

Chapter 12¹

Brazilian Farmers at a Crossroads:

Biotech Industrialization of Agriculture or New Alternatives for Family Farmers?

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Since the late 1990s, Brazil, the world's second largest soybean producer and exporter, has emerged as an important battlefield amid the global conflict over genetically-modified organisms (GMOs). Given the fact that the majority of soybean growers in the United States and Argentina have already adopted the associated package of new technologies, European and Asian consumers, looking for non-GMO sources, are curious as to whether or not Brazilian farmers will accept this new package, whose central components are transgenic seeds and herbicides that kill most plants, except the target crop. Until recently, growing GM crops in Brazil has been prohibited due to a judicial authority that ruled in favour of the claims made by environmental and consumers' organizations (see Pelaez and Dalto, this volume). While the federal government, both the former Cardoso administration and the current Lula administration, has not effectively mapped out its policy either against or in favour of GMOs, the state of Rio Grande do Sul (RS), the southernmost state, has been implementing its "GM-free zone" policy since 1998. Two other southern states, Paraná and Santa Catarina, have also rejected GMOs.

It is in Rio Grande do Sul (RS), however, where the most contentious problem has occurred: namely the smuggling of GM soybean seeds across the border with Argentina. In spite of the states' policy banning GMO planting, many farmers, ranging from small to large scale, have grown and harvested illegal GM soybeans for years with mixed feelings: the expectation of financial benefits on the one hand, and anxiety about negative environmental and health impacts as well as about breaking the law on the other. This kind of farmers' dilemma is our starting point. But the objective of this chapter is not to discuss GMO politics itself, which is already dealt with in other chapters

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(Pelaez and Dalto, and Jepson et al.) of this volume. We focus instead on farmers' responses to GMO issues by contextualizing them in the ongoing neoliberal globalism and its implication of capitalist intensification of the agri-food system. The wave of GMOs that hit the market in the mid-1990s is a part of such trends. Our perspective is also derived from the reality in the southern states, the traditional soybean producing area, where a lot of small-family farmers are being faced with the rapid structural transformation of the soybean sector. This situation has caused socioeconomic difficulties among small-family farmers and led them to believe that adopting Monsanto's Roundup Ready[®] soybean will solve their problems. We assume that, without addressing this socioeconomic reality, any implications for (anti-) GMO politics would not go beyond the level of pro-contra ideological discourses. Therefore this chapter aims to empirically explore how the forces unleashed by neoliberal globalism are shaping local landscapes through GMOs, and how farmers and civil society respond to them. With this approach, our analysis may go beyond the simple dichotomies of "to adopt or not to adopt" GMOs.

As argued in literatures concerning the sociology of agriculture, it can be said that while the forces unleashed by neoliberal globalism seem to homogenize the reorganization of political and economic systems, the actual forms of reorganization are inevitably diversified by national, regional, and local conditions as well as by the actors involved (Jussaume et al. 2002). Accordingly, an adequate assessment of the diversity and complexity of agri-food systems is required, as well as the analysis of a variety of farmers' responses in such diverse settings. Based on field surveys conducted by the authors in August 2000, December 2001 and July 2002 and supplemented by literature surveys, we have selected four different types of local responses led by different key actors: (1) managing to survive by integrating to the mainstream technological paradigm and the global market (Agricultural Co-operative of Integrada, northern Paraná); (2) seeking to differentiate itself as a niche but still within the export market (Agricultural Co-operative of Cotrimaio, northern RS); (3) the well-intentioned activities of NGOs and community groups to stay away from the global reality, finding opportunities in the locality (NGOs in Paraná and RS); and (4) the extension programmes of the state extension agency (EMATER/RS – *Associação Riograndense de Empreendimentos de Assistência Técnica e Extensão Rural*) in Rio Grande do Sul.

We acknowledge that, as stressed in actor-oriented studies, it would be useful to focus on

the self-organizing practices of social actors at the local level (Long 2001), and in fact there are some notable local movements engaged in or promoting alternative farming in Brazil. Many of them, however, are not necessarily successful, and these movements remain too weak to encompass all the rural farmers across the country. Such a huge vacuum in rural Brazil can be best complemented by institutional actors. We also acknowledge that there are many criticisms or distrust of the role of extension programmes stemming from the experiences in the United States (Hightower 1973; Hassanein 1999) as well as those in Southern countries where extension institutions have been basically used to promote the capitalist-intensification model of agriculture (Shiva 1992; Caporal 1998). Contrary to some sceptical remarks about public institutions, however, the emphasis on reforming institutional expertise to serve sustainable agriculture more effectively does not necessarily tend to obscure the role of local actors. This is especially true of the case of EMATER/RS, which has worked on the transformation of a locality based on the idea of agroecology and the participatory and educational approach. This promising aspect of the institutional effort not only to give proper support to family farmers but to work together with them makes the activities of EMATER/RS contrasting with hitherto known attempts that ended up by promoting the modern agricultural technological paradigm, while its activities are more or less limited by an insufficient budget as well as high dependence on state and local politics.

