THE BRAZILIAN BIODIESEL NATIONAL PROGRAM AND THE SOCIAL FUEL LABEL: REMARKS FROM MINAS GERAIS CASE

by

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ABSTRACT

The goal of this project is to examine the Brazilian National Biodiesel Program (PNPB) and explore whether the Social Fuel Label implementation has been effective or not. The examination of the PNPB along the lines of economic, environmental, social and governance aspects, shows the need of Brazil to diversify its biodiesel feedstock as a way to decrease its economic, environmental and social vulnerabilities.

Also, the process of crop diversification could support the inclusion of small farm families in the biodiesel supply chain. We proposed that incentivizing small farmers to grow castor bean could not only help them increase their income but also contribute for Brazil's crop diversification attempt.

However, field research findings in the Minas Gerais state prove that without small farmers' access to credit and collective organization through agriculture cooperatives, crop diversification will not happen nor small farmers will be socially included.

Keywords: The Brazilian National Biodiesel Program; PNPB; Social Fuel Label; Minas Gerais; Small Farmers Credit Access.

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EXECUTIVE SUMMARY

In 2004, the Brazilian federal government launched a program to expand national biodiesel production, the PNPB (Programa Nacional de Produção do Biodiesel). The PNPB was designed to promote regional development and, consequently, to increase the annual income of small farm families. The government offers tax exemptions, credit lines and the right to be part of the official sell auction to biodiesel refineries that buy crops from small farmers. The Social Fuel Label, which is social standard certification, is issued by the government, representing and guaranteeing that refineries (private sector) are contributing to regional development.

The gradual addition of biodiesel into fossil fuel diesel would increase biodiesel domestic demand and generate income for oleaginous crops producers, which will be converted into biodiesel. The PNPB started with a blending requirement policy of 2% of biodiesel and currently requires a 5%, namely B5.

Biodiesel production has been proven economically unviable because its production cost is higher than the fossil diesel's. Also, the government's incentives given to private refineries are not enough to persuade them to comply with the Social Fuel Label.

Government statistics show that the number of small farmers included in the supply chain has increased although this result is not optimal since small

farmers have limited bargaining power and their participation in total national production is inexpressive. National production is mainly made from soy and basically produced by mechanized farms in Brazil. Thus, in order to increase the number of small farmers in biodiesel supply chain, we suggest that:

(i) There should be a better credit access for small farmers to improve their soil conditions and; thereby increase productivity.

(ii) It is also crucial that small farmers organize themselves in agriculture cooperatives so they would have bargaining power and counterbalance other stakeholders' actions.

DEDICATION

With all my love to my parents, Geraldo and Angela, without whom I could not have started this project.

Com todo amor, aos meus pais, Geraldo e Angela, sem os quais eu não poderia ter começado este projeto.

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À todos vocês, muito obrigada!

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GLOSSARY

PNPB	Stands for The National Program for Biodiesel Use and Production (*in Portuguese Programa Nacional de Uso e Produção de Biodiesel*).
Petrobrás MC	Petrobrás (Petróleo Brasileiro S/A) is a mixed capital enterprise, which has a biodiesel refinery branch in Montes Claros (MC) city of Minas Gerais northern state.
MG	Minas Gerais is a Brazilian state where field research took place.
EMATER	EMATER-MG (*Empresa de Assistência Técnica e Extenção Rural* – Enterprise of Technical Assistance and Rural Extension) of Minas Gerais
PRONAF	*Programa Nacional de Fortalecimento da Agricultura Familiar* (National Program for Farm Family Agriculture Improvement) – Program crated in 1995 to enable small farmers have access to credit.
DAP	Declaration of PRONAF's Comptency (*Declaração de Aptidão ao PRONAF*). In order to have access to PRONAF's credit, farm families have to be apt and know the implications of getting a loan.
GTs	Work Groups (Grupos de Trabalho) – Groups formed to assist the PNPB implementation.

1: SOCIAL LABELS AND CODES OF CONDUCT IN THE DEVELOPING WORLD: AN OVERVIEW FOR THE BRAZILIAN SOCIAL FUEL LABEL

1.1 Introduction

The purpose of this research is to study the effectiveness of the Social Fuel Label implementation in the Brazilian national initiative of biodiesel expansion. Effectiveness is defined in this study as the ability to produce a desired effect, which means in this case to provide good working conditions for small farm[1] workers involved in the process of planting crops that eventually will became biodiesel and, at the same time, guarantee incentives (such as tax exemptions and credit lines) to private enterprise owners, which may compel them to not exploit workers and pay a fair amount for the price of the crops produced by workers (small farmers). Therefore, this study's attempt is to analyze whether the Social Fuel Label will produce positive results in accordance with the Brazilian government's expectation or not. The Social Fuel Label is regarded as the unit of analysis of this project and its impact on Brazilian biodiesel industry stakeholders the focus to further conclusion.

According to the Brazilian government, the addition of 2% of biodiesel into the fossil diesel can provide job opportunities to over 200,000 families. Biodiesel

[1] Small farm workers; small farmers, small farm families are all terminologies referring to the portuguesuese term *pequeno agricultor*, which is defined in this project as the leader of an agriculture household (with less than 5 hectares), where familiy members work basically to grow crops for subsistence.

production expansion can also increase the annual income of small farm families; the government prevision is that an average production of between 700 to 1200 kilograms per hectare can provide an income between 2,500 to 3,500 Reais (Brazilian Currency).[2] [3] In this case, the government's expectation is twofold. First, to include small farmers in biodiesel production and second, to make sure enterprise owners will not exploit small farmers in terms of working conditions and the price paid for crop production. In order to reach these expectations the government provides credit lines and tax exemptions to private owners as incentives to compensate their cost with more expensive labor force.

1.1.1 Understanding Social Labels and Codes of Conduct

A social label is a "*symbol such as a logos, trade mark and, in some cases, text, which seek to differentiate a product"* (Diller, 1999 p.104) and is usually issued to enterprises if they comply with codes of conduct, which " are *written statements of principle or policy intended to serve as the expression of a commitment* "(Diller 1999, p. 102). Therefore, social labels and codes of conduct work together, that is to say, behind every label issued there is an idea, principle and purpose. This means that social labels and codes of conduct are intertwined. As Diller (1999) points, codes and labels are part of the process to inform consumers about the product's origin and under what conditions the product was produced.

[2] Information available at: http://www.biodiesel.gov.br/

[3] The current minimum wage in Brazil is R$510,00. So, small farm families' income would vary from 5 to 7 minimum wages. Information available at: http://www.mte.gov.br/sal_min/default.asp

Social labels are usually issued by social organizations, such as the ETI (Ethical Trade Initiative), ILO (International Labor Organization) or Non-Governmental Organizations (NGOs). These institutions provide assistance for enterprises as a way to orient and constrain the private sector to provide fair and ethical working conditions for their suppliers in the supply chain.

Thus, to better understand how social labels and codes of conduct work in developing countries, such as Brazil, research about cases where codes and labels have been implemented will be presented. This study specifically takes into account the role of actors involved in the implementation of codes and labels; the coherence between what is written in the codes and what is in fact put into practice; and the national context in which enterprises (biodiesel refineries) operate.

Stakeholders' interaction plays a very important role in regard to the effectiveness of labels and codes implementations. Using a tailored assessment approach that is developed for each case, we propose to examine the following hypotheses:

1) Stakeholders' awareness may help the Social Fuel Label implementation to be effective.

2) The monitoring/inspection phase may not work in the Brazilian case considering the public sector is the only actor involved in the assessment and validity of the Social Fuel Label.

1.2 Literature Review

1.2.1 The Four Paradigms

Codes and social labels could produce, if implemented, four paradigms: (i) social labels and codes only produce negative effects; (ii) social labels and codes produce solely positive effects; (iii) social labels and codes produce no effects; and (iv) social labels and codes produce effects with apparent limitations that inhibit their success.

From what has been studied about the implementation of social labels and codes in developing countries, the main finding of authors who assessed implementations of those tools through field work is, that despite constant efforts to regulate working conditions, there are still persistent limitations preventing codes and labels to be successfully implemented. Hence, the overall view is that social labels produce mixed results. As Hilowitz (1997) argues, in one of her studies on child labor in developing countries, social labels may reduce and ameliorate working conditions for those still working but could only be applied to certain products and services. Or as McDonald (2007) notes in her study about coffee production in Nicaragua for Starbucks, "*the empowerment of marginalized groups has been very uneven in both substance and scope, which has significantly limited the extent to which those initiatives have been able to globalize justice"* (p. 809). According to McDonald (2007), although marginalized workers became aware of their rights with the label and code implementation, workers' rights could only be entitled with state actions. In the case of Nicaragua, the state does not have autonomy and capacity to recognize workers rights

because it is dependent on other actors such as national elites and foreign capital limiting the state's actions and capacity (Hira 2003).

As a result of persistent limitations, we could argue that codes and labels represent a failure of the improvement of international trade ethics. Nonetheless, as Barrientos (2008) affirms, codes and labels are not developed to solve the world's poverty alleviation and injustice but rather they are part of a "*contradictory process, involving collaboration and conflict between commercial and civil society actors"* (p. 978). Further, it was because of the lack of state capacity or state mediation between society and private sector that codes and labels started to be thought of as a solution. As Utting (2008) argues, it was during the globalization process, when states failed to guarantee good working conditions, that social codes entered in the scenario.

Additionally, the first intention of social codes is not to solve states' problems within their societies. Labels and codes are *"not something with discrete outcomes, but an approach that helps business manage its relationship with society* "(Blowfield, 2007, p.693). So, the role of codes and labels is to work in coordination with the state.

Therefore, what we realize is that there are still obstacles to overcome to make social labels and codes effective, but critical thinking about their effects may lead to produce better social policies.

As O'Laughlin (2008) notes, it is hard to find scholars that really think codes and labels produce no effect whatsoever. All advocates have some

reservations. The positions of scholars, clearly seen in the academic debates, are "*cautious but critical advocates"* of social labels and codes (p. 951).

Considering that the predominant view is the mixed effect argument regarding social labels and codes, we still notice a variation between those who are more optimistic and those that are more pessimistic.

The last debate over the social labels and codes of conduct between scholars who wrote the most about this topic shows a slight switch of position towards a more pessimistic view regarding ethical trade tools. The main issue debated is how much further codes of conduct go if they have to be in accordance with the profit-making enterprises.

Some authors argue that codes fail to help exploitative working conditions because this is not in accordance with private sector pursuit of decreasing costs. Nonetheless, others argue that the codes and labels' main purpose is merely to help the private sector develop a fairer relationship with the societies in which they are immersed and that the action of improving societies' working conditions is still in the state's hands (Hale 2000; Barrientos 2008; Hughes 2001; Mcdonald 2007).

1.2.1.1 Mostly Positive Perception

According to Barrientos (2000), codes and labels represent a contestation of the logic in which civil societies are organized; nonetheless they need to be analyzed under the context of global production in which they emerged with inherent limitations that sustain them (Barrientos, 2008). Barrientos as well as more pessimistic authors such as Blowfield and Dolan (2008) agree that codes

do not reach casual workers; however, she points that codes are just part of a constant process where conflict of interest between society and the private sector takes place. As she explains, "*codes were never going to be a panacea- but they could contribute to a process that seeks new challenges that enable independent organization and provide arena for action"* (Barrientos, 2008, p. 987). Therefore, if codes exist today it is because civil societies called for them. Overcoming limitations of codes and labels is in the hands of the civil society as well as the state's hands. These limitations could only be overcome if people start to be conscious about what is happening with vulnerable workers in the supply chain.

Seidman (2008), similarly to Barrientos, affirms that the positive effect of a code is related to social activism and consciousness. After analyzing empirical cases in India, South Africa and Guatemala, she concludes that fair practice regulations are dependent on the codes' monitoring practices. The author suggests that even voluntary privatized regulation (NGOs), depends on access to information from enterprise insiders and they can provide false information if they want to preserve the enterprise image, so the outreach of the codes are very limited. Thus, Seidman (2008) proposes that labor activists should boycott their employers as a way to put pressure on the latter and eventually start the development of democratic institutions that could enable workers to raise their voices. It is important to mention that Seidman (2008) does not provide information of how transnational labor activists should deploy and consolidate those democratic institutions.

1.2.1.2 Mostly Negative Perception

Some scholars suggest that codes of conduct are a Northern-drive initiative, which has an inherent neo-utilitarian response to the economic and political imperatives of globalization that benefit some in the South and its proponents of the North. So, codes and labels have a structurally embedded limitation that favor some and exclude others (Blowfield and Dolan 2008) because codes and labels are a reflection of the system that conveyed them. According to these authors, this system that has many sectors such as export agriculture that depend on webs of informal jobs restrain the effectiveness of codes and labels. Or in their words', "*Whilst codes, together with national legislation and international agreements, can potentially affect the employment conditions of permanent workers, they are weak in their capacity to reach informal categories of employment"* (Blowfield and Dolan, 2008,p. 7). Following the same path of the latter proposition, Lund-Thomsen (2008) argues that voices and concerns of those much affected by social labels and codes are not heard in conferences that usually happen in North America and Europe. In fact, one of the author's five claims to make labels and codes work more effectively is to find a bottom-up approach where the perception of local stakeholders are taken into consideration before prescribing any sort of rule that codes may contend. Lund-Thomsen's four recommendations are: the need to find meaningful ways to assess the impact of codes instead of just checking their compliance with what is written; take into consideration social, economic, environmental and linguistic contexts in which codes are implemented; the emphasis on the need to hear the

demands of vulnerable workers; and finally the need of global enterprises to engage in long term practices if they honestly want to act socially responsible.

Blowfield and Dolan (2008) and Lund-Thomsen (2008) reach a similar conclusion when arguing that national governments play a very important role in enforcing existing legislation. In a context where national governments are totally absent, it is really hard to enforce any type of code.

Additionally, Bond (2008) notes the importance of the state's composition. Societies would acquire much of their needs if they choose to be represented by a political party that is accountable to the working-class. Also, he adds that global corporations cannot be linked to the notion of poverty and inequality reduction because they are incompatible considering that global corporations are profit seekers.

1.3 Social Labels and Codes' Limitation: Dependent Variables Selection

Regarding the effectiveness of social labels and codes of conduct, and the different conclusions reached by authors, I will present the most frequently cited limitations that inhibit labels and codes to reach effectiveness. I divide these limitations in two categories: *stakeholders' awareness* and *monitoring/verification*. They both represent the evidence, dependent variables, or necessary conditions that if lacking would make a social label/code ineffective.

1.3.1 Stakeholders' Awareness

Stakeholders, those who are involved in the implementation of the codes and labels and can be affected by the actions of the private enterprise (Freeman

1984; Hall and Vrendenburg 2003), must be conscious about the principles that uphold the code of conduct and the rights of the other stakeholders too. Stakeholders in the case of codes and labels are private enterprise owners, workers, and the government. One good example showing the importance of stakeholders' consciousness is presented by Hughes (2001). In her research about the Kenya Flower Council, she reaches the conclusion that the code could only be implemented positively because the "*authors of the Kenya Flower Council's code of practice are the organization's directors, comprising both financial and production managers of the major farms supplying European markets and the way in which these farm managers have assumed the role of active industry regulator is crucial to note"* (p.392). Reaching the same conclusion, Blowfield (2007) notices that there is a greater need for local stakeholders' participation, especially employers who supposedly are benefiting from codes implementation. The cases Blowfield (2007) analyses have Northern NGOs as the main implementers of the codes and labels in developing countries and his conclusion is that there should also be a shift in decision-making from North to South, otherwise ethical trade will be paternalistic.

Hale's (2000) research also suggests that there has been a top-down implementation in the Chinese garment industry with workers not even knowing what rights they have. Ultimately they end up suffering unjust working conditions as they do not mobilize against what has not been included in their code. In this regard, all parties affected in the implementation of the codes of conduct should be aware of its importance.

