

# **The Brazilian Biodiesel Program (PNBP) and Social inclusion**

Power, knowledge and discourse in actors' strategies

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## **Summary**

This thesis critically analyzes the Brazilian Biodiesel Program (PNPB) in relation to its social inclusion component that seeks to integrate family agriculture in the biodiesel value chain. Policy instruments stimulate and regulate the economic linkage between family farmers (smallholders) and biodiesel companies in the frame of the PNPB. The objective of this thesis is to challenge policy assumptions related to the set of measures taken to enable the participation of family agriculture.

Theoretically, this research draws on insights from Political Ecology and the actor-oriented approach. This thesis illustrates one means of operationalizing the study of power and knowledge through the identification actors' strategies. The discussion is based on the methods and findings of a multi-level research and a case study conducted in Serra da Capivara, one of the territories in the State of Piauí where the PNPB is being implemented. Semi-structured interviews with actors on national, regional, state and local level were the main source of information. Secondary data and observation were used to triangulate the findings. The actor-oriented approach was used to link inquiry across levels of analysis. This theoretical and methodological approach enabled the study of how the outcomes of the PNPB are continually negotiated through a convergence of actors' strategies. Three main actors' strategies were identified: discursive strategies, livelihood strategies and resistance strategies. This thesis describes these strategies in relation to motivations, resources and practices of the actors involved.

The case study provides an example of the instruments performance that aim at facilitating family agriculture's participation in the PNPB. It was found that these instruments have failed to take into account the farmers' values and motivations that influence the decision making process. Participation has been used to legitimize and facilitate the action of the government and groups of power. Additionally, a large-scale implementation offers little room for effective participation of family agriculture, while opening remarkable opportunities for large-scale agriculture. The analysis suggests that the current social inclusion component of the PNPB helps to obscure the advancement of the soybean industry and its concomitant wealth condensation and pressure on the land. In brief, this research advocates focusing on political and cultural aspects when seeking economically inclusionary processes, such as value chain inclusion.



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## Table of contents

<b>Summary.....</b>	<b>III</b>
<b>Acknowledgements .....</b>	<b>V</b>
<b>Table of figures.....</b>	<b>VIII</b>
<b>Table of tables .....</b>	<b>VIII</b>
<b>Abbreviations and acronyms .....</b>	<b>IX</b>
<b>1. Introduction.....</b>	<b>1</b>
1.1. Problem statement.....	1
1.2. Underlying assumptions of the PNPB .....	4
1.3. Research objectives and research questions .....	6
1.4. Background .....	7
1.4.1. Regional development in PNPB .....	11
1.4.2. The State of Piauí.....	14
1.4.3. The territory Serra da Capivara.....	15
1.5. Thesis outline .....	15
<b>2. Analytical Framework.....</b>	<b>17</b>
2.1. Introduction.....	17
2.2. Theoretical Tools .....	17
2.2.1. Social Exclusion.....	18
2.2.2. Political Ecology .....	20
2.3. Analytical framework .....	21
2.4. Research methods .....	25
2.4.1. First phase of data collection .....	25
2.4.2. Second phase of the data collection .....	26
2.4.3. Data Analysis .....	28
2.5. Conclusions.....	29
<b>3. National, regional and state level discourses .....</b>	<b>31</b>
3.1. Introduction.....	31
3.2. Discourse of inclusion of family agriculture at national level.....	31
3.2.1. Discourse of participation .....	31
3.2.2. Goals of social inclusion and reasons for non-achievement.....	34
3.2.3. The PNPB as “work in progress”.....	37

3.3.	Regional development as a goal of the PNPB .....	39
3.4.	Actors and narratives at state level in Piauí .....	43
3.5.	Conclusions.....	47
<b>4.</b>	<b>Case Study Territory Serra da Capivara .....</b>	<b>51</b>
4.1.	Introduction.....	51
4.2.	From private to public investment in the PNPB .....	52
4.2.1.	Partnerships with the private sector: Brasil Ecodiesel.....	52
4.2.2.	Transition from Brasil Ecodiesel to Petrobras Biocombustíveis .....	55
4.2.3.	Petrobras Biocombustíveis in the territory Serra da Capivara.....	57
4.3.	Struggle over material practices and meanings .....	58
4.3.1.	Contracts as instruments of inclusion .....	59
4.3.2.	The role of agro-ecological conditions .....	64
4.3.3.	Low productivity and technical assistance .....	67
4.3.4.	Food security.....	70
4.4.	Creating social structures.....	73
4.4.1.	Project Poles of Biodiesel in the Northeast.....	74
4.4.2.	Participation of labor unions.....	76
4.5.	Conclusions.....	79
<b>5.</b>	<b>Social inclusion of the Brazilian Biodiesel Program: power and knowledge dynamics in actors' strategies .....</b>	<b>83</b>
5.1.	Introduction.....	83
5.2.	Power and knowledge dynamics in actors' strategies.....	83
5.2.1.	Actors, roles and interactions in the PNPB.....	83
5.2.2.	Family farmers and their difficulties participating in the PNPB .....	86
5.2.3.	Actors' strategies .....	88
5.3.	Challenging the assumptions of social inclusion of the PNPB.....	94
5.4.	Reflections on the theoretical and methodological approach .....	97
	<b>References.....</b>	<b>100</b>
	<b>Annex .....</b>	<b>109</b>

**Table of figures**

Figure 1: Analytical framework.....	24
Figure 2: Agro-ecological Zoning for Castor Bean in the State of Piauí.....	66
Figure 3: Intercropping system Mamona-Feijão Caupí .....	72
Figure 4: Project Poles of Biodiesel in the Northeast .....	74

**Table of tables**

Table 1: Actors interviewed on national and meso-level.....	26
Table 2: List of interviewed actors on local level.....	27
Table 3: Average productivity in the State of Ceará.....	40
Table 4: Number of family farmers included in the First Implementation in Serra da Capivara .....	53
Table 5: Process of implementation 2008/2009.....	60



## Abbreviations and acronyms

<b>ADR</b>	Agent of Rural Development (Agente de Desenvolvimento Rural)
<b>ANP</b>	National Agency for Petroleum, Natural Gas and Biofuels (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis)
<b>BB</b>	Banco do Brasil
<b>BED</b>	Brasil Ecodiesel
<b>CONAB</b>	National Company of Supply (Companhia Nacional de Abastecimento)
<b>CONTAG</b>	National Confederation of Workers in Agriculture (Conderação Nacional dos Trabalhadores na Agricultura)
<b>EMATER-PI</b>	Institute of Technical Assistance and Rural Extension of the State of Piauí (Instituto de Assistência Técnica e Extensão Rural do Estado do Piauí)
<b>EMBRAPA</b>	Brazilian Institute for Agricultural Research (Empresa Brasileira de Pesquisa Agropecuária)
<b>FBB</b>	Banco do Brasil Foundation (Fundação Banco do Brasil)
<b>FETAG</b>	Federation of Agriculture Workers (Federação dos Trabalhadores na Agricultura)
<b>INCRA</b>	National Institute of Agrarian Reform (Instituto Nacional da Reforma Agrária)
<b>MAPA</b>	Ministry of Agriculture, Livestock and Supply (Ministério da Agricultura Pecuária e Abastecimento)
<b>MDA</b>	Ministry of Agrarian Development (Ministério de Desenvolvimento Rural)
<b>PCPR</b>	Combat of Rural Poverty Project (Projeto de Combate à Pobreza Rural)
<b>PNPB</b>	National Program for the Production and Use of Biodiesel (Programa Nacional de Produção e Uso de Biodiesel)
<b>PRONAF</b>	Program for the Strengthening of Family Agriculture (Programa Nacional de Fortalecimento da Agricultura Familiar)
<b>SEBRAE</b>	Agency of Support to the Small and Medium Entrepreneur (Agência de Apoio ao Empreendedor e Pequeno Empresário)
<b>SFS</b>	Social Fuel Seal (Selo Combustível Social)
<b>STTR</b>	Labor Union of Agricultural Workers (Sindicato dos Trabalhadores na Agricultura)
<b>SRN</b>	São Raimundo Nonato



## **1. Introduction**

### **1.1. Problem statement**

Biofuels remain a contentious subject concerning its social and environmental impacts. On the one hand, some authors have discussed the advantages of biofuels in terms of reduced emissions, job generation for rural poor, and national energy security (Braun and Pachauri 2006; Biswas, Kaushik et al. 2008). On the other hand, other authors claim that the current pattern of biofuel development is not sustainable, because it creates competition in land markets and food production. To a great extent, this harms the rural poor rather than benefiting them (Junginger, Faaij et al. 2006; Doornbosch and Steenblik 2008; Gordon 2008; Koh and Ghazoul 2008). It is argued that the current model for global biofuels trade largely focuses on export-oriented agribusinesses, and it does not leave opportunities for small-scale subsistence production (Gordon 2008). The agribusiness model favors large-scale monoculture production, which requires high chemical use – encompassing environmental impacts such as water and land depletion – and increases the pressure for the expansion of the agricultural frontier. Therefore, research attention has been oriented to the scale of production of biofuels, and regulatory schemes of agricultural and energy markets in which biofuel chains operate.

In the realm of this discussion, Brazil persists as a central actor in the transport biofuels debate. Brazil was initially criticized for its bio-ethanol program. The program ProAlcool, although considered a success in economic and technical terms, was condemned for its social and environmental consequences. Poor working conditions, exclusion of smallholders, and mono-crop intensive agriculture were some of the reasons for the manifested discontent (Hall, Matos et al. 2008). As a policy response to the problems encountered with bio-ethanol, the National Program for the Production and Use of Biodiesel (PNPB) was launched in 2004. The PNPB is the most recent policy in terms of biodiesel development in Brazil, and social inclusion is one of its main objectives. The notion of social inclusion is based on the premise that the biodiesel sector has great potential for generating economic opportunities for

family agriculture<sup>1</sup>. Unlike the bio-ethanol program, the biodiesel program endeavors to achieve the participation of family agriculture as one of the feedstock sources for the production of biodiesel. Developed by several governmental institutions, the PNPB aims at an innovative mode of governance, integrating the participation of different sectors of society. The main instrument to achieve the social inclusion of family farmers is the Social Fuel Seal (SFS).

The SFS is granted by the Ministry of Agrarian Development (MDA) to biodiesel companies which obtain 30 percent of their raw material from family farmers in the South, Southeast and Northeast regions (Diário Oficial da União 2009). Incentives are offered to family farmers to become involved in the production of oleaginous. Family farmers signing commercialization contracts with a biodiesel company obtain access to technical assistance, credit, and certified seed. The biodiesel companies holding the SFS must guarantee family farmers to buy their produce at a fixed minimum price (Federal Government 2005). Thus, several measures have been put in place to facilitate the inclusion of family farmers in the biodiesel value chain.

The inclusion of family farmers (smallholders) in value chains has been a matter of discussion not only in the biofuels debate, but also in food value chains. The inclusion of smallholders in value chains has been thought of as a poverty reduction strategy. The 2008 World Development Report on Agriculture for Development (WDR08) advocates an “agriculture for development agenda” (World Bank 2008). The WDR08 encourages governments and development agencies to use agriculture as an engine of economic growth and poverty reduction. The agricultural strategy promoted in the WDR08 is to establish efficient links between food value chains and smallholders, to enhance the competitiveness of smallholders, and to facilitate their access to markets. Thereby, an investment climate which promotes public and private initiatives shall be created. The WDR08 emphasizes the need of technology innovation in smallholder

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<sup>1</sup> Family agriculture is a concept adopted in Brazil to refer mainly to smallholding agriculture. A family farmer is defined in the National Family Farming Act (Law 11,326 of July 24th 2006) based on four requirements:

- The rural establishment (or undertaking area of activity) does not exceed four fiscal modules.
- The labor used in the related activities is predominantly family-based.
- The family’s income predominantly originates from activities related to farming and the smallholding.
- The establishment is directly managed by the family.

agriculture and strengthening of producers' organizations with the support of civil society, which is referred to as governance:

*There is evidence that the political economy has been changing in favor of using agriculture for development. Both civil society and the private sector are stronger than they were in 1982<sup>2</sup>. Democratization and the rise of participatory policy making have increased the possibilities for smallholders and the rural poor to raise their political voice. New politically powerful private actors have entered agricultural value chains, and they have an economic interest in a dynamic and prosperous agricultural sector (World Bank 2008).*

The objectives and instruments used by the PNPB are in line with the “recipe” to use agriculture for development suggested in the WDR08. The reliance on the markets, the focus on family farmers' productivity, and participatory governance as a pathway to poverty reduction stated in the WDR08 are key characteristics of the PNPB. However, some authors have adopted a skeptical position towards this poverty reduction strategy. The WDR08 was criticized for not addressing power relations and social inequity underlying agricultural markets and value chains (Amanor 2009; Hetherington 2009; McMichael 2009; Woodhouse 2009). For example, social inequity is referred to in the WDR08 as social heterogeneity. Amanor (2009) argues that this vision fails to grasp the implications of social differentiation and concomitant marginalization as a process shaped by power relations. The alleged benefits of joining value chains for smallholders have also been contested. In the cases where small-scale farmers participated in value chains, their participation remained marginal as supplier of raw material. Smallholders commonly join agribusiness' value chains to promote corporate accumulation and facilitate their exercise of power (Amanor 2009; McMichael 2009). In addition, the focus on the need of agricultural innovation assumes that smallholder's knowledge and culture is not appropriate for the development model. In general, social dimensions are often neglected in the planning of economic processes. This has led to the adoption of a series of assumptions regarding the inclusion of smallholders in value chains. This research focuses on the component of inclusion of family agriculture in the Brazilian program of biodiesel

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<sup>2</sup> The reference to this year is because the last World Development Report on agriculture was launched in 1982.

(PNPB). Informed by this literature, the next subsection discusses some of the assumptions that underlie the PNPB and its social inclusion component.

## **1.2. Underlying assumptions of the PNPB**

The Social Fuel Seal is the main instrument through which the PNPB endeavors to make the biodiesel sector socially inclusive. When closely looking at the SFS, we can identify three main assumptions (among many others) that the policy is making. The first assumption is that different sectors of society (voluntary, private and governmental) are able to work together in order to achieve the inclusion of family farmers in the biodiesel sector. According to the policy, different sectors of society meet in a number of events such as the negotiations of contracts, provision of technical assistance and credit, and work together as partners. There is a wide recognition that the task of social inclusion is not the responsibility of governments alone, but shared by all sectors of economy and society. However, a partnership between sectors that works properly in favor of disadvantaged groups is not easily achieved since different actors pursue different agendas. This positivist perspective overlooks unequal power relationships and different political interests and perceptions.

The second assumption is that the needs of both biodiesel companies and family farmers match; or at least they match after the provision of seed, credit, and technical assistance to family farmers. The premise is that family agriculture and biodiesel companies are able to have an economic exchange that benefits both parties. An implicit fact is that appropriate resources (technical assistance and seed) are available to successfully advance technological innovation in family agriculture. Furthermore, the PNPB assumes that family farmers are able to assess and appreciate the benefits of this economic exchange.

The third assumption is related to the terms of inclusion of family farmers in the biodiesel chain. The terms of inclusion are greatly determined by contracts between biodiesel companies and family farmers. In the negotiation of the contracts, family farmers are represented by a labor union, or a cooperative. The main assumption is that contracts are good instruments to achieve economic inclusion of family farmers. One interesting aspect to look at would be the different meanings of contracts, the security they provide, and how well they adjust to different needs and situations. The cultural implications of using contracts as mechanisms for inclusion are difficult to

assess. Under the umbrella of this assumption, another important concept is that of representation. For example, it may be questioned how well a labor union or cooperative can represent the family farmers' interests in the negotiation of contracts.

The PNPB has originated an intense debate concerning its environmental, economic and technical viability. Soybean expansion is one of the pressing issues at the center of the debate. The Biofuel Watch Center concluded that the soybean plantations – which represent 80 percent of the feedstock used for biodiesel in Brazil – continue to have negative environmental and socio-economic impacts (NGO Reporter Brasil 2010). Lapola, Schaldach et al. (2010) argue that while relatively little forest land will be directly converted for biofuels production, large extensions of rainforest and Cerrado will be indirectly impacted through displacement of cattle ranching by pushing rangeland frontier into the Amazon forest. To fill the biofuels production targets: “Sugarcane ethanol and soybean biodiesel will be responsible for 41 percent and 59 percent of this indirect deforestation respectively.”

Socio-economic research conducted on the sites of implementation of the PNPB points out different reasons why, up to now, the PNPB has failed to meet the expectations including family farmers in the biodiesel value chain (Wilkinson, Herrera et al. ; Garcez 2008; NGO Repórter Brasil 2008; Gucciardi Garcez and de Souza Vianna 2009). Some of the reasons include: low prices offered for the feedstock by the biodiesel companies, breach of contracts by the parties, low productivity of family agriculture, delayed delivery of seeds, and problems with access roads and other infrastructure. The reasons given, however, provide more of a description of the situation encountered rather than causal explanations. Thus, it is necessary to search for broader explanations to account for the performance of the PNPB. Otherwise, there is a risk of adopting an over-simplified perspective about the outcomes of this program.

Currently, the PNPB is implemented in several regions of Brazil obtaining different outcomes according to specific situations. One of the areas of implementation of the PNPB is the territory Serra da Capivara where family farmers provide feedstock to Petrobras for the production of biodiesel. Located in the southeastern region in the State of Piauí, Serra da Capivara has been put forward in the local and national news as a positive example of the impacts that the PNPB has in the livelihoods of rural families (MDA 2009). Like many other territories, there is not enough knowledge

about Serra da Capivara concerning the performance of the PNPB. Thus, this territory poses opportunities for the generation of novel information in regard to the assumptions of the PNPB previously discussed in this section. Having presented the research problem that this research is concerned with, the next section elaborates on the research objectives.

### **1.3. Research objectives and research questions**

The first objective of this research is to challenge the assumptions of the PNPB mentioned in Section 1.2 by contrasting the discourse of social inclusion with a case study of family farmers included in the PNPB in the Northeast of Brazil. The study of the discourse of social inclusion will focus on the main reasons and narratives provided by different actors for the inclusion/exclusion of family agriculture in the PNPB. The case study provides the opportunity of taking a closer look at the dynamics taking place locally that account for processes of inclusion and exclusion present in the PNPB. Contrasting these perspectives will facilitate the adoption of an analytical perspective towards the PNPB.

The second objective is to develop an analytical framework through which the findings on the social inclusion of the PNPB can be analyzed. The analytical framework will enable the evaluation of the concept of social exclusion and its usefulness in the study of programs with social inclusion objectives. It will rely on Political Ecology theoretical notions assessing its potential to provide analytical tools for this research. Finally, the third objective is to contribute to the discussion of the PNPB, and to the debate of policies aiming at social inclusion. The results will contribute to the discussion of discourses generating a tendency to adopt untested assumptions, and the role of these assumptions in developing policy solutions of questionable effectiveness.

In order to operationalize the research objectives, a number of research questions have been formulated. The nature of the questions is primarily qualitative and descriptive. Since the PNPB aims at coordinating several sectors of society, the first question has an emphasis on actors and their different perspectives about family farmers' inclusion. The second research question is mainly concerned with the experience of family farmers involved in the PNPB. There is also an interest in learning about the relation between family farmers and the biodiesel company. The third question seeks to



combine the first two research questions in an effort to adopt a more analytical perspective towards the PNPB.

1. How have actors worked together in the implementation of the PNPB?
  - a. Which actors have been involved in the process of inclusion of family farmers?
  - b. What has been the role of different actors in the process of inclusion of family farmers in the biodiesel chain?
  - c. What are the perspectives, approaches and opinions of different actors regarding the inclusion/exclusion of family agriculture in the PNPB?
2. What have been the major difficulties encountered by family farmers in joining the PNPB in the territory Serra da Capivara?
  - a. What have been the local social structures hampering or facilitating the participation of family farmers in the PNPB in the territory Serra da Capivara?
  - b. Have family farmers or Petrobras encountered any difficulties in meeting contract specifications? Have parties respected the contracts as stated?
  - c. Has Petrobras faced any difficulties in reaching family farmers? How are they overcoming these difficulties?
3. How can dynamics of knowledge and power that take place in the social inclusion process of the PNPB be elucidated?

#### **1.4. Background**

In the last decades, the development of the biodiesel sector has been part of the policy debate in Brazil (Gucciardi Garcez and de Souza Vianna 2009). The discussion about a specific biodiesel program was initiated in 2003 seeking to avoid what the Brazilian Government called the ‘social and environmental distortions of Pró-Álcool (Abramovay and Magalhães 2007). In December 2004, the National Program for the Production and Use of Biodiesel (PNPB) was launched. The PNPB is a result of the cooperation and agreement between several governmental institutions. The Executive Inter-Ministerial Commission (CEIB) in charge of designing the program was created

by a Presidential Decree. This commission is composed of several ministries e.g., the Ministries of Environment, Transportation Mines and Energy, Rural Development and National Integration. The core objective of the PNPB is to ensure the sustainable development of the biodiesel sector taking into account social and environmental considerations. The component of social inclusion of the PNPB lies on the assumption that, “the production chain of biodiesel has a great potential for the generation of employment and promotion of social inclusion, especially when the productive potential of family agriculture is considered” (Federal Government 2005). The PNPB has been categorized as an innovative policy for its paraphernalia to achieve social inclusion (Soares, Pavan et al. 2007). This paraphernalia is explained as follows.

First, the PNPB intends to attract the private sector to invest in biodiesel production by creating a demand. The demand is created establishing blending targets of biodiesel mixed with conventional diesel. The National Council for Energy Policy is the institution in charge of assessing the quantity and quality of the mixture. In order to create a secure and stable market, the National Agency of Petroleum, Natural Gas, and Biofuel (ANP) buys in anticipation the biodiesel production through auctions. When the policy was launched in 2004, the mixture between biodiesel and fossil diesel was expected to rise from two percent in 2008, to five percent in 2013 (Federal Government 2005). The targets were achieved beforehand, and in 2007 the mandatory five percent mixture (B5) was changed from 2013 – the original target – to be achieved in January, 2010 (Teixeira 2007).

Second, the component of social inclusion is introduced by regulating the access to the biodiesel market through the Social Fuel Seal (SFS). The SFS endeavors to create incentives for biodiesel companies to purchase feedstock from family agriculture. It states that for a biodiesel company to be granted the SFS, it must obtain 30 percent of the raw material from family agriculture. The SFS gives the respective company the right to participate in all the biodiesel auctions conducted by the ANP. Moreover, 80 percent of the auctions are open only to the biodiesel companies holding the SFS (Diário Oficial da União 2005). In addition, the biodiesel companies holding the SFS obtain tax exemptions.

Third, the SFS seeks to provide incentives to family farmers as well. The Normative Instruction number 01 (Diário Oficial da União 2009), which is concerned with the procedures related to the concession and use of the SFS, establishes that biodiesel

companies should provide technical assistance and certified seed to family farmers. In addition, the acquisition of the raw material from family agriculture is done on a contract basis. The contracts must ensure favorable commercialization conditions for family agriculture and guarantee a minimum price, as well as technical assistance and certified seed. Thus, the SFS entitles companies to get tax exemptions because of the investment made on family agriculture. In this manner, the PNPB aims at promoting the inclusion of family farmers in the biodiesel value chain.

Furthermore, the PNPB intends to create partnerships to facilitate the process of social inclusion of family agriculture. Public and private partners should collaborate on the achievement of a social objective. For example, the role of the Ministry of Agricultural Development (MDA) within the PNPB is to deal with the inclusion of family farmers, granting and monitoring the Social Fuel Seal. As stated in paper, the role of the MDA is to grant the SFS to the companies that have contracts with family farmers, and to monitor that the terms of the SFS are being complied (MDA 2005). Therefore, the role of the MDA in the process of inclusion of family agriculture is central to the PNPB. In general, the MDA is mainly concerned with policies for family agriculture and deals with issues such as the agrarian reform, insurance, and credit.

The MDA is also involved in the PNPB through the National Program of Strengthening of Family Agriculture (PRONAF). This program focuses, among other things, on providing rural credit for family farmers. PRONAF finances projects – individual or collective – that will generate income to family agriculture (MDA 2010). The program has low interests rates and lines of credit for different purposes such as agro-ecology projects, agro-industry and the production of oleaginous for biodiesel. In the context of the PNPB, PRONAF is in charge of the provision of credit to the farmers producing oleaginous for a biodiesel company.

