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Economics of Tobacco Control Paper No. 28

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Crop Substitution and Diversification Strategies: Empirical Evidence from Selected Brazilian Municipalities

Marco Antonio Vargas and Renato Ramos Campos

March 2005

Tobacco Free Initiative
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**CROP SUBSTITUTION AND DIVERSIFICATION STRATEGIES:
EMPIRICAL EVIDENCE FROM SELECTED BRAZILIAN
MUNICIPALITIES**

Marco Antonio Vargas and Renato Ramos Campos

March 2005

Health, Nutrition and Population (HNP) Discussion Paper

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Health, Nutrition and Population (HNP) Discussion Paper

ECONOMICS OF TOBACCO CONTROL PAPER NO. 28

CROP SUBSTITUTION AND DIVERSIFICATION STRATEGIES: Empirical Evidence from Selected Brazilian Municipalities

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Paper prepared for the Tobacco Free Initiative of the World Health Organization – TFI/WHO.

Abstract: This report looks at crop substitution and diversification strategies adopted in Brazil to foster the transition from tobacco to alternative crops. It analyzes the efforts undertaken in some Brazilian municipalities to support small-scale family farmers in their transition from tobacco to other sustainable livelihoods. This analysis comprises three case studies in selected municipalities in the South region of Brazil: Santa Cruz do Sul, Schroeder and Santa Rosa de Lima. Although all are located in the two main tobacco-producing states, Rio Grande do Sul and Santa Catarina, these municipalities show different degrees of economic dependence on tobacco and differences in their forms of insertion in the tobacco agro-industrial chain in Brazil. The report is based on material collected between January and June 2004, in interviews with selected organizations, producers' associations and research institutions, and from secondary sources (e.g., newspapers, directories, etc).

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FOREWORD

In 1999, the World Bank published “Curbing the Epidemic: governments and the economics of tobacco control”, which summarizes the trends in global tobacco use and the resulting immense and growing burden of disease and premature death. By 1999, there were already 4 million deaths from tobacco each year, and this huge number is projected to grow to 10 million per year by 2030, given present trends in tobacco consumption. Already about half of these deaths are in high-income countries, but recent and continued increases in tobacco use in the developing world is causing the tobacco-related burden to shift increasingly to low- and middle-income countries. By 2030, seven of every ten tobacco-attributable deaths will be in developing countries. “Curbing the Epidemic” also summarizes the evidence on the set of policies and interventions that have proved to be effective and cost-effective in reducing tobacco use, in countries around the world.

Tax increases that raise the price of tobacco products are the most powerful policy tool to reduce tobacco use, and the single most cost-effective intervention. They are also the most effective intervention to persuade young people to quit or not to start smoking. This is because young people, like others with low incomes, tend to be highly sensitive to price increases.

Why are these proven cost effective tobacco control measures –especially tax increases– not adopted or implemented more strongly by governments? Many governments hesitate to act decisively to reduce tobacco use, because they fear that tax increases and other tobacco control measures might harm the economy, by reducing the economic benefits their country gains from growing, processing, manufacturing, exporting and taxing tobacco. The argument that “tobacco contributes revenues, jobs and incomes” is a formidable barrier to tobacco control in many countries. Are these fears supported by the facts?

In fact, these fears turn out to be largely unfounded, when the data and evidence on the economics of tobacco and tobacco control are examined. The team of about 30 internationally recognized experts in economics, epidemiology and other relevant disciplines who contributed to the analysis presented in “Curbing the Epidemic” reviewed a large body of existing evidence, and concluded strongly that in most countries, tobacco control would not lead to a net loss of jobs and could, in many circumstances actually generate new jobs. Tax increases would increase (not decrease) total tax revenues, even if cigarette smuggling increased to some extent. Furthermore, the evidence show that cigarette smuggling is caused at least as much by general corruption as by high tobacco product tax and price differentials, and the team recommended strongly that governments not forego the benefits of tobacco tax increases because they feared the possible impact on smuggling, but rather act to deter, detect and punish smuggling.

Much of the evidence presented and summarized in “Curbing the Epidemic” was from high income countries. But the main battleground against tobacco use is now in low- and middle-income countries. If needless disease and millions of premature deaths are to be prevented, then it is crucial that developing countries raise tobacco taxes, introduce comprehensive bans on all advertising and promotion of tobacco products, ban smoking in public places, inform their citizens well about the harm that tobacco causes and the benefits of quitting, and provide advice and support to help people who smoke and chew tobacco, to quit.

In talking to policy-makers in developing countries, it became clear that there was a great need for country-specific analytic work, to provide a basis for policy making, within a sound economic framework. So the World Bank and the Tobacco Free Initiative of the World Health Organization (as well as some of the WHO regional offices and several other organizations, acting in partnership or independently) began to commission and support analysis of the economics of tobacco and tobacco control in many countries around the world.

The report presented in this Economic of Tobacco Discussion Paper makes a valuable contribution to our understanding of the issues and likely economic impact of tobacco control in a specific country setting. Our hope is that the information, analysis and recommendations will prove helpful to policy makers, and help result in stronger policies to reduce the unnecessary harm caused by tobacco use.

Joy de Beyer

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INTRODUCTION

Several countries have expressed concern that global tobacco control efforts may reduce demand for tobacco and adversely impact the economy of tobacco-producing countries. While the effect will not be immediate - recent projections show global tobacco consumption continuing to increase for at least the next 25 years - it is important to look at possible alternative livelihoods that tobacco producers, in particular farmers, can switch to if tobacco demand falls. Crop substitution or tobacco farming diversification programs are not an effective way to reduce tobacco use. As long as demand for a product exists and there are many suppliers, if some suppliers of the product stop providing it, others will supply in their place. However, there is also a growing consensus that efforts to help small farmers to switch from tobacco to alternative crops might be a useful part of sustainable local economic development programs.

This report focuses on crop substitution and diversification strategies adopted in Brazil to foster the transition from tobacco to alternative crops. It analyzes the efforts undertaken in some Brazilian municipalities to support small-scale family farmers in their transition from tobacco to other sustainable livelihoods. This analysis comprises three case studies in selected municipalities in the South region of Brazil: Santa Cruz do Sul, Schroeder and Santa Rosa de Lima. Although all are located in the two main tobacco-producing states, Rio Grande do Sul and Santa Catarina, these municipalities show different degrees of economic dependence on tobacco and differences in their forms of insertion in the tobacco agro-industrial chain in Brazil.

The municipality of Santa Cruz do Sul, in the state of Rio Grande do Sul, is located in the Rio Pardo Valley region, which represents a major link in the Brazilian tobacco industry, supporting an impressive network linking small scale family farmers to multinational tobacco companies and global markets. Most of the municipalities in the Rio Pardo Valley are substantially dependent on activities associated with the tobacco industry. Although this economic dependence has created considerable barriers to switching from tobacco to alternative crops, the region also presents important initiatives aimed at improving agro-ecological production. In the state of Santa Catarina, both the municipalities of Schroeder and Santa Rosa de Lima are less reliant on income from tobacco growing activities. In this sense, the success of crop substitution and diversification initiatives in this region have been, to a great extent, improved by the existence of favorable conditions for the adoption of alternative cash crops like bananas, fresh vegetables and other products associated with organic or agro-ecological enterprises. An analysis of these experiences helps to shed light on the main challenges and opportunities associated with implementing crop substitution and diversification strategies in tobacco producing countries.

In developing this analysis, section two presents a brief overview of the Brazilian tobacco industry and highlights the growing role played by Brazil and other developing countries in the global expansion of the tobacco industry. Section three describes the past and current trends in tobacco growing in selected municipalities in the states of Rio Grande do Sul and Santa Catarina. Specifically, this section analyses the main initiatives adopted in the municipalities of Santa Cruz do Sul, Schroeder and Santa Rosa de Lima to foster switching from tobacco to other sustainable crops; the role of different actors in implementing these interventions; and the reach of such initiatives. Section four emphasizes the main challenges and barriers associated with initiatives

aimed at fostering crop substitution in developing countries, concluding with the lessons that can be taken from these experiences.

This report is based on material collected between January and June 2004, using interviews with selected organizations, producers' associations and research institutions, and researching secondary sources (e.g., newspapers, directories, etc.).

BRAZILIAN TOBACCO FARMING IN THE CONTEXT OF TOBACCO INDUSTRY GLOBAL EXPANSION

Tobacco farming activities are spread over more than 100 countries around the world, with developing countries accounting for about 80 percent of world production (World Bank, 1999). The top tobacco-producing countries are showed in Table 1 below. The People's Republic of China is the world's largest producer of tobacco, supporting about 35 percent of the world's total production. However, because China consumes most of its own production, it does not yet pose any significant threat to other tobacco producing countries in international trade. The United States was the second largest producer until 1998, but its share has dropped from 10.2 percent in 1998 to 6.3 percent in 2003. Recently, Brazil became the second largest producer in the world and consolidated its position as the world's largest exporter of tobacco. This increased production and export of Brazilian tobacco are directly attributable to: (i) the comparatively low cost of production; (ii) the integrated production system, involving contracts directly between farmers and industry; and (iii) the quality of the Virginia tobacco produced in Brazil (Anuário Brasileiro do Fumo, 2003: 44).

Tobacco leaf export does not have a significant share in total export values in most countries, including Brazil where tobacco leaf export generated (US \$1,16 billion) or only 1.3% of total export earnings in 2003 (Vargas, 2004). The two exceptions are Malawi and Zimbabwe, where tobacco accounts for over 50 percent and about 20 percent of total export earnings, respectively.¹

The burgeoning of Brazilian tobacco production in international markets reflects an important trend of shifting tobacco farming to low-income and middle-income countries over the past two decades (World Bank, 1999; Jacobs et al. 2000: 314). As shown in Figure 1 below, developing countries increased their share of world tobacco production from 51 percent to 82 percent from 1962 to 2002; the total share of tobacco production in developed countries fell from 49 percent to 18 percent. By region, Africa increased its share slightly from 5.2 percent in 1962 to 6.7 percent in 2002, while the share of tobacco grown in Latin America and the Caribbean rose from

¹ Zimbabwe used to be one of the world's biggest tobacco exporters. During the 1990s the country accounted for about 20% of global exports of flue-cured tobacco, used for blending with cheaper leaf. However, since 2001, a major land transfer in the country has resulted in a considerable reduction in tobacco growing. (Zimbabwe Tobacco and Products, Annual Report, 2004; available at <http://www.fas.usda.gov/gainfiles/200405/146106428.doc>). In 2003, Zimbabwe earned about US\$318 million from tobacco sales, this fell to about US\$226 million in 2004. Tobacco industry stakeholders are reported to be working toward a rebound in production in 2004/05. (The Herald, Jan 10, 2005, <http://allafrica.com/stories/200501100724.html>)

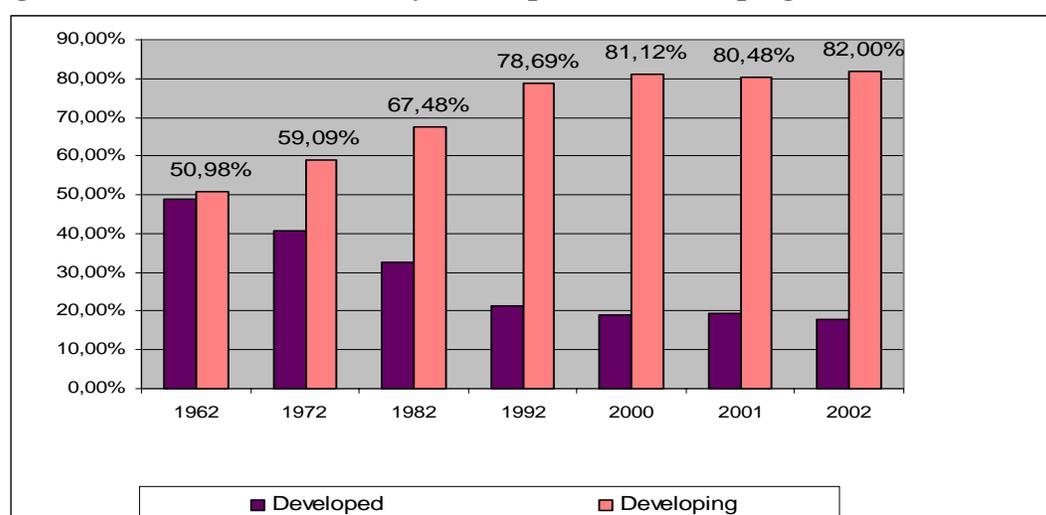
12.2 percent to 15.2 percent during the same period. The share of world tobacco production in Eastern Europe fell from 6.0 percent to 2.5 percent during 1962-2002 (FAO, 2003).