Government awareness also counts significantly for social labels' effectiveness. Authors affirm that there should be a better and more entrenched coordination between private and public action. Barrientos (2000), for example, suggests that codes and labels should not substitute for government actions in developing countries, but rather work in coordination. Diller (1999 p.125) notes that there should be a hybrid model, "*which adapts voluntary private-sector guidelines to a legally binding convention system of multilateral public regulation where states assume certain obligations respecting private-sector standardizing initiatives(…)".* Thus, the national context, or the role of the state, as an important stakeholder, in actively enforcing labor legislation is crucial to make codes and labels work. The importance of national legislation enforcement has already been shown through the argument of Blowfield and Dolan (2008), and Lund-Thomsen (2008) on the mostly negative perception section. These authors' conclusions also reaffirm the need of a national context where national legislation is strongly enforced. That is to say, when national governments work in coordination with the public sector, a positive outcome is more likely. Or simply, as Barrientos (2008) points, the positive results obtained in South Africa in the wine industry, WIETA (Wine Industry and Agriculture Ethical Trading Association), could only happen because of the strong labor legislation enforced after the end of apartheid.

1.3.2 Monitoring and Verification

To enforce what has been written in the codes empirically, it is essential to monitor the codes' implementations. Thus, in the monitoring/verification phases,

there is a common belief among authors that there is a necessity of a third party to keep the information accurate and verify if what is written in the codes are, in fact, being applied. As Diller points (1999 p. 119) "*third party reporting offers various models for balancing control and avoiding conflict of interest"*. Following the same statement, Hilowitz (1997) suggests, "*monitoring/ inspecting must be carried out by reasonably independent agents"* (p.230). However, as aforementioned in the mostly positive perception section, Seidman (2008) concludes that voluntary privatized regulation such as NGOs, which could be a third party, does not protect workers because NGOs are dependent on employers' information in order to make any assessment. Employers tend not to provide true information to keep the enterprise image as "socially responsible". Although there is a disagreement regarding the monitoring/verification phases, it is a process constantly referred to by authors because to evaluate any impact of codes, it is necessary to check whether they are working or not and this is the main reason why this variable seems relevant to this project.

1.4 Case Selection

The main criteria that have been used to select case studies were to choose codes and labels that have been implemented in developing countries. Most of the social labels and codes have been implemented on the national level and by the private sector or NGOs. Table 1 presents the limitations and key factors, which we selected as most relevant with the literature review and findings from the selected cases.

Table 1. Cases and Key Factors Selection

Cases	Stakeholders' awareness	Monitoring and Verification Phases
Kenya – Flower Cut	The author notes that the fact that local financial and production managers were engaged in the code implementation was crucial because they perceived themselves as regulators.	The author suggests that external auditing system could help to increase the credibility of cut flower associations that sells in the international market.
Nicaragua - Coffee	The disempowerment of North decision-makers in the coffee industry contributed to help the empowerment of local decision-makers and thus the issues of marginalized workers were taking into account.	The author does not mention anything about the variable.
India and Nepal – Rugs Rugmark Brazil - Toys	The author does not mention anything about the variable.	In order to reach the effectiveness of the label in the studied case, there should be assiduous independent monitoring
India – Rugs Brazil – Toys China – Balls Brazil, Mexico, Malaysia, South Africa, Sri Lanka –Forestry Products	There should be a hybrid model where public and private sector engage in promoting better working conditions	With a third-party monitoring conflict of interest is avoided.
Pakistan – sporting goods	Workers need to participate in the implementation of the codes in order to have their rights guaranteed. National governments can play a role not only enforcing existing legislation but also providing the resources and infrastructure necessary for suppliers meet their legal obligations.	Auditing relies on top down procedure with limited shareholder participation. Also, auditors stay only a few hours inside the venue of production and information provision can be manipulated.
China – Garment	Top-down implementation of the code made employees not know their rights. They could not mobilize or organize themselves because they did not know what to claim for.	The only way to reach a good monitoring process is making all parts involved, specially, workers aware of their rights. It is the awareness of workers that will monitor employers' action against them.
South Africa – wine and fruits farms	By training local assessors of how implement codes made wine and fruits farm production reaches positive effect once assessors new the language and employees' needs. The positive effect of the code implemented in South Africa is due to strong post apartheid labor legislation.	A big challenge is that monitoring is restricted by the lack of sufficient resources for labor inspection.

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Guatemala – Apparel factories India – Carpets South-Africa – all productive segments		The three cases perceived by scholars as successful are questioned. It is demonstrated that in all cases even independent monitors depend on enterprises internal source of information. The accuracy of the information is questioned.

Source: Elaborated by the author

1.5 The New Case: Brazilian Social Fuel and Its Peculiarities

Different from the selected cases presented in the literature review, the Brazilian social fuel label is a Federal Government rather than a private sector initiative. This is a new type of arrangement where the Brazilian government, through the Ministério do Desenvolvimento Agrário (The Ministry of Agriculture Development), rewards the social fuel label private enterprises (biodiesel refineries) that buy crops from small farm producers and assists the latter with their inclusion in the biodiesel supply chain.

The Social Fuel Label requires participation by enterprises (biodiesel refineries) must follow according to the guidelines bellow[4]:

• Buy 30% of the crop production from small farm families of Northeast, Southeast and South regions of and 15% of small farm families of North and Midwest regions;

[4]These requisites are available at:
http://comunidades.mda.gov.br/portal/saf/programas/biodiesel/2286313

• Write contracts that must be negotiated with small farm families that include the following requirements:

• contractual term;

• price paid for each purchase and criteria for readjustments of the prices;

• conditions for crops' production delivery;

• safeguards to each party;

• the agreement of small farm families' representatives regarding contracts' content and

• the assurance that technical assistance and training are going to be provided to farmers.

The project of biodiesel expansion in Brazil (PNPB), is an attempt to repair the mistakes caused by past agriculture policies, which excluded most small farmers socially. According to Hall et. al (2009), the green revolution technology that greatly helped Brazilian agriculture production and exportation brought a controversial situation to the country. The authors claim that agriculture production was booming with green revolution technology (which could only be afforded by large-scale farmers) small farmers could not compete with them and ended up being excluded and, most of the time, selling their lands to large-scale farmers. The majority of small farmers were left without land and ended up living in *favelas* or slums, places where people live at the margins of society.

Another relevant example, which contributed to this "social exclusion", is the Brazilian ProÁcool program. This was the first national attempt to produce ethanol during the 1970s. The ProÁlcool program can be considered as the

biodiesel program's predecessor because both programs utilize crops as inputs in order to produce a final good, a fuel. Hence, considering what occurred with ProÁlcool has also been a goal for the PNPB policy makers, as an example of what not to do in terms of social policy. Hall et .al (2009) show that the ethanol production supported the use of low-skilled, low paid and seasonal workers as opposed to oil extract workers who have to be trained to do their jobs. In addition, the authors point out that the government subsidies also favored large-scale farmers that were located in more developed regions of the country such as Southeast and Center of Brazil instead of North and Northeast regions. The Brazilian ethanol program was not successful in reducing poverty and conversely it increased the gap between rich and poor.

Therefore, the Brazilian government launched the social fuel label, under the biodiesel program umbrella, as a mechanism to make sure that small farmers will be included in this national biodiesel production. The idea is to incentivize biodiesel enterprise owners to buy small farm families' castor bean, sunflower, soy or any other oleaginous crops in order to include those farm workers in the production chain and promote social inclusion. If a company has the required standards to receive the social fuel label, which means, if companies buy oleaginous products from small farm families, they will have better access to credit lines and financing conditions, tax exemptions and the right to participate in the sell auction. Enterprises must also provide technical assistance and training for farmers.

So, contrary to the ProÁlcool program that had as its main stakeholders, large-scale farm owners, military groups, bureaucrats and mainly the elite, the PNPB has been trying to involve different types of stakeholders that also have different interests. Small farmers have different interests of those of the refineries' owners making an agreement hard to reach among parts (Hall et al. 2009)

Even though there has been a great effort to make biodiesel work, there are still some obstacles and issues that have to be analyzed as a way to check the label's efficiency. One noticeable obstacle is the distance between where most large-scale biodiesel refineries are and where the poorest small families are found. Large-scale refineries, which contribute the most for national production, are usually located in South and Southeast Brazil whereas small farmers who most need income increase and help are usually living on North and Northeast Brazil.

1.6 Steps Towards a New Study

What came out from this overview is that there is not a conclusive approach regarding the effectiveness of social labels and codes of conduct. This inconclusiveness requires a further step in research as a way to bring light to some gaps that are still left on this topic. This is the reason why we propose to study a new case, the national Brazilian social fuel label. The Brazilian label differs significantly from what has been studied in ethical trade literature. Usually, social label programs are part of private sector initiatives or can be a partnership between the private and public sector support. However, the Brazilian case is a

solely public sector initiative, which has as its main goal the regulation of working conditions of small farmers who sign contracts with private enterprises[5] in order to supply the latter with oleaginous crops that will eventually be used in biodiesel fabrication.

The unseen arrangement, with the government as the only provider and guarantor of tools to promote good working conditions, will provide an important contribution of how the relationship of stakeholders develop in the Brazilian context. As the only provider and monitor of the implementation of the social labels, will the government produce positive effects, and will the government's engagement in this initiative alter the limitations on outcomes? In short, the Brazilian case could shed light in the about how codes and labels limitations could be overcome.

1.7 Conceptual Framework

1.7.1 Key factors, Authors and Explanation

The main question this research attempts to answer is whether social labels and codes are effective or not. With the literature review, we draw the conclusion that the effectiveness of labels and codes depends on two factors: *stakeholders' awareness* and *monitoring and verification*. These factors lead me to understand that social labels and codes are going to be effective unless they are enforced, which means that the enforcement of labels and codes is the

[5] Nonetheless, it is important to mention that the Brazilian arrangement is also comprised of government, mixed capital (both private and states'capital) such as PETROBRAS MC, and small farm farmers. In chapter three, the arrangement with mixed capital refinery is extensively explained.

independent variable of this research and it is going to determine whether the social fuel label is going to work or not.

The key factors have been chosen to help explain how limitations could be overcome and, in this sense, predict beforehand possible limitations that may appear with the implementation of the social fuel label in Brazil. It is important to mention that the categories developed with the literature review are a generalization drawn from what is known about social labels and codes implementation in the developing world. So, these categories may not fit perfectly in the Brazilian case, particularly because it is a peculiar case, in which the government is the provider and monitor of the social fuel label.

Ultimately, the process of choice for these variables has relied on the number of times different authors mentioned the same factor in their research cases. The more often different authors talk about the same issue, the more relevant this issue seems to be for this research. Thus, the categories developed in the literature review are going to be took into consideration when the survey took place during fieldwork, at the very last, they are going to be used as a departure point for further analysis.

The following table shows the key factors, the reason why they should be considered as relevant, and authors who perceive the same factor as important. Table 2 is a representation of why we think stakeholders' awareness and monitoring and verification are relevant for social fuel label enforcement.

Table 2. Key Factors

Key Factors	Explanation	Key Authors
Stakeholders' awareness	Authors say that the more employees, employers, the government, managers and consumers know about the code and label, the better the effect caused by the implementation of codes and labels. The higher probability would be that employees would benefit from these tools. Special attention should be paid to how codes are elaborated. Authors note that some codes were designed in a top-down and northern oriented approach leaving some stakeholders without enough knowledge to obtain a positive effect of codes in their favor. Also, authors note that in a national context where national legislations are strongly enforced, a more positive effect is reached when codes and labels are implemented in enterprises. The public sector awareness is crucial to assist codes' and labels' effectiveness in the private sector.	Hughes(2001), Hale (2000), Blowfield (2007), Barrientos(2008), McDonald(2007), Bond (2002), Diller (1999), Blowfield and Dolan (2008), Lund-Thomsen (2008)
Monitoring and Verification	All authors agree that a monitoring system is required in order to verify if enterprises are following the codes' statement. To have a better assessment, authors propose that a third party (such as NGO or any other type of org.) has to be involved in this process. However, a recent study shows that third parties are dependent on enterprises' insiders to have information in order to produce any type of evaluation and they can forge information.	Diller (1999), Hilowitz (1997), Seidman (2008), Barrientos (2008), Blowfield (2007)

Source: elaborated by the author

1.7.2 Stakeholders' Awareness

Stakeholders who are involved in the process of a social label implementation have to be aware of their rights and the rights of others. In other words, workers have to know if they are being abused in their workplaces and need to mobilize in case employers are not following what has been written in the code of conduct. Also, the national government has to be aware of these labels and codes' implementation. The national context where workers' legislation is enforced makes the social label effectiveness more predictable.

1.7.2.1 Expected Relationships Among Stakeholders

Considering that stakeholders (government, private sector and workers) have to be aware of and engaged in the social label implementation, a particular behavior is expected of each in relation to the others. In the case of the Brazilian social fuel label, the relationship among the main actors could evolve as presented in the following table.

Table 3. Expected Relationships

	Public Sector (Gov.)	Private Sector (Refinery Owners)	Workers (Small Farmers)
Public Sector (Gov.)	X	It is expected that enterprise owners will buy crops from small farmers and not exploit any of its workers.	Social inclusion of small farmers is expected with their participation in crops production.
Private Sector (Owners)	It is expected that the national government will provide enterprise owners credit lines, tax exemption and the right to participate in the biodiesel sell auction.	X	It is expected that enterprise owners will provide technical assistance, seeds, fertilizer, and pay fair prices to small farmers.
Workers (Small Farmers)	Small farmers expect that the national government will verify the enterprise owners' compliance with the label.	It is expected that small farmers deliver the amount of good quality crops required by enterprise owners.	. X

Source: Elaborated by the author.

According to the relationships among main actors involved in the implementation of the social fuel label presented in Table 3. The following sub-hypotheses are drawn from it:

a. **Public/ Private Sectors Relationship:** If subsidies that the government is providing to refinery owners do not pay off the costs enterprises incur by complying with social fuel label, refinery owners will not use small farm workers labor force.

b. **Public Sector/ Workers Relationship:** If the government does verify accurately the Social Label compliance, small farmers will be socially included.

c. **Private Sector/ Workers:** If workers deliver enough amount of crops (economies of scale), enterprises will keep buying crops from small farm workers; therefore complying with the Social Fuel Label.

1.7.3 Monitoring and Verification

As a way to guarantee a good result of the social label implementation, which means, in order to make sure that employers are complying with the code of conduct, there must be a monitoring stage. Authors show that an involvement of a third party to monitor the compliance with social label principles is necessary as opposed to an internal monitoring mechanism. To maintain a good assessment, impartiality is required. If those involved in the monitoring process will have any type of gain with unreliable information, such as a false evaluation, there is no point in monitoring.

1.7.3.1 Monitoring and Verification Aspects

In the Brazilian case, the monitoring stage has been done by government officers of the MDA (Ministry of Agriculture Development). That is to say, it is the government that will assess the enterprises' compliance with the social fuel label. As shown in the literature review, most authors believe that in order to reach effectiveness with social label implementation, a third party has to be involved in

the monitoring stage. However, Seidman (2008) shows that the most important part of this process is not only related to third parties but also to information availability. If those who are involved in the monitoring process are dependent on enterprises' insiders to get information to evaluate the compliance, not even third parties are able to produce a real evaluation. Enterprises' insiders can forge information, so the assessment is mistaken and the real monitoring is not enforced. In this sense, there are two variables that have to be considered as present or absent in the social fuel label to confirm its effectiveness: (i) information availability and (ii) information flow. Therefore, two sub-hypotheses can be drawn:

a. Monitoring government officials may be dependent on enterprises' insiders to have information available about the label compliance affecting the outcome.