The Ministry of Agriculture, Livestock and Supply (MAPA) is less directly involved in the PNPB than the MDA, as they have no participation in the implementation of the SFS. On paper, the role of MAPA in the PNPB is to structure the agricultural chains, processing and commercializing feedstock for biodiesel (Federal Government of Brazil 2004). But, it has not been established how MAPA is supposed to do so. Still, MAPA is the authority on agricultural matters, thus, their overall role is somehow critical. For instance, MAPA certifies the quality of the seed that is being delivered to

family farmers, monitors regulations and the development of technologies for family agriculture, and influences agricultural markets.

Another major partner in the execution of the PNPB is the National Confederation of the Workers in Agriculture (CONTAG), which is the largest labor union of rural workers in Brazil. Their role in the PNPB is to monitor the SFS and the terms of inclusion of family farmers at the national level (MDA 2005). Similarly, for the negotiation of the contracts, CONTAG has had a great participation. The structure of CONTAG is composed of a representation at the national level (CONTAG), a representation at state level called Federation of Workers in the Agriculture (FETAG), and a representation at the municipal level which is called Labor Union of Rural Workers (STTR). Today, CONTAG has 27 federations, that is to say, one federation – FETAG – in each state of Brazil. In each state, the FETAG's are composed of several labor unions (STTR's). There are a total of 4,000 STTR's in Brazil. With its organs at state and municipal level, CONTAG represents 20 million rural workers (CONTAG 2010).

It is important to highlight that the PNPB has been modified along the implementation process. Such is the case of the anticipation of the target B5 (5 percent mix of biodiesel) for 2010 instead of 2013. Another modification has been the percentage of raw material that a biodiesel company has to obtain from family agriculture in order to hold the SFS. Initially, this percentage varied according to the region as follows: 30 percent in the South and Southeast regions, 50 percent in the Northeast region and 10 percent in the North and Center-west regions (Diário Oficial da União 2009). The differentiated percentage was supposed to promote larger benefits to the family farmers in the Northeast region. However, the difficulties that biodiesel companies faced in obtaining this percentage of raw material from family farmers, especially in the Northeast region, promoted the change in the required percentage. As mentioned before, the biodiesel companies are now only required to obtain 30 percent of feedstock from family agriculture in the Northeast.

The Northeast is one of the regions that participates the less in the PNPB, only surpassed by the North region. The ANP, which is the organ in charge of the biodiesel auctions, announced that 600 million liters of biodiesel had been bought in the last auction conducted on 31 May, 2010. Of those, only 41 million liters (6.8 percent) came from biodiesel companies located in the Northeast. The regions Center-west

with 273 million and South with 168 million liter of biodiesel sold, presented the largest participation (ANP 2010). The following subsection presents in more detail the strategies adopted within the PNPB to encourage the participation of the Northeast region.

#### **1.4.1. Regional development in PNPB**

The regional disparities in Brazil have been widely discussed in the literature. Azzoni (2000) describes Brazil as a country with “...impressive personal and regional disparities in income.” The World Bank studied inequality in Brazil and concluded that the Northeast was the poorest region. They found clear evidence that rural poverty in the Northeast is the highest of all ten regions, followed by poverty in the urban Northeast (C.Elbers, Lanjouw et al. 2004). The Northeast region hosts 28.5 percent of Brazil’s population with a per capita income of USD 1,836 per year in 1996. In contrast, the Southeast region has a per capita income of USD 5,433 with 42.7 percent of the population (Azzoni 2000).

In addition, the Northeast presents the largest amount of family farmers with 50 percent of the total number in Brazil. The average properties of family farmers are also the smallest of the country, with an average of 16 ha (França, Grossi et al. 2009). Accordingly, the Northeast is the foremost area targeted within the objectives of regional development. As previously discussed, it has been the most difficult area to achieve the participation of family agriculture. This subsection aims at focusing on the approach undertaken in the PNPB to address regional disparities. This approach is mainly characterized by the Project Poles of Biodiesel of the Northeast and the creation of Petrobras Biocombustíveis.

The Project Poles of Biodiesel started in 2005 as a strategy to achieve regional objectives. While biodiesel poles are implemented by the MDA and local partners in 42 locations of the country (Portal da Cidadania 2010), there has been greater emphasis in the Northeast. Hence, a specific project for the Northeast region was implemented in 2007. The objective (set up by MDA and executed by Obra Kolping) was to create 20 poles of production in six states of the Northeast region. The states involved are Bahía, Pernambuco, Rio Grande do Norte, Piauí, Ceará and Maranhão. Obra Kolping is in charge of the execution of the specific project in the Northeast and its headquarters are located in Fortaleza, the capital city of the State of Ceará (Obra

Kolping 2008). This is a social catholic movement that works on the establishment of social structures such as cooperatives and promotes professional development and entrepreneurship (Obra Kolping 2010). For the execution of the project, Obra Kolping has the cooperation of the MDA and the technical support of the GTZ (German Technical Cooperation) and DED (German Development Service).

The prospective poles of production in the region are identified with the help of local governments and institutions such as INCRA, EMATER and GTZ/DED. The methodology of the project is the introduction of a facilitator in each pole of production to support the creation of local Working Groups (WGs). The ultimate goal is to support local actors in the elaboration of a strategic plan for the production of oleaginous with family farmers. The strategic plan is intended to operationalize the PNPB, improving the access to credit, insurance, technical assistance, research, and rural extension for family farmers (SAF/MDA 2010). The foundation of cooperatives for the commercialization is encouraged by the project in order to deal with logistical challenges. This is to ensure the supply of raw material to a biodiesel mill holding the Social Fuel Seal. In this case, the two main biodiesel mills involved are Petrobras Quixadá in Ceará, and Petrobras Candeias in Bahia.

The implementation of the project, specially focused in the Northeast region, shows the recognition of the government of the need to scale down the execution of the PNPB and the adoption of a regional strategy. Still, the competence of the project to deal with different territories within the region is debatable. Furthermore, the regional perspective adopted has been characterized by the entrance of a major player in the scene, namely, Petrobras Biocombustível S.A. This company is a subsidiary enterprise of Petrobras, the parastatal energy company of Brazil. This new branch of Petrobras was established in the Northeast in order to structure the family agriculture biodiesel value chain. This enterprise initiated in 2008 constructing three biodiesel mills in ten months. The biodiesel mills are located in the states of Candeias, Bahia; Quixadá, Ceará; and Montes Claros, Minas Gerais (Petrobras official 2010).

The main oleaginous crop that has been promoted in the Northeast region is castor bean. Castor bean is not suitable for human consumption but it has found usage in many chemical industries such as paints, coatings, inks, and lubricants (Ogunniyi 2004). In Brazil, the Northeast region is responsible for 94 percent of the area planted and 87 percent of the total production of castor bean (72,376 tons per year). The State

of Bahia is the largest producer with 79 percent of the regional production (de Brito Melo, Sobrinho et al. 2006). Therefore, the crop was thought to be the cornerstone of biodiesel in the Northeast region. Castor bean was called by the President of Brazil “Lula” da Silva, “the wonder of social biodiesel” (“a maravilha do biodiesel social”) (Victor 2006).

Given that castor bean is not edible, an intercropping system with Caupí bean has been implemented in the Northeast region. The intercropping system is supposed to contribute to the food security of the household by encouraging the production of castor bean with Caupí bean. The system was developed by the Brazilian Institute for Agricultural Research (Embrapa) in 2002. Embrapa is the institution in charge of the generation and transfer of technology in agriculture. It is divided in several research units consistent with eco-regions in Brazil. The specific research unit of concern in this study is Embrapa Meio-norte located in Teresina, Piauí. This is the research unit which has been more involved in the PNPB (MAPA 2010). Being technology one of the central features of the PNPB, Embrapa plays an important role in this research.

According to Embrapa, there are positive results in terms of productivity derived from the adoption of the intercropping system, apart from the benefits in food security. The reason for this is the potential of the bean to fix atmospheric nitrogen for the soil, which benefits castor bean productivity (de Brito Melo, de Macêdo Beltrão et al. 2003). In this manner, the intercropping system was developed to provide an alternative source of income while ensuring food security of rural families. The intercropping system is also supposed to have positive outcomes in regard to environmental considerations. Moreover, the main argument about the environmental sustainability of the PNPB is the opportunity provided to family farmers to stay away from mono-cropping (Abramovay and Magalhães 2007).

In brief, the PNPB was implemented in the Northeast region with the creation of the Project Poles of Biodiesel which aimed at operationalizing the PNPB at the regional level. In order to promote food security, the intercropping system has been promoted in the region. Furthermore, Petrobras has taken on the task of structuring the value chains of biodiesel with family farmers in the Northeast by establishing two biodiesel mills in the states of Ceará and Bahia. This research directs attention to the biodiesel mill located in Quixadá, Ceará. The biodiesel mill in Ceará obtains its supply from five states in the Northeast which are: Piauí, Ceará, Rio Grande do Norte, Paraíba e

Pernambuco (Petrobras official 2010). Given logistical constraints, only one of the five states will be studied in this research. This is the State of Piauí.

#### **1.4.2. The State of Piauí**

Piauí is the poorest state in Brazil with a per capita income of USD 1,603; while Sao Paulo, the richest state, has a per capita income of USD 6,547. That is 6.2 times the poorest state per capita income (Azzoni 2000). In correspondence with the objective of the PNPB to reduce inequalities, Piauí was one of the first states addressed. Research conducted by Embrapa indicates that the semi-arid region of the State of Piauí has great potential for the production of castor bean due to the agro-climatic conditions such as soil, precipitation and altitude. Yet, data collected by the IBGE from the period of 1990 to 2002 reveal that the State of Piauí has only two percent (3,263 ha) of the total area of castor bean planted in the Northeast region (de Andrade Júnior, de Brito Melo et al. 2004). The climate adaptability of castor bean was a major consideration for encouraging the production of this crop in Piauí in the frame of the PNPB (Embrapa official 2010). The first attempt of the PNPB was carried out by the Federal Government in partnership with Brasil Ecodiesel in 2005 (SEBRAE Official 2010). Currently, Brasil Ecodiesel is not present in Piauí anymore, but Petrobras has taken over the biodiesel value chain (Victor 2006).

Petrobras hires different organizations at the local level for the provision of technical assistance, such as cooperatives of producers and cooperatives of technical assistance (Coordenador Estadual Obra Kolping 2010). In the case of Piauí, the Institute of Technical Assistance and Rural Extension of the State of Piauí (EMATER-PI) was hired to provide technical assistance to family farmers supplying raw material to the Biodiesel mill of Petrobras in Quixadá, Ceará. The contract signed between EMATER-PI and Petrobras stated that the technical assistance should be in accordance with the requirements of the Social Fuel Seal. In the contract, EMATER agreed to accompany the whole process of inclusion of family farmers, from informing family farmers about the contracts, to the commercialization with Petrobras (EMATER 2008).

For the 2009/2010 harvest, family farmers signed contracts with Petrobras in two territories of the State of Piauí. In the territory Cocais, family farmers signed contracts with Petrobras for the production of sunflower. The 2009/2010 harvest is the first year



of commercialization between Petrobras and family farmers in this territory. Thus, it is not pertinent to conduct a research related to the results of this economic exchange yet. In comparison, the territory Serra da Capivara has participated in the PNPB since the first attempt implemented in 2005 with Brasil Ecodiesel. Currently, there are family farmers who have commercialization contracts with Petrobras since the 2008/2009 harvest. The longer involvement of this territory in the PNPB suggests great potential for conducting research useful for the debate. The next subsection provides a brief overview of this territory.

#### **1.4.3. The territory Serra da Capivara**

The territory Serra da Capivara is located in the Southeast region of the State of Piauí and comprises 18 municipalities. These municipalities present a low human development index – on average 0.61 – and important rural predominance, as 60 percent of its population lives in rural areas. This is considerably above the national average of 15 percent (Sistema de Informações Territoriais 2010). The territory Serra da Capivara has been identified as an area of great potential for the production of castor bean; thus, it has become the target of interventions related to the PNPB. In spite of this, the region still does not represent a significant supply of feedstock for biodiesel (Petrobras official 2010).

The territory is located in the southeast of Piauí and is composed of 18 municipalities. However, the area of action of the PNPB only includes 14 of the 18 municipalities of the territory. The 14 municipalities: São Raimundo Nonato, São Braz do Piauí, Anísio de Abreu, Jurema, Caracol, Guaribas, Várzea Branca, Bonfim do Piauí, São Lourenço do Piauí, Dirceu Arcoverde, Fartura do Piauí, Dom Inocêncio, Coronel José Dias, and João Costa (see Annex 2 for more information on each municipality). All the municipalities are identified by Embrapa through the Agro-ecological zoning of castor bean (de Andrade Júnior, de Brito Melo et al. 2004) as appropriate for the production of this oleaginous. In correspondence with the objectives of this research, the territory Serra da Capivara has been chosen to provide a local perspective of the PNPB.

#### **1.5. Thesis outline**

Five chapters comprise this thesis. This chapter has presented the aspects that motivate this research in the problem statement. Subsequently, the research objectives and the research questions were outlined. Background information about the PNPB

and the area of study was also made available in this chapter. Chapter two presents a brief discussion about the literature on social exclusion and Political Ecology and provides the necessary theoretical background to support the construction of an analytical framework. Subsequently, the research methods are discussed. Chapter three provides an extended discussion of the political discourse and concrete policy actions that have surrounded the PNPB since it was launched in 2004. This discussion draws on perceptions of actors involved in the program at national, regional, and state level. Chapter four presents the results of the case study conducted in the territory Serra da Capivara. The final chapter seeks to answer the research questions by bringing together the results of chapter three and four. It does so by elaborating on how the outcomes of the PNPB are negotiated through actors' strategies.

## **2. Analytical Framework**

### **2.1. Introduction**

Chapter 1 discussed a current trend in the development debate related to the insertion of smallholders in value chains for poverty reduction. In this debate, it has been stressed that there is a necessity to increase the competitiveness of smallholders through technology innovation and strengthening of producers' organizations (World Bank 2008). Correspondingly, the PNPB is a policy put in place to develop socially inclusive value chains of biodiesel. The Social Fuel Seal (SFS) intends to include family farmers in the biodiesel sector by providing tax exemptions to enterprises acquiring feedstock from them. Family farmers in turn receive incentives, i.e., credit, technical assistance and certified seed to increase their competitiveness. The PNPB aims at creating partnerships between different sectors of society, and foster participatory policy making to achieve the social objective. However, policies advocating an economic exchange between smallholders and the private sector have been greatly criticized for overlooking social inequity and power relations, not taking into account the social embeddedness of economic transactions, favoring corporate markets and portraying a poor understanding of smallholders' culture (Amanor 2009; Hetherington 2009; McMichael 2009; Woodhouse 2009; Hospes and Clancy 2011).

This chapter aims at developing an analytical framework that allows considering these aspects often neglected in policy analysis. In order to challenge the assumptions of the PNPB mentioned in Chapter one and its discourse of social inclusion, Section 2.2 presents the main theoretical elements that are taken into consideration in this research. Section 2.3 introduces the analytical framework and elaborates on how it builds from theoretical notions. Section 2.4 presents the methods and techniques to operationalize the analytical framework. Finally, Section 2.5 briefly synthesizes and concludes on the main aspects of this chapter.

### **2.2. Theoretical Tools**

Given that the social inclusion is one of the main objectives of the PNPB and is constantly brought to the debate, this notion is taken into account by revising the literature on the concept of social exclusion. This social phenomenon has received considerable attention in academia and policy making. Thus, social exclusion has been studied using different theoretical approaches. This research aims at studying the

social inclusion/exclusion component of the PNPB, while framing it with the support of the Political Ecology theory. At the same time, Political Ecology relies on the Actor-oriented approach to build an analytical framework. The next section introduces the main aspects found in the literature of social exclusion that are considered helpful for this research. Subsequently, Section 2.2.2 discusses the Political Ecology theory.

### **2.2.1. Social Exclusion**

Hitherto, researchers have not reached an agreement on how to frame and define social exclusion. One of the criticisms in using this concept for analytical purposes is its broadness and vague characterization of a social phenomenon (Arthurson and Jacobs 2004). Other authors regard this as an advantage, arguing that the strength of the concept lies in its flexibility and usefulness for different purposes. As Silver (1994) expresses: “The difficulty of defining exclusion and the fact that is interpreted differently according to context and time can also be seen as an opportunity. The discourse of exclusion may serve as a window through which to view political cultures.” Accordingly, social exclusion is used in this research for its potential to view “political cultures”.

It is widely accepted that social exclusion emerged as a concept in France during the 1960’s, when politicians and scientist made vague reference to *the excluded*. The French debate on citizenship and exclusion has been oriented to urban policies and unemployment. It is argued that this debate can be used in every exclusionary study because of its emphasis on participation and representation (Silver 1994). For instance, the term has been commonly used for analyzing the exclusion of specific groups in society such as ethnicity and gender. Perhaps the most important positive aspect of the concept lies in the preoccupation of the restraint of effective and full participation in society (Toit 2004). Concerning this preoccupation, several definitions and approaches to frame social exclusion have emanated depending on the value that adds to a certain debate.

Notwithstanding the evolutionary status of the concept of social exclusion, there are some common agreements in the literature about this concept – such as in the case of the multi-dimensional nature of exclusion. Multi-dimensionality refers to the multiple factors associated with social exclusion which focuses on causality (Silver 1994; Geddes 2000; Kabeer 2000; Percy-Smith 2000). In this respect, the political and

economic dimensions have been thoroughly discussed. According to Sandell (1998), the economic dimension is concerned with issues related to income and production, as well as goods and services. Bhalla and Lapeyre (1997) defined political inclusion as the right to participate in the exercise of political power. The economic, political and cultural dimensions of social exclusion have gained more recognition in recent literature. Hickey and Du Toit (2007) explored specific dimensions of Adverse Incorporation and Social Exclusion (AISE) in relation to chronic poverty; namely, economic, political, socio-cultural, and spatial dimensions. According to these authors, the strength of the AISE research is the possibility to capture the multi-dimensional and interlocking capacity of long-term deprivation.

Under the multi-dimensionality of social exclusion, Bhalla and Lapeyre (1997) concluded that an analytical framework should establish interrelationships between these dimensions. For example, political inclusion can draw the best out of people and raise their productivity, contributing to their economic inclusion. Randolph and Judd (2000) also think that the concept provides a framework for understanding the interconnectedness of the problems that disadvantaged people face. An example is to study the denial of citizenship rights by looking at societal institutions in which those rights are embedded, e.g. the legal, welfare and community systems. Kabeer (2000) tries to avoid the anonymity of social institutions by stating that institutions do not cause exclusion by themselves, but the social actors who make up these institutions and provide agency behind the institutional patterns do so.

Social inclusion has become a major concern in social policy. According to the ILS/UNDP (1994), the focus on social exclusion opens up new perspectives in respect of the policies to be applied. For instance, partnerships for social inclusion are seen as capable of legitimizing decisions of the state, and building trust between the public, private, voluntary, and community sectors. The interventionist views to tackle social inclusion are present in several discourses in Europe, e.g., France and Britain (Béland 2007). At the same time, policies for social inclusion have been criticized, especially those entailing adverse incorporation more than social inclusion. It is commonly stated that the poor have been excluded from the benefits of economic development, or the terms of inclusion have been adverse. When states and elites who run them needed labor, taxes, or soldiers, the poor were included (Herring 2001).

These examples of inclusion exemplify that economic inclusion is not always desirable, because it does not automatically results in social justice.

Another pressing issue within social exclusion and adverse incorporation discussions is the structure-agency debate. This debate deals with the relationship between impersonal structural forces on the one hand, and individuals at the local level with their own thoughts aspirations and beliefs at the other. For example, Percy-Smith (2000) discusses the issue of agency in terms of whether or not the exclusion might be self-imposed or voluntary. He gives an example of individuals who may decide to exclude themselves as a result of history or previous experience of exclusion or discrimination and whether this can be deemed self-exclusion or not. In order to enhance this discussion, the Political Ecology theory is brought to the debate.

### **2.2.2. Political Ecology**

The Political Ecology theory is rooted in cultural ecology which was usually focused in the micro-scale analysis, such as the interaction between local communities and the environment. Such analysis failed to consider the role of political economy, which focuses on the nature and significance of the unequal distribution of power and wealth in society. Amalgamating the two perspectives, political ecology emphasizes that human-environment relations at local, regional and global scales can be understood only by examining the local patterns of resource use and the political-economic forces (Grossman 1998).

Political Ecology studies have largely emphasized processes of marginalization and social exclusion in natural resource management and access. Social and economic inequities are integral features in the study of a politicized environment. Political-ecology researchers have studied the impacts of state policies, private enterprises, as well as individual agents, on natural resources and rural livelihoods. The impact of discourses on the specifications of environmental and social problems has also been explored, and lead to debates about the merits of indigenous and scientific knowledge (Grossman 1998). The study of such multiple constructions and associated environmental discourses, reflects the growing post-structural concern of dealing with contested points of view and suggested solutions (Bryant 1998).

Consistent with these concerns has been the study of power relations reflected in conflicting perceptions, discourses and knowledge claims about development and

ecological processes. Central to this task has been the observation of how the environment is constituted through struggles over material practices and meanings (Bryant 1998). This way, there is an analytical interest in putting together concepts of knowledge and power by emphasizing that views and discourses about environmental change are social constructions reflecting our own backgrounds, values and positions of power.

Going around entangled theories on social power and knowledge in order to develop research practice poses considerable challenges. One means to operationalize the study of power and knowledge dynamics is to focus on actors. Political Ecology researchers have articulated inquiry across scales of analysis by integrating both processes and actors within a framework of ecological, economic and political relations (Burry 2008). Within this inquiry across scales there is a need for more intricate evaluation of actors and how they can represent central agents of power and change. The actor-oriented analysis is the result of a cumulative effect of the increased interest in challenging existing orthodoxies in development research. This allows the study of divergence and cooperation over outcomes through the interaction of different actors pursuing diverse goals and interests (Long 2001).

In the same line of thought, Long (1992) introduced the concept of “actors’ strategies” to refer to the way social groups use their available resources, knowledge and capability to resolve particular problems (Brown and Rosendo 2000). Few (2002) advocated the use of the actor-oriented perspective in the study of power, arguing that analyzing the motives, resources, and tactics of different actors in the negotiation arena can provide the building blocks for an understanding of the effects of overall power relationships. The actor-oriented approach advances the contemplation of how social actors are related into a series of battles over meanings, resources, legitimacy, control, and resistance (Long 2001). Building on this theoretical discussion, the next section shows how the analytical framework was built and operationalized for the study of the PNPB.

### **2.3. Analytical framework**

The vagueness of the concept of social exclusion has been widely discussed in the literature. To avoid the vagueness of this concept, in this research social exclusion is referred to specifically in the context of the PNPB; thus, focusing on the alleged social

inclusion component of this program. It is important to understand that there is no implicit positive or negative connotation of the word “inclusion”. Another important point to make clear is that social inclusion of family agriculture does not mean to place family agriculture as a socially excluded sector of society. The outcomes of social inclusion of the PNPB will be analyzed primarily by focusing on the three dimensions of social inclusion, i.e., economic, political and cultural.

The economic dimension of social inclusion will be studied by focusing on the economic transaction between the biodiesel company and family farmers. The number of family farmers commercializing with the biodiesel company is an indicator of this dimension. The political dimension will be studied by focusing on the role of the labor unions and family farmers' representatives in the PNPB, particularly in the negotiation of contracts. The cultural inclusion will be studied by focusing on the instruments that aim to facilitate the inclusion of family farmers in the framework of the PNPB, and how do they capture farmers' culture. Simultaneously, the interconnectedness of these dimensions will be accounted for the final outcomes of the inclusion/exclusion processes of the PNPB. In order to further operationalize the study of the multidimensional process of social inclusion, this analytical framework builds on Political Ecological studies.