This chapter is divided into four sections. We begin by outlining the reality that surrounds small-family farmers in the southern states in order to underline the relevance of our approach. We then offer an empirical analysis of diversified local responses to that reality in the following two sections, taking into consideration the differences as well as complementarities between the activities of agricultural co-operatives and non-governmental organizations and the institutional activities of the EMATER/RS. Finally, we're going to conclude the chapter by pointing out some limitations of the institutional response, such as political vulnerability, and giving us the prospect of enhancing the institutional alternatives.

The Contradictory Situation of Farmers in Southern Brazil

Since the 1970s, the soybean sector in Brazil has witnessed rapid growth in modernization, which has involved soybean producers in the world market (Warken 1999). At the same time, especially

since the end of the 1980s, the Brazilian political economy has been confronted and affected by external pressures to open its market (i.e. the introduction of the neoliberal model). Moreover, under the ongoing global restructuring of the agri-food system, transnational corporations such as Monsanto, Novartis (Syngenta), Unilever, Cargill and ADM, have invested in the Brazilian agri-food sector (Hisano 2002; Chiba 1998). These processes have caused many changes in rural landscapes. Farmers were under pressure to grow commodities in a competitive market, losing their ‘freedom for farming’ and increasing rural exodus. This process has resulted in the differentiation between commercial-oriented farmers upgraded into huge landowners or corporate farms on the one hand, and marginalized small-family farmers on the other.

As already mentioned, our research concentrates on the southern part of Brazil – Paraná, Santa Catarina and Rio Grande do Sul – where a lot of small-family farmers remain as key actors in the region. Additionally, this southern part is a traditional soybean producing area, which means that it is now not only caught up heavily in the GMO issues but also in the rapid restructuring of the Brazilian soybean sector as shown in Figure 1. Restructuring has meant a shift of the heart of soybean production from the southern states to a newly exploited producing area called *cerrado* (mainly including the Central-west states of Minas Gerais, Mato Grosso, Mato Grosso do Sul, Goiás, Tocantins, Distrito Federal, Bahia and Maranhão). The difference between these two regions is comparable with the difference between small-family farming in the traditional region and corporate farming in the *cerrado* in terms of key actors (see Table 12.1). In this context, “small-family farmers” are those whose average size is around 20-50 hectares, mainly depending on their own labour power (represented by the smallest two size groups in statistics), while “corporate farmers” mean those who are farming more than several hundred hectares by means of capital-intensive technologies (represented by the largest two to three size groups in our statistics). Many in the latter group contract directly and individually with trading companies and/or processing companies.

Although Brazil’s position in the international market has been stable for many years, it is reported that the productivity of the world’s first and third largest soybean producers, i.e. the United States and Argentina, is increasing due to improvements in technology. These competitors’ advantages do not come from technology alone, but also from the support of public policies. Unlike

these countries, the Brazilian federal government is so far neither investing nor providing enough incentives to its farmers (except those in the *cerrado*), leading many of them to question their future competitiveness in the world market. Required to maintain their high levels of production and concerned about losing market opportunities, Brazilian farmers tend to seek out and implement any updated technology to improve production and reduce costs. In this mainstream, the latest technology and products are GMOs.

Designed to improve soybean production on industrialized farms, GMOs are being commercialized as an indispensable product to increase yields. This marketing strategy is pushing small-family farmers, too, to question whether or not to adopt the new technological package. Scientists, government officials and representatives of transnational corporations often speak out about how this new technology will perform in the best interests of farmers. Yet, policies and biotechnologies directed towards small-family farmers are rarely implemented and actual risks and benefits to them remain uncertain. Transnationals' strategies vary according to which sector they are primarily dealing with; and certainly not as a function of small-family farmers' interests. For crop-feed/food complex companies like Cargill, dissemination of this technology in Brazil would enable them to source a cheaper and stable amount of raw materials. For biotech-chemical complex companies like Monsanto, biotech industrialization would open up their market both for seeds and agrochemicals outside their saturated market in the North, contrary to their propaganda. To sum up, GM technology is a result of neoliberal globalism and the capitalist intensification of agriculture.

It is estimated that for Brazilian small-family farmers to maintain their market position, they will have to overcome at least four main barriers, namely: transportation costs; imposition of a complicated taxation system; inequality of resource allocation; and lack of adequate credit facilities (Warnken 1999). The government has so far addressed none of these factors seriously. Reality shows that inputs are very expensive; farmers are subjected to the volatile and competitive export market and the profit they get from their farmland is not enough to make a living. Both internal and external pressures to reduce the cost of production to stay in the competitive market have made more and more small-family farmers abandon their farmlands and migrate to urban slums *favelas* in search for jobs, or to sell their labour power to large producers. In many cases, they end up in situations of poverty and misery. As long as such disadvantageous circumstances remain

unchallenged even “successful” adoption of the latest technology is unlikely to change or to improve the socioeconomic condition of small-family farmers.