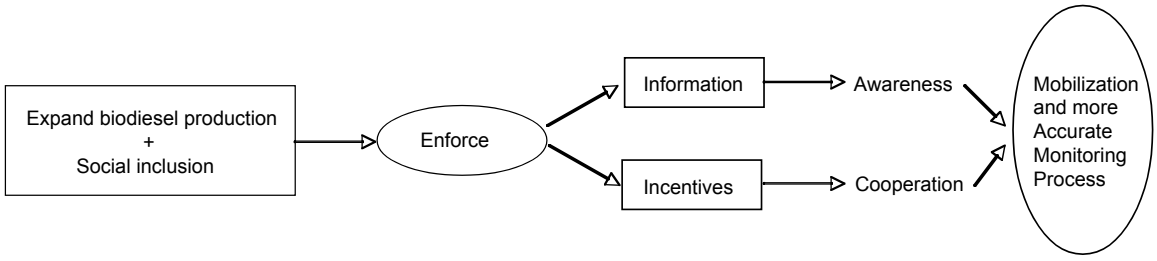
b. The information will flow among those involved in the label implementation only if there is not a conflict of interest.

1.7.4 Key Factors Explaining the Overall Results

Social label enforcement will take place when parties involved have self-awareness in terms of their rights and information flow and availability for all. Being aware of its rights, a party can mobilize in order to have its rights respected by the other parties and by having open access to existent information makes fraud less possible and monitoring could be more transparent. Without these types of enforcement or any other type of enforcement that may be relevant and identified with research development in the future, it may be difficult

to reach positive results. Figure 1 represents the ideal process to reach a social label positive result.

Figure 1. Social Fuel Label Positive Result



Source: Elaborated by the author.

To explain the overall question of whether social labels work effectively or not, we have to consider and verify each of the sub-hypotheses because they represent conditions, which will tell if the social fuel label will work effectively or not. Therefore, the way that I am planning to gather information in order to test the sub-hypotheses will be presented in the next section.

1.8 Methods

To test the propositions drawn from the stakeholders' relationships and from what is known about the monitoring and verification processes, we researched specific information sources such as websites, regulations, contracts among parts, newspapers and blogs. Also, through field research, we observed and interviewed people involved in social fuel label's implementation. The idea

was to gather information from each of the stakeholders (government officials, enterprises owners, and small farmers or small farmers representatives such as cooperatives organizers) and possibly from different parties that are not directly involved with the social fuel label assessment (such as the Agriculture Workers Federation of Minas Gerais State FETAEMG, an organization that provides information and support to small farmers). We also contacted scholars from local universities, such as, the Universidade Federal de Minas Gerais and Potifícia Univesidade de Minas Gerais, who could help me with the development of my research specifically in terms of how the biodiesel Minas Gerais program started and is still working. Although most Brazilian universities are focused on the development of biodiesel technology, we contacted faculty interested in the broad view of the Brazilian biodiesel expansion program, including the issue of social inclusion and social fuel label. Contacting the Government branch of technical assistance and rural extension (EMATER – *Empresa de Assistência Técnica e Extensão Rural*) was a cucial step to gather information to this research. EMATER is one of the main sources of information for my research because EMATER provides technical assistance to small farmers involved with biodiesel production and it is the government's main source of research production. I could contact EMATER because the Minas Gerais delegacy of PNPB staff had the contact of the EMATER-MG coordinator who also introduced me to some technicians that support small farmers.

When interviewing stakeholders[6], we used an interview guide but we also let relevant issues to be raised according to interviewees' responses. We have made different guides for every stakeholders group (interviews' questionnaire guides are available in Appendix C).

We also told interviewees that their names and position would be kept confidential so they will not fell in danger or at risk of any physical or psychological loss. In total, we interviewed 15 people. From that total, 6 were interviewed solely by phone; 3 were sent questionnaires and then phoned to confirm what they have written in the questionnaire and 6 were interviewed in person. In every interview session whether in person or by phone, we asked if the interviewee would let us record. We have a total of 12 interviews recorded and transcribed; 3 interviews that could not be recorded but were transcribed concomitantly the interviewee's response. All information acquired with interviews were summarized and used as a guide for this project.

Table 4 exemplifies the sources of information that we used in this research. We also listed internet sources that provide information constantly about Brazilian Biodiesel industry and how we are currently planning to gather these pieces of information when working on field research.

[6] See appendix A for a table with interviewees' information.

Table 4. Information Spaces

Websites	The Brazilian Agriculture Research Corporation - http://www.embrapa.br/	
Interviews	My intention was to interview people involved with biodisel production in Minas Gerais Northern State. I contacted biodiesel private enterprises, via phone, and checked if they could answer my questions personally or if I could hand or email them a form where they could answer some questions.	-I contacted agriculture cooperatives. One source that helped me to reach them was trough the website: http://www.hotfrog.com.br/Produtos/Sindicato-Dos-Trabalhadores-Rurais On this website there is a list with all Brazilian rural workers syndicates and cooperatives and how to contact them. I could not contact small farmers directly but I was able to talk to each representative and some workers of cooperatives involved in North Minas Gerais' biodisel production. - I was able to contact refinery owners names and locations at: http://www.biodieselbr.com.br. On this website there is a list and contact of all Brazilian biodisel producers. That website was the main source for me to reach refineries and to read about issues that have been developing in the sector. - Regarding the government, I went to Brasília do interview the Biodiesel Program National Coordinator. I also contacted the Delegation of the Ministry of Agrarian Development, in Belo Horizonte. I was able to interview the Minas Gerais program delegate and the actual people who supervise and coordinate the social fuel label. Their contacts are available at: http://portal.mda.gov.br/portal/institucional/Delegacias_Federais_do_MDA
Regulation (number of contacts)	The Brazilian Federal Government has a website with all information regarding regulations that stakeholders must follow http://www.biodiesel.gov.br/	I had accessed the normative instruction (legislation) that establishes each stakeholder duty and expected relationships among them.
Observation	To visit and spend some time in private enterprises. The number of visits depended on the refinery owner acceptance of my presence there.	Only one biodiesel refinery owner let me spend some hours in his biodiesel production spaces (facilities).
Newspapers	While doing my field research, I was attentive to any major sources of news such as newspapers. I'm a native Portuguese speaker, so I had no problems with language comprehension.	I constantly Checked the following newspapers : Folha de São Paulo, Estadão, Estado de Minas and O Globo. I subscribed to receive the monthly magazine Biodiselbr. Also, I was checking archives.
Websites Blogs	Biodieselbr is a website that provides updated information regarding what universities are doing with the topic, enterprises that are not respecting the social fuel standard, how the government is coping with the obstacles that are appearing in the biodiesel field - http://www.biodieselbr.com/	In this website I found data to compare firms complying with social label and those enterprises that are not complying.

University Partners	Federal University of Minas Gerais - http://www.ufmg.br/online/arquivos/004459.shtml Catholic University of Minas Gerais - http://www.pucminas.br/pucinforma/materia.php?codigo=1429&PHPSESSID=c9d68d8fe9bf1bad7676377daf7de41d	One of the main researchers in Brazil about biodiesel and working conditions is a faculty professor of Universidade de São Paulo (USP) Ricardo Abramovay who has recently published a book (Biocombustíveis: A energia da controvérsia). His contacts: University of São Paulo - http://www.abramovay.pro.br/ Antônio M. de Carvalho a sociologist interested in biodiesel.He's a professor of PU/UFMG. Angela Menin – Chemical Engineering professor of UFMG and director of MG SOLDIESEL until 2009. Pompilho- Chemical Engineering of PUC-MG.

2: THE ADVANTAGES AND DISADVANTAGES OF BRAZILIAN BIODIESEL PROGRAM (PNPB)

2.1 Advantages and Disadvantages of PNPB

In 2003 the Brazilian Federal Government established an inter-ministerial commission to work on the feasibility of producing vegetable oils and animal fats as alternatives types of fuels (Pousa at al. 2007; Hall et al. 2009). This inter-ministerial commission consists of 14 ministries and has an executive board, which is lead by the Ministry of Mines and Energy in addition to representatives of the Brazilian National Agency for Petroleum, Natural Gas and Biofuels (ANP); The Brazilian Agricultural Research Institute (EMBRAPA); and the Brazilian Development Bank (BNDES) and PETROBRAS. Thus, in 2004, the National Program for Production and Use of Biodiesel[7] (PNPB) was created with its core objectives being the stimulation of the biodiesel market guaranteeing a viable biodiesel national production to promote regional development and social inclusion of Brazil's poorest regions. Since then, the Brazilian government has stimulated the expansion of its domestic biodiesel production through three main policies (Hall et al 2009):

• First, up to 2% of biodiesel must be added to diesel supply from 2005 to 2008, namely, B2 and up to 5%, namely B5, from 2008 to 2013 with a progressive percentage increase thereafter.

[7] The WCO (World Costumes Organization) defines biodiesel as: mono-alkyl esters of fatty acids of a kind used as a fuel, derived from animal or vegetable fats and oils whether or not used.

• Second, incentives were given to research institutions such as EMPBRAPA and universities for projects that promoted technology development.

• Third, tax exemption, credit lines and the right to participate in auctions are given to biodiesel refineries that buy crops from small farm farmers. Refineries that buy crops of small farmers receive a stamp or label, which shows that they are contributing to social inclusion.

Although the core of the PNPB is small farmers social inclusion, it is important to mention that Brazil is historically dependent on fossil diesel imports. Therefore, the biodiesel national expansion is also a strategic step that could eventually help the country decrease its vulnerability on fossil diesel imports.

Thus, considering the intricacies involved in the national biodiesel production expansion, the purpose of this chapter is to present the advantages and disadvantages of the biodiesel production in Brazil. In this regard, we will provide the context in which the Brazilian biodiesel production is involved and how it has developed until now.

Logically thinking about the possible scenarios that could be formed with the national biodiesel production expansion, we are able to find: first, a positive scenario where biodiesel should be continuously produced as the way it is; second, a negative scenario where biodiesel should not be produced in Brazil anymore, and third, a mixed scenario that represent a perspective comprising both positive and negative aspects that should be kept and altered respectively. Thus, departing from the third scenario we examine the PNPB along the lines of

economic, environmental, social and governance categories, which are fulfilled with information found in secondary data and will be presented as follows.

Our main findings in this chapter are that Brazilian biodiesel production is formed under a mixed paradigm where i) national biodiesel production is not supplying the national demand; ii) biodiesel production and distribution in Brazil is highly concentrated; iii) the number of small farmers participating in the program has increased; and iv) 80% of biodiesel in Brazil is made of soy, which is not the most appropriate crop in term of environmental and social aspects although more economically viable.

2.1.1 The Economic Aspect

In terms of biodiesel production expansion, Brazil has features that are perceived as advantageous. The available agricultural land, with it being the world's fifth largest country in terms of geographical area, means that land does not represent a problem like it is for some European countries that produce biodiesel as well. According to Rodrigues et al. (2007), there are about 2 million hectares to grow oleaginous crops every year in the country.

Brazil is the tenth largest energy consumer in the world[8] where there exists a domestic demand for energy. The agricultural sector represents 25% (17.9% agriculture+7.2% livestock) of the country's GDP[9], which makes the country one of the world's biggest crop producer (Hall et al. 2009). However, an important aspect that has to be taken into account is the fact that the national

[8] www.eia.doe.gov
[9] 2007's GDP according to the authors (Hall et al. 2009)

agricultural productivity is highly concentrated. Garcez and Vianna (2009) mention that according to the Brazilian Institute of Geography and Statistics (IBGE), in 2004 the northeast region's GDP per capita was half of the national average and the North region's 33% less than the national average. Therefore, regional development must be an issue in regard to any type of public policy and the national biodiesel program should address all these problems.

Table 5 shows a comparison between diesel and biodiesel production domestically; diesel imports and exports; the total national consumption of both fuels; distributor sales and the percentage of dependency Brazil has on diesel.

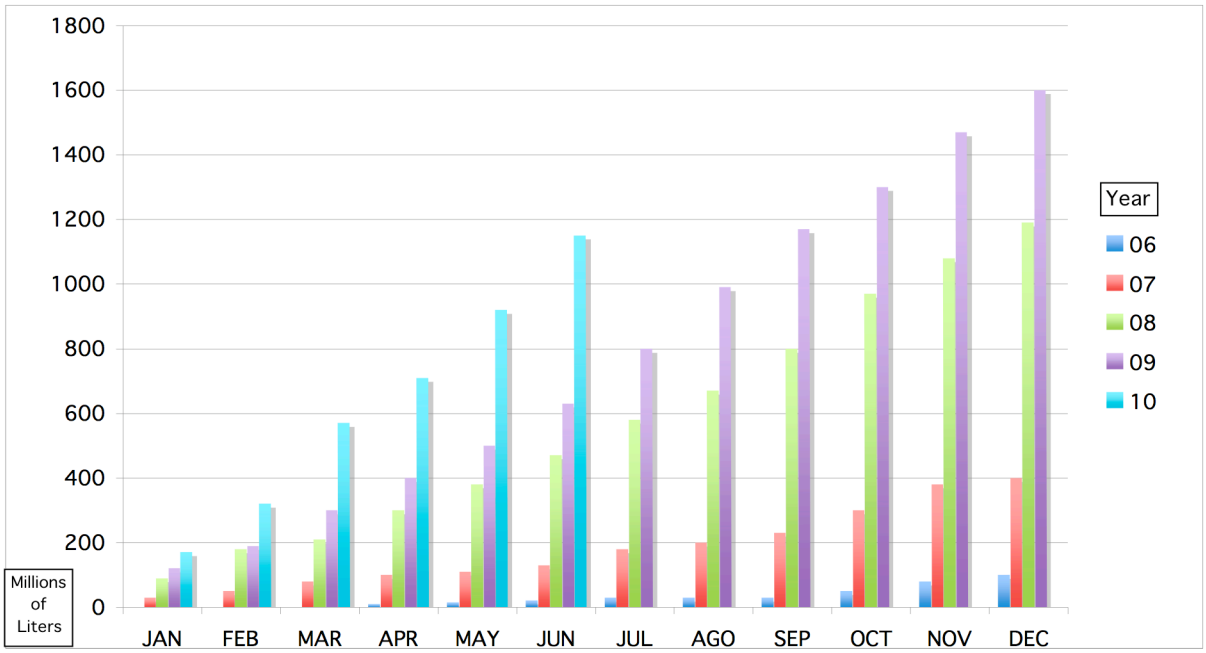
Table 5. Brazilian Fossil Diesel and Biodiesel Production

		2009 1st Semester	2010 1st Semester	Var %
DIESEL	Production (a)	20.598.838	19.904.693	-3%
	Import (b)	1.172.265	3.798.234	224%
	Export (c)	542.418	442.010	-19%
	Net Import (d= b-c)	629.847	3.356.224	433%
BIODIESEL	Production (e)	652.828	1.130.763	73%
Total Projected Consumption (f= a+d+e)		21.881.513	24.391.680	11%
Distributors sales (g)		20.700.690	23.351.029	13%
Dependency on Imported DIESEL (h = d/g)		3%	14%	372%

Source: Reproduction of ANP/MME (2010, p. 1) - http://www.anp.gov.br/?id=472

In 2010 Brazil implemented the B5 policy, which is an additional 5% of biodiesel into the diesel supply. Previously, Brazil required only 2%, the B2, as mentioned in the introduction. Thus, although there is an increase in the total use of biodiesel, we can notice in the table above that there was an increase in diesel importation as well. This means that Brazilian national biodiesel production has been not enough. According to the Ministry of Mining and Energy (MME), the import increase is a result of Brazilian economic activity heating up. In 2010's first semester Brazil imported 3,8 billions of liters[10] of diesel, which corresponds to an increase of 224% compared to the same period in 2009.

Figure 2. Evolution of Brazilian Biodiesel Production Capacity



Source: Reproduction of ANP/ MME (2010, p. 4)

[10] 1 liter = 0,26417 US gallons

According to the Mining and Energy Ministry (MME), from January -July of 2010, Brazilian national biodiesel production reached 1.322 million liters, which represents an increase of 64% considering the 807 millions of liters produced in the same period in 2009. According to the National Petroleum Agency (ANP 2010) periodical publication the estimated demand reached 210 millions of liters per month in the year 2010 (until July) and, in the same period, the national production only reached 191 millions of liters, which means that national production did not satisfy domestic demand, resulting in imports of biodiesel/diesel in Brazil as demonstrated in Table 5.