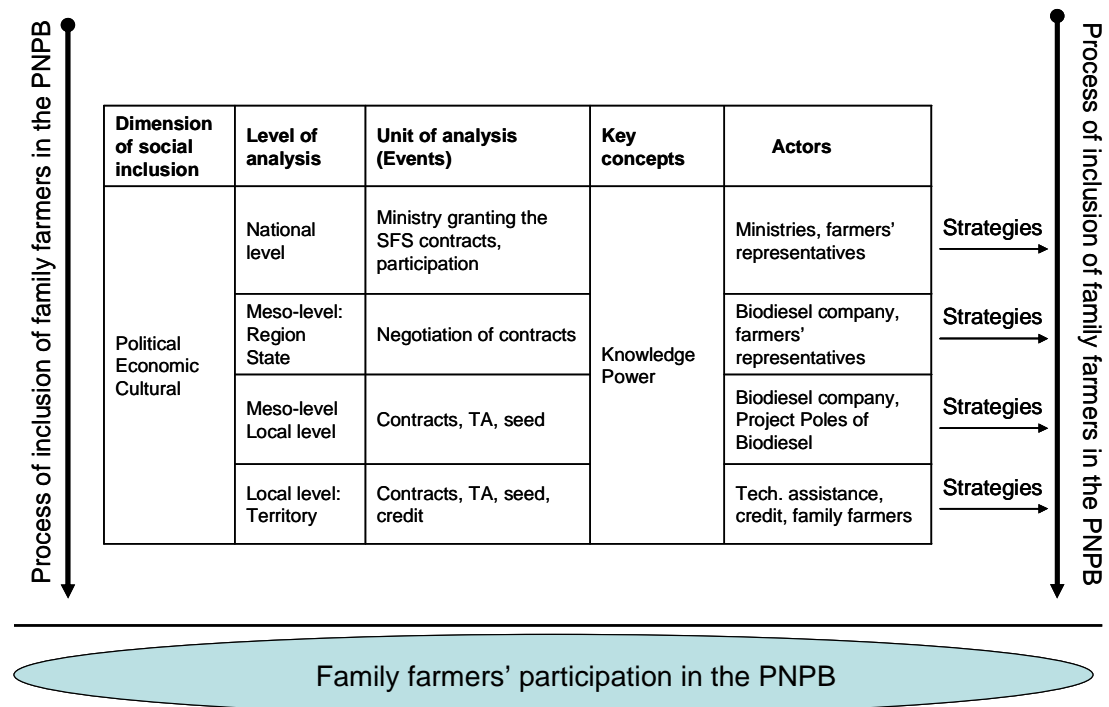
The concepts of knowledge and power are cross-cutting concepts in the study of these three dimensions of social inclusion. In this respect, it is pertinent to elaborate on considerations of power. The working model of power of Few (2002) incorporates three key points: power is dispersed throughout society rather than concentrated solely in the hands of the “dominant”; power is entangled in social relations between agents that differ in their interests, identities and resources; and social power is articulated through complex instruments to exercise power. This research relies on this analytical perspective. The methodological implication is that power dynamics will be studied in social relations. For instance, power is used in the study of political inclusion by focusing on possible power dynamics in the negotiation of contracts. Another example is the construction of identity in discursive practices, which are themselves part of the circulations of power, control and resistance that could be viewed under the umbrella of cultural inclusion. The primary purpose of using power as a concept in the analysis of the PNPB is to be able to trace power dynamics in the interactions between social actors. The premise is that focusing on power dynamics provides a better



understanding of the overall inclusion/exclusion outcomes of family agriculture in the context of the PNPB.

Knowledge is introduced in the analysis by using “ideas” as an entry point to this intricate concept. In this respect, Schmink and Wood (1987) stated that ideas are never innocent, they either challenge or reinforce existing social and economic arrangements. Ideas help to reproduce existing institutions and policies over time, and constitute a political discourse and a policy paradigm. For Hall (1993), a policy paradigm is a “framework of ideas and standards that specifies not only the goals of policy and kind of instruments that can be used to attain them, but the very nature of the problems that they are meant to be addressing”. Keeping these ideas in mind, knowledge and power are thread together through Discourse Analysis. This analysis provides useful insights into the ways that knowledge production and material practices are conjoined in such a manner so as to perpetuate or generate problems or even crises for socially disadvantaged groups (Hajer 2010). The methodological approach supporting this analysis suggested by Hajer (2010) is a two-step procedure for measuring the influence of discourse: if many people use it to conceptualize the world (discourse structuration) and if it solidifies into institutions and organizational practices. If both criteria are fulfilled, it can be argued that a particular discourse is influential in social processes.

The actor-oriented approach is introduced in order to operationalize these concepts – knowledge and power – in a multi-level research. It permits disaggregation of units of analysis by concentrating on the role of individual actors at different levels of analysis. Actor-oriented research can illustrate the complexity of social relationships by focusing on actors’ interactions. The notion of actors’ strategies is used with the analytical purpose of operationalizing the study of knowledge and power dynamics in the PNPB. Few (2002) suggests to focus on actors’ strategies by tracing motives, resources and the actual practices performed by actors in social processes. Figure 1 provides a schematic overview of the analytical framework.



**Figure 1: Analytical framework**

Figure 1 shows that this research departs from a concern with the multidimensional character of social inclusion. A multi-level analysis enables the study of these dimensions. The multi-level approach is based on the structure of implementation of the program. Each level of analysis is deconstructed in specific units or events taking place in the PNPB. At the same time, these units are decomposed in actors and their role in the process of inclusion of family agriculture. The analysis of the perceptions and roles of actors across the process of inclusion of family agriculture will allow the study of actors' strategies in the PNPB.

The study of actors' strategies makes possible the operationalization of power and knowledge as analytical concepts. Power and knowledge are regarded as the building blocks of actors' strategies, but are also the motives (interests driving certain practices) of actors' strategies. Power and knowledge dynamics take place in the convergence of actors' strategies. Hence, actors' strategies are regarded as determining the process of social inclusion and accounting for the outcomes of the PNPB. The strength of the analysis lies in the local level and in the interactions of local actors. Nonetheless, the multi-level approach is used to compare and contrast the findings in order to better understand the outcomes of the PNPB.

## **2.4. Research methods**

The intricate nature of the phenomena analyzed calls for a qualitative methodology. The analytical framework was operationalized in the field mainly through in-depth interviews with the actors involved in the PNPB. The central theme of the interviews was the inclusion of family farmers in the biodiesel value chain. The data collection was conducted in collaboration with the International Policy Centre for Inclusive Growth (IPC-IG) located in Brasília, which is part of the United Nations Development Programme (UNDP). The cooperation took place in the framework of the “Visiting Scholar Programme” within the IPC-IG, which aimed at making use of shared expertise, integration of research activities and preliminary discussion of the findings. The IPC-IG assisted in the selection of actors to be interviewed at the top-level and the selection of the case study. Even though, the research in practice cannot be neatly separated in two parts, the data collection will be presented in two distinct sets to facilitate its understanding.

### **2.4.1. First phase of data collection**

The first part of the data collection concentrated on the national and meso-level implementation of the PNPB. Officials of MDA and MAPA as well as family farmers’ representatives were interviewed, more specifically CONTAG and MST. The identification of actors at national level had the support of the IPC-IG. Interviews were also conducted in Teresina and Fortaleza, where regional and state levels of implementation take place. At regional and state level (meso-level) snowball sampling was used to identify relevant actors to be interviewed. This allowed a reconstruction of the process of inclusion of family agriculture through different actors. Conversations were held with Petrobras officials, the technical assistance provider, officials of the Project Poles of Biodiesel and family farmer’s representatives. In the first phase of data collection a total of 14 interviews were conducted as follows: six in Brasília (DF), five in Teresina (capital city of the State of Piauí) and three in Fortaleza (capital city of the State of Ceará). The matters discussed during the interviews were: roles of actors, difficulties faced in the process of inclusion of family farmers, and perceptions towards challenges and opportunities in the PNPB.

**Table 1: Actors interviewed on national and meso-level**

<i>Level of implementation</i>	<i>Place</i>	<i>Actors and institution</i>	<i>Number of interviews</i>
National	Brasília	MDA	1
National	Brasília	MAPA	1
National	Brasília	CONTAG	1
National	Brasília	MST	2
Regional	Brasília	Banco do Nordeste	1
Regional	Fortaleza	Obra Kolping (Project Poles of Biodiesel)	2
Regional	Fortaleza	Petrobras' supply manager	1
State	Teresina	MST-PI	1
State	Teresina	FETAG-PI	1
State	Teresina	Embrapa Meio-norte	1
State	Teresina	SEBRAE/PRONAF	1
State	Teresina	Petrobras' representative	1
<b>Total</b>			<b>14</b>

#### **2.4.2. Second phase of the data collection**

In order to study the instruments of inclusion/exclusion of family farmers in the biodiesel value chain, a case study was conducted in the territory Serra da Capivara. The second part of the data collection was more intensive and involved a more exhaustive search for information. The data was collected in March and April 2010 with the collaboration of the Institute of Technical Assistance and Rural Extension of the State of Piauí (EMATER-PI). During the field visit, 26 in-depth interviews with local actors and family farmers were carried out. Four main sets of actors around the case study can be identified: family farmers and castor bean producers' associations, labor unions, the Petrobras' representative and the technical assistance provider, i.e., EMATER. However, other local actors such as the credit provider Banco do Brasil, are also part of the research.

The selections of actors interviewed at the local level followed a snowball sampling method. Snowball sampling (also known as chain referral sampling) is a method in which interviewees are identified through a referential mode. Thus, actors interviewed suggest other actors that should be interviewed (Babbie 2008). The starting actors of the snowball sampling were the technicians at EMATER. The focus of the interviews was the process of inclusion of family farmers and the difficulties faced according to different actors involved. The interviews with family farmers were conducted in combination with the technical assistance visits of EMATER. Table 2 shows the actors and institutions that were part of the research on local level.

**Table 2: List of interviewed actors on local level**

<i>Level of implementation</i>	<i>Place</i>	<i>Actors and institution</i>	<i>Number of interviews</i>
Local	São Raimundo Nonato	EMATER	9
Local	São Raimundo Nonato	SEBRAE	1
Local	São Raimundo Nonato	Labor Unions	3
Local	São Raimundo Nonato	Castor bean producers' associations	2
Local	São Raimundo Nonato	Farmers	6
Local	São Raimundo Nonato	Petrobras	1
Local	São Raimundo Nonato	Obra Kolping	2
Local	São Raimundo Nonato	Projeto Don Helder Câmara	1
Local	São Raimundo Nonato	Banco do Brasil	1
<b>Total</b>			<b>26</b>

In addition to the interviews, secondary data was collected from two main sources. The first source was the data base of Petrobras Biocombustível SISDAGRI, that stores information on the farmers that have signed commercialization contracts with Petrobras. The data base has restricted access to the public; thus, it was necessary to obtain access through the technicians of EMATER. SISDAGRI has contact information of the farmers, the number of technical visits performed to each farmer, number of hectares contracted and total production commercialized in the territory Serra da Capivara. The second source of secondary data is the Systematic Data Collection of the Agricultural Production (Levantamento Sistemático da Produção Agrícola). This data base is maintained by the Brazilian Institute of Geography and Statistics in São Raimundo Nonato (IBGE-SRN) and has information about agricultural production and estimated harvests in the territory Serra da Capivara per trimester. The agricultural information was obtained in hard copies from 13 municipalities of the 14 municipalities involved. The raw data was transcribed to an excel format to facilitate the analysis.

The participation in meetings held by actors was regarded as “sites of argumentation” in the data collection. The monthly meeting held by EMATER with all the technicians was assisted. The technicians discussed mainly logistical difficulties faced in their work. An opportunity to observe the interaction of local actors was the meeting held in the headquarters of Banco do Nordeste in São Raimundo Nonato, in order to plan the “Family Agriculture’s Day”. Another important event was the meeting of facilitators of Production Poles of Biodiesel in the Northeast carried out by Obra Kolping in Ceará. In this meeting, several difficulties faced in the poles of production

in the Northeast region of Brazil were discussed. These events are regarded as sites of argumentation. Additionally, participant observation was a tool for data collection. The technical visits to family farmers with the technicians were an entry point to observe the interaction between technicians and family farmers. Visits to individual farms enabled the understanding of some material aspects such as the conditions of roads, settlements of family agriculture and other farm activities.

A limitation to the study was the scattered distribution of family farmers in the territory. Initially, the methodology was going to be partly based on semi-structured interviews with ten percent of the total number of family farmers having contracts with Petrobras. That is around 60 farmers in the territory Serra da Capivara. Unfortunately, this was not possible because of logistical constraints. To visit the farmers without the help of the technicians was considered impossible for a person without proper knowledge of the territory. Therefore, the research agenda was dependent on the assistance of local technicians. Open-ended interviews were conducted when there were opportunities to accompany the technicians in the field visits. Consequently, an additional limitation is that most of the interviews with family farmers were conducted in the presence of the provider of technical assistance. Therefore, it is possible that the farmers might have felt limited to fully speak their minds. Still, this difficulty faced is an important contribution to the understanding of the challenges actors face in accessing and communicating with family farmers.

### **2.4.3. Data Analysis**

The data analysis was mainly conducted with open coding and memoing. The analysis was supported using the Coding Analysis Toolkit (CAT). CAT is an internet-based service of the Qualitative Data Analysis Program (QDAP), hosted by the University Center for Social and Urban Research in the University of Massachusetts Amherst. The data analysis was mainly based on the transcriptions of the interviews conducted. The analysis is anchored in the selection of the main aspects brought forward by the interviewees regarding the challenges and potential of the PNPB in the biodiesel pole Serra da Capivara. The secondary data sources and participant observation were used to triangulate and support the information of the interviews at the local level and combine it with the data from national and meso-level interviews.

Interviews were conducted with central actors in the political process. The interviews were used to generate a better understanding of the meaning and interpretations of particular events for the interviewees. By doing so, the aim was to reconstruct the discourse from which an actor approached a situation. These different approaches are shown in the chapters of research findings. Additionally, secondary data was used to support or contrast the information provided in the interviews. Sites of argumentation were also part of the analysis. Hajer (2010) expresses that sites of argumentation can help to search for data, not simply to reconstruct the arguments used but to account for the argumentative exchange. The analysis of both interviews and sites of argumentation enabled the identification of key issues in the PNPB. These key issues were transcribed in more detail allowing the study of actors' interaction and taking a closer look to possible knowledge and power dynamics. The detection of particular practices was the last step in this analysis for the identification of actors' strategies taking place in the PNPB.

## **2.5. Conclusions**

This chapter has discussed the theoretical tools that were used for the construction of the analytical framework. The study of several theoretical notions on social exclusion and Political Ecology enabled the development of an analytical framework for the study of the PNPB. The analytical framework is based on the multi-dimensional process of inclusion of family farmers by taking an actor-oriented approach. Adopting the actor-oriented approach supports a focus on the role, perceptions, knowledge, and positions of power of the actors identified in the PNPB. At the same time, the different levels of research are connected by adopting a process perspective. This is because the levels of inquiry are interlinked by specifying roles of different actors in the process of inclusion of family farmers in the PNPB. Finally, the methodology conducted in order to operationalize the analytical framework and achieve the research objectives was portrayed.





### **3. National, regional and state level discourses**

#### **3.1. Introduction**

This chapter seeks to discuss the construction of the discourse of inclusion of family agriculture in Brazil at three levels of implementation: national, regional, and state. This is done by describing, analyzing, and discussing interpretive explanations provided by different actors involved in the execution of the PNPB. The ways in which different actors define the difficulties faced in the implementation of the PNPB shape the suggested solutions and direction that the PNPB should take according to these actors. At the same time, the unequal power relationships and political dynamics define policy making in the biodiesel sector in Brazil. Therefore, this chapter seeks to deepen the understanding of the discursive and material struggle within this policy field.

The discussion will start with narratives at the national level and how the discourse is constructed by the actors involved in the inclusion of family agriculture. Afterward, the regional approach of the program is introduced with an orientation towards the Northeast region of Brazil. Given that the regional development is one of the main components of the social inclusion discourse in the PNPB, this section is considered essential. Consecutively, the state level is discussed, whereas the State of Piauí is used as the object of analysis. The final section of this chapter concludes on the main components of the discourse of social inclusion of the PNPB.

#### **3.2. Discourse of inclusion of family agriculture at national level**

This section starts challenging the use of a discourse of participation within the PNPB. Later on, the opinion of different actors regarding whether the objectives of social inclusion have been achieved and the difficulties face in relation to the inclusion of family farmers will be discussed. The final part of this section discusses the lines of argumentation which are used to support the continuation of the program, regardless of its doubtful effectiveness up to now.

##### **3.2.1. Discourse of participation**

The creation of partnerships among different sectors of society – private, civil society and public – for the inclusion of family farmers in the PNPB has been a core component of the discourse. Therefore, the PNPB has been framed as a policy that

aims at a different and innovative mode of governance. Nonetheless, participation and partnerships between different sectors of society is based on specific assumptions concerning representation, equal power relationships and actors sharing a common objective. In this subsection, it is argued that this discourse of participation needs closer scrutiny focusing on the participation of labor unions in the PNPB.

To begin with, the participation of family agriculture can be largely contested due to the issue of representation. When asked about the participation of family agriculture, the interviewee at the MDA said that CONTAG is included in all the process of crafting and execution of the PNPB. However, Brazil has several social movements and institutions representing the rural people. According to the MDA, they have discussed the PNPB with other family farmers' representatives, but they could only negotiate with CONTAG because it is a formally established institution with which they can sign agreements. The social movements, however, do not have the same legal status to sign contracts and agreements. The representative of CONTAG also agreed that the negotiation of the contracts should be with them: "The negotiation on the PNPB should be with us, because we represent the largest number of family farmers in the country" (Interview 2). Consequently, it seems that political inclusion rests mainly on the shoulders of CONTAG.

In the statement made by CONTAG, it is possible to identify the use of a discourse of representation to gain access (power) to negotiate with the government. By stating that they can represent farmers more effectively, CONTAG uses the discourse to determine the rules of inclusion and exclusion. At the same time, institutional and legal patterns determine that negotiations should only be with formally established institutions. The actors (MDA and CONTAG) provide agency to this pattern with reinforcing statements. It can be noticed how the discourse is used to obtain power and access, and how the discourse determines rules of inclusion and exclusion.

In order to analyze the representation of family farmers by CONTAG, theoretical notions are borrowed from studies of urban governance. Le Gales (1998) aims at proposing a framework in the analysis of governance of territories. He proposes that it is first necessary to identify two dimensions of regional governance: an internal dimension and an external dimension. The internal integration dimension of governance refers to the capacity to integrate organizations, actors, and different interests within the decision making scheme. The external integration dimension

relates to a relatively unified collective representation in front of other institutions and other local authorities in order to develop a political capacity to obtain resources and defend a certain strategy.

Both dimensions are of relevance to the representation of family farmers. The internal dimension of integration refers to the capacity of CONTAG to integrate the different demands of different federations and labor unions of family farmers within the decision making scheme. The external integration refers to the capacity of CONTAG to interact with other actors involved in the PNPB and negotiate favorable deals for family agriculture.

The internal dimension of representation integration was discussed with a representative of CONTAG. In this regard, the official of CONTAG said that they are able to know what family farmers want because they have five meetings a year with the federations that have representatives of each labor union (Interview 2). With this approach of integrating different opinions, CONTAG can also be considered a top-down institution, just as much as any governmental institution. This is so because they follow the same administrative structure of the government (national, state and municipal level representative entities). The internal dimension of integration of the labor unions will continue to be discussed in the next chapter. This will be done by analyzing interviews with a federation at state level, and labor unions at municipal level.

A question raised to the MDA was whether they considered CONTAG a good representation of family farmers. The MDA official said that they have worked with CONTAG in several occasions and that has always resulted in positive outcomes for both parties. The family farmers who are not part of labor unions – hence not represented by CONTAG – are advised to become part of one, in order to be better represented (Interview 5). However, the question whether MDA thinks CONTAG is a suitable and effective way to reach family farmers remains unanswered.

In relation to the external integration, according to the representative of CONTAG, the space has been open for them to voice the interest of family agriculture, but the suggestions are almost never taken into account (Interview 2). In the light of this opinion, it seems that the discourse of participation does not necessarily translate into the practice of obtaining the labor unions' input for policy making.

In addition, the partnerships for social inclusion have clearly defined roles for different actors on paper but not automatically in practice. For instance, MAPA is supposed to structure chains of supply of biodiesel in the context of the PNPB. In the interview conducted with CONTAG, the representative mentioned MAPA only when the possibility to certify castor bean seed from family agriculture was discussed. It seemed evident that CONTAG only has negotiations with the MDA, but has little, if any, relations with MAPA or other ministries. MAPA was the only actor who seemed to think that the interaction between MAPA and family agriculture actually takes place. “We work with small and large-scale farmers, our area is agriculture, and we want the small farmer to become large” (Interview 3). With this statement it is important to notice that the problem of family agriculture is merely defined as a matter of scale; almost as if political and cultural barriers did not exist, and the challenges are related to scales in the economic sense. In any case, MDA perceives that they are the only ministry engaged in the inclusion of family farmers. “MAPA only works with large-scale agriculture; we take care of the issues related to family agriculture” (Interview 5).

The dichotomy between MAPA and MDA has deeper roots and responds to one of the most profound dichotomies in Brazilian economy which is “large-scale” versus “family agriculture”. This dichotomy has profound implications in the way family agriculture is perceived, and the interventions that are planned for its development. For example, CONTAG said that role of family agriculture in the economy is food security. MAPA stated that there are crops in which family agriculture is more competitive such as palm and *Jatropha* for the production of biodiesel, and that those crops should be encouraged in family agriculture. The perceptions of MAPA about the efficiency of family agriculture in such crops could respond to a specific agenda of biodiesel development. Consequently, the Brazilian debate on large-scale versus family agriculture also determines rules of participation and terms of inclusion of family farmers in the biodiesel program.

### **3.2.2. Goals of social inclusion and reasons for non-achievement**

The debate on the achievements of social inclusion of the PNPB has been largely polarized between policy makers and researchers. It has been argued by several researchers that the PNPB did not achieve the objectives of social inclusion

(Wilkinson, Herrera et al.; Garcez 2008; Teixeira 2008; Gucciardi Garcez and de Souza Vianna 2009; Lopez de Sousa 2009; NGO Reporter Brasil 2009; da Silva César and Batalha 2010). However, policy makers have brought forward that the PNPB is a socially inclusive program. Similarly, the difficulties faced in the implementation of the program differ among different actors. This is the matter of discussion of this subsection.

Initially, it was understood that the goal of inclusion in 2006 were 100,000 family farmers and 250,000 by the year 2007 (Lopez de Sousa 2009). When the official in charge of the agro-energy section in MAPA was asked about the reasons why the PNPB had not achieved the objectives of social inclusion, he said that the objectives were never officially established. No official numbers concerning the targeted amount of farmers were published. Thus, the PNPB cannot fail to achieve the goals, because they have not been officially established. Currently, after almost six years of implementation, the PNPB has included 100,000 family farmers (MAPA 2010). According to MAPA, this can only be considered a success. By shifting the goals of the PNPB, it becomes impossible to evaluate and monitor the results. “Shifting goals” is a commonly used strategy, not only by policy makers, but in general by executive entities.

In any case, the fact that the PNPB has faced several difficulties reaching family farmers has been widely accepted. The reasons that actors attribute to the difficulties reaching family farmers has deep political implications, specially related to further modifications of the PNPB. MAPA and MDA have mainly attributed the difficulties reaching family farmers to the low technological development that characterizes family agriculture, particularly in the Northeast region of Brazil (Interviews 3 and 5). The low technological development results in low productivity. This, in turn, makes it unattainable for both parties – biodiesel companies and family farmers – to profit from the economic transaction.

The analyst of agricultural policy in CONTAG agrees that technology is a limiting factor for the inclusion of family farmers. Therefore, CONTAG has proposed to the MDA a large investment in the quality of the soil destined to agro-energy production by family farmers. However, according to the representative of CONTAG, the structure of incentives of the program is the main reason for the difficulties faced (Interview 2). In his opinion, the program does not favor family agriculture, as the

incentives are directed to biodiesel companies. The premise is that a biodiesel company having the will to obtain feedstock from family farmers is the only requirement to promote an economic exchange between biodiesel companies and family agriculture. There are no funds intended to facilitate family agriculture involvement in the program. The official at CONTAG said: “The program is a top-down policy and it is not suggested by the people; the government has to create more incentives for family agriculture if they want family farmers to join” (Interview 2). The CONTAG claim that the PNPB is a top-down policy reinforces the disbelief concerning the participatory nature of the program.