Table 1: World's Leading Non-manufactured Tobacco-Producing and Exporting Countries, Production and Exports, 1998-2003 (Metric Tons)

<u>Production</u>	1998	1999	2000	2001	2002	2003
World Total	6,936,725	6,976,519	6,664,156	6,192,284	6,228,886	6,194,666
China	2,373,978	2,478,295	2,563,854	2,358,842	2,454,105	2,307,578
India	646,000	736,200	520,000	490,000	385,000	595,000
Brazil	505,353	629,525	578,451	568,505	670,309	648,500
United States	671,250	586,360	477,632	449,760	398,520	377,030
Zimbabwe	260,000	193,183	227,726	195,905	178,408	178,408
Indonesia	137,564	135,384	135,578	134,379	143,173	135,000
Exports	1998	1999	2000	2001	2002	2003
World Total	1,987,672	2,033,625	1,953,523	2,197,033	2,111,618	n.a
Brazil	300,513	343,029	341,488	435,395	464,862	n.a
China; Peoples Republic of	106,355	131,722	120,334	166,962	169,203	n.a
United States	215,222	190,538	184,396	190,828	157,331	n.a
Italy	95,664	93,862	102,933	109,623	119,165	n.a
Malawi	129,630	95,600	90,300	93,000	114,581	n.a
Zimbabwe	194,141	163,933	177,053	221,145	105,547	n.a
India	75,035	118,838	97363	84,476	101,164	n.a

Source: FAOSTAT. Available at: <http://faostat.fao.org>

Figure 1: Tobacco Production by Developed and Developing Countries, 1962-2002



Source: FAO (2003)

The increasing participation of developing countries in world tobacco production is explained by several factors. First, production costs in developing countries are lower than in developed countries. Second, tobacco use in developed countries has declined, while tobacco demand in developing countries—for both cigarette manufacturing and exports—has increased, catalyzing increased tobacco production. Third, as part of a broader globalization trend during the 1990s, the multinational tobacco companies have established a growing presence in developing countries, and encouraged the expansion of tobacco growing in order to supply new processing plants. Finally, in many developing countries tobacco is still considered a relatively profitable cash crop, particularly when compared with other traditional food crops (World Bank, 1999: 61). Moreover, there are indirect benefits associated with tobacco growing, including loans, inputs, technical support, or other forms of support from government or the industry, and well-developed marketing systems, that help make tobacco an attractive crop for small farmers in developing countries, and that hamper efforts to switch from tobacco to alternative crops (Jacobs et al., 2000; World Bank, 2003: 5).²

For many developing countries, exports of domestic tobacco leaf in the global market depend heavily on a small number of foreign customers associated with the major retailers of tobacco products. This makes access to global tobacco trade networks increasingly based on relatively low costs of production, good quality of leaves and functional integration with the major transnational tobacco companies. The ability of the major transnational tobacco companies to govern the global tobacco value chain rests on R&D, branding and marketing activities, which are characterized by high barriers to entry and command high returns (Vargas, 2004: 10). Because there are many developing countries growing tobacco but a limited number of manufacturers, it is difficult for growing countries to compete in the global market unless they keep the production costs low, quality high and have good trade networks. Hence, although global tobacco farming activities are a key stage in the tobacco value chain, accounting for approximately US \$20 billion,³ this is only a small share – less than 10% - of the total amount generated by tobacco companies from the sale of manufactured tobacco products.⁴

TOBACCO FARMING ACTIVITIES IN THE SOUTH OF BRAZIL

Three states in the South of Brazil (Rio Grande do Sul, Santa Catarina and Paraná) account for almost 90 percent of the land devoted to tobacco farming and for 93 percent of the tobacco produced in the country. Most of the remaining 10 percent comes from the northern states that mainly supply the demand for black tobacco used in cigars. According to the Brazilian Tobacco Growers Association (AFUBRA), more than 600 localities and almost 160,000 growers, mainly

² However, tobacco does not always provide the best returns. For example, one recent study indicated that mixed cropping without tobacco provided higher net returns than mono-cropping tobacco. However, tobacco farmers in developing countries are carried away by the high gross return from tobacco instead of comparing net returns (Malhotra, 2001: 15, *World Bank*, 2003: 5).

³ This figure is based on the estimated global value of tobacco crops (Mackay and Eriksen, 2002: 46).

⁴ For a discussion on the asymmetries emerging from the process of income appropriation along the different stages of the global tobacco chain please see Vargas (2004). According to a recent study (WHO, 2004:16), the combined net revenue of the three biggest tobacco transnational companies is around US\$100 billion per year.

small landowners, are involved in growing tobacco in the South of Brazil (Table 2). Rio Grande do Sul is the state with the highest number of municipalities raising tobacco. However, tobacco has always been more widespread in Santa Catarina, being found in 82 percent of the municipalities. Rio Grande do Sul follows with the equivalent of 64 percent of the municipalities and Paraná comes third with 39 percent⁵ (Anuário Brasileiro do Fumo, 2003: 12). Most of the activities associated with the tobacco industry in Rio Grande do Sul are carried out in localities like Santa Cruz do Sul, Venâncio Aires and Vera Cruz, within the Rio Pardo Valley region. This region also accounts for approximately 45 percent of the small landowners that grow tobacco in the state.

Table 2: Tobacco Production in the South of Brazil - 2002/2003 Crop

State	Growers	Municipalities	Area (hectares)	Production (tons)
Rio Grande do Sul	86,848	300	180,783	285,825
Santa Catarina	53,925	240	119,325	210,328
Paraná	28,180	157	61,604	104,172
Total South region	168,953	697	361,712	600,325

Source: Sindifumo (July, 2003)

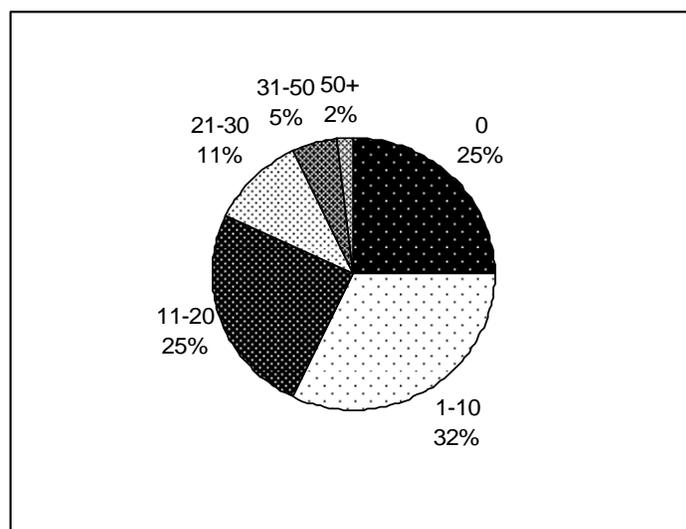
A major characteristic of tobacco farming is the extensive utilization of family labor, which accounts for around 92% of all workers involved in tobacco growing. The remaining 8% is comprised of seasonal workers and totals about 45 thousand jobs per crop year (Anuário Brasileiro do Fumo, 2002). According to a recent study carried out by AFUBRA, there are around 190,000 farmers engaged in tobacco growing activities in Brazil. The same study has showed that the average family size for Brazilian tobacco growers is five; of those, on average, 3.4 family members work in the fields.

The land distribution associated with tobacco growing activities in the South of Brazil is illustrated in Figure 2. This figure shows that around 25 percent of the tobacco growers in the three states of southern Brazil (Rio Grande do Sul, Santa Catarina and Paraná) do not own land, but rather work in a partnership or under lease. Also, Figure 2 highlights that 32 percent of tobacco growers in southern Brazil own properties of between 1 and 10 hectares. According to AFUBRA, an average tobacco farm is 18.5 hectares.⁶ Of this area, an average of around 14 percent, or 2.6 hectares) is used for tobacco cultivation.

⁵ The evolution of tobacco production in the states of Rio Grande do Sul and Santa Catarina from 1990 to 2002 are presented in tables included in the annex.

⁶ This average is the total area of holdings divided by the number of holdings associated with tobacco farming activities in South Brazil in 2002. According to Table 3, during the 2001/2002 crop year there were 114,920 holdings in the South of Brazil with a total area of 2,126,010 hectares.

Figure 2: Tobacco Growing Landowners, by Holding Size, 2000 (hectares)



Source: Anuário Brasileiro do Fumo (2002:35)

Table 3 shows a profile of the current tobacco growing activities in the South of Brazil. The data from the Brazilian Tobacco Growers Association show a considerable increase in the number of growers, the area used for tobacco cultivation and leaf produced. Despite this considerable expansion in the area of tobacco holdings (26.43 percent) and the increases in leaf production (30 percent), the farmers' sale price for flue-cured Virginia leaf produced in the region remained stable between 2000 and 2002.

Table 3: Profile of Tobacco Farming in the South of Brazil

Specification	2000/2001	2001/2002	% growth
Number of municipalities (un)	656	662	0.91%
Number of holdings	99,230	114,920	15.81%
Number of families	134,930	153,130	13.49%
People employed	499,250	566,580	13.49%
Area of holdings (ha)	1,681,590	2,126,010	26.43%
Area with other crops (ha)	938,260	1,219,840	30.01%
Area of tobacco (ha)	253,790	304,510	19.99%
Tons of leaf produced (ton)	509,110	635,110	24.75%
Average price (US\$/Kg)*	1,16	1,18	1.91%
GDP per capita	2,971	2,584	
Gross income from tobacco per family (US\$)	4360,47	4884,48	12.02%
Family income from other crops (US\$) (**)	1090,01	1221,08	12.02%
Gross income per ha of tobacco (US\$/ha)(***)	2318,29	2456,27	5.95%
Average Size of holdings (ha)	16.9	18.5	9.47%

(*): According to FUNCEX data for the R\$/US\$ average rate for March/2001 and March/2002

(**) This value is estimated by AFUBRA and represents crops grown for tobacco farmers' own consumption.

(***) Estimated income with average productivity of 2000 Kg/Ha.

Source: Anuário Brasileiro do Fumo, 2002

The figures in Table 3 show that tobacco growing has continued to spread throughout the three southern Brazil states. Faced with the need to increase production in order to meet global market demand, and as tobacco is grown on small properties, where it is difficult to expand the area devoted to this crop, the tobacco companies operating in the region have adopted a strategy of moving into new areas. Consequently, there has been a continued expansion of tobacco growing into new areas in the southern zone of Rio Grande do Sul, where yield and quality are similar to traditional tobacco producing regions like the Rio Pardo Valley.

The table also shows that tobacco farmers also grow other crops for their subsistence or to supplement their income. According to AFUBRA, these other crops, like corn, beans, vegetables and fruit, take up 25.9 percent of the average area. Another 60 percent of the farm area is taken up by pastures and livestock (20%), native forest and reforested areas (28%), unused areas, weirs or waterways, homes and outbuildings (12%). Although the average earnings associated with these crops are a quarter of those obtained from tobacco, ongoing initiatives have demonstrated that the net returns provided by other crops, like organic vegetables or bananas, may be higher than the net returns provided by growing only tobacco.

CHALLENGES AND OPPORTUNITIES FOR CROP SUBSTITUTION AND DIVERSIFICATION: EMPIRICAL EVIDENCES FROM BRAZIL

This section analyzes three selected experiences of diversification and crop substitution in the South of Brazil. On the one hand, the section discusses the main challenges that are usually faced by crop substitution initiatives. On the other hand, it also demonstrates that there are viable alternatives for tobacco crops, which can provide equivalent net returns and more sustainable livelihoods. In this sense, this section seeks to identify the main features of crop substitution and diversification and the role of key actors in implementing such initiatives. Moreover, it seeks to understand whether tobacco crop reduction and the concomitant expansion of other crops is effective and whether the substitution is a result of explicit public policies.

MAJOR CHALLENGES FOR CROP SUBSTITUTION IN BRAZIL

Notwithstanding the major concerns associated with the increasing expansion of tobacco farming in Brazil, there remain considerable barriers hampering the adoption of broader diversification programs and alternative livelihoods for small family farmers in tobacco-producing regions.⁷ In

⁷ There is substantial evidence pointing to the harmful effects of the control exercised by big tobacco companies over the organization of the tobacco agro-industrial chain in developing countries. The production system used by tobacco farmers is highly labor intensive and requires a considerable amount of pesticides and other agrochemicals. The most cited problems with this production system include the health risks resulting from the inappropriate use of pesticides, the employment of child labor associated with the extensive use of family labor in tobacco growing and the indebtedness of small family producers to the big tobacco companies. Despite the importance of health risks associated with tobacco farming, this issue is outside the scope of this study. For a detailed analysis of the main concerns about the health and safety of small family farmers who grow tobacco in the South of Brazil please see a recent report by Christian Aid/DESER available at: <http://www.christian-aid.org.uk/indepth/0201bat/>.

this sense, it is possible to highlight three major issues that are crucial to understanding the hegemony of tobacco farming in some regions in the South of the country: i) the role of the integrated system in keeping farmers financially dependent on tobacco companies, ii) the role of local and state governments in supporting and subsidizing tobacco growing and processing activities in Brazil and iii) the high gross returns from tobacco crops, particularly when compared with other traditional food crops.