As mentioned above, the majority of small-family farmers are concentrated in South Brazil, especially in the state of Rio Grande do Sul (RS). Partly because of this concentration in RS, the state government has stood against the adoption of GMOs. It considers that the new biotechnology has been developed primarily for large-scale industrialized agriculture and, therefore, is not a feasible option for small-family farmers in the region. Also aware of the fact that a great number of consumers in Europe and East Asia are not willing to buy GM food products, the state government believes that blocking GM crops, rather than promoting them, would be a wise trade policy (Bell 1999). Contrary to this line of thought, however, farmers are still curious to try GM technology. Believing that they will pay cheaper prices for GM seeds (because they don’t actually pay royalties) and use fewer chemicals on the farmland, farmers in the state are smuggling GM seeds from Argentina and planting them illegally. Indeed, it is reported that 70 percent of soybeans planted in 2002 had originated from smuggled seeds. The “GM-free zone” policy in RS does not work any more (see Pelaez and Dalto, this volume). Paraná and Santa Catarina are more or less in the same situation.

Understanding such a condition, EMATER/RS has developed a variety of programmes to stimulate small-family farmers to re-focus on a local-based, agroecological farming model. This model contrasts with the notion in which small farmers had previously been absorbed, i.e. the modernization model: that intensive and industrialized farming is the viable solution to provide high-yield and high-quality products for the mainstream market. The perception of EMATER/RS reminds us that the question of whether small farmers should adopt GM technology or not overlaps with another question as to whether they should stay in export-oriented commodity farming or turn to local-oriented agroecological farming. The latter question is rather important because the mainstream path in terms of both technology and market seems unfeasible for small-family farmers. While it’s becoming increasingly difficult to remain unaffected by the processes of neoliberal globalism, local actors cannot help but respond in some way to the overwhelming reality.

A Variety of Local Responses to the Reality

Local responses vary according to individual actors and their diverse socioeconomic settings. We will look more closely at some local responses in this and the following section.

Linking to mainstream market: the Agricultural Co-op of Integrada

Even in the southern states of Brazil, there is an increasing number of middle and large sized farmers who have been aggressively adopting new technologies to intensify their farming. There are also some areas where not only agricultural co-operatives but also subsidiaries of multinationals are doing business by linking localities directly with the world market. A typical example is the case of the Agricultural Co-operative of Integrada (*Cooperativa Agropecuária de Produção Integrada do Paraná*). This agricultural co-op is located in the northern part of Paraná, where a relatively large number of middle to large-scale farms exists. The co-op members' average farm size is around 100-200 hectares. This agricultural co-op is one of the successors of the Agricultural Co-operative of Cotia (*Cooperativa Agrícola de Cotia*), which was founded by Japanese immigrants in the 1920s and had grown to become one of the largest agricultural co-operatives in Brazil until the head-office was dissolved in 1994. As a successor, Integrada has become the largest agricultural co-op in the northern Paraná. Initially, the purpose of establishing Cotia was to protect the member farms from the whims of the market and to improve their livelihood. As is often the case with agricultural co-operatives during periods of economic growth, however, its original aims receded into the background as the business grew. The more successful it became, the more the pursuit of business became profit-oriented. Although the deterioration of the Brazilian economy accompanied by the drastic change in politics is considered the direct cause of Cotia's failure, it is more likely that its dissolution occurred due to the huge amount of debt produced by its expansionist' business style.

According to Tanaka (2002), the trajectory of Integrada mirrors the later stage of Cotia rather than embracing a legacy of early dates, i.e. decentralization and bottom-up producers' activities. Integrada's main business is the marketing of crops, including soybeans, wheat and corn. Among them, soybeans' share of total sales is around 60 percent. The volume of soybean marketing has been constantly increasing during the past five years (see Table 12.2). About 90 percent of the main crops are sold to transnational grain trading companies such as Cargill, through the Chicago Trading Market, and about 30 percent of soybeans are traded at the futures' market via these

companies (Tanaka 2002). As for the purchasing business, it is worth noting that sales of agrochemicals and fertilizer have increased more than fourfold during the past five years. This means they are still following the mainstream path for the modernization of agriculture.

In regard to GMOs, the co-op had no particular vision at the time we conducted an interview with its executive staff members in Londrina, Parana, in August 2000. They stated that the production of GM soybeans in the region would be more than half of the total cropping area in a few years. Whether farmers would adopt GMOs or not would depend on the extent to which this technology reduced their production costs. The staff understandably expressed their concern about external market trends; however they did not show us any strategy for coping with this issue. This was despite the suggestion of market consultants connected to the co-op saying that it would be possible to segregate non-GMOs from conventional soybeans (including GMOs because they are not officially handled as such) due to the close relationship between the co-op and member farmers (ACP 2000). Rather, it seemed to us that they took the dissemination of GMOs for granted as an inevitable path for the intensification of agriculture. Subordinating their business to the world market order is a rational and acceptable option for them. So long as transnationals keep purchasing their products, the agricultural co-op and its member farmers do not need to concern themselves with GMO issues. We can say that this is still one probable response for local agents to survive the harsh international competition under neoliberal globalism, i.e. to accept what happens at the global level.