The structure of incentives was discussed in the interview with MDA, and the official in charge of the biodiesel program stated that a number of incentives are in place for family farmers: “We are giving seed, technical assistance and credit to family farmers, more than that it would be a subsidy” (Interview 5). He added that the PRONAF is also available for farmers to have access to credit. “We opened the line of credit for family farmers within the PNPB but they did not pay” (Interview 5). In the last statement, the quality and appropriateness of the incentives is not even up for discussion. Furthermore, the comment suggests that family farmers are the ones to blame for not making effective use of the incentives received.

MDA stated that another setback in some regions is the weak presence of farmers’ organizations, paired with the scattered distribution of the farmers in the territories. To overcome these difficulties, they have come up with the methodology poles of biodiesel explained in chapter one (Interview 5). MAPA also agreed with this aspect: “Because of the weak farmers’ organization, MAPA has a Secretariat of Development of Cooperatives for family farmers to be able to achieve competitiveness in scale” (Interview 3). The perspective of both ministries responds to a requirement of large-scale supply of feedstock of the biodiesel sector. Thus, the solutions suggested to this problem are the creation of cooperatives and nucleuses of production to facilitate the achievement of economies of scale.

The perceptions of actors towards the difficulties reaching family farmers greatly shapes the solutions suggested. While CONTAG has suggested the creation of a financial fund to increase incentives for family agriculture, MDA has worked with other actors refining the incentives already offered, aiming at advancing technological innovation and dealing with the scattered distribution of family farmers through the

creation of nucleuses of production. The interventions suggested are based on a set of beliefs of policy makers regarding what farmers perceive and want regarding benefits of the program, technological innovation, and social organization.

### **3.2.3. The PNPB as “work in progress”**

One of the main arguments to justify the marginal social performance of the PNPB is that the program is “work in progress”. The Federal Government has been working on the identification of a number of aspects that need to be improved (MAPA 2010). One of the aspects “improved” is the percentage that biodiesel companies need to obtain from family agriculture in order to get the SFS. The percentage was initially established at 50 percent for the biodiesel companies in the Northeast region. This percentage was reduced to 30 percent in 2009 (Diário Oficial da União 2009). This change allows biodiesel companies located in the Northeast region to have access to the PNPB with a lower number of farmers.

CONTAG, MAPA and MDA agreed that the change can only have positive effects for family agriculture. In general, the perception is that it is necessary to set realistic goals towards what can be achieved with family agriculture. “Family agriculture was given the opportunity and they did not take advantage of it. We will increase the percentage as soon as family agriculture is ready to fulfill the demand” (Interview 5). This shows the recognition that family agriculture was not ready to considerably participate in the biodiesel market. Regardless of this recognition, the participation of the biodiesel sector in the economy continues to be normatively increased, benefiting large-scale agriculture.

The participation of the biodiesel sector is augmented through blending targets, as explained in chapter one. In 2005, the law n°11.097/2005 established a target blending of two percent of biodiesel with mineral diesel (B2) to be achieved in three years. Consecutively, in March 2008 the resolution n°2 of the National Council of Energetic Policy (CNPE) established the mandatory addition of three percent of biodiesel in the diesel (B3). In May 2009 the resolution n°2 of the CNPE established the mandatory addition of B4 beginning in July 2009 (ANP 2010). The goal of adding five percent (B5) biodiesel to common diesel initially established for 2013 was anticipated for 2010, generating a total demand of around two billion liters of biodiesel per year (da Silva César and Batalha 2010).

According to article 1 of Law 11.097 (DOU 2005), the national policy on energy has the objective of augmenting the participation of the biodiesel sector based on economic, social and environmental criteria. Whether these criteria are actually taken into account is not perceptible. On the one hand, the difficulties including family agriculture in the biodiesel sector have been admitted by governmental institutions. On the other hand, the government continues to increase the normative participation of the biodiesel sector, which has the potential to benefit only large-scale soybean production.

These inconsistencies in the PNPB are found to be sustained through a discourse of “work in progress”. This discourse is continued by arguing that the benefits for family farmers are yet to come. The principle is that after modifying and adjusting the PNPB with the support of the labor unions, family agriculture will participate and benefit from the biodiesel sector. Rather than admitting the incompatibilities of family agriculture with the biodiesel sector, or questioning the fundamentals of the program, this discourse aims at giving continuity to the program. In the meantime, the increase in the blending target of biodiesel with diesel keeps strengthening the soybean large-scale agriculture, which is the only crop that can keep up with the growing demand. Currently, 80 percent of the biodiesel in Brazil is made out of soybean (NGO Reporter Brasil 2010). Even though it has been recognized that, at the moment, family agriculture is not ready – or willing – to participate in the production of oleaginous for biodiesel, the blending target keeps augmenting. Mono-crops and social inequality were in principle two trends that the PNPB was supposed to avoid.

It has also been suggested that the SFS needs further modifications concerning the tax exemptions. In the interview with MAPA, the representative said: “The SFS is a powerful mechanism of social inclusion, not only the tax exemption, but also the space in the market that has been open only for the biodiesel companies holding the SFS. Yet, it needs modification for the companies which get feedstock from family agriculture but do not make biodiesel out of it. They should have the right to the tax exemption as well” (Interview 3). This is in reference to the fact that currently companies obtaining castor bean from family agriculture do not make biodiesel out of it. Because of that, companies can hold the SFS and have access to the biodiesel auctions, but not to the tax exemptions. The reason is that the castor bean oil reaches a



higher price in the market than the processed biodiesel. Hence, this makes castor bean biodiesel economically unattainable at the moment.

As a result, MAPA expressed that the law should be modified so these companies also get the tax exemption just by purchasing the feedstock from family farmers, even if they commercialize the castor bean oil in other markets. The justification is that the market for family agriculture is opened thanks to this transaction. The fact that companies obtain castor bean from family farmers to commercialize it, rather than making biodiesel out of it, places the biodiesel companies in a peculiar role. Instead of questioning the choice of crop or the overall economic feasibility of the program, MAPA suggests modifications to further facilitate the peculiar role of biodiesel companies. Once again, the discourse is used to sustain a program of uncertain viability. After 5 years of implementation of the program, the PNPB remains “work in progress”. The questionable performance of the PNPB, especially in the Northeast region, will be discussed in the next sections of this chapter.

### **3.3. Regional development as a goal of the PNPB**

The regional perspective adopted has been characterized by the entrance of a major player in the scene, namely, Petrobras Biocombustível S.A. In an interview with the manager of supply of the biodiesel mill of Quixadá, he expressed that the main difficulty that Petrobras has faced is the low technological level of family agriculture in the Northeast region: “The low productivity of family agriculture resulting from low technology adoption is our main concern” (Interview 40). To deal with the low technological development of family farmers, seed and technical assistance have been provided to ease the adoption of the intercropping system.

According to the researcher designer of the intercropping system: “Castor bean and Caupí bean is the perfect marriage in terms of a production system” (Interview 34). The Embrapa researcher added that when the intercropping is implemented in the right soils, with proper technical assistance and seed of quality, the system can achieve high yields. A demonstrative unit of the intercropping system was conducted in the municipality Anísio de Abreu, located in the southeastern region of the State of Piauí. With the correct adoption of the system, it was possible to achieve a productivity of 1.3 tons/ha of castor bean (Freire de Sousa and Figueira Cabral 2009).

The supply manager of the Petrobras mill in Quixadá said that in the State of Ceará they have reached a large amount of family farmers included. Consequently, in this state Petrobras is not concerned with the number of farmers participating in the program anymore. The main concern of Petrobras in Ceará is to increase the productivity of family agriculture. “In order to keep the SFS, Petrobras could work with the same number of farmers, and increase the participation of family agriculture by raising the productivity of the farmers presently involved” (Interview 40). This increase in productivity would translate in higher returns for family farmers as well. The representative of Petrobras stated that they are working in the implementation of a soil correction project for family farmers to achieve high yields (Interview 40).

To illustrate this point, the case of the State of Ceará is used by the interviewee at Petrobras. Table 3 shows the current average productivity of family agriculture in the State of Ceará. The table compares the potential enlargement in the participation of family agriculture through a hypothetical change in productivity from 0.4 tons/ha to 1.0 tons/ha. This change is based on the productivity achieved when the intercropping system was tested in 2002 (Freire de Sousa and Figueira Cabral 2009).

**Table 3: Average productivity in the State of Ceará**

	<i>Current situation</i>	<i>Targeted situation</i>
Number of farmers	30,000	30,000
Number of ha/farmer	2	2
Total ha of family agriculture	60,000	60,000
Current average productivity (tons/ha)	0.4	1
Total production of family agriculture	24,000	60,000

Source: Petrobras official (2010)

As shown in Table 3, the total production that Petrobras could obtain from family agriculture has a considerable leap from 24,000 to 60,000 tons of castor bean per year, if the current productivity was raised by 0.6 tons/ha. The reasoning is that the participation of family agriculture would greatly increase if the productivity was higher. Nevertheless, to increase the productivity of family agriculture will probably require a considerable financial investment and a longer period of time.

From the point of view of economic efficiency the question is why to invest in castor bean. In this context, the question raised to the supply manager of the Petrobras mill in Ceará, was whether they have made a cost/benefit analysis of buying feedstock from family agriculture. The answer was that at the moment, even though Petrobras

has not made a detailed economic analysis, estimations have indicated that the costs were higher than the economic benefits. However, Petrobras is positive about the present balance, since the current cost is considered an investment in family agriculture that will have significant returns in the future (Interview 40).

The investment in the productivity of family agriculture has the long term objective of modifying the structure of costs in the production of raw material. By increasing productivity, the fixed costs such as technical assistance, preparation of soil and seed are expected to decrease (Interview 40). This would allow farmers to sell a superior quantity with the same costs, bringing the market price of castor bean down. At the same time, farmers will also obtain higher benefits for the higher quantity commercialized and a larger participation. One of the issues that have been discussed is whether or not the option for castor bean will be sustained in the long run. High investments in an unstable, expensive crop with low relevance in the domestic market might be questioned (NGO Reporter Brasil 2009).

From the perspective of Petrobras, another logistical challenge has been the acquisition of seed. The providers of seed do not comply with contracts, often because they do not have the capacity to provide the amount of seed demanded. Now Petrobras adopted a different modality in which they accompany the whole process of seed production in the field. This way, the quality of the seed can be ensured, which is particularly important, because Petrobras has had problems with certified and low-quality seed in the past. Besides, the interviewee of Petrobras added that the provision of technical assistance has also represented difficulties because it is largely oriented to processes rather than results (Interview 40).

In this particular region another difficulty identified has been the scattered distribution of family farmers in the territory. According to the interviewee in Petrobras, this aspect becomes more difficult to deal with because farmers do not have the culture to organize themselves in cooperatives. This makes the distribution of seed, technical assistance and commercialization very difficult for Petrobras (Interview 40). The Northeast is particularly known for this and is often compared to the center and southern regions of the country where the cooperatives and farmers associations are quite strong.

The Project Poles of Biodiesel of the Northeast was supposed to take in hand the scattered distribution of farmers in the territory. They attempted to do so through the identification of nucleus of production, which are geographical areas where several farmers produce oleaginous. The coordinator of the Project Poles of Biodiesel in the Northeast said that it was challenging to create a methodology to work at the local level because MDA had only a methodology to work at a top-level of implementation (Interview 39). According to the Petrobras representative, the creation of nucleus of production has not been possible as farmers do not identify themselves as part of a production unit, and continue to work individually (Interview 40).

A broader consideration of Petrobras is that the price of castor bean oil is higher than the processed biodiesel. Thus, Petrobras buys castor bean from family agriculture, but does not produce biodiesel with it. Instead, they sell the castor oil seeds to capitalize the enterprise to buy soybean for the production of biodiesel (Petrobras official 2010). As explained by NGO Reporter Brasil (2009) “MDA and Petrobras acknowledge that castor bean is far from turning into biodiesel. Processing companies that buy castor bean, do it in order to guarantee the SFS. Because of its valorization in the castor bean oil industry, almost all castor bean purchased by the biodiesel industry is sold to the non-fuel chemical industry, ultimately turning processing facilities into mere intermediaries.” In the attempt of making the PNPB work, Petrobras has adopted an unusual role; apparently, the role of a middleman. The official of Petrobras responded to this claim saying that Petrobras cannot be considered a middleman because it provides seed and technical assistance to family farmers, something that a middleman would not do (Interview 40).

The technical viability was another obstacle Petrobras has faced. In July 2008, the ANP announced that the pure castor oil seed is improper for biodiesel production because of its viscosity (Diário Oficial da União 2008). In December 2009, Petrobras responded to this statement by publishing in their website: “Petrobras Biocombustível already dominates completely the technological process involved in producing biodiesel from castor bean. The fuel was obtained with a blend of 30 percent castor bean oil and 70 percent sunflower seed oil, both produced by family farmers who participate in the company's oleaginous plant supply program” (Petrobras 2009).

In this context, the participation of Petrobras in the PNPB was discussed with MAPA and MDA. The MDA representative stated “The presence of Petrobras in the

Northeast region bears in mind that Petrobras is an enterprise with open capital, and it has to be profitable” (Interview 5). This point was reinforced by MAPA: “The government would not send the company to a business where it is going to be unprofitable” (Interview 3). However, some researchers consider the participation of Petrobras in the PNPB as part of a contingency maneuver. For example, Flexor (2010) concluded: “The preoccupation of the biodiesel producers about the subsistence of the PNPB, induced to the adoption of a governmental strategy in which the task to include family farmers in the Northeast rests on Petrobras Biocombustível S.A.” The topics discussed in this section support the point made by Flexor (2010) and raise questions about the role of Petrobras in the Northeast. This role might appear economic for some actors or political for others.

#### **3.4. Actors and narratives at state level in Piauí**

To continue unraveling the political participation of family farmers in the PNPB, an interview was conducted with the secretary of agricultural policy of the Federation of Workers in the Agriculture in Piauí (FETAG-PI). FETAG-PI is the interface between CONTAG at the national level, and the labor unions at the municipality level. The representative was asked whether the space for participation has been created for them within the PNPB. His answer was, “We were not included in the initial negotiation of the PNPB. When we realized, Brasil Ecodiesel was present in the region and nobody asked us if we agreed [on the general conditions offered by this enterprise]” (Interview 33). Moreover, he said that FETAG did not agree with the terms of BED. “We thought that the number of hectares that farmers were supposed to take care of in “Fazenda Santa Clara” [15 ha] were too much for a family to handle. It was slavery labor. When BED realized it was unsustainable, we were able to negotiate that each family would only take care of 7 ha” (Interview 33). Presently, the interviewee thought that the situation has improved with the presence of Petrobras. The labor unions accompany this exchange by being one of the three parties who sign contracts between family farmers and Petrobras (Interview 33).

The number of family farmers registered with Petrobras in the State of Piauí for the 2009/2010 harvest, was 667 family farmers<sup>3</sup> (Coordinator Emater 2010). This number is considerably lower than the number of farmers registered with Petrobras in the State of Ceará, which is 30,000 (Petrobras official 2010). The representative of FETAG-PI thinks that the PNPB has not represented an opportunity for family farmers, given that food security is their priority, hence the low number of farmers included. He added: “On top of that, the program has had difficulties understanding the culture of family farmers” (Interview 33). According to him, the experience that some farmers had with BED has greatly influenced their current decision making. Even though BED is no longer in the region, it is difficult for the farmers to trust other companies such as Petrobras. Biophysical conditions are also related “The soils in family agriculture farms are too weak. The soil is more proper for bean” (Interview 33).

The interview with FETAG-PI shows a change in the discourse about the reasons why the PNPB has failed to include family farmers as expected. This discourse was sustained by Embrapa Meio-norte, another actor deeply involved in the PNPB in the State of Piauí. Embrapa had a team of researchers who developed an intercropping system composed of castor bean and Caupí bean. The head of the researcher team said that Piauí was the first state where the intercropping system was tested for the production of food and fuel. He thought that the attempt of BED was doomed to failure. According to him, the history of biodiesel production in the State of Piauí started before the PNPB was launched:

*We got involved in a project that aimed at developing an intercropping system for family farmers to cope with the harsh conditions of the semi-arid region. The PNPB had not been launched yet, therefore, we engaged in a small-scale initiative of biodiesel production for local consumption. This was also before the program “Luz para todos”<sup>4</sup>. The intercropping system was developed and tested in Piauí in 2002, when the other states such as Ceará were not even thinking of the production of biodiesel. When the PNPB was launched, it was so large and with so much propaganda that our initiative was set aside. Personally,*

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<sup>3</sup> The number of family farmers included in the PNPB might have increased in the State of Piauí in 2010 as a result of a new production pole being established in the northern region of the State.

<sup>4</sup> The Federal Government of Brazil launched in 2003 a program to provide access to electricity to ten million people in the rural areas.

*I did not agree with the methodology of Brasil Ecodiesel. BED was bringing people from different places to the settlement that they had created in Canto do Buriti. You should never do that to family farmers. They enjoy having the lemon tree in their backyard and the relationships they have built with the neighbours (...). We wanted to continue working with family agriculture, but when Petrobras entered the region, they decided to hire EMATER for technical assistance. It was a political decision in which we were not involved. Therefore, even though I was invited to join the Biodiesel Board of Piauí, lately, I have decided to stay out of it (Interview 34).*

The previous initiative that the representative of Embrapa is talking about is well documented in the book “Technology as an instrument of social inclusion” (Freire de Sousa and Figueira Cabral 2009). In addition, he added that BED did not take care of choosing an area for the settlement that had appropriate soils for castor bean, because they thought they could correct the soil with machinery and fertilizer.

The story and perceptions of the researcher of Embrapa reveal two interesting things. On the hand, it shows that technological development alone, does not have the potential to create social change, but political forces do. In the end, the power exerted by different actors, seemed to have a larger influence in the biodiesel development in the State of Piauí, than the fact that there was research already in place of technology innovation. On the other hand, he is pointing out an aspect of the PNPB that had been set apart of the discussion until now, namely the scale of the program. In his perspective, the program was so large there was no room for small initiatives.

When discussing the marginal social inclusion in the State of Piauí, the coordinator of the Biodiesel Board of Piauí thinks that one of the problems of the PNPB is in its structure. He thinks that the program started backwards. “Instead of ensuring the production of the raw material to supply the biodiesel mills first, they started by installing the processing capacity” (Interview 18). According to him this does not make sense because the biodiesel mills might face problems sourcing the feedstock. Nevertheless, if the possibility of large-scale agriculture to supply the biodiesel mills is taken into consideration, the program started appropriately. This comment reinforces what was discussed in subsection 3.2.3 about the discourse of the program being “work in progress” for family agriculture while generating opportunities for the soybean large-scale agriculture.

Policy makers positioned the problems of social inclusion at the local level by arguing that the low technological adoption of family farmers is a major limiting factor. The

last three interviewees locate the problems faced in the inclusion of family agriculture at different levels of implementation, as opposed to policy makers. Both interviews with the representative of FETAG and Embrapa shed some light to the reasons that might have contributed to the difficulties faced in including family farmers in the State of Piauí. The reasons given are more related to the low understanding of the culture of family farmers of the PNPB, rather than farmers' low technological development. Still, this does not explain a number of questions, such as how the State of Ceará achieved the current number of farmers included, and whether the State of Ceará accomplished a better understanding of the culture of family farmers.

With the aim at finding answers to these questions, the supply manager of the biodiesel mill of Petrobras in Quixadá, Ceará, was interviewed. He explained that the difference in inclusion of both States can be related to the involvement of the Government of State of Ceará. He said that it has been possible to affiliate with the Government of Ceará and governmental institutions that have provided logistical and financial support for the execution of the program. This explanation was supported by the coordinator of the Project Poles of Biodiesel of the Northeast in both States (Piauí and Ceará). He agreed that the difference in the inclusion of family farmers in both states is mainly due to the fact that the Government of Ceará has worked in the development of a strategy for the incorporation of family farmers in the PNPB unlike the State of Piauí. "The government of Ceará has adopted the PNPB as one of the priorities. A strategic plan of biodiesel has been implemented providing incentives for family farmers. The main incentive is an annual R\$200<sup>5</sup> bonus to assist family farmers in the preparation of the land for cultivation (Interview 37).

This was also confirmed by the director of the Biodiesel Board in the State of Piauí. According to him, the difference is the role that the Governments in both states have played. He said that Government of the State of Piauí does not provide additional incentives to family farmers participating in the PNPB. He believes that the large number of family farmers in the State of Ceará is due to the financial incentive offered (Interview 18).

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<sup>5</sup> According to the exchange of 21 July 2010, R\$200 = USD\$111.11 (OANDA 2010)



The manager of supply of Petrobras in Quixadá considers that, on the one hand, the involvement of the Government of the State of Ceará in the PNPB has significantly facilitated the process of inclusion of family farmers. On the other hand, the incentive offered (annual R\$200 bonus) also bears negative side effects. The setback is that many farmers get involved in the program because they are interested in the R\$200 bonus rather than in the cultivation of castor bean. Consequently, those farmers frequently do not invest the necessary labor in their plantations, which brings the average productivity down (Interview 40). This statement suggests a factor that might influence productivity apart from technological innovation. Hence, it provides input for adopting a more critical position towards the technocratic discourse that has dominated the debate of the PNPB.

### **3.5. Conclusions**

This chapter has discussed the different perceptions of several actors about the difficulties encountered in the inclusion of family farmers in the PNPB across different levels of execution. The representatives of ministries and Petrobras agreed that the two main difficulties faced to include family farmers in the PNPB are the following: firstly the low technological development of family agriculture (resulting in low productivity), and secondly the scattered distribution of family farmers paired with the lack of farmers' organizations.

It is perceptible that the problem has been framed in terms of the needs of the biodiesel industry. By framing the problem in terms of productivity and achieving scale through cooperatives, the assumption is that family agriculture needs to be competitive with soybean large-scale agriculture. Consequently, the PNPB was designed not as a socially inclusive program but to reproduce the mode of production that has been dominant in Brazil, i.e. large-scale production. Therefore, the interventions and modifications of the program have been intended to shape family agriculture in the Northeast to fit the biodiesel industry and its requirements. At the top-level of execution, very little has been discussed in the opposite direction, that is to say, the difficulties of the program to adapt to a social and cultural context.

Actors who have had a closer interaction with family farmers (FETAG-PI, Embrapa Meio-norte) have a different opinion. From their perspective, the program has failed to consider the culture and context of family farmers. They have voiced this concern

without being able to influence policy making. These opinions, paired with the opinion of CONTAG unravel the political dimension of the social inclusion of the PNPB. It appears that the discourse of participation of labor unions and partnerships between different actors is more used to legitimize action and modifications within the PNPB.

It can be concluded that despite the use of rhetoric of participation and social inclusion, technocratic perspectives of agrarian development have dominated the discourse. At national and regional level, there is a high orientation towards the role that technological innovation plays in the participation of family farmers in the PNPB. Policy makers have blamed the lack of technological development for the failure in the inclusion of family farmers in the PNPB. Petrobras shares the institutional belief with the government that family agriculture is in need of technology. This belief rests on the view that family farmers do not join the biodiesel chain because the low productivity due to the lack of technology makes castor bean production unprofitable for family agriculture.

As a result of this discourse, technology is introduced to solve the problem of low productivity. The solution has been defined by several policy makers as technological development of family farmers: if only family farmers would adopt the appropriate technologies, productivity would increase which then would increase profitability, making biodiesel out of family agriculture feasible. Nevertheless, attributing the low participation of family farmers in the PNPB to the lack of technology does not explain why some farmers, even when they have been offered the opportunity to “improve” their technology – with technical assistance and seed – still chose not to participate in the program. The continuation of the program has been justified arguing that family agriculture will eventually catch up with technological development. This discourse towards the potential of technological adoption represents a reductionist view of family agriculture. This discourse might not generate social inclusion, but it can be used to carry on with the PNPB strengthening the biodiesel sector.

The aim of this observation is not to downplay the role of the technological innovation in agrarian change. Certainly, the adoption of appropriate technologies could benefit family agriculture. Instead, in this chapter, the point has been made that it is necessary to be aware of the implicit politics contained within technological statements. Trying to solve inherent inequities between family agriculture and large-

scale agriculture, while relying primarily on technological innovation and market access, does not seem to be enough. It seems that technological change alone cannot be a sufficient solution to address the economic regional differences encountered in Brazil. The importance of historical, political, and cultural factors cannot be underestimated in this context.