Integrated production system: a framework for controlling farmers

The integrated production system involves the establishment of contractual obligations between small farmers and tobacco processing or retailing firms. In participating in a supply agreement, small farmers commit themselves to providing the contracting firm with all their tobacco leaf produced and to following the technical guidance and price classification scheme set by the firm. On one hand, the firm is responsible for providing the smallholder with seeds; for selling them the main agricultural inputs like fertilizers and authorized pesticides and insecticides; for giving technical advice through the firm's supervisory and instructor teams; for controlling loans and intermediating between tobacco growers and official banks; for providing transport from the fields to the tobacco warehouses and processing plants; and for buying the entire crop from the farmer (Afubra, 2002). On the other hand, contracting farmers are then bound to volume, quality and production costs defined by the firm. Thus, through establishing these agreements, and in order to reach the competitive standards required by the international markets, the tobacco firms control both the tobacco varieties produced at the local level and the quality and costs of production.

Through this integrated system, the tobacco companies determine which technologies the tobacco growers use and are assured exclusive rights in supplying. This gives the firms total control over the quality and cost of their main input but also allows them to signal to the producers their estimated demand (Vargas, 2001: 14).

Although the integrated production system has existed in the South of Brazil since the 1920s, it was not until the 1970s that this system assumed a crucial role in the reorganization and modernization of tobacco farming activities in the Rio Pardo Valley region. Before the consolidation of the integrated production system in this region, tobacco growing activities were based mostly on the use of organic fertilizers; small farmers determined the quantity produced independently of technical guidance from tobacco firms. As the major international tobacco companies started establishing branches in the region, the small farmers' autonomy was subverted through the adoption of new tobacco growing practices (Vogt, 1994). These changes in the social organization of tobacco production in the South of Brazil were crucial to allowing the large tobacco companies to assume complete control over the tobacco value chain at the local level (Vargas, 2001).

The integrated system offered to the farmers by the tobacco companies has become a strong mechanism to increase their dependence on tobacco, especially considering the lack of structured

markets for alternative food crops⁸. However, the contractual relationship between tobacco companies and small farmers reveals fundamental problems associated with growing indebtedness, and health risks due to the use of highly toxic pesticides sold to farmers by the tobacco companies.

It is also important to highlight that this social organization of tobacco farming activities in Brazil—based on an integrated production system that is controlled by the major multinational tobacco companies—is strongly reinforced by the associations and organizations aimed predominantly at coordinating labour relations and mediating between producers of tobacco leaf and processing firms. AFUBRA, ABIFUMO, SINDIFUMO and the Tobacco Growers Union are the main industry associations aimed at regulating the relationships between growers and the tobacco industry. The Brazilian Tobacco Growers Association - AFUBRA (Associação dos Fumicultores do Brasil) was created in 1995. The foundation of AFUBRA was focused on the need to mediate prices paid by the industry to producers through consolidating the integrated production system. The Brazilian Tobacco Manufacturers Union – SINDIFUMO (Sindicato das Indústrias do Fumo) was created in 1942, however, its representation function did not acquire major importance until 1980, when the sector grew substantially. At present, it has 20 associates, corresponding to the total number of tobacco firms involved in purchasing, processing and trading tobacco in the region. The Brazilian Tobacco Manufacturers Association – Abifumo (Associação Brasileira de Fumo) has only 26 associated firms in the whole country, although it represents the specific interests of the sector's larger firms, especially concerning matters related to tax legislation. Finally, the Tobacco Growers Union (Sindicato dos Trabalhadores Rurais) is actively involved in negotiations related to production costs and prices paid for tobacco leaf to the agricultural producers. The process of negotiating the prices paid to rural producers has always involved asymmetric bargaining power that favours the tobacco companies. Even if these organizations play an important role in maintaining the integrated production system and organizing labour relations for the lead tobacco companies, they have a very limited reach for engaging local actors in alternative development paths associated with diversification strategies.

Public policies to support the tobacco industry

When analyzing the barriers to tobacco crop substitution in the South of Brazil, one must also consider the government financing policies (at local, state and national levels) that affect tobacco leaf growing and processing. As emphasized in previous sections, tobacco growing in Brazil is concentrated in several specific regions in the South that are much more heavily dependent on this crop than the country as a whole. The political weight of tobacco in the regional economy impedes implementation of local public policies aimed at fostering crop substitution.

In particular, in most municipalities in the Rio Pardo Valley, municipal public policies generally reveal more concern for creating infrastructural conditions for expanding activities linked to tobacco agro-industry than for reducing tobacco growing. In Santa Cruz do Sul, for instance, this

⁸ An example of the perception of tobacco growing by local producers was given in a recent survey conducted in the region among the small farmers (IBRAP, 2000). This study showed that more than 93% of small farmers in the region consider that tobacco is the most profitable crop. More than 77% of these small farmers do not believe that other crops would give the same financial return for the same land allocation (about 2.6 hectares).

has been the case since the 1970s, when subsidiaries of the main multinational tobacco companies were established in the municipality. The municipal administration invested in an Industrial District to provide needed infrastructure for the extension of tobacco processing plants by the major multinational companies.

At the state level, there are some important governmental programs aimed at supporting expansion of the tobacco industry. In the course of the 1990s, the state government of Rio Grande do Sul created a program specially focused on the development of the tobacco industry, the PROINCI/RS, based upon Fundopen, the so-called Enterprise Operation Fund. These programs gave tax incentives to several multinational tobacco companies, including Souza Cruz, Universal Leaf or Phillip Morris, to expand production capacity in Rio Pardo Valley. During the 1990s, for instance, Souza Cruz (a subsidiary of BAT) obtained from the state government tax benefits of approximately US \$900 million for constructing the world's largest tobacco processing complex in Santa Cruz do Sul and a cigarette factory in the municipality of Cachoeirinha.⁹

In the same way, the federal government has, until recently, allocated resources from the main program of support for family farming (PRONAF – National Program of Family Farming) as one of the main financing sources for tobacco production in Southern Brazil. According to data from the Department of Rural and Social Economic Studies - DESER (Frozza *et al*, 1998 *apud Silva*, 2002: 67), in 1997 about 32% of the total funding resources of PRONAF at national level went for tobacco production. The percentage was even higher in the three tobacco producing states: 46% in Rio Grande do Sul, 55% in Santa Catarina and 16% in Paraná. In 2001, the federal government prohibited the use of PRONAF resources for financing tobacco production. However, other forms of support have recently been adopted, such as the use of resources from BNDES (National Economic and Social Development Bank) for financing tobacco growers in the South of Brazil. Through this initiative, BNDES approved a financial grant of R \$167 million (about US \$56 million) to 14,694 tobacco growers to be used for constructing stoves and sheds for curing, drying and storing tobacco leaf (BNDES, 2004).¹⁰

Tobacco and alternative crops: the “profitability issue”

The gross return on tobacco compared to alternative crops is a key issue for any crop substitution program aimed at supporting small family farmers in switching from tobacco to other crops. Although the profitability of tobacco farming has fallen during recent years, tobacco remains a highly attractive crop to small family farmers, providing a higher net income yield per unit of land than other conventional food crops like corn or black beans. Table 4 compares production costs and financial returns for corn, black beans and tobacco crops, according to information provided by the Brazilian Tobacco Growers Association (AFUBRA).

⁹ Most of the tobacco multinational companies located in the Rio Pardo Valley also held commercial and storage facilities in the States of Santa Catarina and Paraná to secure the control and organization of their unmanufactured tobacco supply network across the three States in the South of Brazil. These units have also received state government tax benefits.

¹⁰ According to information provided in the BNDES website: <http://www.bndes.gov.br/noticias/not823.asp>

Table 4: Operational Production Cost for Selected Crops, 1999/2000, US\$/ha

Description	Tobacco		Other food crops	
	Virginia	Burley	Corn	Bean
1. Variable costs				
Labor	969.26	771.11	104.94	124.05
Agricultural operations	78.59	61.10	59.79	25.91
Inputs	423.71	402.82	142.53	70.76
Wood	145.71	0.00	0.00	0.00
Others	121.01	108.90	27.80	26.88
Sub-total	1,738.08	1,343.93	335.06	247.60
2. Fixed costs				
Depreciation	160.47	163.06	48.17	48.21
Soil treatment	10.35	11.46	8.37	8.37
Sub-total	170.82	170.82	56.54	56.58
Total	1,909.09	1,518.75	391.60	304.18
Yield kg/ha	2,026	1,678	3,600	1,200
Cost US\$/kg	0.94	0.90	0.11	0.25
Average price US\$/kg	1.17	1.12	0.11	0.22
Gross income US\$/ha	2,370.42	1,879.36	396.00	264.00
Net Income US\$/ha	454.57	360.91	1.51	(42.11)
Day/Man/ha.	149	134	22	26

Source: AFUBRA (2000)

Table 4 shows that the costs of tobacco production are about five times higher than those associated with corn production and about six times higher than the costs of black bean production. This difference reflects, in particular, the greater labor needed for tobacco production (149 days/man/ha). However, the net income provided by tobacco (US \$454.57 per hectare) far exceeds the returns on corn crops (US\$1.51 per hectare) and black bean crops (US \$42.11 per hectare).

However, Silva (2002) emphasizes that the analysis of operational costs for tobacco in Southern Brazil fails to take into account a major cost element: the cost of land. Including the cost of land, estimated at about 15% of the net income from tobacco growing in the region of Santa Cruz do Sul, would raise tobacco production costs considerably.¹¹ Although this also affects the profitability of other crops, and would not change relative profitability, the important point is that the prices paid to local producers – prices set by the major tobacco companies and by local institutions like SINDIFUMO and AFUBRA – do not take into account the cost of land utilization.

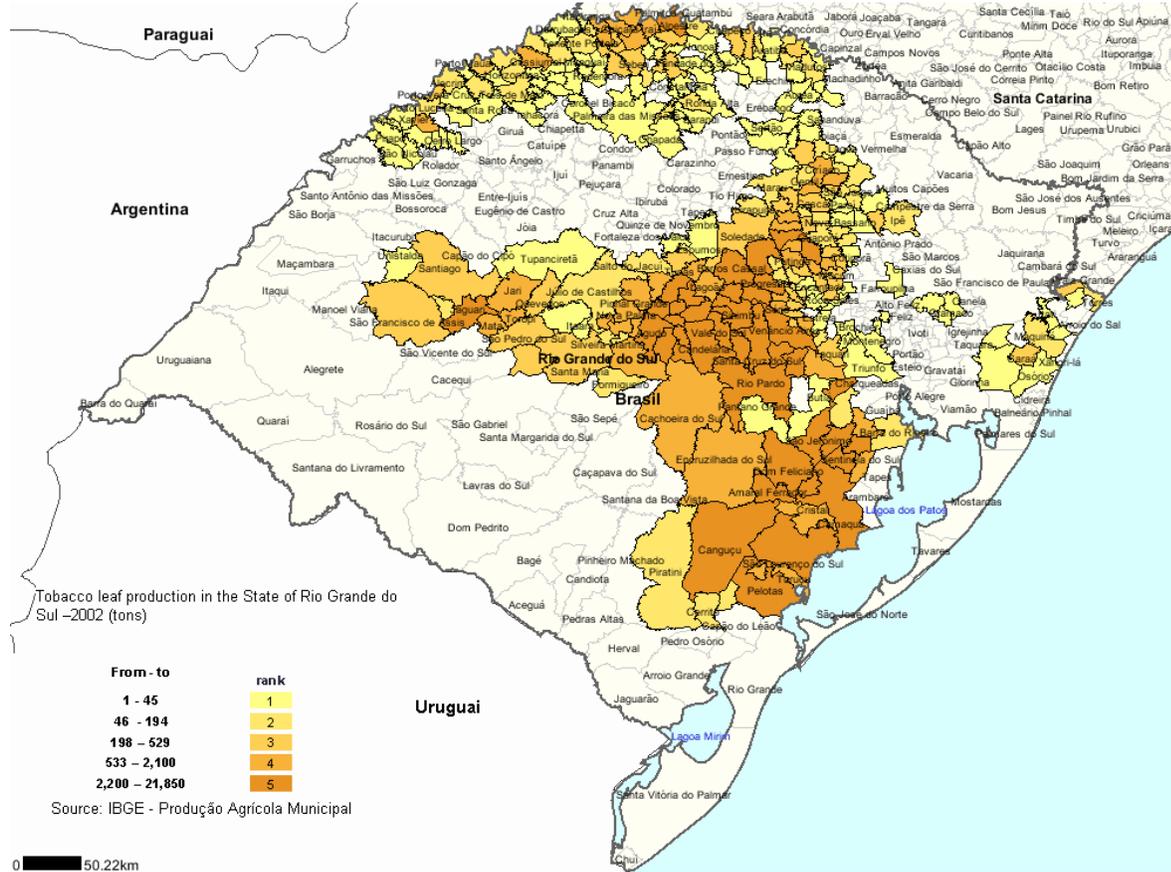
¹¹ According to data provided by Silva (2002), the land cost values per hectare are currently between US \$275.86 and US \$379.31 in the region of Santa Cruz do Sul.

