTEC was also engaged in stimulating agroecological practices. A particular characteristic of COPTEC was that its technicians were selected on the base of its MST militancy or experiences with left wing parties, organizations and farmers' trade unions. This procedure for selecting extensionists indicated that the MST views politics as a non-separable dimension from its technical work.

The COPTEC supervisor C. supported this view of a political-technical extension as according to him “...by supporting the MST's position against GM soybean seeds, the peasants through their actions can fight against Monsanto...”. In fact, the technical activities of COPTEC staff were closely intertwined with the political guidelines and norms devised by the MST to orient the agricultural practices of settlers, as it will be shown in the following section.

MST political guidelines toward agricultural practices in the settlements

The main general political guidelines stimulated by the MST for the agricultural production carried out by settlers living in the MST settlements were; the practice of subsistence production; the practice of activities that are able to generate a monthly income; the avoidance of external agricultural inputs and the practice of producing their own seeds.

According to the COPTEC supervisor C., these guidelines were developed grounded on the observation of the production systems and activities of those settlers, who were being able to maintain themselves successfully in the settlements. These guidelines directed the activities of the organizations directly linked to the MST and acting in the MST settlements such as MST cooperatives and the technical assistance provided by COPTEC. How each

guideline was incorporated and put into practice by local social actors (settlers, extensionists and MST representatives) is described below.

First guideline – the practice of subsistence production

The first MST political guideline fostered in the settlements encouraged settlers to practice subsistence farming. It was observed that many settlers were aware of this guideline and followed this guideline, practicing subsistence farming and buying from the market just the strictly needed, thus, avoiding dependence on the market, as promoted also in the third guideline. Some settlers had even developed strategies to produce their own vinegar from grape's leaves and yeast for making bread.

Milk production was an important subsistence activity in the settlements stimulated by the MST cooperatives. In addition, milk production was crucial for the economic survival of settlers because it provided a regular monthly income throughout the year, as advocated in the MST's second guideline. Besides, another advantage represented by the milk production activity was its low cost, compared to other agricultural activities, and its lower dependence on climatic factors (Pedroso, 2001).

Yet, the milk activity had the drawback of requiring a high demand in labor. In fact, settlers often referred to the milk production as being laborious due to the heavy routine required for the milking activity, usually done manually. Indeed, the milk activity is classified as one of the most labor-intensive activities, demanding more than the double amount of labor from the one required by soybean cultivation (Korb, 2000).

Second guideline - the practice of activities that generate a monthly income

The second MST guideline stimulated the adoption of agricultural activities that could provide a monthly income to settlers, which in the settlements studied, was represented by the milk production. Oriented by this MST guideline, MST cooperatives and technical staff in the settlements focused their activities on the organization of the production and commercialization of milk.

Despite this guideline and the MST cooperatives' activities, soybean production accounted for the main income from agricultural production in the settlements studied in Joia. Soybean is mainly a cash crop, not being used for subsistence and not providing a monthly income for settlers. Extensionists from EMATER or COPTec did not promote this crop,

condemning the specialization in soybean or any other crop. According to EMATER official M.:

“The rural families that have specialized in a single crop (such as the soybean) achieved a lower life quality than those families that maintained a diversified subsistence agricultural production.”

Also according to COPTEC's supervisor C.;

“Soybean is a monoculture crop... in which if a drought occurs, the settlers get indebted and starve.”

The problem of relying on a single crop derived not only from the climatic adverse factors but also from the fact that the local soybean cultivation was embedded into the industrial model of agriculture, where industries provided the whole technological package needed for the soybean production as credit, which needed to be paid at harvest period.

The predominance of soybean as the main income of agricultural activity in the settlements cannot only be ascribed to the easiness of the soybean cultivation, due to the application of the agro-chemical technological package and machinery. The foot and mouth disease, involving the local livestock in 2000, led to the slaughtering of all dairy herds in the settlements affecting the local milk production. After this event many settlers abandoned the milk production activity for the soybean. However, at the time of the research this disease was under control in the settlements thanks to the obligatory vaccinations that had been carried out.

The diversification of subsistence production was promoted by the MST in order to guarantee a certain level of food security in the settlements, diminishing settlers' dependence on the market. COPAC stimulated the diversification of crops in the settlement in Charqueadas by focusing on the production and commercialization of several settlers' products, such as rice, horticultural products, pig's meat, eggs and milk. COOPERVIDA, however, was still not organizing the commercialization of other agricultural crops produced by settlers besides the milk. The commercialization of these other settlers' products was

arranged by the settlers themselves through local intermediaries, which, however, dictated the prices.

Third guideline - the avoidance of external agricultural inputs and the practice of producing their own seeds

A third guideline supported by the MST aimed at reducing the reliance on industrial inputs in agricultural production systems, which is also a principle advocated in agroecology. Following this guideline, COOPERVIDA had a policy of not mediating inputs from the Green Revolution package such as industrial pesticides and fertilizers. Also COPTEC's technicians stimulated the development and use of agroecological techniques such as rotational grazing and phytotherapeutical veterinarian treatments using locally-available medicinal plants (Piasentin and Ruivenkamp, 2006).

The reliance on external inputs of the milk production activity was considered low due to the limited industrial appropriations of this activity. In fact settlers mentioned its low cost of production as being the major advantage of the milk activity, since few external inputs were used. However, attempts to appropriate some of the milk production activities by industries were taking place as national laws creating new norms for milk production in the country were approved (Piasentin and Ruivenkamp, 2006).