Seeking a niche market: the Agricultural Co-op of Cotrimaio

Organic soybean production was one of the effective options against GMOs. In Brazil, organic soybean production began as an isolated initiative in some regions, chiefly in the southern states – Paraná, Santa Catarina and Rio Grande do Sul (Fonseca & Feliconio 2000). Although commercial production is still limited, the growth rate of organic farming remains in the double digits in recent years. The BNDES (Brazilian Development Bank) survey in 2001 recorded 12,590 organic farms cultivating 203 thousand hectares of certified and in-conversion farmland (Neves et al. 2001). In addition, the number of supermarket chains interested in commercializing organic products has increased. In April 1999, representatives of a consortium of leading European supermarkets visited the state of RS, including Sainsbury (UK) and Carrefour (France), which have

been committed to eliminating GM ingredients from their own-brand products (USDA-FAS 2000). There are already market opportunities for selling organic foods in Brazil, but the demand for these products is much higher for vegetables, fruits, and refrigerated processed foods. It is expected that organic soybean will be grown mainly for the export market in Europe and Japan. According to Ormond et al. (2002), the number of organic soybean farmers is 593 (8.40 percent of all organic farmers in Brazil) covering an area of 12,516 hectares (4.64 percent of the total organic area in Brazil).

An organic boom has emerged because of growing consumers' concerns over food safety and environmental problems. In addition, according to the farmers interviewed, organic farming requires harder work than conventional farming, but productivity seems to be about the same. Because of the extreme high cost of conventional agricultural inputs in Brazil, farmers' benefit from the reduced production costs with organic products and the attractive premium prices tend to compensate for other disadvantages.

There are already some agricultural co-operatives dealing with organic products. Among them, we focus on the Agricultural Co-op of Cotrimaio (*Cooperativa Agropecuária Alto Uruguai*) since it represents a remarkable example of agricultural co-operatives, contrasting with the case of Integrada. Data on the Cotrimaio were collected during interviews and a field survey conducted by the authors in December 2001. Cotrimaio is also a big co-op, consisting of about 6,200 farmers with more than R\$120 million sales in 2001. A remarkable characteristic of Cotrimaio's operation is its diversified marketing business, ranging from animal products and the processing of member-farmers' produce, to retailing. This can be contrasted with Integrada, which concentrates on marketing grains. This co-op, located in the city of Três de Maio, RS, is aware that there is an increasing demand in Europe for organic and GM-free soybeans with a premium price. Negotiating with consumer co-operatives in France and the Netherlands since 1998, Cotrimaio has been providing member-farmers with the idea of growing organic and/or non-GM soybeans for the European market.

As shown in Table 12.3, in the year 2000/01, Cotrimaio produced 74,000 tons of non-GMO soybeans, 750 tons of organic soybeans (including 500 tons of 'transitional' organic) for export, in contrast to 24,000 tons of conventional soybean that may contain GMOs. In the following year, the

co-op was planning to produce 108,000 tons of non-GMO soybeans, 1,100 tons of organic and transitional organic soybeans, and reduce to 18,000 tons of conventional soybeans. To be certified as “organic,” soybeans have to be grown in the field that has been cultivated organically for more than two years. Soybeans in the second year of this in-conversion process are called “transitional organic” here.

This co-op is working closely with farmers, sending technical consultants to help them understand how profitable it can be to become organic and to sell their crops in the international market (Cotrimaio 2001). The co-op is paying a 40-60 percent premium for organic edible soybeans, a ten percent premium for transitional organic, and a 3.5 percent premium for non-GMO soybeans. In the latter case, the market price for non-GMOs is just two to three percent more than for conventional soybeans, meaning that Cotrimaio cannot receive much financial compensation for dealing with merely non-GMOs. In the interview, an executive staff member from the co-op complained that an eight percent or more premium price in the consumer market is required to fully cover the cost of handling (e.g. DNA screening and segregated distribution) and to ensure proper benefit for its business.

Thus, the response of this agricultural co-operative is a clear example of pursuing an alternative or niche market, i.e. non-GMO and organic soybeans for export. By doing so, local farmers can avoid severe competition in the conventional market, and hence protect themselves from the pressures of agricultural intensification and marginalization. Its limitation, however, comes from the extent to which it depends on the external market. Considering the price the co-op receives, this kind of relationship between consumer co-ops or supermarket chains in the North and agricultural co-ops or producers in the South may not be sustainable. When it comes to farmers’ preference, some of them told us that the reason they started to grow organic soybeans was the high premium price promised by the co-op staff for them. There are also some farmers who prefer to grow organic crops because of environmental concerns, and because they are against GMOs, understanding that GM technology is not compatible with agroecological farming. Those perceptions of concerned farmers, however, cannot be expected to continue without proper support from the government through policies and extension services (i.e. EMATER/RS as described later).

Dependency on organic markets has another limitation for small-family farmers. The rapid

growth of organic farming has prompted the Brazilian government to regulate the sector. In October 1998, the Ministry of Agriculture and Food Supply published Directive 505 with the purpose of establishing national standards for the certification of organic products. The Directive was legislated in April 1999. Such legislation of standards is controversial. So long as the establishment of nationwide standards helps legitimize organic production in the eyes of consumers and makes it becomes easier for small farmers to sell products to a broad consumer base; it should be welcomed. As is often the case in some developed countries, however, it would also increase the chance for large processors/shippers as well as export-oriented large-scale growers to enter this growing market and compete directly against small farmers (Jussaume 2000).