SANTA CRUZ DO SUL: ALTERNATIVE CROPS IN THE “BRAZILIAN CAPITAL OF TOBACCO”

Santa Cruz do Sul is one of the main municipalities in the Rio Pardo Valley region in the State of Rio Grande do Sul. The Rio Pardo Valley includes 25 municipalities that, with few exceptions¹², are largely reliant on income from tobacco crops. The crop substitution and diversification strategies adopted in the municipality of Santa Cruz do Sul need to be analyzed in light of the impact on tobacco farming activities in the region of the Rio Pardo Valley.

The map below shows the distribution of tobacco production in the state of Rio Grande do Sul. Municipalities with the highest concentration of tobacco growing in the state in 2002 included Venâncio Aires (21,850 tons), Candelária (18,144 tons), Santa Cruz do Sul (14,368 tons), Arroio do Tigre (11,550 tons) and Vera Cruz (10,560 tons), all located in the region of the Rio Pardo Valley. Annex 2 shows tobacco leaf production trends in the state of Rio Grande do Sul.

Figure 3: Tobacco Leaf Production in Rio Grande do Sul –2002 (in tons)



Source: IBGE – Produção Agrícola Municipal -2002

Tobacco growing in the Rio Pardo Valley region dates back to 1824, when the first German colonies were settled in Rio Grande do Sul. Since the mid-19th century, tobacco growing,

¹² The exceptions are the municipalities of Encruzilhada do Sul and Pântano Grande, which, for historical reasons, have specialized in rice instead of tobacco.

primarily by small farmers using family labour, has become the main agricultural activity in the region. As activities related to tobacco acquired major economic importance in the region, a nucleus of locally owned firms emerged, creating a physical and institutional infrastructure to support production and trading. This contributed to the industrial development of the region and promoted several improvements in industrial processing activities. Until the early 1920s, non-manufactured tobacco leaf was the region's main export. However, since the 1920s, several locally owned processing plants have been established in the region, leading to a significant growth in the role of the tobacco industry in the regional and national economy (Liedke, 1977).

To a great extent, the initial development of the tobacco cluster in the Rio Pardo Valley was related to three significant factors:

- i) the structure of land ownership based on small farmers and family labour;
- ii) the existence of skilled local labour; and
- iii) an incipient infrastructure for production and trading developed by national firms prior to 1970.

However, the great impetus for the consolidation of tobacco farming and processing activities in the Rio Pardo Valley occurred during the 1970s, when increasing international demand led to the introduction of the major multinational tobacco companies in this region, in a gradual though continuous way. The multinational companies initially injected resources into local firms, subsequently taking over total or majority share control of these local firms and keeping the former owners in management positions (Vogt, 1994:105). Denationalization during the 1970s was accompanied by substantial increases in production, improvements in tobacco processing factories and reorganization of the agricultural production system. Modernization resulted in deep transformations of the physical and institutional infrastructure of the region, justified as addressing the needs of the tobacco cluster development, though done at the will of the major tobacco companies. During the 1990s, the region became highly vulnerable to the competitive pressures faced by the largest multinational tobacco companies in global markets, particularly concerning companies' strategies to increase tobacco production in developing countries.

Impacts of tobacco industry on local development strategies

The tobacco industry has brought about significant changes in the Rio Pardo Valley region's production system with several negative economic, social and environmental impacts. In terms of health and environmental impacts, tobacco farming is associated with well-known problems of soil depletion, erosion, destruction of native fauna and flora and the use of highly toxic pesticides. In terms of economic and social impacts, there is an increasing consensus in the region that the agro-exporting model exemplified by tobacco growing does not represent a sustainable development option for most Rio Pardo Valley municipalities. Firstly, there is a marked lack of backward and forward linkages between the tobacco industry and other economic sectors of the local economy in the Rio Pardo Valley. Most inputs--fertilizers, herbicides, pesticides, seeds and several other inputs used in growing and handling the crop--are provided through the large tobacco companies and acquired from global suppliers. Very few of the goods and services used in tobacco farming are bought from sources inside the region. Second, the key activities related to marketing, export distribution, wholesale and R&D, are under the control of the headquarters of large transnational conglomerates in the region and/or specialized

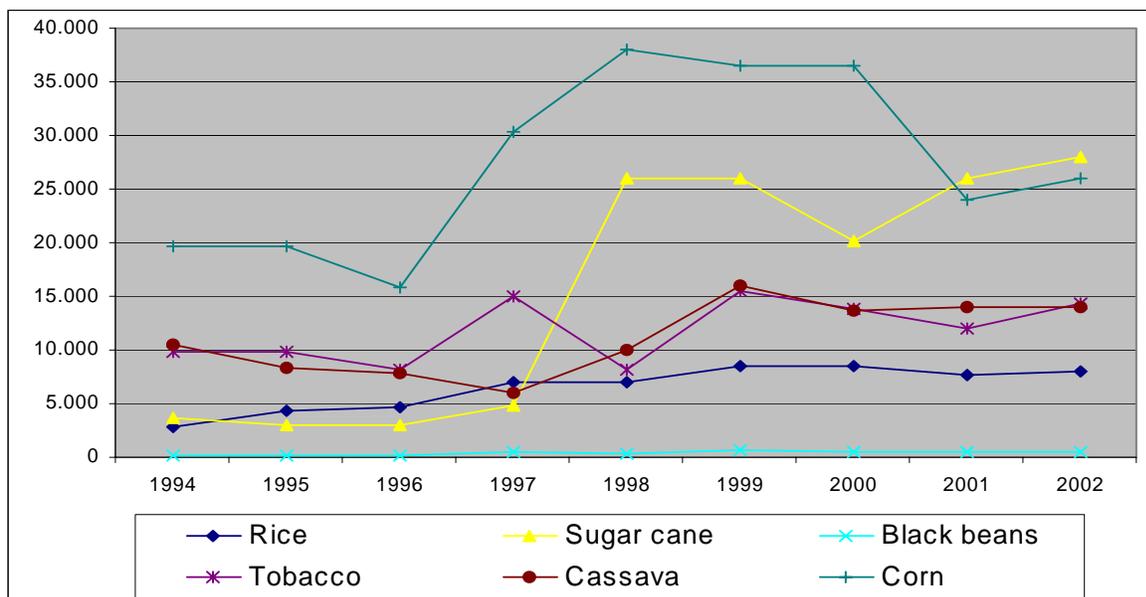
international exporter agents. The heavy control exercised by the major tobacco companies in Rio Pardo Valley over the links in their production chain, guarantees them control of the primary sources of economic revenue along the tobacco value chain (Vargas, 2004: 31).

Moreover, the upgrading and modernization of the tobacco processing firms led to investments in new machinery and to the adoption of new production techniques that resulted in a drastic reduction in employment, in production and administration. The fall in tobacco manufacturing jobs was intense in the first half of the 1990s, and still persists, another instance of competitive adjustment in the tobacco sector bringing negative consequences to the region.

The heavy economic dependence of local economies and regional governments on tobacco tax income is one of the greatest barriers to promoting policy interventions aimed at assisting farmers to adopt alternative crops.¹³

Figures 4 and 5 below show trends in the quantity of tobacco produced in Santa Cruz do Sul between 1994 and 2002 compared to other crops, and the share of different food crops in the total value of seasonal crops in 2002.¹⁴

Figure 4: Santa Cruz do Sul, Main Seasonal Crops, 1994-2002 (in tons)



As shown in Figure 4, corn, sugar cane and cassava, together with tobacco are the agricultural mainstays in the municipality in terms of quantity. Tobacco leaf production reached its highest volume in 1999 (15,525 tons), accounting for 2.46% of total Brazilian production, and remained around 15,000 tons until 2002. By contrast, although corn production reached its highest volume

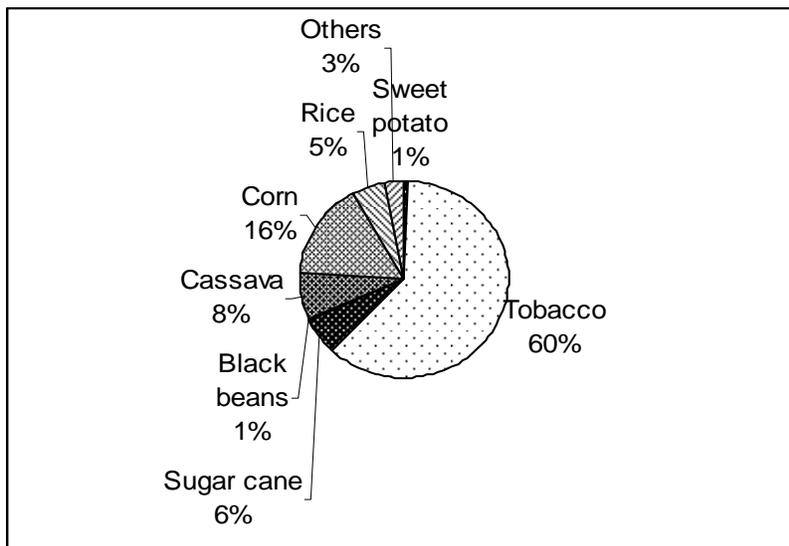
¹³ In some municipalities like Santa Cruz do Sul and Venâncio Aires, tobacco generates more than 40% of total tax revenues.

¹⁴ Seasonal Crops have a growing cycle of less than one year and must be sown or planted again after each harvest. Permanent crops do not need to be replaced after each harvest, like fruit trees.

in the municipality in 1998 (38,000 tons), this accounted for only 0.13% of total Brazilian corn production. The volume of sugar cane production increased sharply compared with other food crops, from 3,600 tons in 1994 to 28,000 tons in 2002. However, this crop accounts for only a marginal share of Brazil sugar cane production (0.01%).

An alternative way to look at the importance of tobacco in Santa Cruz do Sul is through its share in the total value of production of the main agricultural products in the municipality. In 2002, tobacco accounted for around 60 percent of the total value of agricultural production, and 61 percent of the total value of seasonal crops, followed by corn at 16 percent, cassava at 8 percent and rice at 5 percent (Figure 5).

Figure 5: Santa Cruz do Sul, main seasonal crops, 2002 (% of total production value)



Source: IBGE – Produção Agrícola Municipal

Alternative crops for sustainable livelihoods: CAPA’s experience

In the course of the last several years, the search for an alternative and sustainable model for rural development in Rio Pardo Valley has resulted in the creation of some important initiatives aimed at promoting crop substitution schemes, particularly associated with agro-ecological endeavors.

Agro-ecological production belongs to a wide category known as “alternative agriculture,” which aims primarily to use no pesticides, and to minimize the use of all chemical inorganic inputs. Usually, these farmers use alternative techniques such as organic fertilization and multi-cultures, and attempt to substitute chemical cycles with biological cycles. Multi-crop farming is a requirement for generating productive diversity, allowing a biological balance that is fundamental in avoiding diseases and other detriments common to any monocrop.¹⁵

¹⁵ The strong presence of family farming in Southern Brazil has been a key factor contributing to the expansion of agro-ecological production in the region. According to data collected by the Farming Census 1995-1996 (IBGE), family farms comprise 90.5% of farming businesses in the states of Rio Grande do Sul, Santa Catarina and Paraná

In the Rio Pardo Valley, the first efforts to support agro-ecological production, at the end of 1980s, were undertaken by non-governmental organizations providing technical assistance to different groups of family farmers. Efforts to consolidate agro-ecological production as an alternative to tobacco growing have gradually brought in new diverse local partners, including farmers' associations, non-governmental organizations, municipal governments and the public extension agency of the state (EMATER\RS). According to a recent survey, more than 330 families are involved in agro-ecological products in the Rio Pardo Valley region (Etges et al, 2002). Agro-ecological production is based entirely in family farms that are smaller than 15 hectares and produce more than 40 products. These products are sold in fairs, regional and local supermarkets and restaurants, and include a wide variety of horticultural products, *erva-mate* (Brazilian tea), peaches, oranges, beans and corn, among others.