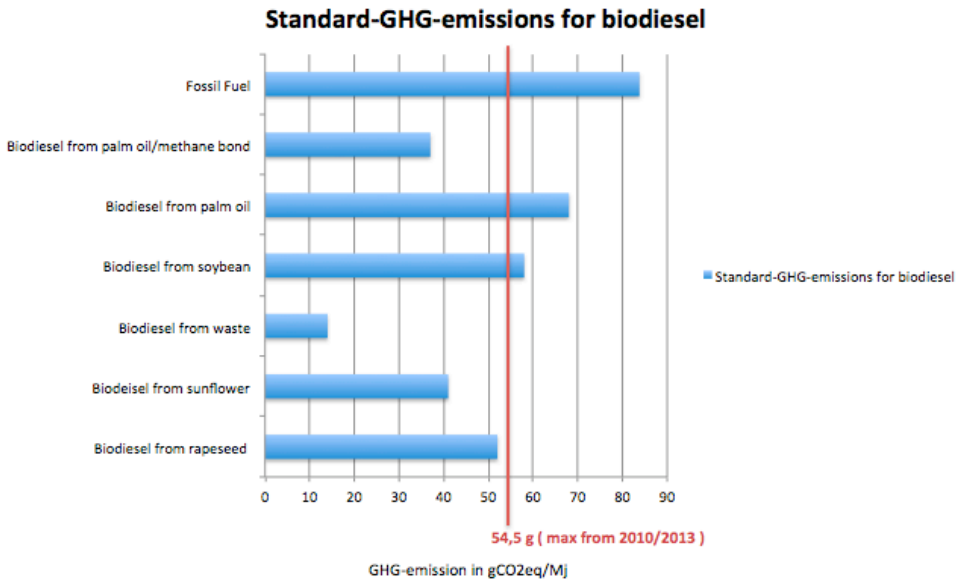
Therefore, there are still some inconsistencies in the biodiesel policy. It seems that the national production capacity is high; however it does not mean that national production will reach the amount demanded nationally. One possible explanation for this problem would be the fact that only a small number of biodiesel refineries in Brazil can produce a large amount of the product and, in this way, production capacity is concentrated (Hall et al. 2009 and Garcez and Vianna 2009). According to Hall et al (2009 p. 82), *"21% of total refining capacity located in the central region will produce over 32% of the country's biodiesel"*. In addition, large scale refineries are located in Southern and Western parts of Brazil and as the National Petroleum Agency (ANP 2010) periodical publication demonstrates, the average of the regional production in June 2010 was 45.5% in Center-West region; 25% in South; 19,6% in Southeast; 6,2% in Northeast and 3.7% in North. Southern and Center-West regions represent 70,5% of the national biodiesel production.

2.1.2 The Environmental Aspect

There are two main factors that are potentially viewed as good results of biodiesel production. First, the decrease of CO2 in the atmosphere, or as Frondel and Peters (2007) point out, the positive effects of biodiesel are based on the assumption that the combustion of biofuels is CO2 neutral. The amount of CO2 accruing during combustion equals the amount that is sequestered during crop growth. Second, by blending biodiesel into regular diesel, scarce non-renewable fuels are saved.

Germany, the world's largest biodiesel producer, has recently published a decree that it is going to implement the European Union's Renewable Energy Directive into National Law, which means that stricter parameters are going to be used in order to access the biodiesel GHG emission. As presented in a document of the German National Government Agency of Oil (UFOP 2009), there should be a GHG-reduction level of 50%. They also mention, "*noteworthy is the fact that "mixing" biofuels in relation to the balancing out of the GHG emissions is only possible when all biodiesel produced or the respective raw material achieve the minimum reduction in GHG. Consequently biodiesel made from soy oil has to run out of the EU-market in latest at the end of 2010"* (p.14).

Figure 3. GHG Emission in gCO2 eq/MJ per Feedstock Variety



Source: Simplified Version of UFOP (2009, p.15)

As we see in figure 3, from 2010 until 2013, in Europe, biodiesel varieties that do not emit more than 54,5 g of CO2 eq/MJ[11] which represents 35% less CO2 emissions compared to fossil diesel emissions that is 83,4 g of CO2 eq/MJ will be allowed, according the UFOP document shows.

Biodiesel made of soy produces 58 g of CO2 eq/MJ yet Brazil has more than 80% of its production based in soy. According to (ANP 2010), in June 2010, biodiesel made of soy produced in Brazil corresponds to 84,1% of the total national production. Therefore, if Brazil eventually intends to export biodiesel to E.U. countries, diversifying its crop variety would be necessary. Giving incentives for the production of biodiesel made of more ecological crops, thus diversifying

[11] eq/MJ= equivalent mega joules

its feedstock, Brazil could export biodiesel to the European market according to their requirements and benefit from revenue exports.

Another environmental aspect that has been a matter of concern is soil acidification caused by fertilizers. A study made by United States Environmental Protection Agency (EPA) shows that biodiesel produces nitrogen oxide (NOx), which comes from fertilizers used in crops and this type of gas produces acidification. It also alters the soil equilibrium (Frondel and Peters 2007). According to the EPA (2002) the amount of biodiesel added to the mixture increases NOx emissions. Therefore, mixtures that contain less biodiesel, such as B10 and under, produce less NOx and therefore less soil acidification.

In this way, in regard to the environmental aspect, we can see that the "green" side of biodiesel has been questioned. As Garcez and Vianna (2009) points, soy is grown on large scales and in monoculture, which requires extensive clear areas that may lead towards loss of biodiversity. The need for pesticides also contributes to contaminate the soil and water. The authors also mention that *the predominance of soybean may also jeopardize biodiesel's social and energetic aspects of sustainability, since job creation for soy-based biodiesel has been estimated to be over 100 times smaller than that of castor bean*," (p.652) for example. Therefore, if Brazil continues to produce 80% of its biodiesel from soy, it loses the opportunity to meet the social and environmental goals of the program. Thus, crop variety diversification may be one of the PNPB concerns in order to reach its main goals, which is social inclusion.

2.1.3 The Social Aspect

The social aspect of Brazilian biodiesel production revolves around the Social Fuel Label, which is a policy tool that the Brazilian government arranged to include small farmers into the bidiesel production's supply chain and consequently, generate social inclusion. To include small farmers in the supply chain, the government offers tax exemptions, credit lines and the right to be part of the sell auction to refinery owners as long as they respect working conditions and buy crops as stated in the government code or normative instruction (*instrução normativa*). Refinery owners have to buy from each country's region a specific amount of crops from small farmers, sign a written contract and provide them technical assistance. The Social Fuel Label uses a symbol, which proves that a certain biodiesel has respected social conditions and, contributed to small farmers' social inclusion in the production process.

Although the Social Fuel Label represents an important initiative, there have been some concerns among refinery owners. In a research interview done by Hall et al. (2009) in Brazil, refinery owners say that the costs of technical assistance are very high and that the exemptions the government gives are insufficient. Santos and Ratmann (2009), in a survey conducted in Piauí state with refinery owners and castor bean small farmer growers, also mention that small farmers have problems following what has been written in the contract they have signed. The authors affirm that "*there is still a lack of commitment on the part of farmers"* (p. 4019).

Currently, 83% of the total of the capacity utilization is represented by refineries that have the social fuel label. ANP (2010) states that currently the total

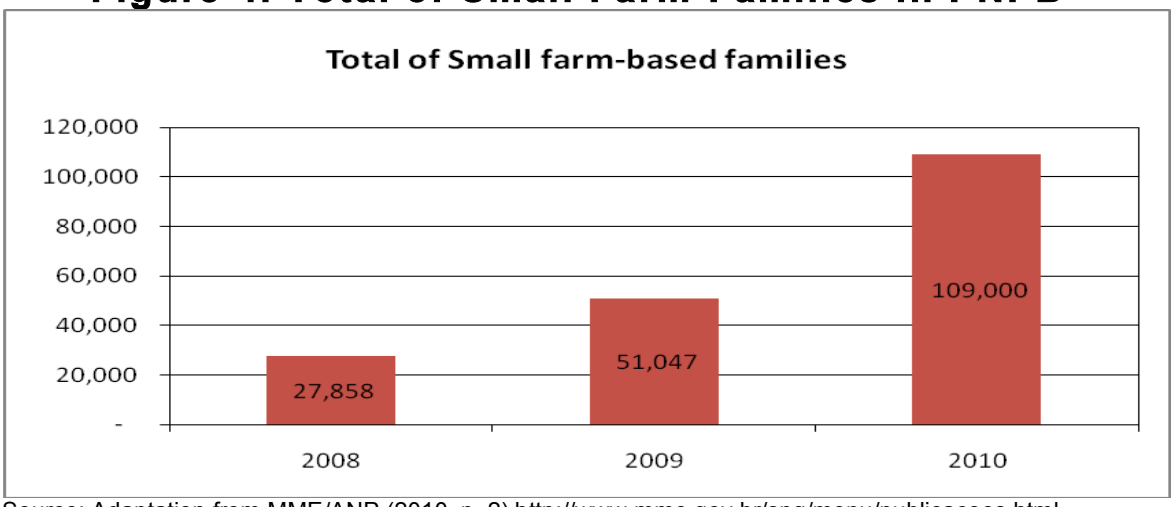
capacity utilization of national biodiesel production represents 390 millions of liters per month or 4,6 billions of liters per year.

Figure 4 represents an estimation of the number of small farm families that supposedly are going to be added into the supply chain, which is a total of 109,000 families. If this projection is true, it will represent an increase of 113% compared to the last year (2009).

The estimation is that by the end of 2010, families will get up to R$0,50 (Brazilian Currency)[12] from each biodiesel liter produced, which represents a little more than double since the program started. Figure 5 shows the amount each family involved in biodiesel production receives back from every biodiesel liter. The number of farm families contributing to the biodiesel production is also increasing according to MDA. In Figure 6, we see that the amount of farm families per biodiesel liter has increased to 40% from 2008 to 2010.

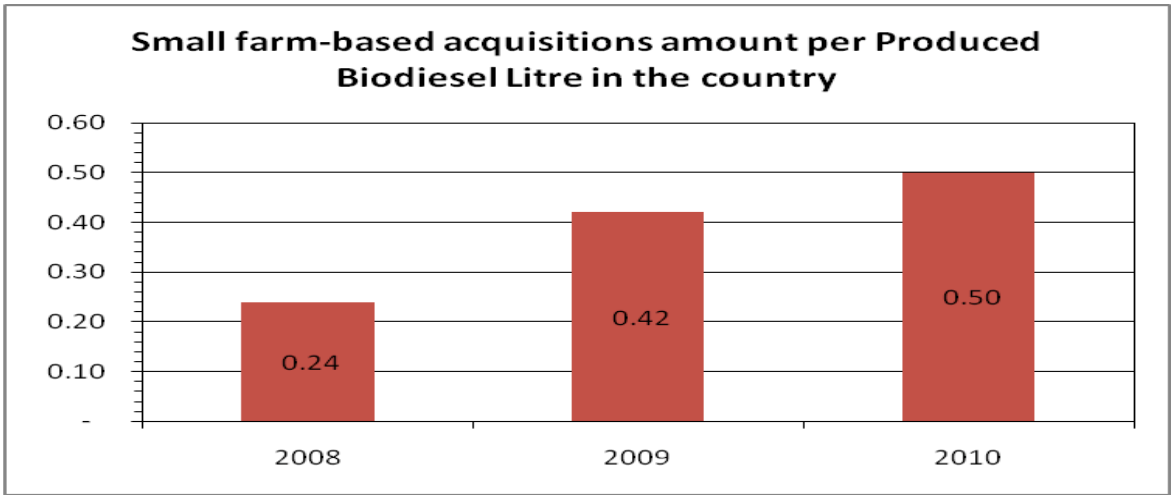
[12] R$0,50 = US$0,30 according to Coinmill's website (March 2011). Available at: http://coinmill.com/BRL_USD.html#BRL=0.50

Figure 4. Total of Small Farm-Families in PNPB



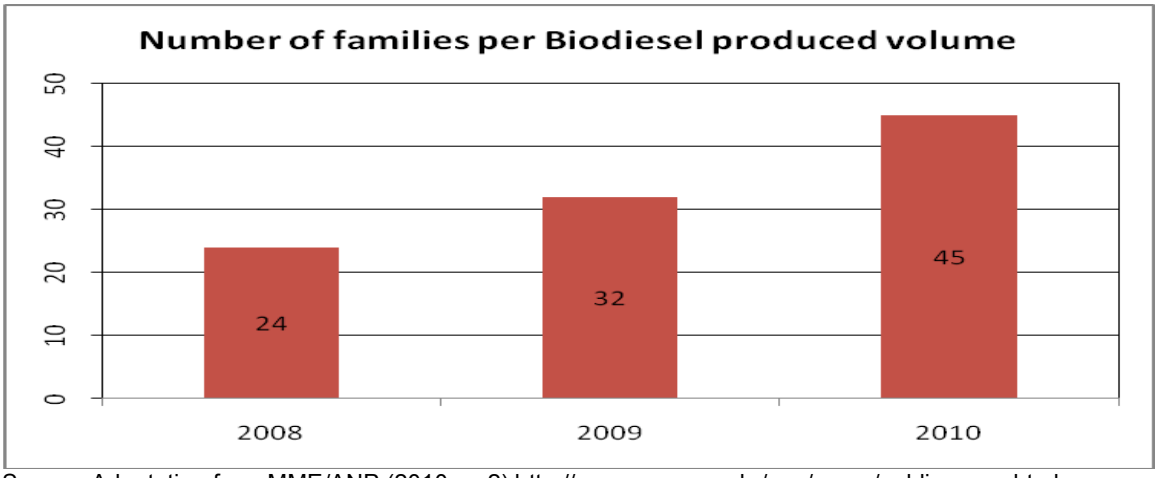
Source: Adaptation from MME/ANP (2010, p. 2) http://www.mme.gov.br/spg/menu/publicacoes.html

Figure 5. Farm Families Acquisitions per Biodiesel Liter



Source: Adaptation from MME/ANP (2010, p. 2) http://www.mme.gov.br/spg/menu/publicacoes.html

Figure 6. Number of Farm Families Included per Biodiesel Volume



Source: Adaptation from MME/ANP (2010, p. 2) http://www.mme.gov.br/spg/menu/publicacoes.html

Although there is a good estimation in regards to the number of families participating in the program and, therefore, the future scenario seems positive, there are some observations that need to be taken into account. The fact that the cost with technical assistance, which refineries incurr to pay for small farmers, is still high even considering government subsidies and may lead to a scenario where refineries will stop buying crops from small farmers.

Also, the increasing demand of biodiesel as we see in the Table 1 and the need to deliver greater amounts of biodiesel could make refineries depend on mechanized large-scale crop production, leaving small farmers out of the biodiesel supply chain.

2.1.4 Governance Aspects

In order to give incentives to biodiesel industry development, the Brazilian government is utilizing financial assistance, exempting taxes from biodiesel refineries. Nonetheless, it is necessary to comply with the Social Fuel Label

regulation to receive financial assistance, which means that refineries must spend by providing technical assistance to small farmers since this is one of the main requirements of the PNPB. Examining the conditionals of biodiesel prices is essential to see if it is economically viable to produce it rather than keep regular diesel by itself. The role of taxes on both diesel and biodiesel has to be considered.