To diminish the off-farm inputs, special attention was paid by COPTEC to cattle feed; a crucial element of milk production systems. In the settlements cattle feed generally relied on native and sown pastures grass and some other crops, such as soybean, maize, wheat, sugarcane and rice. At COPAC these crops were acquired in the market, as the co-operative did not produce these crops in sufficient quantities. In Joia, instead, settlers generally produced these crops within the farm. Most of these crops, with the exception of the soybean, received no or limited amounts of industrial inputs. Indeed, a major bottleneck for achieving agroecological local milk production systems was represented by the soybean production as it was practiced using a large amount of pesticides and other agrochemicals. Besides, some of the settlers even choose for cultivating GM soybean seeds, introducing a new external element into the settlements.

Some attempts of settlers to re-appropriate the activities regarding the soybean production were identified. An example was the use of organic fertilizers commercialized by COOPERVIDA. Some settlers replaced the chemical fertilizers with the organic fertilizer. Although still being an off-farm input, it had the advantages of being cheaper than chemical

fertilizers, having a better effect on soil structure, a long lasting effect in the soil and low environmental impact compared to the chemical fertilizers.

Another re-appropriation carried out by settlers consisted in substituting chemical herbicides by mechanical weeding activities, using a plough pulled by a horse. A local settler provided this service which was cheaper than buying the post-emergence herbicide. This meant that this money remained in the locality instead of going to global agribusiness firms selling herbicides while the negative impacts for the environment were also lower.

Still another technique being implemented by some settlers that replaced the use of pesticides was a cheap biological agent to control the soybean worm *Anticarsia gemmatalis*, a major pest threat to soybean production in the settlements. This technique consisted of taking advantage of a natural pest-predator relationship. A natural enemy of the worm, a virus called *Baculovirus anticarsia* was used.

The practice of conserving the seeds for the following year cultivation was another example of settlers' re-appropriation over their traditional activities. This practice, which renders settlers autonomous in relation to the provision of seeds from industries, however, was undermined by the use of hybrid maize and GM soybean seeds by settlers, which require annual purchases of the seed.

The cultivation of GM soybean seeds was already widespread in the settlements Ceres and Rondinha in 2002, even though national laws prohibited their cultivation at the time and MST radically opposed its use. As a response to this, the local MST organizations devised several mechanisms by making use of allocative and administrative resources under their control in order to prevent settlers from incorporating GM soybean seeds into their practices, as it will be examined below.

MST actions against GM soybean seeds

The use of GM soybean seeds by settlers clashed with MST political positions over farmers' seeds. Not only it reduced settlers' autonomy over their seeds, requiring annual purchases, it increased the control of multinationals over agriculture and food production. Besides, the MST as other organizations in the world expressed their concerns over GM soybean about its safety for consumers, its safety for the environment, and its little prospect for reducing chemical use (Hisano and Altoe, 2002).

Indeed, the industrial appropriation of seeds production can be seen as a crucial

development through which multinationals further control agricultural production, by determining the intrinsic characteristics (genetic code) of the seeds. By shaping the seeds' genetic code the industries can determine which inputs must be used and which activities farmers should perform in agriculture. In fact, the designed genetic code of GM soybean seeds determine that a specific herbicide should be used with it, in order to obtain the advantage of the technology. Thus, multinationals become real political actors “that program agricultural production and are able to impose a specific farming system and regulate the social organization of the agricultural production process from a distance” (Ruivenkamp, 1989, 2000).

In order to counteract the industrial appropriations over the activities involved in the soybean cultivation in the settlements *Ceres* and *Rondinha*, the MST organization took several measures to discourage and repress the adoption of GM seeds in the settlements, especially among MST representatives.

Those MST representatives accused of having planted GM soybean and tested positive were forced to resign from their roles or were denied access to resources controlled by the MST such as the RS State government credit program *Mais Alimento*. For instance, a MST teacher whose plot had been planted with GM seeds was denied access to a secondary school's course promoted by the MST.

Besides, other forms of discouraging the future cultivation of GM seeds in the settlements were taken. For example, educational interventions were carried out by providing courses on the subject of transgenic seeds to settlers and after that settlers were asked to sign a document pledging themselves not to plant GM soybean seeds in the future. Furthermore, the MST organized manifestations against GM crops in a large farm planted with transgenic soybean in Joia (Ogliari, 2002).

Settlers who planted transgenic soybean, nevertheless, did not receive any sanctions as it was argued that the local MST organizations were not able to provide better economic alternatives to GM seeds. If these settlers, who were the majority in the settlements, would be excluded from credit probably heavy local tensions would be generated between settlers and the local MST organizations, probably undermining the MST leadership in the locality.

Final considerations

The set of norms, political guidelines and initiatives devised and implemented by MST organizations and the initiatives of RS State government can be seen as important attempts to create a locality more conducive to endogenous styles of development in the settlements. By promoting agroecological inputs and practices and discouraging those connected to industrial agriculture, these organizations aimed to stimulate settlers to re-appropriate their agricultural activities, improving their autonomy in the food chain. However, the forces promoting an endogenous development in the settlements were contrasted by the powerful images and strategies of industries and the national government to modernize the milk production activity.

Despite the controversies generated by the way these norms were being enforced in the settlements, it can be argued that the MST's ability to control crucial resources for settlers such as public credit and extension services was an important instrument to engage settlers with the MST's images and visions of a more endogenous rural development. According to Caldeira (2008), the ability of a social movement to mobilize resources is crucial for its survival in order to both attract new members and reward its existing participating members. Thus, in a way, the MST was being successful in ensuring its survival and furthering its vision of an endogenous development in the settlements studied despite the powerful forces of the industrial agriculture model promoting a more exogenous style of development.

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