Well-intentioned activities of an NGO and community groups in a locality

In the state of Paraná and in several other states, an NGO named AS-PTA (*Assesoria e Serviços a Projetos em Agricultura Alternativa*) has been helping small-family farmers to succeed in using agroecology. The approach implemented by AS-PTA is to identify constraints in their farming through participatory methods and to develop solutions through research involving the farmers. This participatory process is exemplified in the programme in the central/southern part of Paraná (Weid & Tardin 2001). AS-PTA's staff members offer agroecological alternatives and let farmers choose technologies and ideas which are thought to be adaptable to the local conditions. In order to structure its work, AS-PTA put the proposed alternatives into several divisions: genetic resources, ecological soil management, agro-forestry, and family gardens. Seed production on the farm has also increased with the aim of financial savings as well as diversification and yield increase (Weid 2001). The programme now covers 22 municipalities with a population of 250,000 including roughly 55,000 family farmers, among whom around 10,000 family farmers are directly involved in the intensive experimentation with agroecological practices.

Such experimental activity using sustainable farming methods has been also initiated by a church through the *Diocese de Santa Maria* in the state of RS (Dill & Buske 2001). For the purpose of educating people to become better entrepreneurs and to produce products in an ecologically and economically viable way, a project named *Projeto Esperança* involving 82 families was introduced in the region of Santa Maria in 1982. Since then, farmers started rethinking the conventional farming style, opening their minds to agroecological alternatives such as the multiple farming of

organic rice, fish and ducks. The wet rice fields can be rotated with fish farming and the ducks are expected to control weeds and insects in the rice fields (Dill & Buske 2001). Farmers have also been working on sharing experiences and trying other feasible alternatives suggested in their farm-level trial and error. Another notable achievement is the marketing of their products at local markets based on the concepts of “alternative cooperativism” and “popular/solidary economy.” A commerce centre called *Cooesperança* was established in 1989 to distribute their products directly, and to foster fair business and solidarity between producers and local consumers.

To sum up, these two examples, AS-PTA and *Projeto Esperança*, can be seen as cases of a local response to globalization and the intensification of agriculture in favour of local solidarity, by changing farming from conventional to agroecological, diversifying farm-style and encouraging farmers’ participation. Although the impressive results of these local activities are undeniable, we need to evaluate these experiences carefully. In the first example, Weid (2001), an executive staff member of AS-PTA, points out several obstacles and limitations: the farmers’ lack of access to capital and adequate credit systems slows down the process; their access to seeds for green manure is also restricted due to cost and lack of availability; the regional market is controlled by a handful of intermediaries, and because of this, prices have been lowered and production has been discouraged; and the funding available for AS-PTA to support farmers is very limited despite the fact that public authorities are providing loans for the use of “technological packages.” In Santa Catarina, for instance, AS-PTA is collaborating with EPAGRI, a state extension service, to stimulate the use of green manure and cover crop technology among all state regions, involving more than 100 thousand farmers (de Freitas 1995).

On the other hand, *Projeto Esperança* has also expanded to involve 123 groups and has reached more than 10,000 consumers. The reason for such success can be attributed to its focus on creating alternative markets. Another reason is its close partnership with public institutions, i.e. the State government (through several relevant departments), local municipalities, the regional EMATER/RS, and the Federal University of Santa Maria. Indeed, many noteworthy examples can be observed across the state of RS. In many cases, the EMATER/RS plays the vital role of an “institutional host” (Houtzager 2001) to facilitate and mediate among small-family farmers who are organizing themselves collectively towards adopting agroecological alternatives, some of which are

initiated locally by NGOs and community groups as discussed above. We now turn to a close examination of the EMATER/RS's activities.

Institutional Alternatives: Agroecological Extension in Rio Grande do Sul

According to Caporal (2002a), we can divide the EMATER's history into four phases, each of which is characterized by the philosophy and emphasis of extension programmes. The first period is from 1948 to 1960; the extension focused on supporting poor families and communities by using "rural credit" as a tool to help transform and modernize agriculture. The second period is from 1961 to 1980; modernization of agriculture was promoted further, and rural extension services prioritised the development and diffusion of modern technologies. The education process in this period was based on motivating farmers to adopt new practices and Green-Revolution-type technologies. When the national extension agency (EMBRATER – *Empresa Brasileira de Assistência Técnica e Extensão Rural*) was established under the military government in 1976 and imposed limits on the state-level extension services, some states tried to establish their own rural extension agencies, including EMATER/RS (1977) in the state of RS. The third period from 1980 to 1990 is characterized by "Reflexive Criticism"; the extension agencies were becoming concerned about the environment and the consequences of the modernization of agriculture, while the priorities were still to improve production and productivity. Influenced by Paulo Freire, changes were suggested for the method of the rural extension. The fourth period is from 1990 until now under an "Environmental Transition" to a more environmentally-sound agricultural style. After the dissolution of EMBRATER in 1990, some EMATERs have enforced their environment-oriented programmes.