The Center of Assistance for Small Farmers (CAPA) plays a key role in the Rio Pardo Valley as the main organization working to develop initiatives for crop substitution and diversification addressed to small farmers through programs aimed at production, distribution and selling of agro-ecological products.

Associated with the Brazilian Evangelical Lutheran Church (IECLB), CAPA is a nongovernmental organization dedicated to fostering family agriculture through sustainable rural development. CAPA's activities are not limited to training farmers, but also include incentives for processing, manufacturing and marketing products. There are five CAPA offices in the three states of southern Brazil (Rio Grande do Sul, Santa Catarina and Paraná). According to CAPA information, these offices represent approximately three thousand farmers, organized into 11 cooperatives, 102 groups and associations of ecological food production and 47 groups of alternative health and integral nourishment, CAPA has already promoted the establishment of 13 community agro-industries and one processing facility for seeds (UBS) in the city of Canguçu (RS). Projects are developed by technical teams of professionals in the areas of agriculture, health, management and communication.

CAPA's office in Santa Cruz do Sul was established in 1987 as part of a strategy for expanding IECLB activities in the region of the Rio Pardo Valley. Although the office's working area involves a wider territory (including the Center-South and Taquari Valley regions), the main focus of this CAPA office is in six municipalities of the region: Santa Cruz do Sul, Vale do Sol, Vale Verde, Candelária, Vera Cruz, Paraíso do Sul, Santa Maria and Paverama. The center gives technical support to 426 small-family farmers, which have been organized into 28 work groups in the region.

As part of its action in the region, CAPA created a regional cooperative of farmers, ECOVALE – Regional Cooperative of Ecologists Family Farmers. This cooperative includes 80 farmers dedicated to the production and marketing of agro-ecological products. The main products of the cooperative are vegetables, rice and *erva-mate* (Brazilian tea), and the main marketing channels are ecological fairs held each week in the cities of Santa Cruz do Sul, Vera Cruz, Vale do Sol

(about 900,000 businesses). As a result, in the Southern region of Brazil, agro-ecological production is historically strongly identified with family agriculture.

and Venâncio Aires. Recently, a new and important market for Ecovale products opened through supplying day nurseries in the city of Vera Cruz. It is interesting to note that in some of the municipalities of the Rio Pardo Valley region – such as Vale do Sol and Venâncio Aires – many municipal initiatives for diversification and tobacco crop substitution are made possible through partnerships with the Center of Assistance for Small Farmers.

In the case of Vale do Sol, the partnership with CAPA since the mid-1990s has been crucial to agro-ecological production as an alternative to tobacco culture in the municipality. Currently, the city has six associations of farmers working with agro-ecological products (Done, Aane, Soque Group, Uniserapi, Boa Esperança and Acro). In addition to the agreements established with the municipal administrations in the region, the Santa Cruz do Sul CAPA office also establishes partnerships with farmers' organizations for training and technical assistance. These partnerships are an important source of funding for CAPA's activities, and the funding also helps CAPA to attract other financing from international and national agencies. The partnerships also facilitate communication between the Center and farmers' regional organizations.

Preliminary estimates of the revenues of small farmers involved in these initiatives show that they provides feasible alternatives to tobacco farming for small farmers in the region, in terms of profitability, marketing and production financing. According to data provided by the Center,¹⁶ small family farmers associated with ECOVALE have an annual average income of US \$1,560 (this annual income ranges from a minimum of US \$312 to a maximum of US \$4,684).

Based on these figure, it is possible to establish a preliminary comparison between the net income associated with agro-ecological farming in Rio Pardo Valley and net income from tobacco crops. According to the figure provided in Table 4, tobacco yielded a return of US \$360,91-454.57 per hectare. As noted earlier, an average tobacco farm in Brazil is 18,5 hectares, of which 2.6 are under tobacco. So the average net income from tobacco per family can be estimated as US\$938.37 to \$1,181.88, considerably less than the average net income of farmers associated with ECOVALE.¹⁷

The main features of ECOVALE are shown in Table 5.

¹⁶ The information on ECOVALE and CAPA in Rio Pardo Valley was compiled by the authors through interviews with Sighard Hermany, coordinator of the Center of Assistance for Small Farmers in Santa Cruz do Sul.

¹⁷ It was emphasized during the interviews that most of the small farmers associated to ECOVALE have other sources of income that might include tobacco crops. However, the information provided by the cooperative doesn't allow us to distinguish the profile of farmers fully dedicated to agro-ecological production from those that are also involved with tobacco production.

Table 5: Profile of ECOVALE

Municipalities involved	Santa Cruz do Sul, Vera Cruz, Vale do Sol, Venâncio Aires
Number of associated farmers	80
Main products	Vegetables, rice and erva-mate (Brazilian Tea)
Main market channels	7 (seven) ecological fairs: Santa Cruz do Sul (3), Vera Cruz (1), Vale do Sol (1) and Venâncio Aires (2)
Cooperative gross income in 2003	US \$81,000*
Average net family farmer's income (year)	US \$1,560

* OBS: This income represents the gross annual sales of farmers associated with ECOVALE in 2003

Aside from the agro-ecological experiences associated with CAPA and other local governmental actors, a recent initiative to provide alternatives to tobacco monoculture in the region is found in the development of a pilot project on fish farming in the municipality of Sobradinho. Although this initiative is still in its initial stages, already it has created 50 reservoirs. This initiative is based on the work of a local association of fish farmers – Braspeixe (Association of Brazilian Line Fish Farmers) – and currently has the support of the municipal Secretary of Agriculture, the State Government, and the University of Santa Cruz do Sul. The Association, which represents about 20 small farms in the municipality, intends to serve as a model for sustainable development in the region. A local university, the University of Santa Cruz do Sul, participates in the initiative through research and technology production, allowing the development of farming systems adjusted to local conditions.

DIVERSIFICATION AND CROP SUBSTITUTION IN THE STATE OF SANTA CATARINA: SANTA ROSA DE LIMA AND SCHROEDER

This section examines two experiences involving the reduction of tobacco crops and the expansion of alternatives crops in two municipalities in the State of Santa Catarina. In the municipality of Santa Rosa de Lima, the reduction of tobacco crops has been accompanied by the expansion of organic farming and, in the municipality of Schroeder, by the expansion of banana cultivation. In each case, this section analyses the standard farming characteristics of each municipality and the switch from tobacco. Following this analysis, the study focuses on the actions of the local actors and institutions that influenced the switch away from tobacco growing.

Banana farming in Schroeder: the consolidation of local agricultural patterns

In 2000, the municipality of Schroeder had a population of 10,811 inhabitants, distributed over a total area of 149 km². It is situated in the micro-region¹⁸ of Joinville, in the northeast of the State of Santa Catarina, in a region of old and strong industrialization and near to two of the municipalities with greatest participation in the industrial production of the State, particularly in the textile and electro-mechanics/metallurgy sectors. As a result, in 2000, 87% of residents in Schroeder lived in the urban area. Regarding public health, the municipality had no hospital facility, although it had two clinic centers and four outpatient clinics. Concerning basic sanitation services, only 9% of houses were connected to the sewage system, although 53% of houses were connected to the water system (IBGE, 2000). Regarding transportation and communication infrastructure, the municipality is connected to the main road systems of the state, and access to telephone lines is common, as is the Internet for a growing number of farmers (particularly those in associations).

Table 6 below shows the values of production of the main agricultural products in the municipality. Rice, cassava, sugar cane, corn and bananas have always been the agricultural mainstay of the municipality. During the whole of the 1990s, the banana has remained the main agricultural product in the municipality, contributing an annual average of about 60% of total agricultural production value. The reasonably diversified agricultural pattern, based on bananas, rice, cassava, sugar cane and corn also remained, with very little tobacco leaf production.

In 1990, tobacco accounted for less than 1 percent of the total value of agricultural production in Schroeder. With the exception of 1998 when tobacco reached its highest value in the municipality's agricultural production (approximately 3 percent), as a share of total production value, tobacco has remained one of the lowest crops during the 1990s.

The main agricultural development in Schroeder during the 1990s was banana production gradually increasing in importance, with a slight reduction in the production of rice, corn and cassava. These four remain the main agricultural products.

As shown in Figure 5, the value of banana production as a percentage of total agricultural production in the municipality increased from 49% in 1994 to 69% in 2002. Moreover, the preliminary data for 2003 and 2004 signals a value still greater according to the local producers' association.¹⁹

¹⁸ A micro-region can be defined as a territorial area that is smaller than the state to which it belongs, but larger than a municipality. Typical examples of such micro-regions are provinces, districts, departments or even mega-cities.

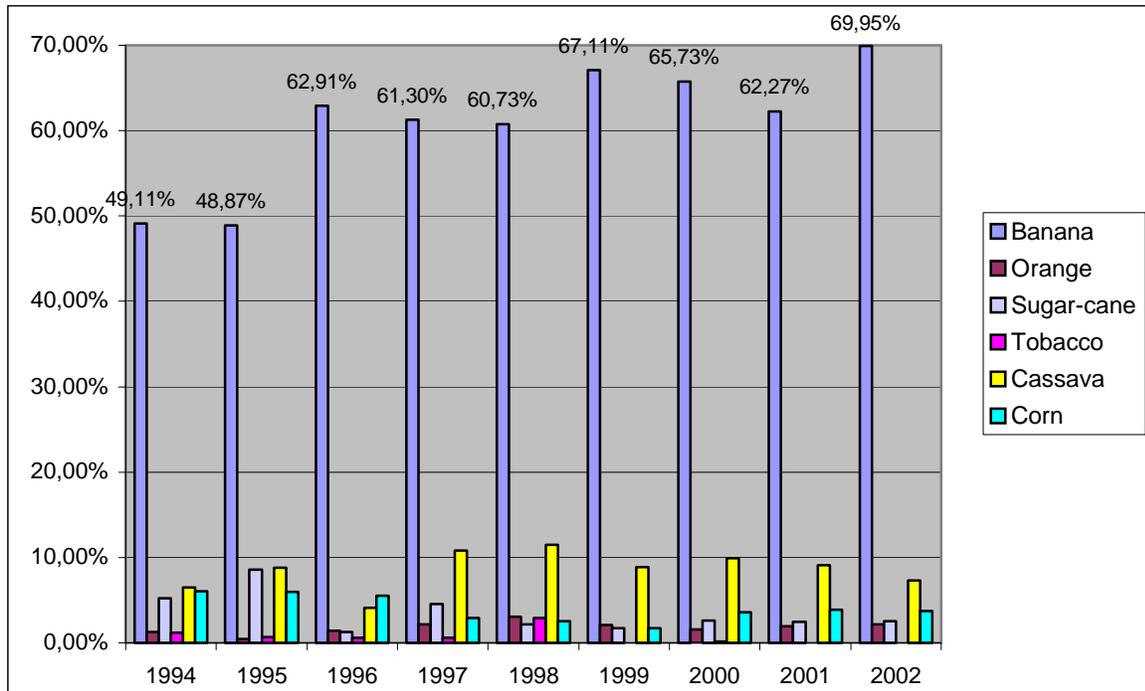
¹⁹ The volume of production for selected products is presented in a separate table in Annex 4.

Table 6: Schroeder, Value of Agricultural Production, 1994-2002 (in US\$ thousands)

Product / Year	1994	1995	1996	1997	1998	1999	2000	2001	2002
Banana	2221,28	1760,68	1043,31	1674,36	1709,64	1749,39	1680,19	1054,17	1571,51
Orange	58,51	16,03	23,73	60,00	86,81	54,21	40,57	33,32	48,16
Palmito	-	-	-	-	-	-	24,23	46,07	-
Tangerine	-	-	0,99	-	-	-	-	-	-
Permanent crops	2279,79	1776,71	1068,04	1734,35	1796,46	1803,60	1744,99	1133,55	1619,67
Rice	1381,91	959,40	396,56	480,89	480,49	482,90	395,54	298,19	321,33
Batata – doce	-	-	0,99	0,92	0,86	-	-	-	-
Sugar-cane	236,17	307,69	20,77	124,61	60,17	44,71	67,61	41,13	56,25
Beans	5,32	4,27	1,98	-	-	-	-	-	-
Tobacco	53,19	24,57	9,89	15,69	82,52	-	3,38	-	-
Cassava	293,62	316,24	68,24	294,44	322,33	230,83	253,55	154,24	164,89
Corn	273,40	213,68	91,97	80,30	72,20	44,71	91,28	65,81	84,38
Temporary crops	2243,62	1825,85	590,39	996,86	1018,57	803,15	811,36	559,37	626,85
Total	4.523	3.603	1.658	2.731	2.815	2.607	2.556	1.693	2.247

Source: IBGE – Produção Agrícola Municipal

Figure 5: Schroeder: Main Agricultural Products 1994-2002, by Share of Total Value of Agricultural Production



Source: IBGE – Produção Agrícola Municipal

Key actors and institutional background: the role of ABS

At the end of the 1970s, banana producers from a nearby municipality (Guaramirim) created a group in the agriculture department of the local Industrial, Commercial and Agricultural Association, which became the current municipal ABS - Banana Producers Association. Also in this period, EPAGRI, the Santa Catarina State's government agency for agricultural research and rural extension services, was already working to improve production through genetic manipulation. Motivated and helped by the creation of the Banana Producers Association of Santa Catarina, the farmers gradually established themselves in the state and national markets. Later, trying to adapt to the quality standards required for further success in the market, the farmers' associations from some municipalities, in connection with EPAGRI, developed efforts for improving the uncontrolled phases of the productive process (monitoring against diseases and post-harvest). Through technological advancement, they achieved gains in productivity.²⁰

Later, in 2000, the Association of Producers of Luiz Alves, in partnership with EPAGRI, set up a pilot monitoring project (sanitary control) aimed at the local plantations. (Monitoring is essential in the control of Yellow Sigatoka, the principal disease affecting bananas.) The fruitful results achieved aroused the interest of other farmers from neighboring municipalities. However, strong results were observed only in municipalities that had a well organized association strongly linked by common objectives. Monitoring is important because it is used to determine the proper time for spraying (given the temperature, wind and rain conditions of each region). Good monitoring, realized with the support of the EPAGRI meteorological station (CLIMERH²¹), has another important benefit (besides Sigatoka control): it increases efficiency in the number of sprays each year.