As a final point, the role of Petrobras was discussed in this chapter. Petrobras has embarked in a mission that has faced many challenges as it was discussed in section 3.3. Given that Petrobras is a parastatal company, the institutional difficulties that this company has found such as politicization and clientelism have been discussed since its creation (Seaborn Smith 1972; Kartt 2010). In this context, it is questionable whether economic inclusion has actually taken place for the family farmers supplying feedstock to Petrobras. If political agendas were to change, this could have an effect on the role of Petrobras in the region. It appears that the value chain in which family agriculture has been included depends on the political context. Thus, the role of Petrobras in the Northeast region raises questions about whether this actor is playing a political role, rather than an economic one.



## **4. Case Study Territory Serra da Capivara**

### **4.1. Introduction**

The territory Serra da Capivara in the State of Piauí is one of the targeted intervention areas of the PNPB. The oleaginous that has been promoted in this region for the production of biodiesel is castor bean. The territory was already a production pole of castor bean during the 70's and 80's when the Industrias Coelho was established in the region, and there was a constant demand for the produce. Farmers were producing castor bean without any contractual relationship or technical assistance. As the Industrias Coelho moved to Bahía, the market for castor bean in the territory drastically declined (Coordinator Emater 2010; SEBRAE Official 2010). However, the reputation of Serra da Capivara as a pole of production of castor bean persisted. Accordingly, it was one of the first territories where the PNPB was implemented (Embrapa official 2010).

The family farmers' representatives (castor bean associations and labor unions) asserted that castor bean has shown a better resistance to drought than other crops such as maize and bean (Interviews 14, 19, 22, 24, and 31). In addition, farmers expressed that the harvest period is opportune because it takes place in months of low agricultural activity. The president of the castor bean association of the municipality of Caracol said: "The harvest months of castor bean are convenient for us [family farmers], because it is when the harvests of maize and beans have finished" (Interview 24). In case of commercialization, it provides a source of income in the driest period of the year, which is usually the most difficult period for family farmers in terms of food security (Interview 19, 22, 29, and 31).

Based on the characteristics of castor bean already described, several actors argued that castor bean has the potential to enhance the livelihoods of rural families (Interview 18, 23, 34, and 40). For that reason, policy makers assumed that farmers would rapidly join the PNPB. However, even if the potential of castor bean to "enhance" rural livelihoods is accepted, the social context in which public policies are implemented have to be considered. This chapter seeks to discuss the social embedding in which the PNPB takes place through a case study conducted in the territory Serra da Capivara. The following section describes the implementation process of the PNPB, which had the participation of Brasil Ecodiesel and the process

of transition to Petrobras Biocombustíveis. Section 4.3 and 4.4 discuss what could be referred to as the second implementation of the PNPB, involving Petrobras Biocombustíveis S.A. The final section presents the conclusions drawn from this chapter.

## **4.2. From private to public investment in the PNPB**

This is an introductory section to the last events occurred in Serra da Capivara related to the PNPB. In the territory Serra da Capivara, the PNPB was first implemented in 2005. The biodiesel company initially involved was Brasil Ecodiesel (BED). The first implementation was considered unsuccessful by the actors interviewed at the local level. Based on the narratives from the actors interviewed, the first implementation will be reconstructed in this section. Afterwards, the transition from Brasil Ecodiesel to Petrobras is explained. This section ends with the description of terms of involvement of Petrobras in Serra da Capivara. This information will enable the understanding of the current participation of family farmers in the PNPB in the area of study.

### **4.2.1. Partnerships with the private sector: Brasil Ecodiesel**

In the territory Serra da Capivara the first implementation of the PNPB was conducted in partnership with the Government of State of Piauí, the Governments of Municipalities, SEBRAE, Embrapa, MDA, MAPA, INCRA, Banco do Brasil, Fundação Banco do Brasil, CONAB, PCPR, FETAG, STTRs, and EMATER. These organizations worked together in the region to provide access to credit, seed, seed banks implementation, capacity building, and technical assistance. Farmers were invited to adopt in their farms an intercropping system composed of Caupí bean as food crop and castor bean (oleaginous) as cash crop. SEBRAE, in collaboration with Fundação Banco do Brasil, implemented a project called Agent of Rural Development (ADR). Within the project, eight people were hired and trained to provide support to family farmers. The main objective of this project was to strengthen capacities of farmers for the cultivation of castor bean through technical assistance. As part of this initiative, farmers' associations were created in each municipality with the initial task of managing the de-husking machine donated by the PCPR (SEBRAE Official 2010).

The credit was provided through the Program for the Strengthening of Family Agriculture (PRONAF) executed by the Banco do Brasil. The access to credit represented a strong incentive, given that the majority of farmers had never had access to credit before (Banco do Brasil Official 2010). SEBRAE, EMATER and the Government of State were in charge of the provision of seed. SEBRAE coordinated the overall execution of the PNPB in Serra da Capivara in 2005. For that purpose, a castor bean project was created in the frame of the agro-energy section of SEBRAE (Projeto Desenvolvimento Sustentável do Agronegocio da Mamona no Semi-Árido Piauíense). Table 4 shows the number of family farmers participating in the PNPB during 2004/2005 and 2005/2006 according to the records kept in SEBRAE (SEBRAE 2007).

**Table 4: Number of family farmers included in the First Implementation in Serra da Capivara**

<i>Year</i>	<i># Municipalities</i>	<i># Farmers</i>	<i>Area (ha)</i>
Implementation 2004/2005	14	1813	3626
Implementation 2005/2006	23	4485	9818
Implementation 2006/2007 ( <b>not executed</b> )	42	7735	26842

Source: SEBRAE (2007)

The local actors interviewed consistently expressed that the first attempt to implement the PNPB in Serra da Capivara was unsuccessful. The intended objective to include 7735 farmers in the 2006/2007 harvest was not executed, and the project had to be concluded in 2006 (SEBRAE 2007). The main reason for the decision to end the project was the problem faced with the credit scheme. The vast majority of the farmers did not pay back the loan and Banco do Brasil faced a credit default of 90 percent (Banco do Brasil Official 2010). The combination of several aspects resulted in a low amount of castor bean commercialized in this implementation phase. The following paragraphs describe the motives given by different actors in relation to the outcomes of the first implementation.

One of the problems was that the credit was not available on time and farmers received the credit when the time to prepare the soil had passed. The representative of Banco do Brasil said they did not have the operational capabilities to supply the demand that credit originated at that moment (Banco do Brasil Official 2010). The seed was also delivered behind schedule because of difficulties finding providers of castor bean seed. In addition, the quality of the seed was deficient. Instead of certified

castor bean seed, grain<sup>6</sup> was distributed to the farmers (Coordinator Emater 2010). The quality of the technical assistance was also criticized, in particular the new modality of technical assistance called Agent of Rural Development (ADR). The problem was that there were only eight ADR's (technicians) for 1813 farmers included in the first year (SEBRAE Official 2010). Brasil Ecodiesel also had their own technicians, but farmers considered them as auditors rather than providers of technical assistance. All these factors contributed to a low productivity of castor bean and poor harvests for family farmers.

As a consequence of these events, a low number of farmers were able to harvest enough for commercialization. Some farmers complained about the low price offered by Brasil Ecodiesel, which did not even cover the labor invested. According to the president of the Labor Union of São Raimundo Nonato, the farmers agreed on the commercialization price in the contract without knowing the required labor or productivity that they would obtain from crop. Thus, they realized upon harvest time that the price in the contract was too low. Some farmers also had problems with the breach of contract by Brasil Ecodiesel. Farmers complained about the company not coming to the area to buy the production as stated in the contract. The representative of SEBRAE said that the amount of castor bean was too low and that it was not profitable for the company to visit the region to purchase the produce from the farmers. Therefore, farmers had to look for other commercialization channels. Often, this was done through middlemen, who offered lower prices. Given the context of low experience with production and commercialization of castor bean in the region, the usefulness of contracts is challenged. These events demonstrate that contracts might be worthless in some institutional contexts.

In general, the difficulties faced express the challenges to consolidate an economic exchange between family farmers and the private enterprise. Additionally, the actors involved seem to not have taken into account that the operationalization of technical assistance, provision of seed, and credit required some planning. Actors said that the massive and sudden implementation of the program were the major causes for the difficulties encountered (Interviews 8, 18, 23, and 27). It was also the case that some

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<sup>6</sup> The term grain refers to the castor bean used as raw material for the production of oil. The seed is specially selected from grains for the purpose of planting.



farmers were interested in the credit, but were not really interested in the production of castor bean. According to the representative of Banco do Brasil, some farmers obtained the credit but invested the money in other activities. This shows that – plainly speaking – part of the failure was related to the fact that farmers were not interested in planting castor bean.

#### **4.2.2. Transition from Brasil Ecodiesel to Petrobras Biocombustíveis**

Notwithstanding the high-expectation setting in the first initiative, the partnership with Brasil Ecodiesel did not result as planned. Consequently, the private-public partnership with Brasil Ecodiesel ended in 2006 (Victor 2006; SEBRAE 2007). The representative of SEBRAE said that the partnership was not effective because some of the actors wanted to be part of the partnership “just to appear in the picture” or to gain votes for the next elections (Interview 23). As a consequence, some partners did not cooperate sufficiently. The situation occurred in Serra da Capivara can be considered an example of the complexities that involve the creation of partnerships. The assumption that actors are able to work together should be revised. In April 2010, Brasil Ecodiesel officially announced the closure of the biodiesel mills located in the States of Piauí and Ceará declaring problems with the supply of feedstock (Wilson 2010).

In early 2010, the territory Serra da Capivara still had a high credit default percentage, which is at the center of the protests of family farmers’ representatives. According to local actors, the problem has not improved significantly. Through renegotiations of the debt, the credit default has decreased from 90 percent to 70 percent. Thus, it remains problematic in the region because family farmers indebted with Banco do Brasil are being denied credit in some of the local businesses. The line of credit of PRONAF was closed in Serra da Capivara, and only the farmers who paid the debt have access to another credit for the cultivation of castor bean (Banco do Brasil Official 2010). Family farmers ended up perceiving that contracts implied debt, that castor bean was not profitable and that technicians and companies were not trustworthy (SEBRAE Official 2010).

The labor unions in the area complained about the problems family farmers faced during the 2005/2006 and 2006/2007 harvests. However, they thought that they did not have a voice and that their complaints were not considered by local actors

(Interviews 22, 28 and 29). The president of the labor union of São Raimundo Nonato said that it was difficult for them to communicate with FETAG in Teresina<sup>7</sup> to express their concerns (Interview 22). Also the representative of FETAG said that they were aware of the problems family farmers faced, but that they did not have the power to pressure the authorities or Brasil Ecodiesel to change the situation in favor of family farmers (Interview 33). Labor unions were supposed to voice family farmers' concerns, and so they did. However, the positions of power did not change because of the PNPB, which makes it difficult to achieve effective participation.

To further reveal the issue of participation within the PNPB another example is provided. Brasil Ecodiesel was present in other areas of Piauí obtaining similar outcomes (Petrobras official 2010). According to the representative of the Movement of Landless Rural Workers (MST) in the State of Piauí, the MST opposed to the proposal of Brasil Ecodiesel since the beginning. The opposition was because the Government of the State of Piauí assigned to Brasil Ecodiesel a property that was supposed to be destined to a family farmers' settlement through the agrarian reform. The property was located in another territory of Piauí named Canto do Buriti<sup>8</sup> (Interview 7). According to the representative of MST, they were never invited to participate in any decision making at the state level. Therefore, the political inclusion that was stressed in the design of the PNPB did not work in the area of study. The representative of MST at national level said that from this point forward, the MST will not work with private enterprises anymore (Interview 1). This indicates that the PNPB might have generated divisionism rather than membership. Also, it shows how different conflicting objectives that actors pursue, shape the context in which the PNPB is implemented, and so, the outcomes of the PNPB.

In recognition of these difficulties encountered by Brasil Ecodiesel in the implementation of the PNPB, the Project Poles of Biodiesel (Projeto Pólos do Biodiesel) was launched. The main objective of the project is to support the operationalization of the PNPB and overcome the difficulties faced in the process of inclusion of family farmers in the biodiesel value chain. In 2007, the Project Poles of

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<sup>7</sup> Teresina is the capital city of the State of Piauí and is located ten hours away by bus from São Raimundo Nonato.

<sup>8</sup> This property in Canto do Buriti was better known as "Fazenda Santa Clara".

Biodiesel promoted the creation of a Working Group in Serra da Capivara, composed by local actors e.g., EMATER, SEBRAE, Banco do Brasil and labor unions. The working group cooperated to enhance and give continuation to the PNPB. With the help of the Working Group, a number of difficulties were identified. Among the difficulties identified were: the quality and timely distribution of the seed, the quality of technical assistance and the low price of castor bean. Taking these difficulties into account, Petrobras Biocombustíveis S.A. has taken over the task of social inclusion of the PNPB in the Northeast region.

#### **4.2.3. Petrobras Biocombustíveis in the territory Serra da Capivara**

In 2008, Petrobras started working in the Northeast region with the main objective of developing the productive base of castor bean with family agriculture. In the case of Serra da Capivara, EMATER was hired to provide technical assistance to family farmers. In the contract signed between EMATER and Petrobras, EMATER agreed to accompany the entire process of inclusion of family farmers, from the moment of registration of family farmers, until the commercialization with Petrobras. The family farmers involved in the PNPB should also have access to credit through the PRONAF. Nonetheless, the defaulting problem registered in the past has obliged Banco do Brasil to restrict the respective line of credit. The distribution of the seed is critical since the timely provision of the seed and quality was a serious problem in the past implementation. The acquisition and quality of the seed are the responsibility of Petrobras. Petrobras provides the seed to EMATER, which is in charge of delivering the seed to the farmers (Interviews 8 and 18). Usually, EMATER informs the farmers through the radio that the seed is being distributed in the offices of EMATER in each municipality, or through the labor unions.

The contracts of commercialization are signed by individual farmers, the labor unions and Petrobras. The minimum price and the place of commercialization (buying post) are negotiated at the local level. The rest of the sections of the contract are fixed, since they were previously negotiated with the labor union at national level (Petrobras official 2010). The minimum price set in the contract can increase according to the price of the market. If the price of the market at the moment of the commercialization is higher than the negotiated minimum price in the contract, the price which Petrobras pays to local farmers is re-adjusted to the market price. The market price is informed

by the Secretariat of Agriculture, Irrigation and Agrarian Reform (SEAGRI) through their web page ([www.seagri.ba.gov.br](http://www.seagri.ba.gov.br)). For the harvest of 2008/2009, the minimum price for castor bean amounted to R\$ 0.71/kg (EMATER 2008). The payment is done through Banco do Brasil and it takes up to seven days for the farmers to receive the payment. The farmers who do not have a bank account receive the payment presenting the document of identity.

The first year of operation of Petrobras in the territory has already finished, as the first commercialization took place in 2009. The number of farmers registered has increased in the second year of commercialization (2009/2010) from 417 in the 2008/2009 harvest to 667 farmers in the 2009/2010 harvest. The territory Serra da Capivara, with the involvement of Petrobras, has been broadcasted as a success in the local and national press: “With the good results obtained in Serra da Capivara, the perspective is to enlarge the action in the State of Piauí to the northern region of the Cocais, involving settlements of the agrarian reform” (MDA 2009). But, the IBGE registered the presence of 19,472 family farmers in Serra da Capivara (Sistema de Informações Territoriais 2010). Provided that the inclusion in 2010 achieves 667 family farmers, this represents 3.6 percent of the total number of farmers in this territory. Thus, the current inclusion of the program can be considered low.

To sum up, this section described the process of transformation that the PNPB has undergone throughout the years, from its first implementation in 2005, up to the situation encountered in early 2010. The first attempt in 2005 was characterized as a deficient implementation, leading to problems of credit default and breach of contracts from both family farmers and the biodiesel company. In 2007, the Project Poles of Biodiesel of the Northeast in collaboration with local actors helped in the identification of the main difficulties and suggested solutions. These actions supported the current presence of Petrobras in the region. Henceforth, the current state of affairs – as exposed in March-April 2010 by local actors in Serra da Capivara – will be discussed. The following sections 4.3 and 4.4 advance and discuss the instruments and actions undertaken in the case study with the involvement of Petrobras.

### **4.3. Struggle over material practices and meanings**

This section discusses some of the policy instruments used to bring together Petrobras Biocombustíveis and family farmers in the frame of the PNPB. This is done with the

objective of uncovering mechanisms that might influence the willingness of family farmers to join the program. This section is divided in four subsections. First, contracts will be discussed as mechanism of inclusion of family farmers. Second, the agro-ecological considerations that affect the participation of family farmers, and how is addressed by policy makers is analyzed. In the third subsection, the issue of low productivity will be contrasted with the technical assistance offered. The last subsection aims at contesting the meaning of food security by analyzing the main instrument promoted by the PNPB, namely, the intercropping system. The analysis of these four issues aims at giving an understanding on how family agriculture is perceived and disputed between local actors in the context of a biodiesel policy.

#### **4.3.1. Contracts as instruments of inclusion**

The year 2008/2009 was the first year of commercialization of castor bean of Petrobras in the territory Serra da Capivara. According to the team of technicians, one of the main drawbacks faced in the first year was the previous implementation of the PNPB that involved Brasil Ecodiesel (Interviews 8, 9, 10, 11, 20, 21, 25, and 26). All the local actors interviewed mentioned that the experience of most farmers with BED was considered negative. The current status of credit default in the region was one of the major manifestations of this. “Today, many farmers are doubtful about signing a contract with Petrobras because they do not trust companies and fear to acquire another debt” said the coordinator of EMATER in Serra da Capivara (Interview 8).

According to the coordinator of the Thematic Network of Biodiesel of EMATER-PI, the initial objective for the 2008/2009 harvest was to work with 750 farmers distributed in 14 municipalities of the territory Serra da Capivara. No more than 417 farmers accepted to sign commercialization contracts with Petrobras (Interview 18). According to technicians in charge of informing about the contracts, many farmers were simply not interested in the production of castor bean. Additionally, they could not get hold of 750 farmers because family farmers were reserved about signing contracts. Some of the farmers stated that they were afraid it would affect their credit record. Even though it was largely explained by the technicians that the contracts did not imply any debt, many farmers still perceived it as a risk which they did not want to take (Interviews 11, 20, 25). The number of farmers included in the 2008/2009 harvest is shown in Table 5.

**Table 5: Process of implementation 2008/2009**

<i>Municipality</i>	<i>Goal of EMATER</i>	<i>Contracted</i>	<i>Farmers who planted castor</i>	<i>Farmers who commercialized</i>
Anísio de Abreu	72	32	25	14
Bomfim do Piauí	46	3	3	1
Caracol	87	66	47	36
Coronel José Dias	28	6	4	2
Dirceu Arcoverde	53	2	0	0
Dom Inocêncio	50	21	13	13
Fartura do Piauí	24	42	22	32
Guaribas	26	17	15	7
João Costa	49	12	12	7
Jurema	22	35	35	7
São Braz do Piauí	68	39	33	13
São Lourenço do Piauí	46	11	10	6
São Raimundo Nonato	159	116	28	30
Várzea Branca	20	15	15	7
<b>Total</b>	<b>750</b>	<b>417</b>	<b>262</b>	<b>162</b>

Source: EMATER-SRN (2009)

It was put forward by local actors that some farmers do not appreciate contracts and the benefits offered with it. The technician of Várzea Branca said: “Farmers producing castor bean prefer to remain independent from contracts, and be able to commercialize according to their will” (Interview 20). This was complemented by the president of the Labor Union of Anísio de Abreu. He believes that the signing of any document or contract, especially for the farmers that are illiterate, is likely to affect family farmers’ willingness to join the program (Interview 22). These statements raise the question whether contracts are the appropriate mechanism of inclusion in first place. The President of the Association of Castor bean Producers of SRN manifested that at the beginning, family farmers were worried because the contracts were issued for a period of five years and they did not know what that implied (Interview 31). After the first year of commercialization with Petrobras, many farmers started to feel more confident about the contract (Interview 31). This suggests that apart from wanting autonomy, family farmers are insecure about the meaning and implications of contracts.

For the specific case of Petrobras, the contracts signed between family farmers and Petrobras are also signed by the president of the labor unions of the municipality that the family farmer belongs to. The president of the Labor Union of São Raimundo Nonato was interviewed concerning the position of the labor union towards contracts.

He said that in terms of commercialization, some family farmers have expressed that it is more convenient to sell the produce directly to the middleman. This is preferred because the middleman usually goes directly to the farm and pays in cash at the moment of the transaction (Interview 22). This is considered more convenient by farmers, than taking the production to a buying post and waiting seven days until the payment gets deposited in the bank (as practiced by Petrobras). The labor union's representative said that their position towards contracts is that currently they do not oppose to them because no farmers have complained so far. For the moment, labor unions only sign the contracts as witnesses (Interview 22). The representative of Petrobras in Ceará said "farmers are used to deal with middlemen who offer "bad conditions." We want to change this; we want farmers to get used to a fairer relationship with an enterprise" (Interview 40).

This assertion aims at positioning Petrobras as an enterprise which can offer better conditions to family farmers. It derives from the assumption that a contract and a minimum price are the "good" conditions and that farmers want to obtain these good conditions. With this assertion, the family agriculture unit is defined as an income maximizing unit, ignoring other preferences, traditions and values that family farmers may have. For example, family farmers may find it more convenient to commercialize with middlemen because they do not want to invest labor in commercialization. That way, they can direct the labor to other activities that are more valued in the household. Long term relationships built with a specific middleman might also influence the farmers' preferences. Hence, what family farmers find more rewarding cannot simply be defined as profit maximization.

The statement of Petrobras also shows that there are different perceptions of the role that middlemen play in rural livelihoods. The coordinator of EMATER in the territory Serra da Capivara said that a limitation to the program has been that many farmers of the region are not used to comply with contracts: "When family farmers are in urgent need of money, they commercialize with middlemen before than the commercialization with Petrobras takes place" (Interview 8). In this sense, commercialization with middlemen can be identified as a strategy to handle emergencies. Given the lack of formal coping mechanisms, middlemen represent a possibility to cope with an urgent need of money. The president of the association of castor bean producers of Caracol added that it was also the case that farmers were

skeptical about Petrobras buying the produce. Anticipating the possibility of not having any channels of commercialization, they accepted deals with the middleman at a considerably lower price than the one stated in the contract (Interview 24). Again, middlemen are used to cope with uncertainty. It is important to make clear that no suggestion is made here that middlemen are the “best” option for family farmers. Rather, the point is that the rural context is not black and white, and that we cannot position rural actors in either category.

Continuing the discussion on contracts with Petrobras, some family farmers made positive comments about the contracts. Some farmers interviewed that were involved in a first year of commercialization with Petrobras perceive that the market risk has been reduced (Interviews 19, 24 and 31). The satisfaction with the price was also notable compared to the price offered by Brasil Ecodiesel and middlemen, according to some of the technicians of EMATER (Interviews 8 and 18). The president of the association of producers of SRN said: “Next year, if the minimum price offered is R\$1/kg<sup>9</sup>, I can be sure that castor bean production is going to be profitable for me” (Interview 31).

Despite the positive perceptions of farmers about the price and the reduced market risk, it is difficult to clearly attribute this improvement to the contract *per se*. This is because family farmers said that even though they had signed the contract, they never saw the contract again. The contracts were sent to Ceará for the company to sign them, but they never returned; not even after the commercialization (Interviews 19, 24 and 31). This fact raises questions about Petrobras’ real intentions, particularly about its willingness to transfer power. The labor unions were also asked if they had ever used the contracts for any purpose. They answered that they only sign the contracts but that they do not have a copy of the contract either way. In any case, if farmers were to have any complaints, they could not rely on the contract since they are not in possession of it. Hence, on the side of the farmers, a gentlemen agreement seems more close to what happens in the field, rather than contract farming. In the area of study, in practice, family farmers only have the word of EMATER that Petrobras will buy the produce. Yet, family farmers have expressed satisfaction with the

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<sup>9</sup> According to the exchange rate of 21 July 2010 R\$1 = USD 0.569 (OANDA 2010)



commercialization *per se*, and no complaints have been filed by family farmers to the labor unions interviewed.