EMATER/RS, linked to the state government of Rio Grande do Sul, is famous for its strong and well-organized extension system, as well as for adopting an environmentally-sound policy. About 80 percent of its budget comes from the state government, followed by 8 percent from the counties (Caporal 2002a). Since 1997, EMATER/RS's priority has been given to small-family farmers, a majority and prevailing rural actor in the state. The institution promotes rural development, using technical assistance and educational processes to strengthen family-based farming and stimulate farmers to improve the quality of their lives. Farmers usually welcome the extension services, and also join in projects provided by central and regional offices of

EMATER/RS in collaboration with many other institutions, including rural workers' associations, women's associations, state or local schools, municipalities, and churches.

The idea adopted by EMATER/RS is "agroecology," which has become one of its most important projects, drawing attention to the need to preserve ecological and cultural biodiversity, act locally and make use of diversified practices (Caporal and Costabeber 2001). A chief staff member of EMATER/RS's regional office interviewed by the authors argued that the Brazilian national agricultural research institution (EMBRAPA – *Empresa Brasileira de Pesquisa Agropecuária*) still adheres to the "old-fashioned idea" of the Green Revolution. "Agroecology is a more innovative way of thinking," he added. Another important aspect of EMATER/RS's agroecology programme is to integrate farmers' skills with academic knowledge. This programme reflects on past experiences, in which the knowledge of agricultural experts prevailed in agricultural matters, sometimes ignoring the wisdom of farmers acquired during many years of experience in their local settings. On the other hand, although some farmers' experience-based knowledge may lead to the development of a better agricultural model, most farmers in the state are immigrants from European countries and have lost even their "transplanted" knowledge on sustainable agriculture during the Green Revolution. In such a situation, a critical integration of their re-discovered knowledge with scientific expertise is an inevitable attempt to create an innovative way of thinking to convert the conventional farm to a/the new agroecological one (Altieri 2001). With this view, EMATER/RS has recently launched a new programme entitled ATER (*Ações de Assistência Técnica e Extensão Rural*) for working together with farmers to make them aware of their experience-based expertise, by drafting and conducting a Rural Participative Diagnosis (DRP – *Diagnóstico Rápido Participativo*)³ for each local community (Caporal 2002b).

The goal of EMATER/RS is not only to change the way of farming but also to create local marketing systems that are economically affordable, ecologically balanced, socially fair and culturally acceptable. In 2001, the number of agroecological groups totalled 160, with 2,436 members. Their agroecological products are sold at farmers' outlets or in local/regional markets

³ The soul purpose of the DRP is to mobilize rural communities to identify main concerned problems and opportunities. To prepare specific plans to address them, potential technologies are evaluated based on environmental, economical and social aspects expressed by local people. In the whole process, participatory measures are employed to involve the entire community.

with the support of public institutions, NGOs and farmers' associations as well as some Catholic-church organizations. According to Caporal (2002a), there are already 107 weekly markets selling agroecological products with more than 800 farmers participating. Additionally, EMATER/RS has initiated a number of collaborative relationships with agricultural co-operatives working to produce local-oriented agroecological and organic products (see Table 12.4).

The role of EMATER/RS in agroecology is not much different from those of NGOs and community groups, which can also create feasible programmes to develop a sustainable agricultural model. It can be said, however, that EMATER/RS has the most important and pivotal role as a facilitator or "institutional host" given the institution's broad range in terms of areas and beneficiaries. Indeed, out of 623 thousand families (as estimated in 1999) in the state's rural area, it gave assistance to more than 350,000 families in 2001, and among these nearly 285,000 families received continual assistance. EMATER/RS has more than 2,300 staff located in one central office, ten regional offices and 470 county offices (95 percent of all 497 counties in the state) (Caporal 2002a). There is no other service available to so many farmers and rural areas.

Since 2000, with the aim of disseminating these alternative ideas, EMATER/RS, in partnership with the state government, has also organized international seminars on agroecology (Felippi 2000; Caporal 2002a). The first was held in Porto Alegre and had around a thousand participants. The second was held in 2001, again in Porto Alegre and had some 2,300 participants from countries throughout the world. The lecturers were from the United States, Europe and Latin America, including Professors Miguel Altieri (University of California, Berkeley) and E. S. Guzman (University of Cordoba). The number of participants in the third seminar, held in September 2002 at the same venue, increased to 3,087. The fourth seminar was to be held in November 2003 also in Porto Alegre.

These international seminars are not the only events organized by the institution. In 2001, EMATER/RS organized 2,945 local events across the state, involving 141,649 farmers. In the region of Santa Rosa, for example, 26 events were held in April, 37 in May and 25 in June, 2002. These events include field trips, technical demonstrations, technical speeches, campaigns and meetings for farmers, especially women and young farmers among others. All the events are free of charge and opened to anyone who is interested. Sometimes other enterprises or public institutions

interested in rural services sponsor these events. Furthermore, EMATER/RS tries to reach farmers across the state through radio and TV programmes.