In Schroeder, monitoring started in 2002. This initiative (of assimilating technology into farming practices) would not have been possible without the mobilization of the organized producers, not to mention the important technical assistance provided by EPAGRI. Cooperative links are seen, for instance, in the shared purchase of spraying technologies and the strong cooperation among producers for processing and distributing their bananas. The development of banana cultivation was reinforced by the installation of three processing (dried bananas) firms in the municipality, which foster commercial relations in the region.

Today, the success of Bananas Producers' Association of Schroeder (ABS) can be expressed by the following features: 92 associated producers own a combined area of 937.5 hectares, accounting for the production of 2,250,000 boxes/year (approximately 50 thousand tons), an average of approximately 50 tons/ha, higher than the national average. Comparing data on banana production across the whole municipality clearly shows the influence of ABS. This association, formed informally during meetings organized by a local leader (and banana

²⁰ One of the first examples of the search for technological advancement is the 1993 joint initiative by the Associations of Producers and EPAGRI's technicians that organized a trip to Ecuador (a world reference in the sector), taking 12 people (technicians and farmers) from six of the better organized municipalities: Guaramirim, Luiz Alves, Corupá, Jaraguá do Sul, São João do Itaperiú and Schroeder.

²¹ Centro Integrado de Meteorologia e Recursos Hídricos de Santa Catarina (Integrated Center of Meteorology and Hydric Resources of Santa Catarina).

producer) in 1991, is a paradigm for a successful association. According to data provided by ABS, the average price for bananas is R\$ 160,00-200,00 /ton. The gross income per hectare is approximately R\$ 8,000 (US \$2,700), and net income for small producers is around R\$ 2,400 per hectare/year (US \$811). This net income is considerably higher than the profits from growing tobacco (see Table 4), providing strong incentives to local farmers to switch to banana production.

Tobacco has not been produced in Schroeder since 2001. According to interviews with local farmers in the municipality,²² tobacco was phased out gradually. The main causes identified were: the farmers' dissatisfaction with the way that tobacco is classified, dependence on a single annual crop, and continuous falls in tobacco producers' revenues.

Santa Rosa de Lima: organic food crops as an alternative to tobacco

The municipality of Santa Rosa de Lima has a total area of 184.29 km² and is located in the mid-southern region of the state of Santa Catarina. According to IBGE's Census, Santa Rosa de Lima had a population of 2,007 inhabitants in 2000, seventy nine percent living in the rural area. Of the 493 existing homes, only 4% were connected to a water system and less than 1% of houses had access to the sewer system. Regarding health services, the municipality had only two outpatient clinics and no hospital (IBGE, 2000).

The road system which leads to the town is precarious (narrow and winding dirt roads) and the telephone network reaches very few houses out of the urban area (through both conventional and cellular lines). Although most houses have electricity (both in the rural and urban area), it is extremely expensive compared to other regions in the state and has to be acquired through a cooperative created specifically for this purpose.

As for access to formal education, the situation is improving, although almost the entire older generation has only a fourth grade education. In the past, the municipality provided no resources for people to continue their education.

In 1905, the first groups of German settlers started arriving in the town, although it was not until 1920 that the migratory flow intensified through the integration of Italian and Azorean settlers. Contrary to the usual procedures at that time, there was no support from either the government or the settler companies in the region. So the farmers had to rely on their own initiative to structure the initial settlement of a region, facing problems of access (uneven topography and dense forests) and without any basic infrastructure, particularly roads and communication.

²² The authors conducted a number of interviews with small farmers and local government authorities and local associations in Schroeder, in January and February 2003.

Multi-crop farming and breeding small animals have been the strategies used by farmers since settlements began to guarantee survival and, at the same time, generate a commercial surplus. A typical farm grew, for instance, peanuts, black beans, rice, cassava, potatoes and corn crops, in addition to breeding dairy cows and “lard pigs”, a rustic species of pig freely bred and fed with a stew made of sweet potato, cassava, corn and pumpkin. Gradually, with the intensification of regional trade, the region also started to participate in the trade of live animals and other agricultural surplus, yet within the context of commercial relations based upon “personal links, a lack of competitiveness and the arbitrariness of the few traders with respect to the prices of products sold by the farmers” (MULLER, 2001: 71).

For a long time, until the mid-1960s, trading lard was the main, and economically profitable, activity of the settler farmers. However, with the coming of the “green revolution” (or agricultural modernization), this activity started decreasing as soy and its products (stimulated by official agricultural policy) replaced lard, leading to new consumption standards. Contrary to what would be expected, hog agro-industrial integration, still significant in that region and in other regions of Santa Catarina State, did not appear in the municipality of Santa Rosa de Lima. The crisis in pig-breeding activities was not solved by introducing processes for hog agro-industrial integration, as occurred in other regions of the State. This would have required, aside from initial investments, an infrastructure of roads, which did not exist in the municipality.

One alternative found to overcome the demise of pig-breeding activities was tobacco agro-industrial integration. Although gradual, this transition from pig breeding to tobacco farming was consolidated between the 1970s and the 1980s through the strategies of tobacco companies. Tobacco cultivation had previously been only on a small scale, using manual labor and without significant economic impact. A new strain of tobacco inaugurated the agricultural “modernization” process in Santa Rosa de Lima. Also known as “greenhouse tobacco”, this crop was introduced along with the integrated production system, through which all inputs – seeds, chemical fertilizers, pesticides – as well as technical assistance and access to agricultural credit lines were supplied by the company.

As emphasized earlier, despite tobacco being harmful to farmers’ health and involving intensive labor by the whole family (particularly during the harvest), tobacco was attractive for its profitability and for providing financial security to farmers through its guaranteed sale. The revenue from the sale of the tobacco crop allowed farmers to acquire goods and invest in their property.

However, tobacco culture began to decline from the beginning of the 1990s, (especially with the crop of 1996/97), inaugurating a second big crisis in the municipality of Santa Rosa de Lima. The revenue decrease from tobacco production is attributable to, among other reasons, the: a) rise in interest rates and costs of bank financing; b) rise in raw material prices; c) stagnation of prices of agricultural products; and d) greater “rigor” in tobacco classifying criteria by the leaf dealers (through which the companies started under-assessing production value). As emphasized in previous studies (Muller, 2001: 119), the unstable situation and arbitrariness of the tobacco market, along with restrictions on agricultural credit benefits, resulted in revenue loss by

producers and led many of them to give up tobacco production. The evolution of the volume of tobacco produced in this municipality is compared with tobacco production in the main regions in the State of Santa Catarina in Table 7.

Table 7: Tobacco Production in the State of Santa Catarina, 1990-2002 (tons)

REGION	QUANTITY (Tons)													2002/	
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	1990	1990
Santa Catarina	152.396	145.048	198.201	226.421	173.372	135.732	166.468	200.736	163.768	204.675	188.327	178.207	223.382	46,58%	
<i>State Regions</i>															
Oeste Catarinense (1)	22.114	22.119	38.516	48.709	45.862	24.457	31.624	40.307	33.252	41.485	40.800	40.222	49.642	124,48%	
Norte Catarinense (2)	19.967	19.389	36.217	34.275	27.268	26.874	31.486	35.240	23.493	35.077	35.353	32.937	44.815	124,45%	
Serrana (3)	3.354	2.303	3.551	3.621	3.467	2.220	3.661	3.963	3.792	3.113	3.157	2.735	3.132	-6,62%	
Vale do Itajaí (4)	42.296	39.577	51.004	55.375	43.307	35.514	40.726	52.678	44.366	52.059	48.300	46.236	55.611	31,48%	
Grande Florianópolis (5)	8.306	7.200	9.304	8.700	6.687	5.867	6.213	3.867	8.089	7.416	6.510	6.086	7.302	-12,09%	
Sul Catarinense (6)	56.359	54.460	59.609	75.741	46.781	40.800	52.758	64.681	50.776	65.525	54.207	49.991	62.880	11,57%	
<i>Selected municipalities</i>															
Santa Rosa de Lima	418	469	495	736	655	527	306	550	273	489	288	277	368	-11,96%	
Schroeder	76	45	51	59	35	15	5	10	47	-	3	-	-	-100,00%	

Source: IBGE - Produção Agrícola Municipal

Searching for revenue alternatives during the tobacco crisis, one of the farmers' options was the development of dairy activities. In the mid-1990s, with the installation of a dairy company in the region, trading conditions improved considerably. The foundation of the Association of Ecological Farmers of Serra Geral Slopes –AGRECO– represents a major initiative in the search for alternative farming cultures. From its foundation, AGRECO has been a key actor in fostering crop diversification and the organic farming transition in the region.

Many researchers in agro-ecology believe that family agriculture, that is, the small property managed by the family nucleus, may be the most likely locus for consolidating this new standard based on more flexible production techniques. Every property needs a specific solution, requiring “craft care” rather than industrial production. The Serra Geral Slopes region, which lends its name to AGRECO, also includes farmers from other neighbor municipalities in Santa Rosa de Lima, such as Anitápolis, Armazém, Grão-Pará, Gravatal, Rancho Queimado, Rio Fortuna and São Martinho.

Key actors and institutional background: the role of AGRECO

AGRECO was founded in 1996 by a group of twelve families with the aim of assisting small farmers in a region in decay caused by the tobacco crisis. The main impulse for its creation came from a local leader, an owner of a supermarket network in the state's main city, Florianópolis. This businessman made a proposal to the local farmers: he would purchase the entire harvest that the families could produce without using pesticides (initially with exclusivity). The idea arose from his contact, during trips to Europe, with a promising market niche – the sale of organically cultivated products, that is, without pesticides (AGRECO, 2003).

In its initial stage, from December 1996 to mid-1998, the association counted on the assistance of teachers from the Center for Agricultural Sciences (Centro de Ciências Agrárias-CCA) of the

Federal University of Santa Catarina (UFSC) and technicians from EPAGRI, as well as the support of the local government. At the time, the whole production was sold and sent each week to two supermarkets in the network in Florianópolis. The association's role was to provide skilled technical support to its members, coordinate the whole production chain and centralize sales. The first problems related to this marketing appeared early and can be summed up as follows: the association's board of directors faced increasing difficulties in establishing new sales contracts and, at the same time, synchronizing the production cycle of cultivated foods (Schmidt: 2002).

The second stage lasted from mid-1998 to the beginning of 2000 and signaled an important change of course for the association. First, between mid-1998 and the end of the same year, the number of associated members jumped from 200 to nearly 500, including more than 200 families and extending to other municipalities (as mentioned above). Second, and this is the main reason for the sharp increase in the number of associated members, the region was preparing to enter a project for the development of family agriculture – “Inter-municipal Project for Module Agro Industries Network”- designed and financed by the federal government, through the Department for Rural Development (SDR) of the Ministry of Agriculture.²³

The original project aimed to install, in a particular region of the State of Santa Catarina, 53 small rural firms financed by PRONAF – Agro-industry (National Program for Family Farming) - and with resources from BNDES (National Bank for Economic and Social Development). The Centro de Estudos de Promoção de Agricultura de Grupo (Center of Studies for the Promotion of Group Agriculture) - CEPAGRO, which works in the Center of Agricultural Sciences (CCA) of UFSC, played a significant role in this period; besides coordinating the proposed project at regional level, it also provided the technical assistance required for integrating the region in the project.