Taxes added to fuel production are the CIDE (Intervention and Contribution upon the Economic Dominium); PIS (Social Integration Program); CONFINS (Social Security Financing Tax) and ICMS (Transportation and Circulation of Good and Services between States and Municipalities). Table 6 we see the taxes paid during the period of 2003. The fuel that is most taxed is gasoline (R$0,945) and the least taxed is regular diesel with a total of R$ 0,4596. According to BiodieselBR[13], the CIDE is not added to biodiesel production, therefore, taxes exempted are the PIS/COFINS and ICMS, which represent a total of R$0,2416. Since CIDE is not charged and PIS/CONFINS are exempted (only if refinery owners comply with the Social Fuel Label), there is no tax charged on the biodiesel final production.

Table 6. Tax Added to Each Type of Fuel (R$) *

TAX	REGULAR GASOLINE	HYDRATED ALCOHOL	REGULAR DIESEL
CIDE total	0,4058 (=0,5411 x 0,75)	0,0293	0,2180
PIS/COFINS producer	0,0004	0,0050	0,0006
PIS/COFINS distributor	----	0,0594	----
ICMS producer	0,3154	0,2355	0,1862
ICMS distributor	----	0,0968	-----

[13] Information available at: http://www.biodieselbr.com/biodiesel/impostos/biodiesel-impostos.htm

ICMS tax substitution	0,2234	0,0944	0,0548
Total amount of tax per liter	0,945	0,5204	0,4596

Source: http://www.biodieselbr.com/i/biodiesel/tributos-combustiveis.png

* R$ = Real (the Brazilian Currency)

The price of biodiesel is set by the Brazilian National Petroleum Agency (ANP), which sets the maximum price (or a reference price) of biodiesel per liter. As BiodieselBR website explains, the maximum price that ANP sets is what supposedly would keep the final price under reasonable value to the final consumer. However, before establishing the reference price, ANP makes an estimation of the total amount of biodiesel that is going to be needed to add in the blending, currently B5 (containing both fossil diesel and 5% of biodiesel). This estimation is based on a three-month production period and the auction happens every three months and has two stages and two phases.

In the first stage, ANP establishes the maximum price and the supply that is going to be needed for three months. Only refineries that have the social fuel label are allowed to sell their biodiesel production in the auction organized by ANP and PETROBRAS, which is the main biodiesel distributor in the country. In this first phase of the first stage, biodiesel refineries can sell up to 80% of their total production and bids are made anonymously. The logic of this auction is called inverse logic, which means that those who offer a smaller price for a bigger amount of production will be the winners and approved to be in the second phase of the first stage. Refineries approved for the second phase are those that offered a smaller price for an amount of production that is usually up to 30% more than ANP estimation.

After the first stage (first and second phases), refineries without the social fuel label are able to sell their production in the second stage, where the rest necessary to supply the ANP estimated demand is going to be sold by social fuel non-compliers. Therefore, the Brazilian biodiesel auctions start with the establishment of biodiesel maximum price according to ANP and the winners are those who offer more biodiesel for less (more biodiesel for the smallest price possible).

In auction 20[14], the maximum price ANP set was R$2,32 per liter and the final price reached was R$1,75[15]. On top of this price, the distributor has to add its service. According to ANP (2010), the diesel price on the same period (March 2010) before the distribution was R$1,748[16]. Since we do not have the information of how much is added by distributors after the auction final price is reached, it becomes difficult to make any final evaluation here. However it is certain that the biodiesel price will be higher than that of diesel, since before adding the PETROBRÁS distributor part both fuels have the same value.

When examining national biodiesel distributors in Brazil, we notice the prevalence of three big enterprises: PETROBRÁS, Ipiranga and Shell. Since the beginning of 2010's first semester, the total volume of biodiesel consumed by distributors (1,131.341 m3), PETROBRÁS was responsible for 470.803 m3, Ipiranga for 252.918 m3 and Shell for 114.951 m3. So, biodiesel distribution is also concentrated in the hands of three main enterprises. Therefore, more

[14] The 20th auction that happeneded in Brazil. It took place on November 2010 and it was the last one considering the time this text was written.

[15] Reference: http://www.biodieselbr.com/revista/018/a-alquimia-do-preco-3.htm

[16] Reference: http://www.anp.gov.br/preco/prc/Resumo_Mensal_Combustiveis.asp

research considering this concentration of distribution should be done in order to make clear if there is any collusion among them or the government.

Table 7 shows the largest biodiesel producers in Brazil. The largest producer Ecodiesel has branches in many regions throughout the country (6 precisely, on North, Northeast, West, South and Southeast). The second biggest producer, Granol, has 3 branches in the South, Southeast and Western regions.The other ones are located in South-Southeast (Biocapital, BSBio, Oleoplan Bertin); West (ADM, Caramuru and Fiagil) and Comanche on Northeast. Therefore, all the top producers are either located in South-Southeast region or Center-West. This situation reinforces the previous conclusion that biodiesel production is uneven throughout Brazil. Of the 50 refineries that exist in Brazil, 21 are located in the West and 18 in South-Southeast regions (ANP 2010).

Thus, we notice that to make a precise evaluation we would need to know the refineries' total expenditures with small farmers and combine this with all subsidies provided by the government. Nevertheless, comparing prices solely, we promptly identify that biodiesel costs more than regular diesel. So, the question would now be, are the social benefits surpassing the economic costs? Although we do not have a clear answer we have notice the biodiesel production it is not well distributed throughout the country and it is not coming from the targeted Northern areas. In this sense, currently, social benefits are not surpassing the economic costs.

Table 7. Top 10 Biodiesel Refeneries in Brazil*

	Refinery	Volume produced m3	Total produced m3	Region
1	Brasil Ecodiesel	892.200	383.659	NE; S; N; NE
2	Granol	247.020	315.608	S
3	ADM	205.400	173.039	W
4	Biocapital	180.450	101.011	SE
5	BSbios	172.960	100.711	S
6	Caramuru	165.000	150.962	SW
7	Oleoplan	127.570	103.415	S
8	Fiagril	116.000	68.999	SW
9	Bertin	67.200	70.362	SE
10	Comanche	60.000	24.747	NE

* Considering all auctions until December 2008.
Source: Created by the author with data available at http://www.biodieselbr.com/biodiesel/fabricas/usinas-biodiesel.htm

2.2 Governance, Economic, Environmental and Social Aspects: Main Findings

After analyzing the data provided, we can restate that Brazilian national biodiesel production is not supplying the national demand; the number of small farmers participating added to the supply chain is increasing although there has been conflict regarding written contracts agreements between small farmers and refineries (Hall et al 2009 and Santos and Rathmann 2009); biodiesel production is concentrated in Center-West and Southern regions; biodiesel distribution is concentrated in the hands of three big distributors; and 80% of biodisel is made of soy. Nonetheless, as shown in the governance section, biodiesel needs subsidies to keep up with the regular diesel price otherwise the addition of biodiesel would make the final fuel mixture (biodiesel B5 + regular diesel) more expensive and it would not be economically viable. In this way, unless the biodiesel industry in Brazil expands production and reduces its costs –stopping to need subsidies- it seems that biodiesel is not worth producing. National production is concentrated in the Center-West and Southern regions of Brazil

and even if the number of small farmers is increasing with the program, they may not be from the poorest regions that need to develop. Buying crops from small farmers located in Northern regions in Brazil would imply increases in logistics costs for big refineries in Center and Southern regions. Second, as shown previously, biodiesel from soy, which represents 80% of national production, is not the most ecological choice. Also, soy is mostly produced by mechanized and large-scale farms, it is mostly produced in Brazil's Southern and western parts, and it would leave the main target of the program outside the supply chain.

2.3 Alternatives For PNPB Improvement

Although biodiesel production is not economically viable, there could be offsetting social gains. The PNPB's main objective is to promote social inclusion by the addition of small farmers into the supply chain. The data on the inclusion of small farmers shows that the number of farmers has increased since the beginning of PNPB, but it has not reached the expected level of inclusion. Additionally, the relationship between refinery owners and small farmers has not always been the easiest. Small farmers have their own beliefs of how they should grow crops and do not always accept advice given by technicians (La Rovere et al 2010; Zapata et al 2010). Also, small farmers, especially in the Northern regions of Brazil, have a low level of education which is an obstacle to make them understand what has been accorded in the agreement between them and refineries (Hall et al 2009; Garcez and Vianna 2009; Santos and Rathman 2009). Thus, a proper analysis of the relationship among those involved in the social

inclusion process is needed in order to show the expected behavior of each actor.

The main actors involved in this attempt to expand biodiesel production are small farmers, the private sector represented by biodiesel refineries, and the government. Table 4 in Chapter One, shows the relationship among them and the expected behavior among these three stakeholders.

Considering the expected relationships of each stakeholder and the costs and benefits of Brazilian biodiesel production, three concerns have emerged:

- First, the concentration of biodiesel production in the Southern and Central regions. The enterprises responsible for most of the national production are not located in the areas that are the targets of regional development.
- Second, the concentration of biodiesel distribution in the hands of three big companies. PETROBRÁS, Ipiranga and Shell are mainly responsible for biodiesel distribution throughout the country.
- Third, the utilization of soy as the main feedstock is problematic. Soy represents 80% of biodiesel national production and is mostly produced by mechanized farms. Also, it is one of the crops that least decreases the amount of greenhouse gases emissions on the environment comparing to fossil diesel.

Since not enough research has been done in terms of production and distribution concentration and it is beyond the scope of this research, our main proposition in order to improve the PNPB's current economic,

environmental and social performance is that the government should support crop diversification.

2.3.1 The Utilization of Soybean as Biodiesel's Main Feedstock

Even though infrastructure for soy production in Brazil already exists, which facilitates the production process, relying mainly on one type of feedstock can leave the biodiesel national market very vulnerable according to the soy price fluctuation. Therefore, in terms of policy recommendations, it would make sense for the Brazilian government to provide incentives for the diversification of crops. Diversifying crops can decrease the levels of emissions since soy is one of the types of crops with a cycle that emits more greenhouse gases. There are crops such as palm oil, castor bean and sunflower that could be more sustainable in terms of emission. The E.U. is working to stop the use and production of biodiesel from crops that do not reach 30% of less emission if compared to regular diesel emissions. Therefore, if Brazil perceives E.U. as a future importer of its biodiesel, it would be wiser to start looking at oleaginous crops that could work environmentally better than soy.

Specifically in the case of Brazil, incentives for crop production such as castor beans would make sense since they grow in tropical regions such as Northeast Brazil, and can survive during a drought period, which is very common in this region (La Rovere et at. 2009; Pinto et al. 2005; Zapata et al. 2010). Also, as La Rovere et al (2009) point, they grow well with edible crops such as corn and bean that are usually produced by small farmers in the northeast as subsistence mean. Those types of crops do not need high technology to grow

and production costs could be offset by the increase of farmers' income. Furthermore, if the production of low emission crops overreaches its capacity and Brazil starts to export it, the savings from foreign exchange could help to minimize the costs as well (Subramanian et al. 2005).

Pinto et al (2005 p. 1317) point out that in order to choose the best oleaginous crop for biodiesel production, we must consider "*the oil percentage in the plant and the yields of oil per hectare"*. Figure 7 illustrates this statement. Thus, crops such as castor bean that do not need high technology and produce a good amount of oil/hectare seems to be a good option for small farmers to work with. Crops such as castor bean could help diversify Brazilian biodiesel production and at the same time support increasing small farmers' income. The majority of small farmers in Northern Brazil grow crops for subsistence, so encouraging them to grow a crop that can be planted together with subsistence ones and that could be sold to the biodiesel industry would help them increase their income. Nonetheless, as Zapata et al. (2010) suggest, the institutional design of the PNPB or the relationship among the actors involved in the program show that small farmers have little bargain power; hence attaching themselves to a agriculture cooperative could increase their capacity of bargaining. Bialoskorski Neto (2000) explains:

> *Agricultural cooperatives in Brazil initiated activities in order to provide rural producers with bargaining power in concentrated market. At first, this business strategy obtained best agricultural commodity prices for rural producers and also better price stability. After the initial period, the cooperatives showed many advantages, including bargaining power, and growth in important Brazilian agricultural regions* (p. 153).

Therefore, support to small farmers should not only to give incentives to produce crops such as castor bean but also make them understand that being part of an agriculture cooperative can increase their bargaining power and their benefits from the biodiesel industry as well.

Figure 7.Crop Variety and Oil percentage per hectare

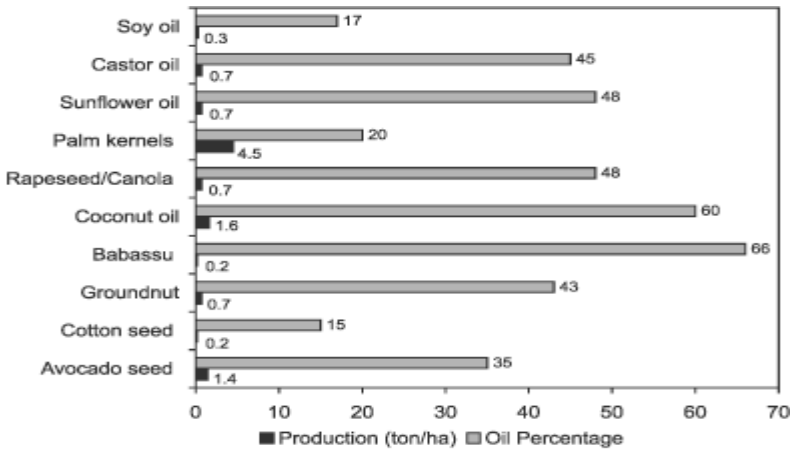


Figure 6. Oil percentage and production.

Source: Pinto et al. 2005 (p.1317)

2.4 Considerations

Considering the advantages and disadvantages of producing biodiesel in Brazil, we notice that the use of soy as a main feedstock for biodiesel is critical for any analysis regarding policy recommendations since it intertwines the economic, technical and social aspects of the fuel production. Economically speaking, soy biodiesel represents less cost because mechanized production infrastructure already exists and it would be much easier to reach economies of scale- in order to supply completely the national demand- basing the production on machines rather than human labor force. However, considering that the main

objective of PNPB is to promote regional development by the insertion of small farmers in the supply chain, it makes no sense to rely on soy because small farmers would be excluded and the PNPB's target not reached. Therefore, taking into account the trade off of whether increase production relying on mechanized soy production or include small-scale farm producers into the supply chain, we propose that crop diversification should take place.

If small-scale farmers grow crops that produce more oil/hectare and that relies on low technology, they will be contributing more in terms of productivity as well as increasing their share in the national biodiesel production. Crops such as castor bean are promissing to this situation because it requires low technology, it is resistant to droughts and can be planted together with crops used for subsistence. Nevertheless, it has to make more explicit to small scale farmers that acting collectively by joining themselves to a cooperative, can give them bargaining power, making their needs and claims clearer to policymakers.

Diversifying feedstock sources makes the country less vulnerable since single crop reliance can make the industry vulnerable in terms of that crop price fluctuation. But without the usage of machines and relying on man labor force it is unrealistic that Brazil would be able to fully supply its domestic demand and eventually export biodiesel. So, our proposition is that using different types of feedstocks and relying on different types of source production- whether mechanized or man labor force- can improve the PNPB's current performance. In this regard, our policy recommendations can be summarized as i) the need to diversify crops in order to make Brazil less vulnerable and dependable on a

single crop price fluctuation; ii) give incentives to small farmers to produce crops such as castor bean, which requires low technology to produce, is resistant to droughts and can be planted together with crops used for subsistence and iii) support small farmers to join agriculture cooperatives as their bargaining power would increase.

3: THE PNPB IN MINAS GERAIS: FINDINGS FROM FIELD RESEARCH

3.1 The Minas Gerais Biodiesel Program and Its Regional Implications

In this chapter, we are going to investigate stakeholders' (government, small farmers and biodiesel refineries) perceptions with particular emphasis on economic, environmental, social aspects and governance of PNPB's in Minas Gerais (MG) state.