What interests us is that the promotion of agroecological ideas serves to divert small-family farmers away from GMOs and external competitive pressures, intentionally or unintentionally. In Santa Rosa, the northern part of the state that shares a border with Argentina, despite a lot of Roundup Ready[®] soybean seeds having been smuggled into the country, small soybean farmers interviewed by the authors in December 2001 and July 2002 showed a strong interest in changing their farming model from conventional to agroecological rather than to biotech intensification (see Table 12.5). In addition, many of them said that they relied on EMATER/RS for such a transformation and appreciated its close relationship with local farmers. Even in this region, however, some agricultural co-operatives still pursue the intensification of agriculture, promoting Roundup[®] herbicide together with smuggled GM soybean seeds among member farmers. Given that small-family farmers generally trust agricultural co-operatives as well, it is not surprising that the EMATER/RS's local activities are sometimes constrained in such cases. Moreover, the fact that there are some extension agents and agronomists backing GMOs as a "new tool for sustainability" should be acknowledged.

Conclusion

Under the advancement of neoliberal globalism and the intensification of agriculture, small-family farmers in the southern states of Brazil are becoming entangled in a relentless survival game in the competitive market. While soybean, one of their main crops, has been high up on the list of the country's most promising goods for export, the role of small-family farmers in soybean production is diminishing rapidly. The federal government and multinationals give priority to the industrialized middle and large-scale producers mainly in the *cerrado*. Small-family farmers are faced with a choice: either they fully enter the competitive market in a bid to improve their socioeconomic status, or they leave farming altogether and migrate to urban areas. It is in this context that GMOs are introduced in this region and become part of a contentious political issue. There is no reason to presuppose that a choice for small-family farmers should be made between GMOs and non-GMOs, however. As we have discussed, their reaction to the GMO issues can be correlated with their

responses to agricultural restructuring under neoliberal globalism, regardless of their awareness. Thus, even for actors who are against GMOs, their option is not only non-GMOs for the export market, but also agroecological alternatives for the local market. This is the first major conclusion of our chapter.

The second concerns the role of extension services in helping small-family farmers to continue farming. Saving and vitalizing rural Brazil requires a lot of financial and human resources. Even successful experiences led by NGOs and community groups cannot progress without intensive and continuous support from public institutions. Especially in the case of the state of Rio Grande do Sul, EMATER/RS's activities based on agroecology play a key role in enabling farmers to access alternative technologies and markets, and diverting them away from GMOs without addressing a political ideology or emotional perception.

EMATER/RS is not free from restrictions, however. Firstly, EMATER/RS's budget is not sufficient to fulfil its needs, pay its workforce and assure state-wide activities, in spite of favourable support from the state government. Secondly, the institution's dependence on state politics and on local governments makes it both unstable and vulnerable. Although its initial idea of agroecology and an alternative style of extension is not directly related to the state government's policy, their activities are heavily supported by the state government as well as the local left wing party (i.e. the PT or Workers' Party). In this sense, no one can predict how much the new right-wing state government will affect EMATER/RS's activities. On the other hand, it should be noted that the new federal government, the Lula administration, supported by the Worker's Party, has decided to legalize provisionally the planting and sale of GM soybeans from October 2003. As such, the political instability concerning GMO issues is expected to continue and bother the extension activities and other local actors for a while. Finally, even in southern Brazil, which is known for being well-organized as well as for having the most democratically and equally distributed locality in the country, we cannot deny the fact that compared with "Northern" countries, grass-root movements are relatively weak and small-family farmers remain a rather passive actor. This fact could inhibit the extension from carrying out successfully the participatory and educational approach required. Hence an awareness program must be part and parcel of the educational effort.

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Table 12.1 Comparisons between Brazil (total), Central-west (*cerrado*) and South (traditional), by Size Groups in 1995/96

a. Number of Farms Producing Soybeans by Size Groups

Size Groups of Total Area (ha)	Brazil		Central-west*		South*	
	number	%	number	%	number	%
Less than 10	57,203	23.5	567	5.3	55,771	25.1
From 10 to less than 100	157,148	64.7	2,574	24.2	149,921	67.5
From 100 to less than 1000	24,713	10.2	5,298	49.8	15,670	7.1
From 1,000 to less than 10,000	3,774	1.6	2,099	19.7	895	0.4
More than 10,000	153	0.1	96	0.9	4	0.0
TOTAL	242,999	100.0	10,634	100.0	222,265	100.0

b. Quantity of Soybean Production by Size Groups

Size Groups of Total Area (ha)	Brazil		Central-west		South	
	1,000t	%	1,000t	%	1,000t	%
Less than 10	357	1.7	10	0.1	338	3.1
From 10 to less than 100	5,060	23.4	186	2.3	4,585	42.7
From 100 to less than 1000	8,602	39.8	2,695	32.7	4,761	44.4
From 1,000 to less than 10,000	6,657	30.8	4,626	56.1	1,035	9.6
More than 10,000	912	4.2	729	8.8	14	0.1
TOTAL	21,588	100.0	8,246	100.0	10,733	100.0