One of the main purposes of the project was to add value to family farming production by installing small agro-industry units, integrated as a network and connected to a central unit of management support, of inter-municipal character, and managed by the farmers themselves. According to information provided by CEPAGRO, the federal government project would meet (in the perspective of local leaders) the concerns of the associated farmers once it could contribute to “creating jobs” and “strengthening the association links”. Furthermore, the project would include the following services: a) technical assistance; b) marketing and trading; c) joint purchase of machines, equipments and inputs; and, the most important, d) joint sales to final consumers. Joint sales were intended to cut out middlemen in the selling process, realizing greater profits for farmers.

Meanwhile, the region accessed technical support from the state (necessary anyway for building the agro-industry units) by joining the “State Program for Family Farming Development through Vertical Production (DESEVOLVER). The DESEVOLVER program counted on the financial support of the National Council for Scientific Development (CNPq), through the “Program of Adjusted Technologies”, and was useful for providing skilled technical teams to help the

²³ For a comprehensive discussion of the origins and development paths of AGRECO, please see Schmidt: 2002 and Muller: 2001.

farmers. At the governmental level, according to Schmitd (2002), the support of municipal prefectures, EPAGRI and, later, of Santa Catarina Superintendence of National Institute for Settlements and Agrarian Reform was fundamental to the accomplishment of the region's participation in the DESEVOLVER program.

Regarding building agro-industry units, only 14 projects have received initial approval. Simultaneously, the problems related to the selling process have intensified because the main buyer declared bankruptcy and closed in May 2000. There are also other serious difficulties: a) the overwhelming volume of production because of the explosion in the number of associated members; b) intensification of competition with producers from the metropolitan region of Florianópolis; c) difficulty in transporting perishable products long distances to supply the refined demand of the great urban centers; and d) financial difficulties caused by spoilage (return of goods) and the debts of big buyers.

Perhaps for this reason, the idea of working with (non-perishable) processed products through agro-manufacturing was pursued as an alternative strategy by the board of AGRECO to overcome this latest crisis.

The third²⁴ and last stage comprises the period since 2000. In this stage, 27 agro-industry units were established (out of the 53 initially planned) and started producing a range of products of vegetable and animal origin, such as hog salami, honey, brown sugar and its byproducts (melado and cachaça), pickles (vegetables and fruit), eggs, processed milk and vegetables (sold exclusively in local fairs). Pickles offer the ability to change vegetable producers (of the first stage) into non-perishable product manufacturers.

The support received during this stage came basically from a partnership with the Brazilian National Agency for Small Business - SEBRAE, through the project "Sustainable Rural Life", a pilot project and agricultural sustainable development model that was being implemented in other regions by the same institution. The three-year project injected financial resources to cover expenses for the farmers' training and guaranteed the operation of the association's office.

The current situation of the associated agro-manufacturers is very heterogeneous, but can be summed up as follows. According to data collected by field research, preliminary findings are that:

- 1) The agro-manufacturers who get to place their products in the supermarket networks (honey and brown sugar, for instance) are in a better situation than those who worked with less elaborated products sold in local fairs and groceries;
- 2) Almost all the farmers did not get their livelihood only through selling organic products, needing other sources as well, which varied from one property to another;
- 3) Although producers were unanimous regarding the success of the experience in view of its social character, a majority of the producers were unsatisfied with the high debts resulting from the financing taken from PRONAF and employed in a pioneer experiment.

²⁴ All information on this phase was obtained through field research done at the end of 2003 and reported in a preliminary way in: Oliveira, B. Carvalho, L. (2004).

Many said that “they paid too expensive a price for learning” and that, after the building of the agro-industry units, they found themselves without the required working capital to assure economic success (as in any other business);

- 4) Still, in relation to the social character of the project, it was observed that association efforts in the region were strengthened, which enabled the creation of a credit cooperative and an association of rural tourism (citing only the main result), which are direct results of the pioneering agro-ecological experiment.

Concerning the central matter of this study – the substitution of tobacco by agro-ecological products – it is estimated that approximately 35 to 45 families presently remain associated and working with organic foods (although this is not, as explained above, their main revenue source). Other families returned to tobacco or to other activities connected to conventional agriculture. The evolution of agricultural production in Santa Rosa de Lima is presented in Table 8.

Table 8: Santa Rosa de Lima: Value of Agricultural Production 1994-2002 (%)

	1994	1995	1996	1997	1998	1999	2000	2001	2002
Orange	3,84%	3,16%	1,03%	3,35%	5,72%	4,50%	4,02%	5,83%	6,31%
Peach	0,00%	1,87%	2,16%	1,14%	2,06%	1,25%	1,34%	0,63%	0,00%
Permanent crops	3,84%	5,03%	3,19%	4,48%	7,78%	5,74%	5,36%	6,46%	6,31%
Rice	0,26%	0,10%	0,19%	0,27%	0,56%	0,21%	0,18%	0,18%	0,12%
Sweet potato	0,00%	0,00%	1,50%	1,07%	1,78%	1,52%	1,79%	0,00%	0,00%
Potato	1,96%	3,45%	1,03%	1,94%	2,72%	2,01%	1,70%	3,50%	1,53%
Sugar cane	1,37%	1,78%	8,43%	6,16%	8,72%	8,72%	9,64%	8,07%	6,37%
Onion	0,77%	1,87%	2,06%	1,47%	1,69%	1,59%	2,23%	1,17%	1,95%
Beans	2,65%	1,78%	1,59%	0,87%	2,53%	1,25%	1,79%	1,61%	2,06%
Tobacco	82,17%	78,01%	57,36%	69,95%	51,17%	60,90%	50,18%	62,15%	64,68%
Cassava	1,88%	2,07%	7,22%	4,69%	5,34%	4,22%	5,18%	4,22%	2,54%
Water-melon	0,00%	0,00%	6,65%	2,88%	4,59%	3,18%	3,21%	1,26%	0,00%
Corn	5,12%	5,92%	10,78%	6,22%	13,12%	10,66%	18,75%	11,39%	14,45%
Temporary crops	96,16%	94,97%	96,81%	95,52%	92,22%	94,26%	94,64%	93,54%	93,69%
Total	100,00%								

Source: IBGE – Produção Agrícola Municipal

Finally, in the two cases studied, neither the cultivated area nor the value composition of municipal agricultural production show significant changes in the last decade. In the municipality of Santa Rosa de Lima, the amount of tobacco produced grew until 1994, decreased as a percentage of total value for most of the rest of the decade, reached a low point in 2000, and then rose again, but to well below the 1994 levels. After tobacco, sugar cane, cassava and corn were the main agricultural products in the municipality throughout the 1990s, but were well below the value of tobacco. In the municipality of Schroeder, tobacco was always a minor crop, and from 1998, the municipality stopped cultivating it. Bananas, sugar cane, cassava and corn have remained the main municipal products.

CONCLUSIONS

This report has examined the initiatives undertaken by Brazilian municipalities to foster switching from tobacco to other crops. In particular, the study has examined the role of diverse organizations in implementing diversification schemes aimed at helping small family farmers in their transition from tobacco to other crops and sustainable livelihoods.

Overall, the efforts to support small farmers to diversify and to switch from tobacco to alternative crops still face considerable barriers in developing countries. In Brazil, the expansion of tobacco production in the southern region, particularly during the 1990s, has enhanced the power of large tobacco companies over tobacco farming activities and has created important lock-ins in terms of regional development paths in many localities. Two factors have contributed to limiting the implementation of more effective public policies aimed at creating alternatives to tobacco cultivation: the existence of a considerable contingent of small growers dedicated to tobacco growing, and the relative economic importance of the activities connected to tobacco production and processing in several municipalities. In particular, in the major tobacco producing regions in Brazil like Rio Pardo Valley, public policies sought to support regional development through the expansion of tobacco growing and manufacturing activities by means of tax incentives and loans to some of the large tobacco conglomerates operating in Brazil.

Despite these obstacles, the case studies analyzed in this report demonstrate that specific diversification programs, placed within broader rural development programs, can make switching from tobacco to alternative crops viable, even in regions/municipalities that are heavily reliant on tobacco. In this respect, the experiences of Santa Cruz, Schroeder and Santa Rosa de Lima have some important features in common. In all these municipalities, farmers associations (AGRECO, ABS) and NGOs (CAPA) have played a key role in organizing small farmers and launching diversification and crops substitution initiatives. Also, all these initiatives have been associated with training and technical support in order to provide small farmers with the necessary skills and competencies to make their transition to alternative crops feasible.

In Schroeder, the Bananas Producers' Association (ABS) has established important partnerships with state technological institutes like EPAGRI aimed at providing technical support to improve productivity and quality in bananas production. In Santa Rosa de Lima, EPAGRI has also provided, with other local and regional technological and training centers, technical support to the organic farmers' association (AGRECO). In Santa Cruz do Sul, CAPA has a technical team of eight professionals in the areas of agriculture, health, management and communication that provides most of the technical support for small family farmers who grow organic products in the region. In addition, CAPA has also developed some partnerships with local universities and EMATER.

Also, the three case studies show that the efforts to foster crop substitution have been linked with identification of new market channels and opportunities for adding value in alternative food crops. In particular, the role of CAPA demonstrates that the success of the agro-ecological experience in Rio Pardo Valley was based not only on the training of farmers, but also entailed incentives for processing and marketing products.

The box below summarizes the main features of the experiences with farm diversification and crop substitution analyzed in this study.

Box 2: Crop substitution and farm diversification in Brazil: main features

Characteristic	Santa Cruz do Sul	Schroeder	Santa Rosa de Lima
Key actors/organizations	NGO and farmers cooperative (CAPA and ECOVALE)	Farmers association (ABS)	Farmers association (AGRECO)
Average share of tobacco in total agricultural production value	High (60%)	Very low (Less than 1%)	High (40%)
Alternative crops	Organic food crops (mainly horticulture)	Bananas	Organic food crops (mainly horticulture)
Number of producers directly involved	80	92	35 -45
Technical support and training	CAPA and EMATER	EPAGRI	EPAGRI and Universities – UFSC

Concerning the importance of government policies, the study suggests that in regions dominated by tobacco farming, local/state governments have a rather limited interest in leading crops substitution programs. However, as demonstrated by the CAPA experience in Rio Pardo Valley, partnerships with local government authorities are critical to disseminate and consolidate broader farmer diversification efforts.

Finally, it is important to highlight that any tobacco-farming diversification or crop substitution strategy must be suitable to the specificities of the local/regional production structures. In the case of Schroeder, the importance of local banana production was crucial to the successful switch from tobacco in the municipality.

Thus, in each case study analyzed in the state of Santa Catarina, the reduction in tobacco production was different. In the case of Santa Rosa de Lima, as previously seen, tobacco production was reduced, but not in a sustained way, and tobacco farming coexists with other crops. In the municipality of Schroeder, bananas became the focus for local agricultural specialization, because of the financial returns generated for the farmers. Therefore, we can say that banana growing has taken the place formerly occupied by tobacco. However, bananas also displaced almost all other crops in the municipality. Moreover, we should not forget that tobacco growing was always a small part of local agricultural production compared to other regions in the state.