The supply manager of the biodiesel mill of Petrobras in Ceará said that the breach of contracts by family farmers has not been a major constraint. He added that family farmers have been complying with contracts within their possibilities. Hence, Petrobras did not consider that much of a problem (Interview 40). The manager also said that even though the contract states that farmers who do not comply with the contract should pay to Petrobras the costs that they have incurred, Petrobras does not enforce this because they know farmers are not able to cover the costs. This indicated that there are informal processes of renegotiation of the contract taking place. While the contracts establish on paper that the party breaking the contract should cover the value of it, it is understood that this will not be enforced. Therefore, Petrobras admitted that they only have contracts with family farmers to have access to SFS.

A question to be raised in this analysis is whether the economic exchange between Petrobras and family farmers in the area of study would be any different without contracts. It seems that none of the parties relies on the contract for any purpose. Furthermore, the initial objective of empowerment of family farmers through contracts seems to have failed. Apparently, contracts serve the purpose of the MDA verifying if Petrobras should hold the SFS rather than enabling the economic exchange. Another question is whether contracts enable or hamper economic inclusion. Given the illiteracy, lack of trust, past bad experiences or plain personal inclination, contracts might keep farmers away from the PNPB.

This subsection discussed the reasons why family farmers might oppose to the signature of contracts of commercialization with Petrobras. Table 5 shows that of the 417 farmers who had signed contracts, only 262 of them planted castor bean. The technicians said that farmers signed contracts with the hope of obtaining financing to prepare the land or access to credit, even when this was not part of the contract. Since they did not receive what they wished, they decided not to plant – arguing that capital and time were insufficient (Interview 11 and 20). But according to the technicians, the main reason provided by family farmers who did not plant castor bean was insufficient rainfall at the planting stage (Interview 8, 18). Therefore, agro-ecological considerations are the object of analysis of the following subsection.

### 4.3.2. The role of agro-ecological conditions

In the semi-arid region of Northeast Brazil, the uncertainty of rainfall and drought is part of everyday life. This greatly influences farmers' decisions making and livelihoods have been adapted to these agro-ecological conditions. The drought-tolerance of castor bean has been one of the major aspects influencing the decision of policy makers to encourage the production of this crop for the PNPB. Nonetheless, the rainfall still poses difficulties for farmers to be able to join the program. Even though castor bean is a drought-tolerant crop, it requires a considerable amount of water at the beginning of the vegetative process. The crop requires constant rainfall during the first stage of development and a dry period during the maturation of the fruits (de Brito Melo, de Macêdo Beltrão et al. 2003). For this reason, rainfall is a critical factor in the accessibility of the program for family farmers.

Family farmers that showed interest in planting castor bean by signing contracts with Petrobras were interviewed. Farmers expressed that although they had prepared the land with anticipation, the rainy season started too late, making it unattainable to plant. The year 2009/2010 was especially problematic in this respect. Therefore, family farmers had to take strategic choices for the sake of food security, even after the signature of contracts. As the rainy season was late and short, they only had time to cultivate crops such as maize, beans and cassava (Interviews 12, 16, 24, and 31).

The coordinator of the biodiesel section of EMATER said: "The main difficulty that farmers face is the low amount of rainfall: sometimes the distribution is not appropriate or the rainy season starts too late" (Interviews 8 and 10). Consequently, in the year 2009/2010, a large number of farmers did not plant at all, or planted later than recommended. The technicians said that they do not recommend planting late, because the rainy season would have to last until May for the plants to survive, which is an unlikely scenario. Still, some farmers decided to plant, with the hope of the rainy season lasting long enough.

When putting the aspect of rainfall apart, the technicians of EMATER expressed that the characteristics of the soil also have to be taken into account in each farm. The soil texture<sup>10</sup> is considered a determinant factor in the possibility of a farmer to plant

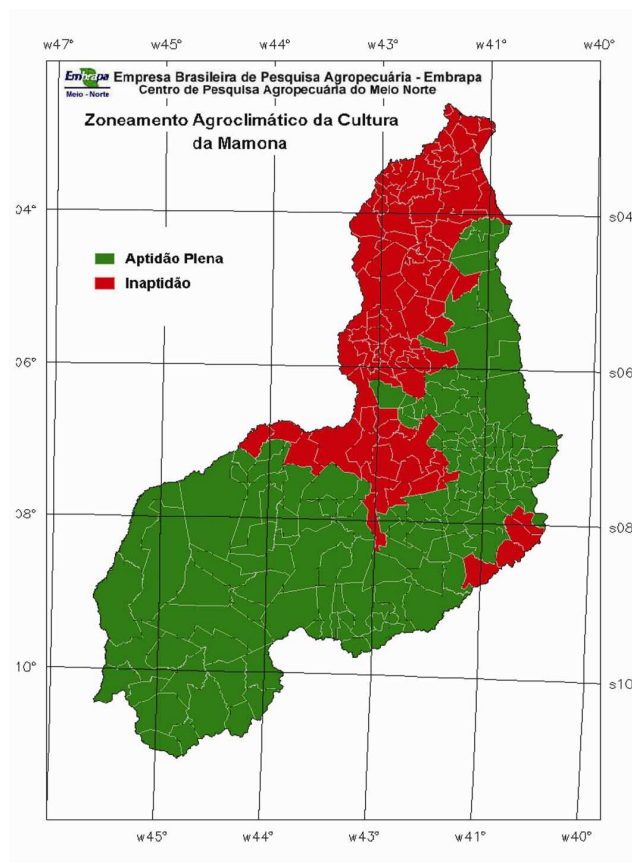
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<sup>10</sup> Soil texture: proportion of sand, lime and clay present in the soil.

castor bean. For example, soils with sandy texture are considered suitable for cassava, but not for castor bean (Interviews 26 and 17). Thus, it is not possible for those farmers with sandy soils in their property to join the program. According to the technician of São Lourenço, this is one of the main reasons why the number of farmers cultivating castor bean in São Lourenço is low compared to other municipalities (Interview 26). In contrast, the production of cassava is widespread throughout this district.

The agro-ecological considerations are introduced in the implementation of the PNPB by means of the study “Agro-ecological Zoning of Aptitude of Castor Bean in the State of Piauí” (See Figure 2). The agro-ecological zoning of castor bean is a document which identifies the municipalities that are suitable for castor bean production, based on historical data of precipitation (de Andrade Júnior, de Brito Melo et al. 2004). Even though soil is a determinant concerning the agro-ecological aptitude of castor bean, it was not taken into consideration due to the lack of soil data on the region (Embrapa official 2010). Either way, the Agro-ecological Zoning can be regarded as an instrument to exercise power. Policies such as credit and insurance are based on the Agro-ecological Zoning of Castor Bean. The lines of credit are only made available for the planting time stipulated in the Agro-ecological Zoning (Banco do Brasil Official 2010). The technical assistance also follows this document, since the time to distribute the seed and recommendation on when to plant should follow its rationale (Coordinator Emater 2010).

One of the problems raised by the technicians at EMATER was that the information included in this document was not accurate for some municipalities. In particular, the rainy season predictions have been inaccurate. The problems of accuracy are related to the quality of the sources on which the Agro-ecological Zoning is based. EMATER has raised the issue several times in meetings with MAPA and Embrapa, but to change the document is troublesome (Interviews 8, 10 and 18).



**Figure 2: Agro-ecological Zoning for Castor Bean in the State of Piauí (de Andrade Júnior, de Brito Melo et al. 2004)**

As mentioned before, the importance of an accurate agro-ecological zoning study is that the credit given to family farmers through the PRONAF is based on it. Farmers who do not comply with what it is indicated in the Agro-ecological Zoning, but have obtained a credit from PRONAF, lose both the right on the harvest insurance (Garantía Safra) and the price insurance provided by the credit line. On the contrary, if farmers follow the Agro-ecological Zoning plan in a year of irregular rain, the harvest is insured. This is monitored by the technical assistance provider. Paradoxically, this document asks farmers to plant castor bean even if farmers know that it is not the proper time for planting. If farmers act contrary to this, they have no right to obtain the insurance.

Concerning the quality of this science product, the idea of an instrument determining the correct time for providing credit and planting is disputable from a technical point of view. It has been widely discussed that the semi-arid tropics are characterized by high levels of spatial and temporal variability in rainfall making it problematic for climate related measures to be efficient (Lemos, Finan et al. 2002). Additionally, soil information is not considered in the document, leaving to the technical assistance

provider's criteria whether the farmer has the proper soil. Given the quality and quantity of data that the instrument is based on, the use of this instrument should be very cautious.

Putting the technical aspect aside, another important point should be contested. This point is the notion of having instruments that policy makers rely on to determine when farmers should plant and when credit should be provided. The instrument seems more suited to exercise power by technicians and policy makers than offer assistance. Farmers have great experience assessing whether it makes sense to plant or not. Even though the advice might come in handy for some farmers, the final word should be of the farmer. It is not the family farmers' ignorance what has caused the problems related to loan default in credit schemes, but a deficient implementation of a microfinance program (see section 4.2.1). This problem becomes more critical if the accuracy of the instrument is unconfirmed. Again, cultural aspects such as local knowledge are not taken into account.

In summary, the agro-ecological conditions might limit the participation of family farmers in the program in the semi-arid region. The instrument to cope with this constraint relies on scientific knowledge while local knowledge is not considered. Shifting the focus from farmers who were not able to plant castor bean, the next subsection addresses the experiences of those farmers who were able to do so.

#### **4.3.3. Low productivity and technical assistance**

Of the 262 farmers who were able to plant castor bean in the 2008/2009 season, only 162 commercialized with Petrobras. It was already discussed in section 4.3.1 that some farmers did not comply with the contracts and commercialized with the middleman instead of with Petrobras. This subsection analyzes the productivity of castor bean in the research area. According to the coordinator of the biodiesel section of EMATER, the low yield was said to be a major cause of non-commercialization. Some farmers did not commercialize with Petrobras because they considered the costs of transportation of the produce to the buying post higher than the benefit (Interview 18).

The average productivity in the territory Serra da Capivara for the year 2008/2009 was 500 kg/ha of castor bean – there are no records on Caupí bean productivity – (Coordinator Emater 2010). This is considered low, because according to researchers

of Embrapa (de Brito Melo, Sobrinho et al. 2006), the intercropping system is able to yield a productivity of 1.0 tons/ha of castor bean and 1.1 tons/ha of Caupí bean (Freire de Sousa and Figueira Cabral 2009). With precipitation between 600 and 700 mm/year, an average castor bean productivity of 1.5 ton/ha can be achieved. Still, castor bean is expected to be economically viable in regions with a minimum precipitation of 400 to 500 mm (de Brito Melo, de Macêdo Beltrão et al. 2003).

According to the technicians of Embrapa, the productivity can be raised by managing the soils and conducting certain agricultural practices. A demonstrative unit of the intercropping system was conducted in Aníseu de Abreu, and it was possible to achieve a productivity of 1.3 tons/ha of castor bean (Freire de Sousa and Figueira Cabral 2009). The technicians of EMATER expressed that the low yields achieved in the territory Serra da Capivara are a result of the properties of the soils. The technicians considered the soils of the region too acid (with a high pH-value). Soil correction measures, such as incorporation of liming material (calcium carbonate/CaCO<sub>3</sub>) are thought to be the main action to take in order to improve the properties of the soil and productivity in family farms. Other factors are soil degradation and erosion as a result of years of agricultural use (Interviews 8, 9, 10, and 18). Accordingly, there is a project in course executed by EMATER and financed by Petrobras to conduct soil analysis for the diagnosis and application of soil correction measures (Coordinator Emater 2010; Petrobras official 2010).

Apart from soil properties, the technicians said that some farmers presented low productivity because they did not follow the technical recommendations. An example of this relates to crop management practices. Based on germination percentage of the seed, several seeds must be sown in each seed spot to ensure the density of the crop. When the seeds germinate farmers are told to pick out the best seedling in each seed spot and remove the rest. To have more than one seedling per seed spot is undesirable because the two plants will compete for light and nutrients, bringing the production of both plants down. According to the technicians, farmers do not want to follow this recommendation because for them it does not make sense to take one plant out. What they do instead is try to bend the stem of both plants so they will grow in opposite directions to avoid competition. The technicians said that this practice negatively affects the productivity of family farms (Interviews 11, 20 and 21).

The technicians argued that some family farmers do not want to follow technical recommendations, because they are receiving technical assistance for the first time with the program. Therefore, farmers are not used to follow instructions from outsiders. For instance, the municipality Dirceu Arcoverde did not have a technician since a long time ago, (the current technician was hired in 2010). The technician of this municipality explained that it is complicated to work with family farmers who are receiving technical assistance for the first time, and even more difficult to attempt modifying practices that have been part of their culture for decades (Interview 21).

The last issues discussed revealed a certain mismatch between technicians and family farmers. This point is illustrated with the next example. On the one hand, the technician of the municipality Várzea Branca said that some farmers have shown interest in planting castor bean, but that they did not like the fact of having a technician coming to their farm because they prefer to do things on their own (Interview 21). On the other hand, some farmers uttered that they would appreciate to receive more technical assistance. The presidents of the labor unions of the municipalities of Anísio de Abreu, and Várzea Branca said that the number of farmers exceeds the capacity of technical assistance for some municipalities. Therefore they would like to have more technicians available (Interviews 28 and 29). The president of the association of castor bean producers stated: “The technical assistance does not provide technical recommendations. I would like the technician to take a look at my field and tell me what I can do to improve it, but they do not even go to my field with me, they only come to ask me if I planted and come back for commercialization” (Interview 31).

The statement of the technician and the family farmer are seemingly opposite concerning what farmers want. But taking a closer look, both comments fit into a simple disagreement on the role that technical assistance plays in this context. Family farmers might perceive that the role of technicians is more oriented to auditing rather than providing practical assistance in the field. Thus, they might reject having a technician coming to their farm to “monitor”. But this does not necessarily mean that farmers do not want technical assistance or want to do things on their own; although, that might be the case for some of them.

The perceptions on the provision of technical assistance are polarized between family farmers and the technical assistance provider. Technicians blame farmers for not

following technical recommendations or rejecting technical assistance. In contrast, farmers considered that technical assistance should be improved. These different perspectives indicate a gap between the technical assistance provider and family farmers. Additionally, the fact of farmers receiving technical assistance for the first time should contribute to the technical assistance provider to adopt a different approach. Within the realm of possibility, perhaps technical assistance should change its approach to supporting rather than instructing or trying to modify family farmers' practices.

#### **4.3.4. Food security**

The concern about food security in family agriculture has led to the promotion of an intercropping system of castor bean with Caupí bean within the PNPB. The intercropping system was developed by Embrapa in 2002 (de Brito Melo, de Macêdo Beltrão et al. 2003), and apart from contributing to food security, there are positive results obtained in terms of productivity as a result of the intercropping. The reason for this is the capacity of the bean to fix atmospheric nitrogen to the soil, benefiting castor bean productivity. Another advantage of the intercropping system is relevant concerning environmental considerations. The main argument about the environmental viability of the PNPB is the possibility to stay away from monocropping.

An interview was conducted with the leader of the team who developed the intercropping system in Embrapa. He assured that in terms of returns, castor bean and Caupí bean were the “perfect marriage” (Interview 34). Putting the intercropping system aside, an additional argument that has been put forward about the contribution of castor bean to food security is its drought tolerance. Castor bean is more likely to survive in the case of strong drought than food crops. Even though castor bean cannot be destined to household consumption, the possibility of its commercialization can increase the access to income to purchase food (Petrobras official 2010). Naturally, this argument is only valid when there is access to a market outlet.

Notwithstanding the claimed advantages of the intercropping system, this technology itself might not be entirely attractive for family farmers (Interviews 11, 12, 14, 15, and 31). Some farmers stated that they barely had enough time for the cultivation of crops to ensure the household's food security, thus, they find it difficult to plant castor

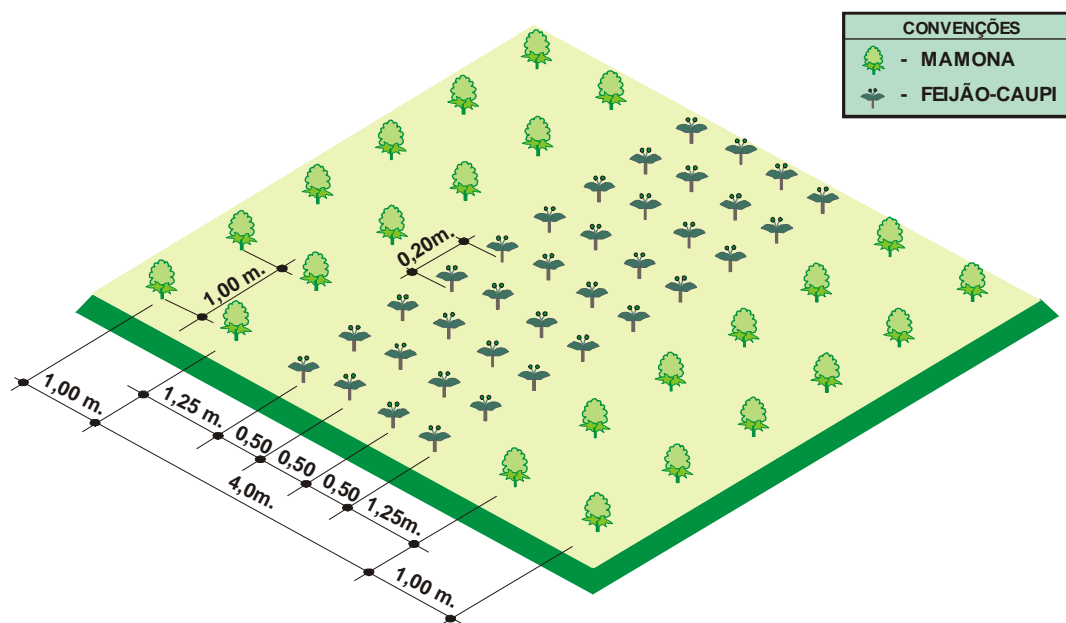


bean. This aspect was largely emphasized by the president of the Association of Castor bean Producers of São Raimundo Nonato. He suggested that in order to make the PNPB attractive for family farmers it is necessary to help farmers cope with the scarcity of labor. This could be achieved by enabling the access to machinery for the preparation of the soil during the cultivation time, when scarcity of labor is most critical. The availability of labor is an aspect that was not raised by any of the local actors in the region. Apparently, there is a common belief that labor is an abundant factor in family farms.

Additionally, some farmers stated a preference for intercropping castor bean with maize instead of Caupí bean, independently of the risk of obtaining a lower productivity of castor bean (Interview 16, 19 and 24). A farmer expressed that he preferred to intercrop with maize, because the market for beans varies excessively (Interview 19). The head of the researcher of Embrapa said that despite the poor performance of maize (in terms of productivity and drought resistance), compared to other crops such as cassava and beans, family farmers cultivate maize every year in the semi-arid region. According to him this is because maize is deeply rooted in their diet and culture (Interview 34). Consequently, intercropping castor bean with Caupí beans is another example of a technical recommendation that family farmers not always follow, since some farmers intercrop with maize. Intercropping with maize is not recommended by technicians because the plants of maize create more competition for light and nutrients than beans (Coordinator Emater 2010).

Within the intercropping system not only the selection of crop but the variety of beans was also conferred. Even though the variety of beans delivered has a good external market, some of the farmers preferred the local varieties that they are familiar with. Additionally, according to the technicians of the municipalities of Dirceu Arcoverde and Várzea Branca, some farmers prefer local varieties of castor bean because of post-harvest practices. The varieties provided by the program – Paraguassu and Nordestina – are modified to avoid the plant dropping the grain in the field. Even though this may diminish losses in yield, local varieties of castor bean are preferred by some farmers, since it is easier to de-husk manually, as done in the past. The technicians of EMATER said that intercropping with local varieties is not recommended. The problem of intercropping castor bean with the local variety of bean is the growing pattern of the plant. The local variety grows horizontally instead

of vertically, thereby creating competition to castor bean and affecting its productivity (Interviews 8, 17, 20, and 21). Figure 3 illustrates the intercropping system which is currently implemented.



**Figure 3: Intercropping system Mamona-Feijão Caupí (de Brito Melo, de Macêdo Beltrão et al. 2003)**

The technical recommendations related to the intercropping system respond to the orientation of technicians towards achieving high productivity in castor bean. However, it fails to recognize that family farmers have other motivations apart from productivity and profit making. As it was mentioned, possible market outlets, or household consumption patterns, might be more important for family farmers, rather than increasing castor bean productivity. Thus, family farmers might not follow technical recommendations in order to favor their assessment of what would provide them more benefit. In addition, it appeared that technicians frequently did not take the preferences of family farmers seriously, or deemed them inadequate. The technician of Várzea Branca said that “the preference of family farmers for local varieties is not based on any evidence or technical consideration, but on cultural preferences, or plain farmers’ resistance to change” (Interview 20). Somehow, this statement implicitly attributes a hierarchy to the different knowledge(s) at stake.

The agricultural activities that farmers are engaged in play an important role in the decision to cultivate castor bean as well. For instance, those who own farm animals might find it difficult to manage a castor bean plantation. The reason is that castor bean has a toxic component which can cause the death of animals that ingest the

leaves or fruits of the plant. Thus, it is necessary to keep the animals away from a castor bean plantation in order to avoid intoxication. The technician of EMATER for the Municipality of Dom Inocêncio explained that Dom Inocêncio has a long history of livestock production (specifically sheep and goats) and the toxicity of castor bean is considered a menace to these livelihoods (Interview 25). This exemplifies the different meanings of food security. For farmers with livelihoods based on livestock, castor bean production is not compatible with their food security. Therefore, the contribution of the intercropping system to food security has to be considered in the light of a wide variety of family farmers' strategies.

Going over the main points of this subsection, the concerns about food security of family farmers have led to the implementation of an intercropping system for family farmers. However, cultural considerations have affected the adoption of this intercropping system, challenging once more the effectiveness of technology oriented approaches. Furthermore, the meaning of food security varies for each farmer. For some farmers, the production of maize or local varieties of beans might be fundamental to their food security. For other farmers, food security might be related to livestock production, which is difficult to balance with castor bean production. Labor availability in the household might also be considered in the light of food security. In brief, technological innovation in family agriculture has proven to be more complex than anticipated by policy makers.

This section dealt with four different aspects of the PNPB that have aimed at the inclusion of family farmers. It has been discussed that the technocratic approach that the PNPB has adopted and contracts as mechanism of inclusion might actually lead to exclusion of family farmers. The next section deals with a far more complex issue, which are local social institutions. Evidence collected in the field will be discussed to build a case on interventions pretending changes in social structures and relationships.

#### **4.4. Creating social structures**

The Northeast region has been largely characterized as a region with lack of cooperatives and producers' associations paired with the scattered distribution of family farmers in the territory. Allegedly, this is one of the main reasons why there is a very few agri-business investment in the region. The PNPB has attempted to cope with this difficulty in order to link family farmers with biodiesel companies. This

section discusses relevant issues of this attempt, such as the creation of farmers' organizations and the promotion of participation of labor unions.

#### 4.4.1. Project Poles of Biodiesel in the Northeast

According to the facilitator of the Project Poles of Biodiesel, the scattered distribution of the farmers in the territory Serra da Capivara is the main logistical challenge faced by the PNPB. Therefore, one of the main objectives of the Project Poles of Biodiesel is to overcome this difficulty through the organization of family farmers in 20 poles of production of oleaginous to supply a biodiesel company (Interview 27). To illustrate this idea, Figure 4 shows what a Pole of Biodiesel should look like according to the project. A pole of biodiesel is a territorial unit ideally composed of eight municipalities (município). At the same time, each municipality is composed of approximately five nucleuses of production. On average, each nucleus of production has 40 family farmers. Given that the Project Poles of Biodiesel was supposed to create 20 poles of production, in the end, the project would include 32,000 family farmers in the Northeast region (Obra Kolping 2008).

