



# **O PROGRAMA NACIONAL DE PRODUÇÃO E USO DO BIODIESEL EM RIO VERDE (GO) NA PERSPECTIVA DA NOVA ECONOMIA INSTITUCIONAL**

**Renata Maria de Miranda Rios Resende<sup>1</sup>**

**Marcio Caliari<sup>2</sup>**

**Alcido Elenor Wander<sup>3</sup>**

## **Resumo**

A reabilitação urbana do patrimônio arquitetônico e monumental em bairros históricos tende a propiciar a disputa na utilização/apropriação dos “novos” espaços daí resultantes, não só por novos moradores, normalmente de classes sociais mais abastadas, mas também por novos comerciantes, mais especializados em contextos empresariais. Surgem, assim, novos espaços de residência, lazer, entretenimento e cultura, entre outros. Apurar contributos locais para que bairros típicos proporcionassem experiências locais e turísticas diferenciadas na perspectiva da fidedignidade às origens foi um dos grandes objetivos deste trabalho. Paradoxalmente, conforme observado na cidade de Lisboa e após uma investigação realizada em 2014 e 2015, a mesma governação local de reabilitação urbana suscita ambivalências a vários

---

*Recebimento: 1/6/2016 • Aceite: 28/12/2016*

<sup>1</sup> Mestrado em Agronegócio pela Universidade Federal de Goiás. Administradora do Instituto Federal Goiano, Rio Verde, GO, Brasil. E-mail: renata.riosresende@gmail.com

<sup>2</sup> Doutor em Tecnologia de Alimentos pela Universidade Estadual de Campinas. Professor da Universidade Federal de Goiás, Goiania, GO, Brasil. E-mail: marcio.caliari@pq.cnpq.br

<sup>3</sup> Doutor em Ciências Agrárias pelo Georg August Universität Göttingen, Alemanha. Pesquisador da Empresa Brasileira de Pesquisa Agropecuária, Santo Antônio de Goiás, GO – Brasil. E-mail: alcido.wander@embrapa.br

níveis. Por um lado, promovendo identidades e valores que caracterizam objetivamente a Tradição e a História num regime de reciprocidade com os habitantes locais, e, por outro lado, transformando espaços onde os valores culturais se assumem numa função comercial sem correspondência nas expectativas das gentes locais nem coerência com a autenticidade (resultante dos valores identitários) dos respetivos espaços. Enquanto no Bairro Alto permitiu-se aos investidores a decisão na apropriação e utilização do espaço, na Mouraria, registou-se um processo de governação integrada com a mobilização da população residente e forças ativas do bairro. No primeiro caso, surgiram conflitos entre novos e velhos utilizadores do bairro, assumindo-se a oferta turística como espaço de animação noturna centrada num espaço público de boémia, no consumo de álcool e num ambiente de festa permanente. No segundo caso, geraram-se sinergias propiciadoras de uma reabilitação urbana defensora da mobilização das estruturas identitárias do bairro, promovendo estilos de vida tradicionais e resgatando o seu imaginário coletivo assente nos seus próprios sistemas de valores. Na Mouraria, observa-se um Turismo comunitário, envolvendo gentes locais, que, apropriando-se do seu espaço turístico, o projetam no pressuposto de consubstanciar objetivamente o seu património numa experiência turística diferenciada.

**Palavras-chave:** PNPB; Agricultura familiar; Custos de transação; Contratos

## **The National Program for the Production and Use of Biodiesel in Rio Verde (GO) from the perspective of the New Institutional Economics**

### **Abstract**

Using a case study, this paper aimed to identify whether the contract-based governance structure of the National Program for the Production and Use of Biodiesel (Programa Nacional de Produção e Uso do Biodiesel - PNPB) is successful in Rio Verde, Goiás, Brazil, to detect possible opportunistic attitudes among participants in the

municipality's biodiesel chain; to verify the presence of the transaction frequency attribute and whether it generates loyalty between the parties; and to identify the perception of the parties in relation to the efficiency of the contracts. Two agricultural cooperatives of family farmers in the municipality (the Federation of Agricultural Workers of the State of Goiás (Federação dos Trabalhadores na Agricultura do Estado de Goiás - FETAEG) and the Union of Rural Workers of Rio Verde (Sindicato dos Trabalhadores Rurais de Rio Verde)), representatives from four of the five companies that operate in the city's biodiesel sector and that have been awarded the Social Fuel Seal (Selo Combustível Social - SCS) and 43 family farmers in Rio Verde who belong to the PNPB participated in this research (defined from an intentional non-probability sample). It was found that governance using contracts has been unable to limit possible opportunistic actions in the municipality. Uncertainty was identified on the part of the producers regarding their loyalty to cooperatives and companies as a result of prior unfavorable experiences, particularly in relation to the price charged by certain companies. Finally, the contract, while offering guarantees, may be adverse for the producer.

**Keywords:** PNPB; Family farming; Transaction Costs; Contracts

## Introduction

Family farming has demonstrated its importance in the contemporary world and its production capacity. It represents a prominent participant in Brazilian agribusiness (GUILHOTO et al. 2006). However, family farming experiences substantial difficulties in organizing and defending its interests because priorities differ according to property and access to capital and technology. “In the case of smaller properties, the problem is accentuated given the diversity of production systems and strategies that determine diffuse goals; consequently, the strength of the industry is diluted into local groups” (GUILHOTO et al., 2006, p. 356-357).