c. Production Value of Soybeans by Size Groups

Size Groups of Total Area (ha)	Brazil		Central-west		South	
	1,000 R\$	%	1,000 R\$	%	1,000 R\$	%
Less than 10	75,336	1.8	1,869	0.1	71,391	3.2
From 10 to less than 100	1,042,391	24.6	34,309	2.4	949,008	42.3
From 100 to less than 1000	1,728,286	40.7	483,472	33.2	998,958	44.6
From 1,000 to less than 10,000	1,229,123	29.0	807,854	55.4	218,966	9.8
More than 10,000	166,952	3.9	130,068	8.9	3,177	0.1
TOTAL	4,242,124	100.0	1,457,571	100.0	2,241,501	100.0

d. Percentages of quantity and value in total, by Size Groups

Size Groups of Total Area (ha)	Brazil		Central-west		South	
	quantity	value	quantity	value	quantity	value
Less than 10	1.7	1.8	0.0	0.0	1.6	1.7
From 10 to less than 100	23.4	24.6	0.9	0.8	21.2	22.4
From 100 to less than 1000	39.8	40.7	12.5	11.4	22.1	23.5
From 1,000 to less than 10,000	30.8	29.0	21.4	19.0	4.8	5.2
More than 10,000	4.2	3.9	3.4	3.1	0.1	0.1
TOTAL	100.0	100.0	38.2	34.4	49.7	52.8

Note: Central-west consists of Mato Grosso, Mato Grosso do Sul, and Goiás (as well as these states, Minas Gerais, Tocantins, Distrito Federal, Bahia and Maranhão are usually included in the *cerrado*). South consists of Rio Grande do Sul, Santa Catarina, and Paraná (as well as these states, São Paulo is usually included in the traditional area).

Source: IBGE, Censo Agropecuario, available on the website (www.sidra.ibge.gov.br) accessed on October 30, 2002.

Table 12.2: Five-year Summary of Integrada's Marketing Business

year	1996				1997				1998				1999				2000			
crops	Volume	/96	Sales	%	Volume	/96	Sales	%	Volume	/96	Sales	%	Volume	/96	Sales	%	Volume	/96	Sales	%
Soybean	125,523	100	31,627	64	175,782	140	52,037	57	184,797	147	43,646	47	214,260	171	60,961	49	232,137	185	69,826	62
Wheat	74,353	100	4,237	9	103,659	139	20,053	22	133,156	179	24,242	26	101,235	136	23,397	19	37,775	51	16,109	14
Corn	55,648	100	5,827	12	88,942	160	10,003	11	102,947	185	14,298	15	136,943	246	23,420	19	85,795	154	17,587	15
Cotton	17,387	100	4,335	9	8,700	50	1,498	2	13,016	75	4,241	5	11,239	65	5,643	5	13,046	75	5,019	4
Others	4,991	100	3,690	7	7,886	158	8,410	9	8,702	174	5,894	6	7,532	151	10,185	8	4,878	98	4,973	4
Total			49,716	100			92,001	100			92,321	100			123,606	100			113,514	100

Source: Integrada, Relatório Annual de Atividades 1997-2000.

Table 12.3: Soybean Handled by Cotrimaio (tons)

Type of Product	2000/01	2001/02 (estimated)
GM-free	74,000	108,000
Conventional	24,000	18,000
Organic (in-conversion)	500	500
Organic (certified)	250	600

Source: Interview with Cotrimaio conducted by authors in December 2001.

Table 12.4: Co-operatives Working with EMATER/RS for Agroecological Production

Area/Region	Products	Cooperatives
Serra do Sudeste and RS	Vegetables, Chicken	Cooperativa da Coolmeia
Ipe, Antonio Prado and Sarandi	Grapes, Wine	Cooperativa da Coolmeia
Northeast RS and Alto Uruguai	Subtropical fruits	Cooperativa da Coolmeia
Vale do Cai	Citrus	Cooperativa dos Citricultores do Vale do Cai
Constantina	Wheat	Cooperativa de Pequenos Agricultores (Coopac)
Barra do Rio Azul (Alto Uruguai)	Brown Sugar	Associação de Agricultores Familiares Agroecológicos de Campo Alegre
Barra do Rio Azul (Alto Uruguai)	Brown Sugar, jam, sweets, pickled fruits, juice, milk, bread, cheese	Centro de Apoio ao Pequeno Agricultor (CAPA); Cooperativa Central Alto Uruguai (COCEL); Sindicato dos Trabalhadores Rurais de Aratiba; Cooperativa de Produção Agropecuária Aratiba (COPAAL) and Movimento das Mulheres Trabalhadoras Rurais
Centro-Serra	Vegetables, Fruits	Cooperativa Ecológica (COAGRICEL)

Source: EMATER/RS, 2002.

Table 12.5: Farmers' opinions in Santa Rosa regarding Agroecology and GMOs

	Age	Size (ha)	Growing Organic	Agroecology			GMOs		
				Positive	Not Sure	Negative	Positive	Not Sure	Negative
A	41	9	X	X					X
B	60	12		X					X
C	28	14	X	X					X
D	39	21		X					X
E	58	28	X	X					X
F	63	31		x (if profitable)			x (if legal)		
G	54	36	X		X			X	
H	25	40		X					X
I	51	80			X			X	
J	76	103				X		X	
K	25	120			X		X		

Source: Authors' Survey in Santa Rosa, RS, Brazil, in December 2001 (A, G-J) and July 2002 (B, K).