The MG biodiesel program seems very suitable for further analysis evaluating castor bean as an appropriate crop for diversification as most suitable for small farmers, because there have been attempts to expand small farm family castor production in the Brazilian state.

The information available here is from secondary and primary sources. The latter was gathered through field research in Minas Gerais state, where PNPB's stakeholders were interviewed. The methodology used to structure this chapter is the same used in chapter two, Hira's (2009) approach.

3.2 The PNPB's Institutional Federal Aspects and Micro-Region Development: The Minas Gerais Case

In order to implement the PNPB nationally, the Ministry of Agriculture Development (MDA) was created, which is represented regionally by delegacies.

Above the regional delegations, we find the program's national coordination that is located in Brasilia. In MG, the delegacy is located in the capital of the state, Belo Horizonte.

In 2006, the MDA in conjunction with the Ministry of Small Family Farmers (SAF) adopted a policy called Biodiesel Production Poles (*Pólos de Produção de Biodiesel)* as a strategy to reach Brazil's micro-regions that most need assistance in terms of development. Both Ministries counted on municipal administrative bodies, workers' syndicates, EMATERs (government branch responsible for small farmers technical assistance) and banks to form groups of work or GTs (*Grupos de Trabalho*) in Brazil's state levels to identify hindrances that could prevent local production arrangements[17] development to function as expected. Also, GTs were formed to give support in order to identify and remove any PNPB's obstacles in those poles. According to the MDA, GTs' main objective is to make the biodiesel production chain stakeholders communicate as a way to increase synergies, as the MDA national coordinator argues.

The Biodiesel Production Poles Policy has been implemented in Brazil's five regions and represents 63 poles throughout the country. GTs responsible for

[17] Productive arrangements is defined here as the relationship among small farmers cooperatives, which produce crops; local refineries' industrial capacity and the biodiesel local production insertion in the national energy matrix (Abromovay 2007).

poles are able to collect data and provide information for MDA, making the communication between themselves bi-directional.

In Minas Gerais (MG) there are four poles, Montes Claros, Serra Geral de Minas (comprising Rio Pardo and Jaíba), Vale do Jequitinhonha and Noroeste de Minas. In Montes Claros and Serra Geral de Minas the biodiesel production chain is set and there exists coordination among them. Nonetheless, in Vale do Jequitinhonha and Noroeste de Minas there is a lack of agriculture cooperatives that makes trade difficult between individual small farmers and the closest refinery PETROBRAS Montes Claros (MC).

In MG, there is also a program called The Minas Gerais Biodiesel Program of Technology and Production Development (Programa Mineiro de Desenvolvimento Tecnológico e Produção de Biodiesel - SOLDIESEL) that is designed to implement actions towards technology development and renewable fuels production. SOLDIESEL was first created previously the PNPB.

Since every Brazilian state has autonomy regarding regional policies, Biodiesel production has been studied in MG before the creation of PNPB in 2004. However, as the coordinator (until 2009) of SOLDIESEL mentions, the PNPB needed to articulate its implementation at both federal and regional levels. So, the SOLDIESEL was adapted to work in conjunction with the national program. The MG's biodiesel program became more focused on R&D; therefore, it is coordinated by the Ministry of Science, Technology and Higher Education. SOLDIESEL was re-adapted as a mechanism to support the National Biodiesel Program (PNPB) and work together with GTs.

Although the SOLDIESEL had a body of experts that have been working on biodiesel production field previous to the PNPB, it became less involved with the applicability of policies delegated by Brazil. In this way, the Federal Delegation of the Agrarian Development of Minas Gerais became the main institutional body and representation of the Biodiesel production federally. The poles of production policy is the most important tool that coordinates the courses of action regionally by the national government body of MDA.

3.2.1 Economic Aspects

The region of MG where biodiesel production is taking place is in the Northern part of the state. Northern MG borders the Brazilian Northeast state Bahia and has a very similar climate: semi-arid, which is very hot and dry. Water scarcity is one of the main problems of the region and one of the causes of the region's low soil productivity (Krol and Bronstert 2007). Northern MG's low GDP per capita and the fact that agriculture is the principal source of income are the most noticeable similarities between Northeast Brazil and Northern Minas Gerais.

According to Fundação João Pinheiro (FJP), Minas Gerais GDP[18] per capita in 2008 was R$14.232,81, whereas Northern MG 2008 GDP per capita was R$6.850,68 which characterizes it as the second poorest MG region. The lowest GDP per capita is found in Vale do Jequitinhonha, R$5.219,05, which is also considered a pole of biodiesel production in MG. The need for economic

[18] All information about MG's GDP is available at: http://www.fjp.mg.gov.br/index.php/servicos/81-servicos-cei/58-produto-interno-bruto-de-minas-gerais

development, and the high concentration of small farm families producing subsistence products in less than five hectares is what made policymakers chose the poorest regions of MG as the poles of biodiesel production, since the crops produced by those small farmers will be sold to Petrobrás Refinery of Montes Claros, as the code or normative instruction of social fuel label compels the refinery to do so.

PETROBRAS (MC) is the only refinery that complies with the social fuel label and therefore the only private actor is in a direct relationship with small farmers. Nevertheless, we cannot say that PETROBRAS MC is solely a private actor since it has mixed capital where 49% is owned by the state and 51% is owned by the private sector. So, the state still has veto power on any PETROBRAS decision. According to source inside the MDA-MG biodiesel program, the reason why MC is able to comply with the social fuel label is because the refinery has the Federal Government as venture capitalist. In his words: "*they don't like us to tell this, but definitely the compliance with social fuel label is related to the presence of the government inside* PETROBRAS". He also mentioned that the location of PETROBRAS in MC was a political decision and only happened because it was a government order. PETROBRAS MC is a leading refinery in terms of production and size in Minas Gerais state, none of the other two private refineries are even close to PETROBRAS' utilization capacity that is a total of 109 millions of litres per year. Abdiesel Araguari's utilization capacity is 2 millions of litres per year and B-100 is 11 millions of litres per year (see table 7). In MG state there are four more biodiesel refineries that already

exist but cannot commercialize any of their biodiesel because they have not reach ANP's standards for sale. Thus, they are not able to sell their product in any of the official auction phases (phase 1 where refineries with social fuel label sell their biodiesel and phase 2 where refineries without the social fuel label but with a production according to the ANP standards sell their production).

Table 8. Biodiesel Refineries in Minas Gerais (MG) State

	Refinery	Capacity Utilization Millions of liters per year	Total Production Millions of liters until (Dec.2010)
1	Abdiesel Araguari	2	0,16
2	Abdiesel Varginha	1	---
3	B100 Araxá	11	3,7
4	Biosep Três Pontas	10	---
5	Biobras Diesel Caxambú	9	---
6	Fusermann Barbacena	11	---
7	Petrobrás Montes Claros	109	110
Total	----	153	113,86

Source: Elaborated by the author.
Data available at: http://www.biodieselbr.com/usinas/minas-gerais.htm

As mentioned in chapter one, to comply with the social fuel label, refineries must purchase 30% of their total buy of crops from small farmers' production. Nevertheless, the situation in MG is very uncertain because small farmers may not be able to deliver the agreed amount of crops on the contract, particularly, in areas such as Northern MG where the soil has a high acidity and rainfall is scarce. According to the owners of two refineries, relying on small

farmers represents a high cost and only a refinery with the size and capacity utilization as Petrobrás is able to keep with social fuel label requisites. One of the studied refinery owners' states,

> *I had everything set to start dealing with small farmers. I was about to buy sunflower seed from 800 small farmers that are landless (from MST- Movimento dos Sem Terras- The Landless People Movement). So, I would give them the land, seed and technical assistance. It would cost me around 5 million and half of Reais per year, thus, it would not be economically viable to us. On top of that, I realized that those people had never had true contact with the land. They are not well prepared at all and that means a high risk.*

Another refinery owner also commented, "*it is better to buy from a large-scale producer so I am sure that I will have the amount of input needed to deliver later on to the distributor"*. The fact that the social fuel label is not economically viable is also noted by the pioneer scholars of biodiesel in MG who argue that if they comply with the social fuel label they will end up in bankruptcy. As Martins and Carvalho (2005) notes, the first refinery of MG, located in Cassia with a production of *raphanus sativus* (nabo forrageiro) oil end up in a condition of bankruptcy. The refinery had the social fuel label but there was not enough crop production, the technology to make the biodiesel according to ANP standards was very expensive, the refinery production was not enough to compensate the

investments, and the sale price to distributors was too low to cover their expenses.

Another important incentive that deters these two refineries from working with small farmers is the fact that the price paid for biodiesel per litre in auction phases 1 and 2 is the same or close to the same. As one refinery owner notes, in the beginning of PNPB*," it used to be paid for those with social fuel label 18% more per biodiesel liter, now it is basically the same price"*. In the last auction (2011 February) the price was, on average, in both phases R$2,04[19]. According to BiodieselBR, in last auction (21)[20] we see a large supply and low demand, a situation that persisted since the middle of 2010. In auction 21, R$1,35 billions and 660 millions of litres were sold and were going to be distributed in the country in the second trimester of 2011 with a blend of 5%, B5. In this way, the favourable scenario that we see in MG for private refineries makes refineries not comply with the social fuel label since the biodiesel litre price paid to those without the label is basically the same. In addition, it enables refineries to buy soybean from large-scale enterprises such as Cargill, ADM and Bunge because it guaranties the amount of crops needed for their production.

Low productivity is an obstacle to including small farmers in the biodiesel production chain. One the representatives of São Francisco's cooperative, which is going to be named cooperative 1 for its representative's anonymity, explained that "*there is no way to produce more castorbean with the soil conditions that we*

[19] http://www.biodieselbr.com/noticias/bio/21-leilao-marcado-muitas-surpresas-forte-queda-preco-180211.htm

[20] There has been until now 21official biodiesel auctions. Most scholars, blog writers, websites analysts refer and name the auctions according to the number of times auctions occurred.

have now. We need lime to decrease the acidity and then have a larger harvest. In one hectare of castorbean, farmers are able to harvest 600 kg to 700kg of castor bean". That is not enough to supply Petrobrás MC because what is agreed in the contract is around 1.500kg per hectare. Once castor bean production has not been enough and the castor bean oil (castor biodiesel is R$1,4623 per litre and soy biodiesel R$1,31 per liter)[21] is more expensive than soybean oil, Petrobrás is not producing any of its biodiesel from castor production.

What is happening now, according to scholars and one MDA-MG's insider, is that PETROBRAS is exporting castor bean oil. Although PETROBRAS MC's manager could not say anything about this situation- he said the information is confidential- it makes more sense economically speaking to Petrobrás export castor oil instead of producing biodiesel from it. However, even though small farmers are able to sell their crop production they are not being included in the biodiesel supply chain. Thus, if small farmers are producing castor but it is not being used for its ideal purpose because of economic costs, it shows PNPB's inconsistency. Since castor oil is more expensive than soy oil, private refineries are not going to buy this type of crop and this is one more reason deterring smaller private refineries from contracting with the small farmers labour force.

Usually small farmers from agriculture cooperatives sign individual contracts with PETROBRASMC. Every harvest they go to their cooperative administration place with their harvest to deliver to PETROBRASMC's truck. Although small farmers' castor bean production is usually under expectations,

[21] http://revistagloborural.globo.com/GloboRural/0,6993,EEC987004-1931,00.html

PETROBRAS MC honour their agreement and buy small farmers production. As the Cooperative 2 representative mentioned," *it is a guaranteed buy*. Another issue that does not contribute to larger harvest productivity is the fact that when small farmers notice that their harvest will be very small, they migrate to larger properties of orange and coffee production to work as seasonal workers", as pointed out by one of the cooperative's administrative workers. In MG, the only cooperative that works as a corporation (or company) is the Cooperative 3, named as such because of confidentiality. They are soybean producers and very well organized, they share technology (trucks and machines) and sell to Petrobrás MC without the guaranty of buy as opposed to what happens with small farmers of Cooperatives 1 and 2. So, when they have their harvest ready, they sell to Petrobrás MC and the amount of money received is given back to Cooperative 3's members proportionally to the amount every single farmer produced. They are able to produce 4.000kg of soy per hectare. Cooperative 3's representative adds, "*we set the price with Petrobrás MC annually but it is not a rigid contract. If we find an enterprise that pays more for our soy, we sell to them.* As we see, the institutional organization of Cooperative 3 gives them bargaining power" (Staduto et al 2004). Although they do not have a guaranteed buy from Petrobrás MC, they are able to sell to other competitors because their productivity is high and has good quality. The MDA-MG delegate states that Cooperative 3 is an exception in the region.

The conclusion we draw from the economic aspect of MG biodiesel production is that the social fuel label is very expensive to comply with -

government's tax exemptions are not enough- and the amount paid by social label compliers is the same of non-compliers, a situation that makes the social label less attractive. Small farmers harvests' low productivity is also an obstacle that prevents adherence to the social fuel label by MG's refineries.

3.2.2 Environmental Aspects

The issue of small farmers low productivity is related to the bad soil conditions of MG's Northern region. Although the oil percentage per hectare of castor bean is 45% as opposed to 17% of soybean (see fig 7), castor's low productivity per hectare (around 600kg-700kg) reduces the total oil content if we compare the productivity of 4.000kg of soybean per hectare. In this way, small farmers' low productivity in MG is not related to small farmers' commitment, but related to soil conditions. The representative of Cooperative 2 affirms, "*in our region have a bad soil condition, we need lime to improve the soil acidity and pesticides to improve our harvests. We need government help otherwise the program will not work at all*". According to an MDA-MG source, the problem of the program in MG is neither small farmers' lack of commitment nor the fear of loosing the sell –because PETROBRAS MC guarantees the buy. The bottleneck is productivity and lack of funds to correct this situation. Although there is a program called PRONAF (Programa Nacional da Agricultura Familiar) that supposedly should lend credit to small farmers, most of them are not able to have access to it.

The issue of whether to use soy or castor bean in terms of environmental aspect also revolves around the GHG (green houses gases) emissions. As shown in Fig.3, there is a publication from the German government claiming that biodiesel made of soybean pollutes the environment more than colza and rapeseed biodiesel. The ANP 2011 report shows that the Brazilian percentage of soybean as biodiesel feedstock decreased from 84,1% on July 2010 to 75.22% on December 2010. The percentage decrease gave place to animal fat that raised its percentage from 12.53% on July 2010 to 20,58% on December 2010. Thinking about the European market as a possible destination for Brazilian biodiesel, this would eventually bring benefits to Brazil. Nonetheless, the soy environmental issue inside Brazil is not the most important debate. In fact, the European position creates an economic barrier that is set (before the international market exists)[22] to prevent developing countries such as Brazil and Argentina to eventually export their biodiesel made of soybean. As a professor from the department of Chemical Engineering from the Catholic University of Minas Gerais states, the "*difference between the percentage CO2 emissions of those types of crops is very small. Of course this is an embargo"*. One of BiodieselBR writers complements the scholars' statement, arguing that if developing countries start, in the future, to export biodiesel they will be aggregating value to their typical exported commodities, such as soy and wheat, and that would increase their export revenues.

[22] According to scholars, the biodiesel international has not been set yet because there is no biodiesel trade among countries. Biodiesel production is an incipient industry that is still developing its production and, consequently, trade.

An important observation made by the Catholic University scholars is that in regard to environment we also need to take into consideration the type of transesterification. Transesterification is the process where we are able to withdraw biodiesel byproduct, glycerin, by the addition of ethanol or methanol (Fukuda et al. 2001 and Meher et al 2006). In Brazil, methanol is extracted out of natural gas, which is a fossil fuel and ethanol is made of sugarcane. Since Brazil does not have much natural gas availability, sugarcane ethanol is the best option for transesterification (Martins and Carvalho 2007). Transesterification through ethanol is more ecological than through methanol since the latter requires the use of a fossil fuel. Therefore, while in developed countries, such as Germany, transesterification occurs by the use of methanol, in Brazil it occurs by ethanol. In this way, biodiesel made of soy in Europe has a different production process compared to the Brazilian soybean biodiesel. Without a detailed study we cannot make any type of environmental evaluation about Brazilian biodiesel and more research is needed to investigate this aspect.