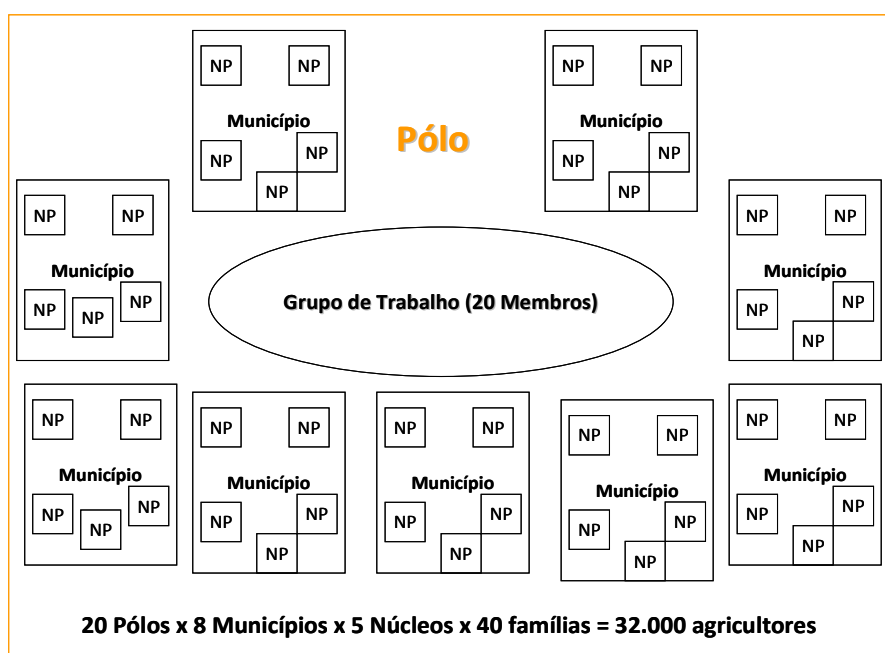


Figure 4: Project Poles of Biodiesel in the Northeast (EMATER 2009)

In accordance with the Coordinator of the Project of the Poles of Biodiesel in the Northeast (Obra Kolping) the identification of the Poles of Biodiesel had been done with the contribution of a number of actors at state level. For instance, the recently created biodiesel pole in the northern region of Piauí, in the territory Cocais, had been

identified by INCRA and GTZ/DED. He said that for the project poles of biodiesel, the municipalities selected are usually the ones which are identified in the Agro-ecological Zoning study (see section 4.3.2). Another way of selecting municipalities to work with is through technical recommendation of the technical assistance provider present at each pole of production (Interview 39). As far as it was possible to infer from this interview, family farmers representatives, or family farmers themselves do not participate in the process of selection of municipalities. Therefore, the willingness of family farmers to participate in the program is presupposed, as long as the agro-climatic conditions to plant castor bean are appropriate.

A nucleus of production is created through the identification of 40 to 50 farmers, within a ratio of 12 km and in the minimum size of 120 ha, who are interested in the production of castor bean (Coordenador Estadual Obra Kolping 2010). The objective of creating nucleus of production is that family farmers will locate themselves within a production unit. As a result, family farmers will come together to commercialize castor bean and to share information. The appraisal of the supply manager of the biodiesel mill of Petrobras in Ceará is that the project has not been successful establishing such nucleuses of production, “The Project Poles of Biodiesel has identified family farmers as part of a nucleus of production, but farmers do not feel that they are part of a nucleus of production” (Interview 40). Additionally, the farmers producing castor bean are scattered over a large area and thus often live far away from each other. Therefore, technical assistance, distribution of seed and commercialization it is still very challenging in the areas of action of Petrobras (Interview 36 and 40). This intervention suggests that policy makers believe that nucleuses of production – social structures – can be easily constructed.

According to the facilitator of the Project Poles of Biodiesel in Serra da Capivara, the difficulties of dealing with the farmers being scattered in the territory are also related to the weakness or lack of farmers’ organizations. Many of the castor bean producers associations (which were created in 2005 with the help of SEBRAE) do not work properly or have stopped working (Interview 27). The technicians of EMATER said that they have observed that the low participation in the program that some municipalities presented may have influenced the fact the associations formed in the past are not active anymore (Interviews 11, 20, 25, and 26). In contrast, the municipalities such as Caracol and São Raimundo Nonato which have a large number

of farmers involved in the program have active castor bean producers' associations (Interviews 24 and 31). The presence of farmers' associations in some municipalities has facilitated the activities in castor bean processing, e.g. the scheduling of the de-husking machine.

Even though the Project Poles of Biodiesel has attempted to create social interaction between farmers to facilitate the operationalization of the PNPB, it has not been possible. The notion that social structures can be crafted on paper, as shown in Figure 4, demonstrate that the PNPB has failed to capture the complexity of social institutions. To further elaborate this argument, the following subsection discusses the participation of labor unions at local level.

#### **4.4.2. Participation of labor unions**

The participatory governance structures encompass issues of political representation. The representation of labor unions of family farmers in the process of inclusion of family farmers has shown to be deficient. Some of the farmers interviewed having contracts with Petrobras said they were not part of labor unions or castor bean producers' association. This suggests that there are farmers who participate, or want to participate but they are not represented through any family farmer's representative. There are other reasons why labor unions might not be fully representative of family farmers. For example in the interview with the presidents of the labor unions, they expressed that in general the labor unions are more integrated by women than by men. This is so because women seek the labor unions before most men do to obtain security in their pregnancy. Men on the contrary, often seek to be part of the labor union only when they want to retire, i.e. to obtain a pension. These observations only have the objective of questioning the notion of representation of family farmers.

Apart from representativeness, participation in the actual process of inclusion should be more analyzed. The presidents of the labor unions interviewed said that their involvement in the program was mainly through the signature of the contracts (Interviews 22, 28 and 29). Labor unions are one of the three parties signing the contracts between Petrobras and individual family farmers (Petrobras official 2010). The technicians at EMATER said that labor unions participated in the program, because they helped making contact with family farmers for the signature of contracts and distribution of seeds (Interviews 10, 17, 20, and 21). As far as it could be deduced

from the interviews, the role of the labor unions was limited to collaborate in the mobilization of the family farmers and signing the contracts. Hence, the participation of the labor unions at the local level in the PNPB appears to have mainly a practical use for EMATER and Petrobras.

It was brought by the facilitator of the Working Group in Serra da Capivara that the limited participation of the labor unions is related to the low interest labor unions have shown in participating. The facilitator added that the space for participation has been open for labor unions in the meetings organized by the Working Group in Serra da Capivara. Still, the labor unions are not always present in these meetings (Interview 38). A possible explanation for this is that labor unions do not perceive that the meetings truly open a space for participation. But even if the marginal participation of labor unions can be fully attributed to the little interest they have in the program, this only demonstrates that the program might have difficulties offering a convincing alternative to family farmers.

In any case, in the field visit, the role that the labor unions play in the PNPB was found to be a reproduction of the role that labor unions usually play in local processes. An illustrative example of this point was the planning of the “Family Agriculture Day” in the region. The Banco do Nordeste (Bank of the Northeast) was in charge of the organization of the Family Agriculture Day in the territory Serra da Capivara. For this purpose, a meeting in the headquarters of the bank in São Raimundo Nonato was organized. Representatives of local organizations such as the SAF, FETAG, CONAB, INCRA, EMATER, SEBRAE, Dom Helder Câmara, PCPR and the labor unions were invited to participate in the meeting. The issues discussed in this meeting are described in this subsection for the sake of the analysis.

The meeting was conducted by an official of the Banco do Nordeste. He informed to the attendants of the meeting that the MDA was organizing the day of family agriculture in the region. The local institutions were asked to prepare expositions for that day. “In this event we will show the best things that we have to offer to family agriculture” (Official of Banco do Nordeste). Additionally, they needed a strategy for the mobilization of family farmers for this event.

The representative of the organization Dom Helder Câmara suggested that, since it was the day of family agriculture, instead of having external people presenting, it

would be appropriate to have expositions from family farmers themselves. This way, family farmers can show what family agriculture is about, and maybe they would feel more identified with the event. Also, this could result in some benefit for family farmers. The official of Banco do Nordeste said that they [MDA and Banco do Nordeste] had already decided to have the representation of family farmers through one community only. The community selected to represent family agriculture was going to be the one with the largest influence of the institutions working with family agriculture.

The representative of Dom Helder Câmara, later on suggested that it would be nice to have the representation of the Quilombolas<sup>11</sup> as well. The representative of Banco do Nordeste said that the day of family agriculture was a day of celebration, and that they did not want to introduce any “sadness” in that day. The representative of the MDA said that she was a Quilombola herself, and that she would like to see some representation of that group in the family agriculture day. The official of Banco do Nordeste closed the discussion by saying that maybe the community representing family agriculture would have some story related to the Quilombolas. The representative of Dom Helder Câmara finally raised the question about why the Bishop had not been invited to the meeting, given that the Bishop through Caritas was involved in interesting actions with family agriculture. The official of Banco do Nordeste responded that the Bishop was too polemical.

The official of Banco do Nordeste continued the meeting saying that they needed labor unions to help mobilize around 650 family farmers for this day. Those farmers assisting the event would have free transportation and lunch. The day selected had been May 20, which was a Thursday. The president of the labor union of São Braz do Piauí said that for him, it might be difficult to get family farmers transported for that day because it was a week day. Thus, he asked if the day could be changed to a weekend. The official of Banco do Nordeste answered that it was impossible to change the day because the representatives of the MDA coming to the event had already scheduled that day in their agendas. The meeting was closed after the local organizations agreed to give an exposition about their work with family agriculture,

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<sup>11</sup> The Quilombolas are the descendants of the slaves that escaped from slave plantations that existed in Brazil until abolition in 1888.



and labor unions agreed to mobilize the required number of family farmers for that day<sup>12</sup>.

This narrative is used to illustrate two points. First, it illustrates how the participation of family farmers is used to serve the purposes of those who are in power. The participation of family farmers is merely used for mobilization of farmers for an event that has the main objective of showing what the governmental institutions do. The second point is the similarity that labor unions play in local processes, and the role the family farmers play in the PNPB. In the region it was possible to notice how different actors share the institutional belief that labor unions' task is to mobilize farmers or to inform farmers about issues. Therefore, it can be said that the PNPB has not changed anything in the participation of the labor unions at local level. The actual role that labor unions play is a reproduction of the role that labor unions play at the local level. As long as this is not changed, no real changes in participation and social inclusion can be expected. Finally, the nominal participation of family farmers is used to legitimize action and agendas since it is claimed the labor unions were part of the planning. What it is not said, is the role each actor played in that planning and the terms of that participation.

#### **4.5. Conclusions**

This chapter discussed specific instruments used in the PNPB such as the contracts, agro-ecological zoning, technical assistance, and the intercropping system. It was argued that in the territory Serra da Capivara these instruments have failed to consider local knowledge and the cultural context in which they are implemented. Similarly, the meaning of contracts has an important cultural component that affects farmer's willingness to join the program. It has also been discussed that social institutions can neither be easily changed nor crafted. This affects the terms of participation of labor unions, and family farmers since there are social structures that determine to a great extent the participation of labor unions in everyday processes.

The case study conducted in Piauí suggests that the lack of consideration of values, motivations and objectives of family agriculture in policy making has led to the

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<sup>12</sup> More information about the "Family Agriculture Day" in the region can be found in Magalhães (2010).

formulation of a number of assumptions which are not fully appropriate. Family agriculture policies are based on the assumption that the only difference between family agriculture and large-scale production is the size of the unit. Family agriculture is regarded as having the same objectives of a large-scale producer e.g., profit maximization, technology innovation and access to market. This assumption can be observed in the provision of technical assistance which is mainly oriented to the improvement of productivity. Other objectives of family agriculture such as risk management and food security are neglected or marginally taken into account. The claim from family farmers' representatives that food security is a priority for them has been taken into account implementing the intercropping system. Still, this science product frames food security as the production of beans, disregarding the variety of activities and crops that might be important for family farmers within their food security conception.

Concerning the three dimensions of social inclusion (economic, political and cultural), the case study provides an example for the interconnectedness of these dimensions. The low political inclusion of labor unions in the crafting of the PNPB at the local level results in a program that fails to take into account cultural concerns. This can be considered low cultural inclusion given that family farmers do not feel identified with the program. The low cultural inclusion becomes evident when identifying the gap between technicians and family farmers. As a result, the program fails to considerably include family farmers through contracts, and a small quantity of castor bean is commercialized with Petrobras, compared to the initial objectives of social inclusion. Therefore, failing to politically and culturally include family farmers resulted in low economic inclusion. This suggests the importance of considering the multi-dimensionality of social inclusion for the creation of socially inclusive programs.

Another important issue at stake is the different manifestations of power. Discourses of participation are used to legitimize the position of powerful institutions. This is the case for the labor unions which are invited to participate in local processes to legitimize contracts with Petrobras in the region, or the MDA in the Day of Family Agriculture. It was also observed that no power has been transferred to family farmers in the region, since the physical contracts are not in their possession. Instruments such as the Agro-ecological Zoning also remove decision-making power from family farmers, if they want to benefit from public policies such as credit and harvest

insurance. Technical assistance was also contested as monitoring entity rather than providing assistance. It seems that controlling mechanisms have been put in place to direct agricultural production. Resistance to such control might be manifested through the low participation of labor unions and family farmers in the PNPB.

The problems documented with this case study mirror the problems that can be found with other governmental initiatives oriented to family agriculture. The programs are based on objectives of the modernization of family agriculture and the orientation of the rural economy towards the market. The means to achieve these objectives rely on one-size-fits-all programs that fall short considering the diversity and complexity of the rural livelihoods. Although it is not possible to generalize from this case study about the national performance of the PNPB, it is possible to obtain insights regarding the motives for the low number of farmers included in the program.



## **5. Social inclusion of the Brazilian Biodiesel Program: power and knowledge dynamics in actors' strategies**

### **5.1. Introduction**

This chapter starts by summarizing the main research findings. The actors' roles and interactions that take place in the PNPB across different levels of analysis are described first. Afterward, this chapter discusses the findings regarding the instruments that endeavor to facilitate the participation of family agriculture in the case study. Subsequently, power and knowledge dynamics are studied in actors' strategies. This is done by identifying motives, resources and practices of actors in the PNPB. This approach supports the operationalization of the key concepts power and knowledge. The implications of these findings are developed into a policy debate about the social inclusion component of the PNPB. The final section offers a reflection on the theoretical and methodological approach used in this research. In this manner, this chapter aims at answering the research questions and revealing how the research objectives were accomplished.

### **5.2. Power and knowledge dynamics in actors' strategies**

#### **5.2.1. Actors, roles and interactions in the PNPB**

The PNPB has been characterized as an innovative policy because it endeavors to connect different sectors of society for the accomplishment of a socially inclusive biodiesel sector. It is the first policy in the history of Brazil that seeks to provide instruments that allow family agriculture to participate in the value chain of biofuels. The PNPB relies on the assumption that a number of actors with different objectives, values and agendas can work together for a social objective. This research has focused on actors, roles and interactions in order to challenge this particular assumption. The identification of the actors involved in the PNPB was found to be crucial in this research. In different levels of analysis, actors were identified using a snowball sampling method. Next, the findings of the roles of actors at national, regional, state, and local level are summarized.

The roles of actors in the process of inclusion of family farmers at the national level were found to be different than what it was established on paper. For example, the role of the Ministry of Agriculture (MAPA) is not clear in practice. On paper, in the

Inter-ministerial Commission (CEIB), MAPA should help to structure biodiesel chains including family agriculture. The labor union interviewed (CONTAG) and the Ministry of Agrarian Development (MDA) believe that MAPA is oriented towards large-scale agriculture only. In addition, CONTAG, as a representative of family agriculture should participate in the decision making in the PNPB. Nonetheless, CONTAG argued that the space for participation has been opened, but their recommendations are rarely put into practice.

At the regional level, another actor whose role is largely contested is Petrobras. This is because Petrobras, the parastatal energy company of Brazil, seems to have a role determined by political objectives, rather than economic ones. While MDA and MAPA state that Petrobras' presence in the Northeast seeks profitability, Petrobras itself has claimed that at the moment, biodiesel production from family agriculture does not render the expected profits. However, the current investment in family agriculture has the long-term objective of making biodiesel from family agriculture profitable. Considering this statement, it seems that Petrobras has embarked on the program with the main objective of making the PNPB feasible in the Northeast, which corresponds to political objectives.

At state level, it was also possible to study how different processes of inclusion take place simultaneously within the PNPB, depending on roles that actors decide to play. For example, a comparison of the role played by both governments in the states of Ceará and Piauí explains the large difference in the number of farmers participating in the PNPB in those states. In the case of the State of Ceará, the government has invested a monetary fund in the PNPB providing an economic incentive for farmers to participate. This has not been the case for the government of Piauí, according to the interviewed actors. The intervention of the state government, thus, shapes processes of inclusion of family agriculture in both states. Whether the larger participation of family farmers in the Ceará renders benefits to family farmers beyond the bonus, cannot be easily determined, since the PNPB's overall configuration is implemented in the same manner in both states.

At the local level, some actors take unexpected leading roles. Such is the case of the provider of technical assistance, i.e., EMATER. The contract that EMATER signed with Petrobras, gives EMATER a great responsibility since they are in charge of the whole process of inclusion of family farmers at local level, from registration of family

farmers, to commercialization with Petrobras. EMATER operates as an intermediary between Petrobras and family farmers. It was found that the link between Petrobras and family farmers is the technical assistance provider, through which Petrobras aims at reducing transaction costs. Hence, a lot of decision power has been placed on the provider of technical assistance. At the same time, this affects the way family farmers perceive the technical assistance and their openness to technical support. For instance, family farmers' representatives put forward that the technicians are regarded as auditors rather than providers of assistance.

The representation of family farmers in the PNPB has shown to be different than the one established on the policy outline. At local level, the role of labor unions was found to be rather marginal. Labor unions are only in charge of signing contracts as witnesses but they do not participate in the negotiation of contracts. Moreover, the participation is used to facilitate the communication of top-down policies, rather than consulting family farmers. In contrast, in the local context, unexpected actors play important roles. Such is the case of middlemen, and their influence in the decisions of family farmers to join the PNPB or break the contracts they have signed. The underestimation of the role of middlemen in rural livelihoods, has led to the assumption that contracts are preferred by family farmers. Furthermore, the role of middlemen has been portrayed as prejudicial to family farmers. Yet, empirical data collected suggests that middlemen play an important role on the livelihoods of family farmers.

Apart from focusing on actors and their roles within the PNPB, this research has focused on different perspectives and interactions between the actors involved. It was discussed that perceptions change across different levels of implementation. Actors at national level locate the problems of the PNPB at the local level, arguing that the main difficulties are the lack of technology and the weakness of farmers' organizations. At the regional level, actors such as FETAG and Embrapa have a different perspective. According to them, the large-scale implementation of the program has ignored the culture of family farmers. This opinion re-scales the pitfalls of the PNPB as originated at the national level, where the PNPB was initially crafted. This means that while national level actors locate the problems of PNPB in including family farmers at local level, regional and state level actors locate the problems of the PNPB at national level. The significant different opinions along different levels of

implementation put forward the difficulties that these actors might find in the attempt to work together.

It was also discussed that interactions between actors are greatly determined by different objectives. Specific agendas of actors do not allow all sectors of society to work together. Such is the case of CONTAG and MAPA. The orientation of MAPA towards large-scale agriculture does not allow both actors to work together effectively. Likewise, the partnership initiated in Serra da Capivara failed, according to the representative of SEBRAE, because some local actors joined the partnership with the objective of obtaining propaganda rather than supporting the inclusion of family farmers in the PNPB. Also, several difficulties were found in the attempt of connecting the social movement of family agriculture MST with Brasil Ecodiesel. As a result, MST stated that they are not interested in working with the private sector anymore. The social movement MST referred to the failed experience of Brasil Ecodiesel in the State of Piauí as one of the reasons why they will only work with the Government henceforth. In some cases, the PNPB has separated actors instead of connecting them. Therefore, it was found that the policy objectives of the PNPB that incorporate notions of participatory governance, partnerships for social inclusion, and connecting different sectors of society, did not consider different interests and agendas of the actors involved.

### **5.2.2. Family farmers and their difficulties participating in the PNPB**

It has been established that family agriculture has not benefited from past biofuels programs in Brazil and that the benefits have been mainly directed to large-scale agriculture. The PNPB's objective of social inclusion rests on the assumption that the requirements of the biodiesel industry, as initially developed in Brazil, can be fulfilled by family farmers. This is possible after the provision of seed, technical assistance and credit to family farmers. At the same time, the assumption is that the biodiesel industry can provide benefits to family farmers. These assumptions are challenged with a case study conducted in Serra da Capivara, focusing on the experience of family farmers attempting to join the PNPB. In order to identify pitfalls, attention has been oriented in this research to the instruments that seek to facilitate this inclusion.

The PNPB relies on number of instruments that attempt to facilitate the economic exchange between family farmers and the biodiesel companies. This is the case of



contracts, which are supposed to enhance commercialization between family farmers and Petrobras. Nonetheless, the acceptance of contracts is influenced by the past experience with Brasil Ecodiesel in the area of study, given that family farmers complained about this enterprise not complying with the contract. The failure in the provision of credit and subsequent problems with the credit default resulted in farmers relating contracts to debt. Similarly, farmers' values about freedom and lack of knowledge about the meaning and implication of contracts generate rejection of this instrument. Hence, contracts not always enhance the economic exchange between the parties. In addition, family farmers who accept contracts have difficulties meeting its specifications. Some farmers expressed that the irregularity of the rain made it difficult to plant castor bean as stated in the contract. Labor scarcity during the rainy season was another difficulty that farmers found in planting castor bean.

The provision of credit also seeks to make the PNPB attractive to family farmers. Thus, farmers obtained access to credit in the first implementation in Serra da Capivara. However, farmers' own interests motivated them to use the credit for other purposes. The farmers who invested the money on castor bean production faced problems with productivity and were not able to pay the loan back. The current status of credit default in the area is one of the main reasons why farmers are currently reluctant to produce castor bean. Therefore, it cannot be said that the incentives have facilitated the participation of family farmers. On the contrary, in some cases, the incentives have hampered family farmers' participation in the PNPB. This shows that there are local dynamics that influence the performance and acceptance of these instruments that cannot be overlooked.

In the same line of argumentation, the adoption of the intercropping system promoted in the frame of the PNPB is influenced by local aspects. For instance, competing markets, or the preference that family farmers have in terms of food crops might affect the attractiveness of the intercropping system. This is the case of the farmers' preference to intercrop with maize, because of the better performance of this crop in the local market in comparison to beans. Traditions, like the preference for old varieties of castor bean and beans were also found to play a role. The perceptions and adoption of the practices suggested by the technicians are also influenced by farmers' values and knowledge. The orientation of technical recommendations towards

maximizing the productivity of castor bean neglects other interests that family farmers might have, apart from maximizing utilities.

The representative of Petrobras stated that the main difficulty that they face at the moment is the low productivity of family farmers. In some cases, to maximize productivity of castor bean, might collide with other interests of family farmers of ensuring food security, accessing food markets, preserving traditions, spreading risk and coping with uncertainty and adverse weather conditions. The needs of the biodiesel sector, which are mainly, mass production of feedstock at the minimum possible price, suggests a mismatch between the interests of the biodiesel sector and the interests of family farmers.

The difficulties that family farmers find further suggest that the instruments introduced in the context of the PNPB are not sufficient to overcome these different interests. In the case study, family farmers have made statements about not being interested in the PNPB by not paying attention to technical recommendations, not adopting varieties recommended, intercropping with the crops that are more important for them, or not planting castor bean at all. These can be considered statements of family farmers about how well the PNPB matches their livelihoods. The concept of social embedding expresses the notion that family farmers exist within cultural contexts and cannot be seen as independent utility-maximization decision-makers. In this respect, the point is that it is important to highlight the importance of the social embedding on the performance of the PNPB.

### **5.2.3. Actors' strategies**

The third research question was concerned with identifying knowledge and power dynamics within the PNPB. The findings of this research revealed roles, interests and actors' interactions in the PNPB. In order to operationalize the study of knowledge and power dynamics taking place in the PNPB, the concept of actors' strategies is used. After identifying roles and interactions, the actual practices through which actors determine processes of inclusion/exclusion within the PNPB can be discussed. These practices are regarded in this research as actors' strategies. As mentioned in the analytical framework, actors' strategies refer to "the way social groups use their available resources, knowledge and capability to resolve their particular problems" (Brown and Rosendo 2000). Thus, knowledge and power are the building blocks of

actors' strategies. In this frame, knowledge is taken into account by assuming that ideas are never innocent, but they either reinforce or challenge current social structures. Power is both a mean and the purpose of actors' strategies existence. In this manner, the analysis of actors' strategies that shape the PNPB is done by tracing motives (to exercise power or resist to it), resources (knowledge or power based resources of actors) and the actual practices performed by actors. The main strategies of actors influencing the outcomes of the PNPB identified in this research are: discursive strategies, resistance strategies and livelihoods strategies.