The consolidation of a crop that already exists in the area, or even a new crop, once adjusted to the profile of local holdings, provides an alternative source of agricultural revenue. Its

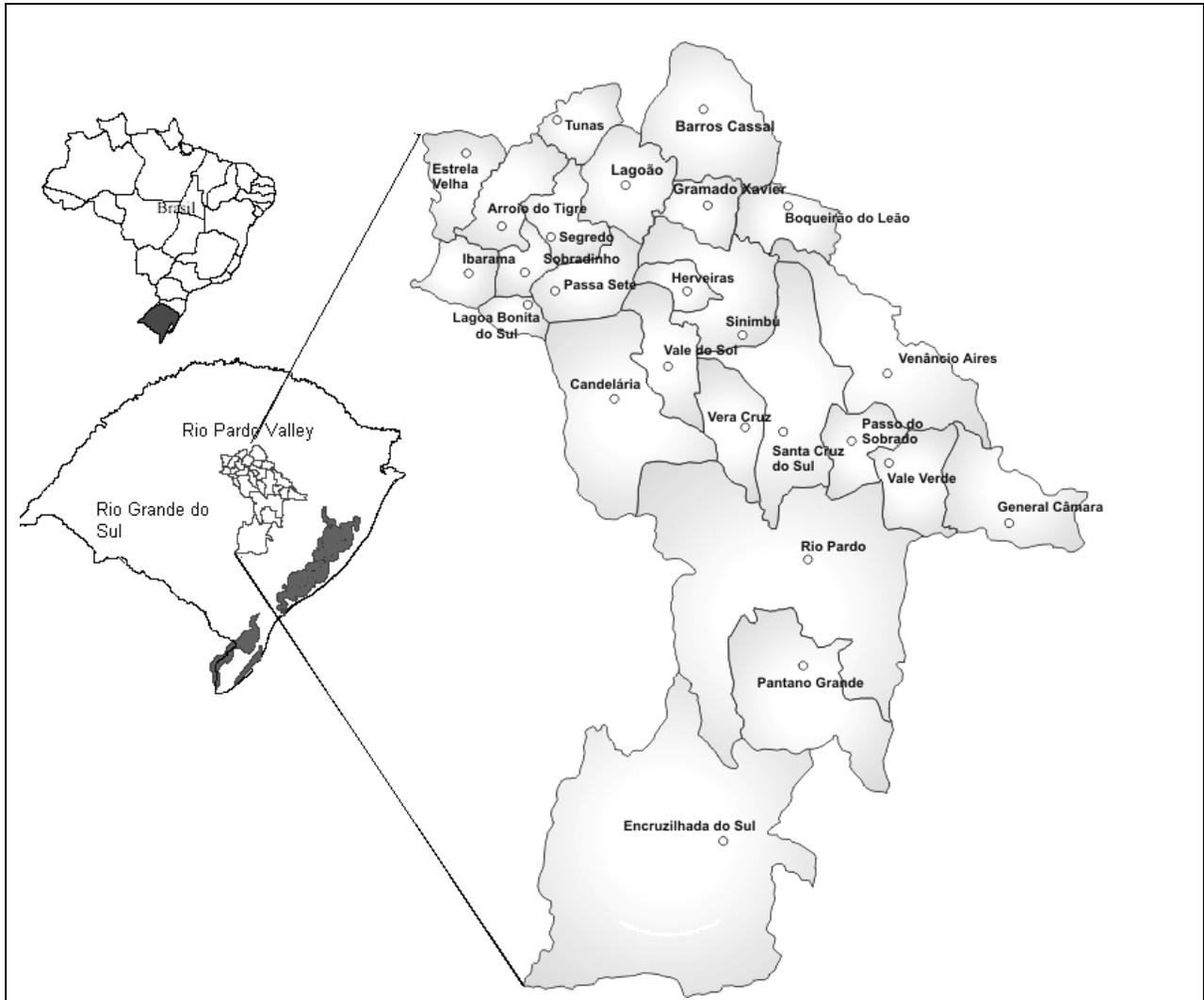
attractiveness to farmers is related to its profitability under the particular growing and other local conditions.

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ANNEX 1: LOCATION OF THE RIO PARDO VALLEY REGION – RIO GRANDE DO SUL - BRAZIL



ANNEX 2: TOBACCO LEAF PRODUCTION, RIO GRANDE DO SUL, 1990-2002

Tobacco leaf production in the state of Rio Grande do Sul - 1990-2002 (in tons)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Brasil	445.489	413.831	575.652	655.739	519.541	455.986	476.638	596.952	505.353	629.525	579.727	568.505	670.309
Rio Grande do Sul - RS	204.615	186.568	280.330	318.690	229.524	223.159	206.918	274.451	235.519	306.393	294.873	298.193	339.832
State regions													
Noroeste Rio-Grandense	23.558	20.994	39.821	46.363	32.648	25.295	23.244	29.666	27.584	33.800	29.782	30.400	38.071
Nordeste Rio-Grandense	8.447	7.254	11.401	14.886	10.781	10.711	10.546	14.799	11.484	14.843	13.679	11.969	13.687
Centro Ocidental Rio-Grandense	12.404	11.613	15.532	17.595	14.415	14.175	13.616	16.796	15.405	20.789	18.932	20.179	27.481
Centro Oriental Rio-Grandense	116.364	102.184	149.085	168.334	122.719	125.793	111.061	150.928	119.974	159.920	160.083	154.026	168.654
Metropolitana de Porto Alegre	30.583	29.275	36.866	43.450	31.357	31.842	32.210	41.065	37.759	49.227	49.316	53.546	59.752
Sudoeste Rio-Grandense	150	120	128	360	320	240	319	240	240	360	360	360	420
Sudeste Rio-Grandense	13.109	15.128	27.497	27.702	17.284	15.103	15.922	20.957	23.073	27.454	22.721	27.713	31.767
Selected municipalities in Rio Pardo Valley													
Arroio do Tigre - RS	9.000	7.560	13.600	10.080	6.075	7.200	6.300	6.806	7.560	8.910	10.080	10.500	11.550
Candelária - RS	12.350	8.400	18.000	18.900	13.680	14.943	8.400	13.400	14.850	16.000	18.000	16.800	18.144
Santa Cruz do Sul - RS	23.760	22.780	27.000	12.000	9.900	9.900	8.250	15.000	8.100	15.525	13.869	12.060	14.368
Venâncio Aires - RS	15.580	12.300	18.600	24.000	17.100	18.000	17.640	22.176	18.886	18.900	18.690	18.690	21.850
Vera Cruz - RS	6.200	6.800	8.400	9.240	7.000	7.000	6.300	8.085	4.042	9.933	9.933	8.470	10.56

ANNEX 3: TOBACCO LEAF PRODUCTION, SANTA CATARINA, 1990-2002

TABLE 1: Tobacco production in the State of Santa Catarina -1990-2002 (in tons)

REGION	QUANTITY (Tons)													
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2002/1990
Santa Catarina	152.396	145.048	198.201	226.421	173.372	135.732	166.468	200.736	163.768	204.675	188.327	178.207	223.382	46,58%
<i>State region</i>														
Oeste Catarinense (1)	22.114	22.119	38.516	48.709	45.862	24.457	31.624	40.307	33.252	41.485	40.800	40.222	49.642	124,48%
Norte Catarinense (2)	19.967	19.389	36.217	34.275	27.268	26.874	31.486	35.240	23.493	35.077	35.353	32.937	44.815	124,45%
Serrana (3)	3.354	2.303	3.551	3.621	3.467	2.220	3.661	3.963	3.792	3.113	3.157	2.735	3.132	-6,62%
Vale do Itajaí (4)	42.296	39.577	51.004	55.375	43.307	35.514	40.726	52.678	44.366	52.059	48.300	46.236	55.611	31,48%
Grande Florianópolis	8.306	7.200	9.304	8.700	6.687	5.867	6.213	3.867	8.089	7.416	6.510	6.086	7.302	-12,09%
Sul Catarinense (6)	56.359	54.460	59.609	75.741	46.781	40.800	52.758	64.681	50.776	65.525	54.207	49.991	62.880	11,57%
<i>State Microregion</i>														
São Miguel d'Oeste (1)	8.499	10.552	17.597	20.441	20.256	11.723	13.805	18.010	13.819	18.356	17.245	17.348	21.146	148,81%
Chapecó (1)	5.814	6.375	11.939	16.767	16.416	8.339	11.960	15.081	12.778	18.493	18.782	18.386	22.543	287,74%
Xanxerê (1)	1.261	1.013	1.984	2.468	1.650	1.019	1.330	1.485	1.460	1.861	1.970	2.194	3.217	155,11%
Joaçaba (1)	5.099	3.074	5.037	5.623	4.998	2.146	2.971	3.796	3.601	1.482	1.602	1.340	1.660	-67,44%
Concórdia (1)	1.441	1.105	1.959	3.410	2.542	1.230	1.558	1.935	1.594	1.293	1.201	954	1.076	-25,33%
Canoinhas (2)	17.523	17.524	33.580	31.643	25.350	25.533	30.235	33.531	22.332	33.926	33.985	31.853	43.464	148,04%
São Bento do Sul (2)	1.273	954	1.527	1.387	1.176	903	875	1.216	818	942	1.239	1.003	1.268	-0,39%
Joinville (2)	1.171	911	1.110	1.245	742	438	376	493	343	209	129	81	83	-92,91%
Curitibanos (3)	1.179	607	1.063	1.131	1.094	473	1.296	1.464	1.260	1.080	1.118	1.064	1.080	-8,40%
Campos de Lages (3)	2.175	1.696	2.488	2.490	2.373	1.747	2.365	2.499	2.532	2.033	2.039	1.671	2.052	-5,66%
Rio do Sul (4)	26.428	24.244	33.741	35.397	28.464	23.389	27.741	36.796	29.489	33.005	30.129	28.965	35.571	34,60%
Blumenau (4)	4.114	3.050	4.570	4.883	3.204	2.497	2.755	2.899	3.676	2.289	2.029	2.068	1.762	-57,17%
Itajaí (4)	761	577	575	573	162	101	131	55	140	45	-	10	2	-99,74%
Ituporanga (4)	10.993	11.706	12.118	14.522	11.477	9.527	10.099	12.928	11.061	16.720	16.142	15.193	18.276	66,25%
Tijucas (5)	6.733	5.766	7.763	7.037	5.470	4.871	5.165	2.509	6.717	6.192	5.366	4.973	6.055	-10,07%
Florianópolis (5)	245	176	184	162	51	62	56	78	108	32	40	29	15	-93,88%
Tabuleiro (5)	1.328	1.258	1.357	1.501	1.166	934	992	1.280	1.264	1.192	1.104	1.084	1.232	-7,23%
Tubarão (6)	17.757	20.324	20.228	26.811	18.110	16.014	16.407	21.575	16.533	19.924	17.791	14.860	17.998	1,36%
Criciúma (6)	14.051	11.970	15.270	18.695	10.802	10.417	13.433	16.438	13.266	16.611	13.575	12.381	15.179	8,03%
Araruama (6)	24.551	22.166	24.111	30.235	17.869	14.369	22.918	26.668	20.977	28.990	22.841	22.750	29.703	20,98%

ANNEX 4: SELECTED CROP PRODUCTION, 1994-2002

Table: temporary crops - selected products 1994 -2002 (in tons)

Brazil	1994	1995	1996	1997	1998	1999	2000	2001	2002
Rice	10.540.789	11.226.064	8.652.328	8.351.665	7.716.090	11.709.694	11.134.588	10.184.185	10.457.093
Sweet potato	655.613	619.186	414.283	490.087	444.925	472.422	484.443	484.719	498.046
Sugar cane	292.101.835	303.699.497	317.105.981	331.612.687	345.254.972	333.847.720	326.121.011	344.292.922	364.391.016
Black beans	3.369.684	2.946.168	2.452.036	2.840.243	2.191.153	2.830.915	3.056.289	2.453.681	3.064.228
Tobacco	519.541	455.986	476.638	596.952	505.353	629.525	579.727	568.505	670.309
Cassava	24.464.293	25.422.959	17.743.155	19.896.205	19.502.717	20.864.340	23.040.670	22.580.282	23.065.577
Corn	32.487.625	36.266.951	29.652.791	32.948.044	29.601.753	32.239.479	32.321.000	41.962.475	35.932.962
Santa Rosa de Lima	1994	1995	1996	1997	1998	1999	2000	2001	2002
Rice	30	24	21	24	23	15	12	12	9
Sweet potato	-	-	108	96	117	168	195	-	-
Sugar cane	625	625	2.984	2.625	2.500	3.600	3.600	3.600	3.600
Black beans	82	44	51	40	32	35	50	41	47
Tobacco	655	527	306	550	273	489	288	277	368
Cassava	970	1.045	1.546	1.560	1.350	1.350	1.350	1.350	1.080
Corn	672	720	867	798	930	924	1.050	1.036	1.050
Schroeder	1994	1995	1996	1997	1998	1999	2000	2001	2002
Rice	6.600	5.610	2.055	2.475	2.250	2.700	2.925	3.150	3.150
Sweet potato	-	-	7	7	7	-	-	-	-
Sugar cane	9.000	9.000	821	3.000	2.000	2.000	2.000	2.000	2.000
Black beans	9	9	4	-	-	-	-	-	-
Tobacco	35	15	5	10	47	-	3	-	-
Cassava	7.500	7.500	979	1.875	1.875	1.875	1.875	1.875	1.875
Corn	2.400	2.400	698	750	750	600	1.200	1.200	1.200
Santa Cruz do Sul	1994	1995	1996	1997	1998	1999	2000	2001	2002
Rice	2.908	4.312	4.622	7.016	7.016	8.554	8.554	7.735	8.042
Sweet potato	1.200	840	840	840	1.361	1.361	1.361	1.361	1.361
Sugar cane	3.600	3.078	3.078	4.800	26.000	26.000	20.150	26.000	28.000
Black beans	192	225	138	462	297	612	504	522	582
Tobacco	9.900	9.900	8.250	15.000	8.100	15.525	13.869	12.060	14.368
Cassava	10.500	8.400	7.800	6.000	10.000	16.000	13.600	14.080	14.080
Corn	19.750	19.750	15.800	30.400	38.000	36.480	36.480	24.000	26.000

Source: IBGE –Produção Agrícola Municipal



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