Thus, in terms of environmental aspects of PNPB in MG state the most relevant observation is that soil acidity impedes high castor productivity and there is an urgent need for soil reparation.

3.2.3 Social Aspects

The PNPB brings together the interest of three stakeholders that used to have a contentious relationship. Government, small farmers and private refineries have to work together in a new productive arrangement (Abramovay 2007) and this configuration could only be possible if there was a monitoring among stakeholders' actions as their interest and, consequently, their courses of action could conflict considering their different priorities. However, in MG's case the productive arrangement is different because private refineries are not part of the current productive arrangement. The economic cost (small farmers' low production and articulation and high expenses with technical assistance) is an obstacle for private refineries to be part of PNPB. Solely PETROBRAS MC, which is a large corporation and partially belongs to the federal government, has the basis to be part of this productive arrangement proposed by PNPB. Thus, we cannot consider that PNPB works in its proposed format in MG region because the government is also part of Petrobrás, which makes its participation doubled.

The interviews with agriculture cooperatives representatives and workers show that they agree that Petrobrás honors and respects small farmers labor force. A source of MDA-MG states, "*there was a farmer last year whose castor production was not picked up. Then, we called Petrobrás MC and soon they sent a truck to pick his small production"*. One of PETROBRASMC's sources add, "PETROBRAS*MC wants to give support to small farmers not make them loose their harvest"*. This whole picture shows the commitment of Petrobrás MC with farmers since picking up that farmer harvest implied an extra logistical cost.

Technical assistance to small farmers is also Petrobrás's obligation. Technical assistance is made through a government body called EMATER-MG (*Empresa de Assistência Técnica e Extenção Rural* – Enterprise of Technical Assistance and Rural Extension). Petrobrás contracts EMATER to provide technical assistance to small farmers individually. Some cooperatives have in their staff agriculture technicians who Petrobrás can contract to support farmers as well as EMATER. It is also important to notice that when small farmers sign a contract with Petrobrás, even though it is individual, they must look for a cooperative or workers syndicate so these institutions are able to support them with any assistance they need. In MG the most common situation is the agreement between small farmers individually. Nonetheless, there is an exception in the region, Cooperative 3, which has been representing small farm families before any contract with PETROBRASMC. Cooperative 3 works as a company and its role is actually to legally represent farmers collectively as only one.

According to a source of EMATER-MG, one technician supports around 100 families per year. They must visit a farmer's workplace 4 times a year and whenever needed, the technician has to give assistance. The EMATER-MG source stated that the main obstacle regarding technical assistance is the process of learning. "*Small farmers usually have low level of education, so telling them to read textbooks will not work. EMATER-MG had to develop a methodology, which is participative methodology. We usually sit in a circle and then a topic is given and they develop knowledge by sharing of experiences"*.

Although this methodology has been developed for the biodiesel program in Minas Gerais and it is working, as the source said, there is no way to make a true evaluation of "*whether the program is working or not because it is too soon to say anything".* The technical assistance started to be diffused in 2008 and they are still working on the best way to support farmers.

Another obstacle pointed out by EMATER-MG's interviewed group and by the three interviewed cooperatives is that in the beginning of the 90's there was a big private company that contracted farmers (giving them seed, pesticides and package to crops) to grow cassava. When all farmers were ready with their harvest, the company went bankrupt and small farmers involved lost money and did not have a market to sell to. Thus, the fear of loosing with castor bean exists in agricultural communities of Northern MG. A MDA-MG source said, "*technicians need to show small farmers that Petrobrás is not going to bankrupt, the sell is already established and guaranteed in the contract, so they do not need to fear any loss"*. Past experience is also a hindrance that does not contribute to making the number of small farmers increase, or, in turn, the amount of castor produced. According to Cooperative 1 representative, small farmers learn by observation of others, so if they see that someone of their community has gained money with castor production, they will start to act in the same way. With Petrobrás MC in Northern MG, the initial target was to reach 15,000 small farm households as castor producers but until mid 2010 there were only 8,438[23] small farm households involved in local biodiesel production.

[23] http://www.biodieselbr.com/noticias/bio/petrobras-montes-claros-um-ano-dobro-capacidade-070410.htm

Nuclear family social problems may also represent an obstacle in terms of productivity. One of the EMATER-MG interviewees mentioned that "*most of times small farmers not only need technical support but also social support*. There are many intricacies involved in small farmer families. As he exemplifies, *in one household of castor bean production there was a father with three sons. One of them got married and wanted to sell his part of the land they cohabitated, meanwhile their castor production was set aside and they did not deliver the amounted agreed with the cooperative"*. Therefore, small farm families also need social assistance. Social assistance could also work with the need to work cooperatively with other small farmers showing how they could also gain with the latter (Campelo et al. 2008).

The social aspect of MG the biodiesel program showed that a participative methodology is a good tool to help small farmers understand better agriculture practices; social problems that commonly occur in nuclear farm families should also be a target of MG's biodiesel program and, finally, there were past failed contracts with private enterprises that today do not contribute to make small farmers start to produce castor bean, since that past failed experience is on small farmers' memories.

3.2.4 Governance

The PNPB governance aspect that represents an obstacle for MG's small farmers is their inability to have credit access. Northern MG's soil condition is very acid what is a noticeable barrier to increase small farmers harvests' productivity. Small farmers need access to credit to improve soil condition, which could be done by the addition of lime to neutralize the soil acidity, and to have access to pesticides.

A program called PRONAF (National Program for Farm Families Improvement) provides credit for farm families and landless people projects. PRONAF provides the lowest financing interest rates (0.5 to 5.5 % per year) of Brazilian financing market (Abramovay and Veiga 1999). Also, credit lines offer a bonus for those who pay their debt on time. Table 9 shows groups of people who are able to receive PRONAF's credit.

Table 9. PRONAF Credit Availability and Interest Rates per Group

Groups	**Groups Specification**	**Available credit**	**Interest Rates**
A	Beneficiaries from Land Reform	Up to R$21,500	0.5% p.a
B	Income up to R$2.000 annually	Up to R$2,000	0.5% p.a
C	Income from R$2.000 to R$14.000 annually	Up to R$3,000	3.0% p.a
A/C	Land Reform beneficiaries with income from R$2.000 to R$14.000 annually	From R$ 500 to R$ 5,000	1.5% p.a
D	Income from R$14.000 to R$40.000 annually	From R$ 6,000 to R$18,000	4.0% p.a
E	Income up to R$60.000 annually	From R$28,000 to R$36,000	5,5% p.a

Source: Adaptation of EMATER. Data used available at: www.emater.tche.br/site/br/.../pronaf/Folder_Pronaf_plano_safra.pdf

To have access to credit, small farmers first have to ask EMATER or their workers' syndicate in order to receive a document called DAP, which is a declaration that shows their competence to have the PRONAF credit. In this way, as soon as small farmers look for EMATER, the latter prepares a project based on the agriculture activity they want to expand, their annual income[24], related income activities and combines these pieces of information with the available credit lines. The next step is to go to the bank (Banco do Brasil or Branco do Nordeste – these are the two banks involved in PRONAF) to request a bank manager to make the agreement. Nonetheless, PRONAF is not the top priority for bank management. Credit card sales, capitalization titles for public investments are examples of activities that render more points to bank managers' accounts in their curriculum and career trajectory. An MDA-MG source states, "*sometimes small farmers have everything set, DAF, the project with credit lines, and all the steps needed to get the credit line, but usually the bank manager does not approve or simply sets the request aside".* The representatives of Cooperatives 1 and 2 also complained about the lack of funds, according to one cooperative representative the main problem is the lack of credit to correct their soil and to buy pesticides to increase productivity. The representatives add, we cannot complain about Petrobrás, which follow the rules, but we need money to improve our harvest. However, as opposed to Cooperatives 1 and 2 representatives, Cooperative 3's representatives say "*we cannot complain about credit, the only thing we can complain is the dry time we are having now"*. This

[24] Small farmers annual income must be at the maximum of R$110,000. Information available ate the Federal Government's website: http://portal.mda.gov.br/portal/saf/programas/pronaf

situation occurs because Cooperative 3 is an exception in the region. Their small farmers members are soy producers that work collectively and are represented legally by the cooperative as a company. Their last production of 30,000 tons of soy makes them able to compete with big soy producers. Therefore, PRONAF works for Cooperative 3's members.

According to Petrelli and Silva (2004), PRONAF is privileging tobacco and soybean producers because these are agro-industrial products that are mainly exported whereas products to solely supply the domestic demand represent a low share in PRONAF's total distributed financing. PRONAF has been benefiting farm families (see table 8.) that are most efficient (group A) instead of the most vulnerable (group B) in terms of capital and land condition (Guanzirolli 2007). According to Guanzirolli (2007), the privilege for most efficient farm families is also related to their ability to obtain credit payment because if they have a low productivity capacity they will probably need to renegotiate past debts and consequently make a new loan.

Therefore, in terms of governance in MG we see that even though there are mechanisms such as PRONAF to give small farmers credit access, the lack of coordination between PNPB and PRONAF does not contribute to adding small farmers to the national biodiesel supply chain. The bank management disincentives to give small farmers credit lines and the privilege to have access to credit for more efficient farmers of soy and tobacco producers are the main reasons small farmers lack credit and are outside biodiesel productive arrangement.

3. 3 Minas Gerais Case Main Findings

Our main findings about the MG case regarding economic, environmental, social and governance aspects are:

i) Solely Petrobrás MC refinery has enough funds to provide all needed assistance to small farmers; small refineries believe the social fuel label is economically not viable.

ii) Refineries without the social label mentioned that it is not disadvantageous to have the right to only participate on the auction second stage where biodiesel prices per litre used to be lower. The price paid on first and second stages are now basically the same.

iii) The inability or the uncertainty of small farmer production is more related to the bad soil conditions in which their properties are located than to farmers' commitment. The MG's northern regions have very acidic soil and need to have its acidity corrected otherwise small farmers' crop production will not increase.

iv) Small farm families not only need technical assistance but also social assistance.

v) Small farmers seem to be learning with the participative methodology EMATER-MG is using now.

vi) Small farm families feel insecure to grow castor bean because of past events where they signed a contract with a private company to grow cassava but the company went bankrupt and there was a big loss among them.

vii) Small farmers' difficulty to access credit or have their PRONAF's claim approved by bank management represents an obstacle to castor production.

viii) Small farmers' castor production is not being used to make biodiesel; it has been exported since the castor oil litre is more expensive than the biodiesel made of soy.

3.4 Testing Hypotheses

Considering the information gathered through the extensive interviews with MG biodiesel program stakeholders, we are now able to test our proposed hypotheses on chapter one:

i) <u>If subsidies that the government is providing to refinery owners do not pay off the costs enterprises incur by complying with the social fuel label, refinery owners will not use small farm workers' labour force.</u>

The MG case showed us that small private refineries are not complying with the social fuel label because it is not economically viable. To support this hypothesis, we would argue that the (R$5.5 millions) of cost estimation, made by a refinery owner, to provide land and technical assistance to 800 farm families plus high expenditures to contract small farmers' labour force, discouraged the refinery from counting on small farmers as their suppliers. Certainly, we should add to this statement that there are two more reasons that do not encourage private refineries to use farm families' labour force. First, the small farm families'

low and uncertain productivity of castor bean (600-700kg per hectare) as opposed to big enterprises that are able to produce 4.000kg of soy per hectare is also an economic obstacle against using small farmers' labour force. Second, the price set on the auction stages 1 and 2 are now basically identical. As we mentioned earlier, the price on average in both stages was R$2,04.

ii) If the government does verify accurately the social label compliance, small farmers will be socially included.

MG's case showed us that it is not only the government assessment on Petrobrás MC that really counts to add small farmers into the supply chain. There are obstacles that need to be overcome in order to see true social inclusion. First, small farmers need credit so they can correct their soil acidity and buy pesticides. Second, they need to work cooperatively. As Cooperative 3 example showed us, their ability to join forces in sharing machines and organizing the production makes them work as a company, which is able to compete with large-scale crop producers.

Third, technical assistance as well as government verification are very important if small farmers are to be added to the production chain. As the EMATER-MG source told us, the participative methodology is enabling farmers to share experiences through self-experiences and conversation.

iii) If workers deliver the agreed amount of crop, enterprises will keep buying crops from small farm workers; therefore complying with the social fuel label.

MG productive arrangements do not work as it was first thought. The only refinery able to comply with the social lavel is Petrobrás MC, which is partially owned by the national government. Thus, the situation that we see in MG is that even if small farmers are not able to produce the amount agreed on or even if their harvest production is low, Petrobrás MC will still pay the cost. As the MDA-MG source mentioned there was a situation where Petrobrás forgot to pick up a single small farmer castor production and as soon as the MDA-MG complained on the farmer's behalf a truck was sent to pick it up.

Whether or not this situation happens because Petrobrás is 49% governmental has remained unknown. In our interviews, Petrobrás insiders were not able to talk about the issue.

iv) Monitoring government officials may be dependent on enterprises' insiders to have information available about the label compliance affecting the outcome.

The MDA-MG source and one of the PNPB's coordination sources both mentioned that there have been no problems regarding information. According to a PNPB source there is an intranet program called SABIDO were refineries must fill out some requested information and annually the national government sends a government officer to check the information. In MG there have been two officer visits as MDA-MG technical supervisor mentioned and they mentioned no obstacles in terms of information availability.

v) The information will flow among those involved in the label implementation only if there is not a conflict of interest.

Petrobrás MC seems to be in accordance with small farmers' interests in opposition of what was expected. In arrangements where private companies and small farmers work together, they do not share the same interests (Abramovay 2007). However, Petrobrás MC is incurring costs to support small farmers. As Petrobrás MC source pointed out, Petrobrás intention is to make small farmers not to loose. Also, the event where Petrobrás went to pick up the production of a single producer paying for all transportation and logistics costs means, at least, that there is no conflict of interest. And that is the reason why the social label implementation is still valid and guaranteed by Petrobrás MC.

In chapter two, we proposed some policies according to our findings based solely on secondary sources. However, the primary sources (interviews) in the MG case brought more pieces of information making necessary changes in proposed policies.

Firstly, we proposed that Brazil should diversify its crops production in order to be less vulnerable and dependable on a single crop price fluctuation. This proposition seems suitable for MG's case as well, however the attempt to diversify MG's biodiesel production with castor bean revealed obstacles such as land productivity and farmers' inability to access credit that needed to be overcome as a first step. Secondly, we proposed that there should be incentives given to small farmers to produce crops such as castor bean, which requires low technology to produce, which is resistant to droughts and can be planted together with crops used for subsistence. Again, if there is no soil acidity correction, which is why small farmers need access to credit, the productivity will

remain low. Thirdly, we also recommended that small farmers should join agriculture cooperatives to increase their bargaining power. That seems to make sense for MG's case because the organized most collective, Cooperative 3, is an exception in the region and seems to be in a better situation compared to Cooperatives 1 and 2. They have better access to credit and are organized enough to compete with larger enterprises.

Our main conclusions of this project after field research in Minas Gerais are:

• There is an urgent need to improve soil acidity in Northern MG in order to increase productivity;

• Small farmers' inability to have credit access also contributes to low productivity since they have no means to buy pesticides and lime to decrease soil acidity;

• Small farm families need social assistance as well as technical assistance;

• Small farmers' past economic loss, as a result of an agreement with a private enterprise, makes them insecure and unwilling to engage in Petrobrás castor bean project; and

• Petrobrás is not producing biodiesel from castor oil because of its high cost in the international market.