The strategies of the Ministries of Rural Development and Agriculture were identified as discursive strategies. The motive found in both ministries is to legitimize the program they are responsible for and give continuation to it. First, when the program was launched, the discourse is used to portray the PNPB as a program making use of innovative governance by encouraging the participation of different sectors of society. To support this discourse, spaces for participation were opened. However, the interview with CONTAG shows that the space for effective participation has been opened, but it is debatable due to representation issues and relative positions of power. Second, when the social inclusion of the PNPB is defied, the discourse evolves into a manipulation of the information regarding what the social inclusion objectives initially were. Later on, the discourse transforms into allocating responsibilities to different actors regarding the results obtained. An example of this is to blame farmers for not making good use of the incentives offered, such as not paying the credit. Finally, the discourse is that the PNPB is work in progress in terms of inclusion of family agriculture while providing opportunities for large-scale agriculture. Hence, discursive strategies are used to manipulate public opinion in order to legitimize the PNPB. In the meantime, the blending targets are increased with the acknowledgement that only the soybean sector can keep up with them, and even achieve the targets beforehand.

Discursive practices are used to reinforce roles because actors have an interest in being regarded in a certain manner. For example, Petrobras uses discursive strategies to position itself as a company that offers a better deal for family farmers than middlemen. Also, when CONTAG claims that they should represent family agriculture because they are the largest rural labor union, they determine the rules of inclusion/exclusion for other social movements. Thus, discourse is used to gain

recognition as a representative entity and to gain access to negotiate with the government, acting upon power dynamics. This also makes CONTAG more attractive for family farmers to affiliate to than other labor unions. Another example of how discursive strategies are used to define roles is that of MAPA. Given that policies favoring large-scale agriculture have been condemned, MAPA has an interest in not been related only to large-scale agriculture. Through discourse strategies MAPA aims at positioning itself as a ministry concerned with smallholder development because “MAPA wants the smallholder to be large”. However, this discourse is contrasted with CONTAG and MDA’s opinion that MAPA has little relationship with smallholder agriculture. In the end, whether the discourses explain reality or not, it does not matter. What matters is how through discourse struggle some discourses come to be accepted as the truth, providing legitimacy and power to certain institutions.

In this discursive struggle, there is also the formation of knowledge about family agriculture’s conceptualization. MAPA claiming that they want the smallholder to be large contributes to the conception of family farmers as a small version of a large-scale producer. Chapter four demonstrated that considering family agriculture as a homogenous smaller version of large-scale agriculture leads to wrong assumptions concerning the motivations and values of family farmers. The conception of family agriculture as a smaller version of large-scale agriculture with the only objective of improving productivity and achieving economies of scale generates policy instruments of ill effectiveness. Rarely, definitions aim at regarding family agriculture as a heterogeneous and complex sector of society. That way, dynamics of knowledge define sectors of society as well as policies directed to those sectors.

It was shown how discursive practices are used to reinforce roles, define actors, gain access, and exercise power. In these strategies and motives, it is also important to identify resources. An example of this is the resources that the Ministry of Rural Development (MDA) has to get through their discourse. In the media, Serra da Capivara has been portrayed as a territory where the PNPB has had a positive impact on the lives of family farmers. In contrast, the secondary data showed that in Serra da Capivara, the number of family farmers participating represents 3.6 percent of total number of family farmers. Empirical data showed that of the 3.6 registered, not all the farmers have commercialized, which reduces the scope of the program even more.

The difficulties reaching the areas of actions of the PNPB make it hard to confront this discourse. Similarly, in Section 4.4.2 it was clearly stated that the Family Agriculture's Day had the objective of providing the organizations that work with family agriculture the opportunity to show what they have to offer. The Family Agriculture's Day can be seen as a strategy of governmental institutions to market their work. Thus, the ministries have means to spread a message of the results of the PNPB and their role.

In the example of the meeting to plan the Family Agriculture's Day, it is also useful to observe how positions of power determine the participation of labor unions. In the meeting, labor unions were invited to participate because the organizers needed the support of labor unions to mobilize farmers for that day. In the meeting, the president of a labor union suggested the change of the date, but this request was not even considered since the decision about the date had already been made. Thus, participation was used to operationalize preconceived plans about the Family Agriculture's Day. In the PNPB, this strategy can also be identified. For instance, labor unions are one of the parties signing the contracts. With the signature of labor unions, policy makers and Petrobras are able to claim that the process has been participatory. However, labor unions stated that they only sign the contracts but do not participate in the negotiation. Also, when family farmers had complaints about Brasil Ecodiesel, labor unions voiced these complaints, but their intervention did not help to change the situation in favor of the farmers. This has resulted in labor unions deciding not to participate in some activities of the PNPB. This non-participation is afterward used by officials to claim that labor unions are not present in the spaces of participation that have been opened, for example the meetings of the working group that the Project Poles of Biodiesel coordinates. Given the lack of power of labor unions, their options are limited to perform a strategy of non-participation.

It has been discussed that discursive strategies are used to influence dynamics of power and knowledge. However, discursive strategies are not fully accountable for the outcomes of the PNPB. On the contrary, top-down assumptions and discourses converge with local realities. For example, actors' strategies cope with instruments formally established that do not fit the local context such as contracts. Petrobras does not make use of the contract to charge the investment of seed and technical assistance made on farmers that break the contract. The representative of Petrobras said that they

recognize the little possibilities of farmers of paying back the value of the investment. Therefore, the contract is informally renegotiated in this particular section and the penalty for the farmers not complying with the contract is not implemented. At the same time, Petrobras also employs practices that aim at not empowering family farmers. This is the case of family farmers signing contracts with Petrobras but not being in possession of the contract in the area of study. The contracts were taken to the company headquarters to be signed and did not return to the farmers. Hence, a gentlemen agreement seems more close to what happens in the field than a contractual relationship. This strategy of Petrobras releases responsibilities from both actors, and maintains intact power relationships.

The dynamics that take place across levels of analysis through the actors' strategies was also noticeable. This can be exemplified by the strategy adopted by the Government of State of Ceará, which includes a monetary bonus for those farmers producing castor bean for Petrobras. This strategy accounts for the difference in the number of family farmers included in the States of Piauí and Ceará. The bonus was, according to Petrobras, affecting the results in terms of the productivity of family farmers. Petrobras said that some of the farmers asking for the bonus do not invest the necessary labor on castor bean, which brings the productivity down. Allegedly, the only interest of some farmers is to obtain the bonus. This corresponds to family farmers' interests and own strategies. At the same time, Petrobras acts upon this practice by adopting the strategy of focusing on productivity of family farmers, rather than the number of farmers participating in the State of Ceará.

Shifting the attention away from vertical interactions to horizontal interactions, it can be observed how actors' strategies at local level determine the outcomes of partnerships for social inclusion. According to the representative of SEBRAE, actors at local level participated in the first partnership in Serra da Capivara with the objective of obtaining propaganda and political visibility. Therefore, participation in partnerships is used to benefit from the propaganda given to the program. In this case, motives and the resulting strategies of different actors influenced the effectiveness of the partnership.

The strategies of family farmers are not identified in this research particularly as discursive strategies. Family farmers' strategies are identified as livelihood strategies and resistance strategies. Strategies to ensure livelihoods relate to those strategies to

secure their subsistence. The practices of farmers to conduct their livelihood strategies converge with the implementation of the PNPB, generating the overall outcomes. For example, farmers might oppose to the cultivation of castor bean because they fear to have insufficient labor for food crops. Also, a strategy to ensure food security is to plant only food crops when the rainy season is short, even when they have signed contracts to plant castor bean for Petrobras. Farmers preferring to commercialize with the middleman because of the convenience in terms of commercialization correspond to the aim of pursuing their livelihoods' strategies.

Farmers' knowledge plays a crucial role in the performance of their strategies. This dynamic of knowledge at local level take place in farmers' strategies mainly represented by scientific versus traditional knowledge. Through the instruments and discursive practices analyzed, actors implementing the PNPB attempted to shape family agriculture's participation through: definitions of family agriculture, technical assistance, contracts and science products such as the agro-ecological zoning and the intercropping system. These instruments converge with local knowledge and values giving room to other strategies of family farmers that are identified as resistance strategies.

Resistance practices are mainly represented by the rejection of contracts, not following technical recommendations, not adopting improved varieties, or rejecting technicians in their farms. In this case, resistance is very much a response to practices of control. Farmers turning down contracts because they want to commercialize freely, or some technicians expressing that family farmers do not want technical assistance because they want to do things on their own are examples of this resistance to control. The outcomes of the PNPB show resistance to this domination, meaning that these measures failed to completely determine the participation of family farmers. Conversely, family farmers, through practices of resistance, also shape the terms of their participation exercising their available resources of agency and resistance. This also shows the limited possibilities of those who engage in resistance.

This section has emphasized the ways in which social arrangements are constructed through the convergence of actors' strategies. Actor's strategies of discourse, participation, non-participation, livelihoods, and resistance were identified in the PNPB. The interlocking of actors' strategies in vertical and horizontal interactions was also distinguishable. Uncovering actors' strategies enabled to distinguish

dynamics of power and knowledge that shape the outcomes of the PNPB. Knowledge was found being used in the strategies of actors to obtain power and exercise control such as creating instruments of intervention. Discursive strategies to manipulate knowledge and perceptions towards the PNPB were also discussed. Power was studied as dispersed in social relations. In this case, social relations are particularly studied in terms of convergence of actors' strategies. The aggregated findings of actors' strategies in the PNPB suggest that instead of aiming for a socially inclusionary policy, participation is used to operationalize the preconceived development of the biodiesel sector.

### **5.3. Challenging the assumptions of social inclusion of the PNPB**

This research studied how top-down policy making has resulted in a mismatch between policy and practice. Assumptions within the PNPB were identified and challenged with the collection of empirical data. This enables the critical analysis of the PNPB to make a contribution to the policy debate. The PNPB aims at reducing inequity in Brazil by promoting partnerships for social inclusion, enabling private investment, and providing technology to family farmers. Power relations, interests and agendas of different actors have been overlooked in order to link private enterprises with family agriculture. The PNPB has relied on technocratic approaches to achieve the participation of family farmers, reducing the problem of connection between the private sector and family agriculture to the need of technological innovation.

The innovative governance of the policy was based on the participation of actors of society. Apparently, with participation the Government sought to balance the interests of marginalized groups and the interests of the groups on which it depends more directly, such as the private sector and large-scale agriculture. However, in the context of the PNPB, participation has not meant political deliberation on mutually acceptable measures. Political participation has been turned into appropriate participation to legitimize and facilitate the action of the Government and groups of power. The PNPB has failed to provide disadvantaged groups an effective representation, thus no influence on decision-making: the PNPB has faced difficulties achieving the goals of economic inclusion of family farmers.

The multidimensional character of social exclusionary process has been used in this analysis to study the component of social inclusion of the PNPB. It was found that the



political inclusion has not been achieved since the participation of labor unions, which were supposed to represent farmers, is marginal. The cultural inclusion can be observed in the instruments used to enhance the participation of family farmers, which were often partially adopted or rejected by family farmers. This indicates a low cultural inclusion of family farmers' values and motivations. This has been useful to give a causal approach, arguing that neglecting political and cultural dimensions has led to a low number of family farmers participating in the program.

Material dimensions should also be taken into account in social inclusionary processes. Agro-ecological and spatial dimensions were not taken into account in this research, but they were found to have strong influence in processes of social inclusion of the PNPB. For example, the spatial dimension accounts for those farmers who are not included because their farms are located far away from the buying posts or with deficient road infrastructure. The agro-ecological conditions such as the duration of the rainy season influenced farmers' decision making about planting food crops, rather than castor bean. These dimensions should also be considered in future research. In this research, the effect of spatial and agro-climatic has been framed within cultural dimensions, such as the effect of these material dimensions in livelihoods strategies. In other words, these dimensions are framed within other dimensions to narrow down the scope of the research. Nonetheless, other research might find it useful to make differentiated analysis for these dimensions.

Drawing from the case study conducted, it was found that the instruments that were supposed to facilitate family agriculture's participation in the PNPB have failed to take into account farmers' values, interests and motivations that influence their decision-making. As long as family agriculture is not treated as a heterogeneous group of people, the policies oriented to family agriculture will render the same results of the PNPB. Therefore, this research calls for shifting attention from merely economic issues to political and cultural ones. Policies seeking social inclusion should not reduce inclusion to simply economic inclusion but to consider the importance of a multidimensional approach of social inclusion.

The current structure of the Brazilian biodiesel program, with a large-scale implementation and ambitious blending targets, offers little room for effective participation of family agriculture. Conversely, it opens tremendous opportunities for the soybean industry. Here it is not suggested that the development of a biodiesel

sector is never compatible with family agriculture. Rather, it is suggested that the current structure of the biodiesel sector in Brazil provides more opportunities for large-scale agriculture than family agriculture. The modifications in the PNPB enacted in the name of social inclusion, such as the percentage of raw material that a biodiesel company is requested to obtain in order to hold the Social Fuel Seal, seem to benefit only biodiesel companies.

Some problems were found with the concept of social exclusion per se. The reason for this is that social exclusion/inclusion gives a perspective that an individual or group of people is either in or out of a system. This results in a strong emphasis on the number of family farmers included in the PNPB. The terms of that inclusion are often neglected. For example, policy makers claim that there are 30,000 farmers included in the State of Ceará and this is sufficient to proclaim that the PNPB is socially inclusive. But it was discussed that several actors agreed that farmers participate in the PNPB because they are interested in the monetary bonus, not in planting castor bean. Therefore, in this case, the sustainability of this participation depends on the bonus. To focus on status of inclusion and exclusion within the PNPB gives a horizontal image. This is different from a vertical one that indicates social and income disparities. Thus, it is difficult to assess these vertical positions. Even though this has been pointed out by several authors, the conceptual “luggage” of this notion seems difficult to get rid of, when applied to policy interventions. While it is not denied that some family farmers might be commercializing in favorable terms with biodiesel companies, it is important not to forget who the real winners of this program are. Taking a look at the states participating the most and the crop that mainly composes biodiesel in Brazil can help to understand who the real winners are.

Based on the analysis of the family farmers included in the PNPB, this report argues that the social inclusion discourse of the PNPB operates to obscure the inequalities between different modes of production in Brazil. The focus on the number of family farmers included as a measure of success or failure of the PNPB ignores the terms and characteristics of this inclusion. For instance, directing the attention to bimodal statuses of inclusion or exclusion within the PNPB obscures other statuses of family farmers within the PNPB such as mere providers of raw material, dependence on the biodiesel company and poor influence in the decision making of the PNPB. Furthermore, the alleged component of social inclusion of the PNPB diverts attention away from the

advancement of the soybean sector. The biodiesel sector is being overtaken by the soybean industry, creating the same social distortions – land pressure, mono-crop, and concentration of capital – created by the ethanol program.

#### **5.4. Reflections on the theoretical and methodological approach**

This research draws on Political Ecology insights to underline analytical and methodological positions. This field of study has motivated the emphasis on knowledge and power struggles in shaping social processes. In the study of these struggles, political-ecologists have consistently encouraged a multi-level approach to explore the circulations of power and knowledge. These research concerns were found to be useful because they directed attention to aspects that are often overlooked in the analysis of family farmers' inclusion in value chains.

Even though the definitions of power and knowledge used in this research may seem overly general, it is not so much the definition of these concepts *per se* what was useful in this analysis, but the orientation and kind of theorizing that it motivated. Here, it is argued that these two concepts are the building blocks of plentiful theorizing. In this particular case, knowledge and power are perceived as the building blocks of actors' strategies. For example, in this research, knowledge and power inspired the theoretical concern of identifying power and knowledge dynamics in the PNPB. This resulted in the identification of specific actors' strategies. Subsequently, the study of actors' strategies allowed to connect these two concepts and understand that neither of them can be appropriately studied without giving attention to the other.

Furthermore, knowledge and power were useful to narrow down the scope of analysis, so as to concentrate in these two aspects. This is because in order to understand the PNPB, it was important to look at the interventions and instruments put in place. Such is the case of contracts, credit and technical assistance. The literature on smallholder's technological innovation, microfinance, and contract farming was not reviewed in this analysis. While it is recognized that the use of this literature could have greatly contributed to the analysis, time limitations made it impossible to review all the literature related to each specific instrument. A way to cope with this constraint was to focus on knowledge and power dynamics in the performance of these instruments. This enabled the adoption of a critical perspective towards the instruments that aim at facilitating the inclusion of family agriculture in the PNPB.

The analytical implications of a multi-level approach rendered much greater challenges. In this research, the most pressing challenge was to connect this multiple level of analysis in a coherent explanation of policy outcomes. The actor-oriented approach helped in making a connection of these levels of analysis through actors' interactions in the implementation of the PNPB. Therefore, the multiple levels were threaded together through interactions between actors and references that they made to one another. Thus, the analytical perspective adopted in this research to thread together different levels of inquiry is the convergence actors' strategies.

The methodological challenges of conducting multi-level research were numerous, particularly that of identifying and interviewing actors that could represent each level. It was possible to get around this difficulty due to exceptional opportunities to interview actors that accounted for pertinent insights of national, regional, state, and local approaches. In addition to multiple-level research, the methodological Political Ecology approach suggests combining multiple dimensions in the study of social processes such as biophysical and environmental with political and economic ones. In this research, it is recognized that these aspects could have contributed greatly to the debate. Nonetheless, the study of biophysical dimensions was sacrificed in order to pay attention to cultural and political aspects. It was also necessary to narrow the scope of the research due logistical and time limitations.

The case study conducted makes it possible to understand the importance of aspects that should be ethnographically defined according to specific cultural and institutional contexts. This explains the problems encountered with a large-scale one-size-fits-all implementation of the program. The multilevel research helped to support and contrasts the validity of these findings. For example, the narratives of actors at different levels of inquiry also point at the pitfalls of a large-scale implementation. Therefore, it is important to keep in mind that more specific research in each area of implementation helps to understand how local knowledge and institutions affect farmers' decision making to join the PNPB or any given program. The strong use of narratives comprises the drawback of reliance on the interpretations of the researcher. This research coped with this limitation by triangulating secondary data collection and observation.

This thesis might be regarded as an ambitious attempt to study intricate dynamics in social interactions, but the objectives respond to an attempt to embrace complexity.

The inclusion of family farmers was found to be complex, not exclusively derived from economic considerations such as market opportunities, but a result of a series of ecological, political, labor and institutional considerations. This attempt resulted in the identification of actors' strategies that come together in policy negotiation, formation of knowledge and the design of instruments of intervention. Thus, the multi-level approach enabled the comparison of how the policy assumptions collide with the local context, and it was proven to be useful to enable a better understanding of the outcomes of the PNPB.

Apart from Political Ecology, the concept of social exclusion was used. This concept has been useful not so much for its conceptual framing of a social phenomenon, but to analyze how it is applied in policy making. As stated by Silver (1994), the discourse of exclusion/inclusion may serve as a window through which to view political cultures. In this research, this has been the main use of this concept. The social inclusion discourse has been used to uncover political cultures in the Brazilian biodiesel sector.

Finally, this research highlights the importance of deconstructing social outcomes in terms of a large and diverse set of actors. Adopting this risky and ambitious approach enabled the identification of different strategies taking place in the PNPB. In brief, this research has relied on the actor-oriented approach and actors' strategies to uncover knowledge and power dynamics that account for the outcomes of the PNPB. The strategies identified in this research respond to the concern with applying concepts and methods that inter-relate political, cultural, and economic dimensions of the process of social inclusion of the PNPB. It also highlights the importance of considering the multi-dimensional nature of inclusion/exclusion in both analytical exercises and policy making. Even though this research only begins to address these concerns, it will contribute to deepen the understanding of social inclusion policy outcomes.



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## Annex

### Annex 1: List of interviewees

<i>No.</i>	<i>Interviewed institutions</i>	<i>Name</i>	<i>Date</i>
1	MST	Milton Rasgunho	1-3-2010
2	CONTAG	Antonhino Rovaris	9-3-2010
3	MAPA	Denílso Ferrera	10-3-2010
4	Entrevista MST	Luis Carlos	11-3-2010
5	MDA	Marco Antonio Leite	15-3-2010
6	Banco do Nordeste	Máximo Antonio	16-3-2010
7	MST	Neguinho	22-3-2010
8	Technician Fartura	Erasmó	24-3-2010
9	Technician Petrobras	Salomão	24-3-2010
10	Technician input EMATER	Isaías Rubem de Macedo	25-3-2010
11	Technician Bom Fim do Piauí EMATER	Ederbal da Silva Santos	28-3-2010
12	Farmer 1	Maria Estela	29-3-2010
13	Farmer 2		29-3-2010
14	Farmer 3		29-3-2010
15	Farmer 4	José Francisco	29-3-2010
16	Farmer 5		29-3-2010
17	Technician Guaribas EMATER	Sebastião	30-3-2010
18	EMATER-PI	André Rocha	1-4-2010
19	Farmer 6	Fernando	2-4-2010
20	Technician Várzea Branca EMATER	María del Socorro Teixeira	5-4-2010
21	Technician Dirceu Arcoverde EMATER	Sérgio Soares da Silva	5-4-2010
22	President Labor union SRN	José Ribeiro dos Santos	6-4-2010
23	SEBRAE	Marcelo Asunção	7-4-2010
24	President Association of Castor Bean Producers Caracol	Salvador Ferrera	7-4-2010
25	Technician Dom Inocencio EMATER	Genival Assis de Oliveira	7-4-2010
26	Technician São Lourenço EMATER	Lucas Almeida Bastos	7-4-2010
27	Obra Kolping	Francisco Alves Sulica	8-4-2010
28	President Labor Union Aníseu de Abreu	Arnaldo Elías Ferreira	9-4-2010
29	President Labor Union Várzea Branca	Teresina Pães de Maceida	9-4-2010
30	Dom Helder Camara	José João	9-4-2010
31	President Association of Castor Bean Producers SRN	João Batista	11-4-2010
32	Banco do Brasil SRN	Robinson Beni Almeida	12-4-2010
33	FETAG	Simão Reinaldo	13-4-2010
34	Embrapa Meio-norte	Francisco de Brito Melo	13-4-2010
35	PRONAF	José Wellington	14-4-2010
36	Petrobras	Janaina Mendez	14-4-2010
37	Obra Kolping	Artu Adriano Fernández	15-4-2010
38	Obra Kolping	José Martins	15-4-2010
39	Obra Kolping	Antonio José Cunha	15-4-2010
40	Petrobras	Paulo Moreira	19-4-2010

**Annex 2: Data on municipalities of the territory Serra da Capivara**

<i>Municipality</i>	<i>Extension</i>	<i>Urban and rural population</i>	<i>Total population</i>
ANÍSIO DE ABREU	326,822 km <sup>2</sup>	(urban: 3,348 – rural: 3,818)	7,166
BONFIM DO PIAUÍ	293,593 km <sup>2</sup>	(urban: 1,159 – rural: 3,722)	4,881
CARACOL	449,465 km <sup>2</sup>	(urban: 3,013 – rural: 5,027)	8,040
CORONEL JOSÉ DIAS	1,822,115 km <sup>2</sup>	(urban: 1,103 – rural: 3,402)	4,415
DIRCEU ARCOVERDE	1,005,706 km <sup>2</sup>	(urban: 1,855 – rural: 4,211)	6,066
DOM INOCÊNCIO	4,024,385 km <sup>2</sup>	(urban: 856 – rural: 8,053)	8,909
FARTURA DO PIAUÍ	717,991 km <sup>2</sup>	(urban: 895 – rural: 3,790)	4,685
GUARIBAS	4,279,673 km <sup>2</sup>	(urban: 898 – rural: 3,916)	4,814
JOÃO COSTA	1,716,165 Km <sup>2</sup>	(urban: 453 – rural: 2,572)	3,025
JUREMA	1,297,315 km <sup>2</sup>	(urban: 498 – rural: 3,549)	4,047
SÃO BRAZ DO PIAUÍ	604,081 km <sup>2</sup>	(urban: 935 – rural: 3,257)	4,192
SÃO LOURENÇO DO PIAUÍ	683,661 km <sup>2</sup>	(urban: 691 – rural: 3,583)	4,274
SÃO RAIMUNDO NONATO	2,427,894 km <sup>2</sup>	(urban: 17,202 – rural: 9,688)	26,890
VÁRZEA BRANCA	233,927 km <sup>2</sup>	(urban: 2,647 – rural: 1,828 )	4,475