3.5 Final Conclusions:

The question this research intended to answer is whether the Brazilian social fuel label is effective or not. We understand that the most effective ability to produce positive results is to provide good working conditions for small farmers and to guarantee incentives (such as tax exemptions and credit lines) to private enterprise owners, which may discourage them from exploiting workers and compel them to pay a fair amount for the price of the crops produced by workers (small farmers). Therefore, the picture we draw, after field research, is that good working conditions are being guaranteed for small farmers but the government incentives are not economically enticing enough to compel private sector refineries to engage in the social fuel label's project. Good working conditions are guaranteed because small farmers work on their own household and not as seasonal workers who need to work on large-scale farms as it used to happen in previous Brazilian biofuel production programs such as ProÁlcool. Seasonal workers are usually constantly under surveillance and have the obligation to work a large number of hours in large-scale farms' workplaces. However, the arrangement proposed in PNPB does not require hours of work or seem to put small farmers under pressure. Small farmers' commitment with refineries is to deliver the amount of crops they were able to harvest. The price paid for crops per kilogram is set in the contract between both parties and in our MG case study showed not to be a disagreement issue or a complaint by small farmers' part.

The government relationship with the private sector is not working as it was expected to be. As the two private refinery owners in MG mentioned, the cost of relying on small farmers' labor force represents a high risk for their business in terms of cost, small farmer's low productivity and preparedness (knowledge) to work effectively. And that risk is preventing private refineries for engaging in the social fuel label project.

Therefore, the social fuel label has not being effective because the government incentives are not substantial enough to make private enterprises engage in the regional development cause and the expected production arrangement and relationships are not set. The production arrangement that has been working has a mixed capital refinery as its component and the causes why it does occur are still to be found. There has been speculation that the only reason why the social fuel label is working with that mixed capital refinery is because of government partial ownership, as MDA-MG's and EMATER's technical assistance sources stated in our interviews. Nonetheless, there is no concrete evidence to prove any statement like that.

In regards to our two key factors' (stakeholders' awareness and monitoring and verification phase) selection, they prove to be important but not the most relevant and conditionals for the social label to work effectively specifically in Minas Gerais case. A difference in the Brazilian social label arrangement and the social labels presented in the literature review explain why those factors are not the most relevant issues for effectiveness in the Brazilian case. Those categories do not fit perfectly in the Brazilian Social Fuel Label in

Minas Gerais, and they are limited in their ability to answer the research questions. By contrast with the suggestions of the literature, the main cause that prevents the Social Label from working effectively in Minas Gerais is the lack of access to finance by small farm families.

Stakeholders' awareness category was defined in chapter one, as the ability of those involved in the social label scheme of being aware of their rights and the rights of others. In our case study, one of the interviewed sources mentioned the importance of small farmers to complain to the MDA if PETROBRAS MC did not respect any of the contract's agreed points. A small farmers' production pick up was forgotten by PETROBRAS MC's truck, so the small farmer complained to MDA and did not loose its harvest's sale because PETROBRAS sent someone to pick it up. Thus, this situation shows that the farmer awareness to complain about his/her rights enabled him/her not to loose that income. However, this is not the most important issue that would help farmers and, consequently, enable the label to work effectively. Access to credit seemed to be a priority to assist farmers in their productivity and better participation in the supply chain.

The monitoring and verification phase, which is related to the need of a third-party monitor to guarantee the social label's stakeholders' action transparency, seemed not to show any visible problems in our case study. Although the monitoring phase is made only by the government in Minas Gerais, there was no complain in regards to what is agreed among participant by any interviewed sources. We do not know yet if the cluster (government + mixed

capital refinery + small farmers) enables an easier information flow and availability since the government has sources inside the refinery. Thus, we have no concrete evidence to make any evaluation about this key factor in our case study.

Although categories selected on literature review are not perfect to make inferences in this project, we could argue that the Social Fuel Label by itself is not enough to reach development in Brazil. Without government action in areas other than the social one- such as the biodiesel price differentiation in auction stage 1, for example- there is no way to reach a better situation for PNPB. That conclusion also contributes to the the fitting of the Brazilian situation into the *Mostly Negative Perception* (section developed in Chapter One) of Social Labels and Codes effectiveness. This project's conclusions suggests that social certification are not the best tools to reach regional development. Even though social labels can bring consciousness to societies' private sector, they are not able by themselves to bring many changes in terms of real development. Thus, the Social Fuel Label strengthens the social certifications theoretical argument that they are able to help but are not a *panacea* to correct any developing society social problems.

In this way, the conclusion we are able to draw from the MG social fuel label case study is that the government has to give better incentives to make private refineries engage in the social fuel label project. The current productive arrangement in the MG region is not the expected one where the government, private sector and small farmers work in conjunction. Also, small farmers' lack of

credit access does help make their labour force less productive and attractive to the private sector. However, it is important to notice that government participation in the arrangement is vital to keep the label functioning. We have to remember that incentives and funds to both private sector and small farmers come from a single source, the government. Nonetheless, government has to be aware and adapt its incentive strategy so the initial production arrangement is set for the social fuel label to work and be in fact implemented. Thus, considering all the information acquired in this project, to achieve expected relationships among stakeholders, the government has to (i) provide better tax exemptions to the private sector (refineries); (ii) increase and make easier credit access to small farmers and (iii) increase the price paid on auction stage 1, so Social Fuel Label compliers are benefited from their engagement in the PNPB social cause. In this regard, with all those steps needed to improve PNPB current situation, we are also able to ask a further question is it still worthy to keep producing biodiesel in Brazil? Future studies could answer and bring light to the Brazilian attempt to expand its biodiesel production, We also suggest a future research agenda, which could help the improvement of PNPB's current situation and is presented as follows:

(i) Investigate relationships among those involved in PRONAF's credit release (Banks, bank managers, government and small farmers);

(ii) Investigate the steps small farmers need to take in order to work as the ideal cooperative 3 and

(iii) Investigate new varieties of crops that could adapt to small farmers reality and means as well as bring benefits to them.

APPENDICES

Appendix A

People interviewed in Minas Gerais:

	GOVERNMENT
1	The Biodiesel Program National Coordinator
2	The Minas Gerais Delegate of the Ministry of Agriculture Development
3	The Technical Supervisor of the Ministry of Agriculture Development (especially on North of Minas Gerais).
4	The Social Fuel Label Technical Supervisor (Southeast region: RJ, MG, SP, ES)

	SMALL FARMERS
5	COOAPI – Cooperative of Chapada Gaúcha Representative
6	COPASE – Cooperative of São Francisco Representative
7	COPERSAM – Cooperative of Rio Pardo Vermelho Representative
8	COOAPI – An active member of the cooperative who tries to organize farmers.
9	COPERSAM- – An active member of the cooperative who tries to organize farmers.

10	**The coordinator of the technical assistance in MG (EMATER)**

	REFINERIES
11	Petrobras (Montes Claros) Manager – The only refinery that has the social label.
12	Abdiesel (Araguari) Owner – Refinery that does not comply with the social label
13	B-100 (Araxá) Owner – Refinery that does not comply with the social fuel label

14	**SOLDIESEL coordinator and PUC scholar**
15	Chemical Engineering Professor of PUC-MG

APPENDIX B: DVD INTERVIEWS RECORDED

The DVD, attached, forms a part of this work

Data Files: 11 Interviews in person and by phone with sources from government, biodiesel production private sector and agriculture cooperatives.

Interview items – 2MB (6:18:47)

APPENDIX C - FARMERS' REPRESENTATIVES INTERVIEWS' QUESTIONS:

1) How would you describe the importance of technical assistance to small farmers?
Como vc descreveria a importância da assistência técnica aos pequenos agricultores?

2) How often does technical assistance come to help farmers?
Em qual frequência a assistência técnica é prestada aos peq. Agricultores?

3) How often does the government come to inspect small farmers?
Em qual frequência o governo inspeciona os pequenos agricultores?

4) How would you describe relations between farmers and refineries' managers?
Como vc descreveria a relação entre os peq. agricultores e os gerentes das refinarias?

5) Do farmers sign a written contract (formal) with refineries?
Vcs assinam um contrato formal com as refinarias?

6) In general, do refineries honor the agreements?
Em geral, as refinarias honram com o acordo entre vcs?

7) Do you think power relationships among those involved in the biodiesel supply chain is fair?
Vc acha que as relações de poder são justas na cadeira produtiva do biodiesel?

8) Is the PNPB helping small farmers improve their social condition?
Vc concorda que o PNPB está ajudando a condição social dos pequenos agricultores?

9) Do farmers sell crops solely for Minas Gerais state's refineries?
Os agricultores vendem materia-prima só para as refinarias de Minas Gerais?

10) How would you describe government inspection in farmers' work place?
Como vc descreveria as inspeções governamentais nos locais de trabalho dos agricultores?

11) Do you think technical assistance, provided by refineries, has been helpful?
Vc acredita que a assistência técnica provida pelas refinarias têm ajudado?

12)Do you think the price refineries are paying for your crop production is fair?
Vc acha o peço pago pelas refinarias pela produção de vcs justa?

13)Do you think it is important to sign a formal contract?
Vc acha importante assinar um contrato formal?

15)What type of crop do you mainly sell for refineries?
Qual o tipo de cultura vcs mais vendem para as refinarias?

16)Is there any environmental consciousness among farmers? Give examples, please.
Existe alguma consciência ambiental entre os agricultores? Exemplifique.

APPENDIX D -PRIVATE SECTOR- SOCIAL LABEL COMPLIER INTERVIEWS'QUESTIONS

1) In general, how would you describe the quality of crops small farmers are supplying to you?
De maneira geral, como vc descreveria a qualidade das oleginosas que vcs têm comprado?

2) Do you think technical assistance is important to farmers?
Vc acredita que a assistência técnica é importante para os pequeno agricultores?

3) How often do government officials come to your refinery?
Em qual frequência os governo mada fiscais para avaliar sua empresa?

4) Did you sign a contract a formal contract with small farmers?
Vc assina um contrato formal com os pequenos agricultures?

5) How would you describe relations between farmers and refineries employees?
Como vc descreveria as relações entre os empregados de sua empresa e os pequenos agricultores?

6) Is the cost you spend with technical assistance to farmers worthy?
O preço pago pela assistência técnica é válido?

7) Do Farmers honor your agreement?
Os peq. Agricultores honram com o acordo assinado?

8) What type of information do you have to provide government officials?
Que tipo de informação vc precisa fornecer ao governo?

9) Who are the main actors involved in the biodiesel productive chain?
Quem são os principais envolvidos na cadeia produtiva do biodiesel?

10) What are the main advantages and disadvantages of complying with the social fuel label?
Quais são as vantagens e disvantagens de aderir ao selo?

11) What is the main feedstock used by your company to produce biodiesel?
Qual é a principal material-prima comprada por sua empresa para produção de biodiesel?

APPENDIX E -PRIVATE SECTOR – SOCIAL LABEL NON-COMPLIERS INTERVIEWS' QUESTIONS

1)In general, how would you describe the quality of crops that have been supplied to you?
De maneira geral, como vc descreveria a qualidade da matéria-prima que a Abdiesel tem comprado para produção de biodiesel?

2)Do you buy crops from small farmers?
Vc compra materia-prima de pequenos agricultures?

3)How would you describe relations between crop suppliers and refineries employees?
Como vc descreveria a relação entre os empregados da sua empresa e os forncedores de material-prima?

4)Do you have any intention to comply with Social Fuel Label in a near future?
A empresa tem pretensões futuras de participar do esquema do Selo Combustível Social?

5)Why does your business do not comply with the Social Fuel Label?
Por que, atualmente, a empresa não possui o Selo Combustível Social?

6)Do subsidies the government offers as a social fuel label compliance offset the gains acquired with auction participation in stage 1?
Os Incentivos (subsidios) dados pelo governo são suficientes para fazer uma empresa participar do lote 1 do leilão?

7) Does your company participate in official auctions stage 2?
A sua empresa participa do segundo lote do leilão?

8) How would you rate your business development in the past 12 months?
Como vc descreveria o desempenho de seu negócio nos últimos 12 meses?

9)What is the main reason for you business to not comply with Social Fuel Label?
Qual seria a principal razão de sua empresa não aderir ao Selo?

10What are the main criteria you use to buy crops?
Qual seria o principal critério vc utiliza para comprar material-prima?

11)Who are the actors involved in the biodiesel productive chain of your business?
Quem são os principais envolvidos na cadeia produtiva do biodiesel da sua empresa?

12)What is the main obstacle that is preventing your business to work optimally? How do that obstacle could be overcome?
Qual seria o principal obstáculo para a produção de biodiesel da Abdiesel? Como esses obstáculos porderiam ser superados?

13)Does the environmental aspect count in any production process of the biodiesel you produce? If yes, How do this play out?
O aspecto ambiental é levado em consideração em algum momento no processo produtivo do biodiesel da sua empresa? Se sim ou não, como isso ocorre?

14) what are the advantages and disadvantages of not complying with the Social Fuel Label?
Quais são as vantagens e desvantagens de não obter o Selo Combustível Social?

15) Do you pay a fair price for the feedstock you buy or is it above or under ypur expectations?
O preço pago pela matéria-prima para produção de biodiesel é justo ou acima do esperado?

16)What is the type of feedstock do you buy?

Qual tipo de material-prima vc compra?

APPENDIX F - TECHNICAL ASSISTANCE – INTERVIEWS' QUESTIONS

1) How does EMATER perceive the relationship between refineries and small farmers?
Como a EMATER percebe o relacionamento entre refinarias e agricultores?

2) In your opinion, what is the biggest obstacle that prevents an optimal technical assistance?
Na sua opinião, Qual seria o maior obstáculo que impede um resultado ótimo de assistência técnica?

3) How many times during the year does EMATER provide technical assistance to farmers?
Quantas vezes durante o ano a EMATER presta assistência técnica?

4) In your opinion, why solely Petrobrás MC has the social label?
Na sua opinião, por que a Petrobrás é a única refinaria que possui o selo?

5) Do you think small farmers are learning with technical assistance? How?
Vc acha que os agricultores estão aprendendo com a assitência técnica?

6) What type of methodology does EMATER use to teach farmers?
Qual o tipo de metodologia a EMATER utiliza para ensinar os agricultores?

7) How would the PNPB improve?
Como o PNPB poderia melhorar?

APPENDIX G - GOVERNMENT – INTERVIEWS' QUESTIONS

1) Do you think the social label performance in MG is good?
Vc acha que o o desempenho do selo em MG é bom?

2) How would you describe the importance of technical assistance to farmers?
Quão importante é a assitência técnica aos agricultores?

3) How would you describe the relationship between farmers and the government?
Como vc descreveria a relação entre os agricultores e o governo?

4) How would you describe the relationship between refineries and the government?
Como vc descreveria o relacionamento entre refinarias e o governo?

5) In general, do refineries honor their duties?
No geral, as refinarias honram com suas obrigações?

6) How often does the government inspect small farmers at their workplace?
Em qual frequência o governo inspeciona os peq. Agricultores em seus locais de trabalho?

7) How often does the government inspect refineries?
Em qual frequência o governo inspeciona as refinarias?

8)Do refineries promptly provide the piece of information the government need?
As refinarias fornecem prontamente as informações necessárias para o governo?

8) Do the involved parties act accordingly to social label regulation?
As partes envolvidas agem conforme as normas do selo social?

9) How do get information needed with refineries?
Como vcs adquirem as informações necessárias com as refinarias?

10)How do evaluate social label performance until now?
Como vc avaliaria a performance do selo social até agora?

11)What is the main obstacle that prevents the social fuel label to work effectively?
Qual seria o principal obstáculo que impede o selo de funcionar effetivamente?

12)How would PNPB improve?
Como o PNPB poderia melhorar?

13)Why does only one refinery comply with the social label?
Por que somente uma refinaria possui o selo social?

14)How do you evaluate the technical assistance given to farmers?
Como vc avaliaria a assistência técnica dada aos agricultores?

15)Do you think small farmers and refineries have a good relationship?
Vc acha que os agricultores e as refinarias possuem um bom relacionamento?

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