The National Program for the Production and Use of Biodiesel (PNPB) was created with the primary objective of implementing the biodiesel production chain in Brazil. The program is based on three principles: environmentalism (i.e., the reduced use of fossil fuel), economization (i.e., decreased diesel imports) and, in particular, social inclusion (i.e., incorporating family farmers into the biodiesel production chain), which enables the farmer to remain in agriculture through the generation of employment and income in rural areas (MDA, 2012).

The municipality of Rio Verde is a notable grain producer, particularly of soybeans. According to the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística) (IBGE) (2012), Rio Verde is the largest municipal producer of soybeans in Goiás, with 907,500 tons produced in 2012, followed by the municipality of Jataí, with 863,100 tons. Accordingly, family agricultural producers of Rio Verde were included in the PNPB for soybeans because of the area’s existing soybean production chain.

According to the National Agency of Petroleum, Natural Gas and Biofuels (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis - ANP) (2014), soybean oil accounted for 73.92% of the raw material used for biodiesel production in Brazil in March 2014. In the Central-West region, this percentage increased to 87.81%.

The PNPB uses a governance structure based on contracts between biodiesel producer companies and family farm producers who possess the Declaration of Suitability to Pronaf (Declaração de Aptidão ao Pronaf - DAP) of the National Program to Strengthen Family Agriculture (Programa Nacional de Fortalecimento da Agricultura Familiar - Pronaf) or between producer companies and cooperatives of family farmers who possess a legal DAP. Contracts are an important mechanism in the transaction between producers and buyers of

material for biodiesel production because they provide it guarantees and safeguard the parties.

Thus, this paper intends to answer to the following question: has the PNPB's contract-based governance structure in Rio Verde (GO) been efficient and able to limit opportunistic behavior by members of the biodiesel chain?

In addition to the primary objective of identifying whether the PNPB's contract-based governance structure is successful in Rio Verde (GO), and the paper's specific objectives are to detect possible opportunistic attitudes among the participants in the Rio Verde biodiesel chain, to verify the existence of the transaction frequency attribute and whether it generates loyalty between the parties, to detect the possible actions of companies that may generate loyalty and to identify the perception of the parties in relation to the efficiency of the contracts.

Therefore, this study aims to provide more information regarding the PNPB in Rio Verde (GO).

### **National Program for the Production and Use of Biodiesel (Programa Nacional de Produção e Uso do Biodiesel - PNPB) and the Social Fuel Seal (Selo Combustível Social - SCS)**

Following the global trend of the 1990s in the quest for sustainable development and alternatives to limited non-renewable fuel resources, Brazil began to study the feasibility of using biodiesel as an alternative source of energy in the country. In 2004, the PNPB was created to facilitate the production and use of biodiesel in the country. The program is based on economic, environmental and social principles.

The social inclusion of family agriculture was one of the program's highlights. Such inclusion is achieved using the SCS, which is awarded to biodiesel producer companies that promote the inclusion of family farmers in the biodiesel chain and acquire raw materials from these families, which generates employment and income in rural areas. In return, a company that holds an SCS receives tax advantages and is guaranteed participation in 80% of the biodiesel traded in the ANP public auctions. Additionally, such companies receive special financing conditions with the banks that operate the program and may use the SCS to promote their image in the market (MDA, 2012).

To receive, maintain and use an SCS, biodiesel producer companies must fulfill certain obligations to family farmers: the purchase of a minimum percentage of raw material from family

agriculture (which varies according to region), the provision of free technical assistance to the contracting families, the promotion of training in oilseed production and the encouragement of cultivation in areas of agricultural zoning (BRASIL, 2012).

The raw materials needed to qualify for an SCS can be purchased directly from family farmers who possess a DAP through the family farmer's agricultural cooperative, which also must possess a DAP, or from an agricultural cooperative that satisfies the same criteria established for the family farmer agricultural cooperatives. In all cases, the use of prior contracts is required. It is noteworthy that to count toward an SCS, the quantity of raw material marketed by the cooperative must should be produced exclusively by members of a cooperative that holds a DAP registered at the Secretariat of Family Agriculture (Secretaria da Agricultura Familiar - SAF) (BRASIL, 2012).

Contracts must be signed by both parties before the crop is planted, and the consent of at least one entity representative of family farmers is required, which should minimally include the following:

- a) the identification of members of the contract parties, including the DAP number of the family or, if applicable, the agricultural cooperative;
- b) the quantity contracted per raw material and the specification of the equivalent area in hectares (ha);
- c) the contract deadline;
- d) the pricing criteria, the benchmark price or the purchase price of the raw material;
- e) the criteria for adjusting the contract price and the minimum price;
- f) the conditions, responsibilities and delivery location of the raw material;
- g) a disclaimer clause for the biodiesel producer on the provision of technical assistance to the family farmer;
- h) a disclaimer clause on breach of contract and on damages that result from the fault or willful misconduct of the parties;
- i) the safeguards provided to the parties, including an explanation of the conditions

for cases of crop failure and *force majeure*;  
and

- j) identification and agreement with the contractual terms of the representative of the family farmer who participated in trade negotiations, with a clause inserted before the word “FORUM”, as follows:

*“The organization representing the family agriculture, (agency identification, Union, Federation, Confederation, with name, Tax ID, address), herein represented by Mr. (name, qualification, address), as provided in its statutes, has manifested its full accordance with the terms of this contract”* (BRASIL, 2012. p. 7).

### **New Institutional Economics**

For the new institutional economics, also referred to as transaction cost economics (TCE), the transaction is the primary analysis factor (WILLIAMSON, 2000), whereby the costs that arise from the exercise of the right of property are studied, considering the institutional environment in which the transaction occurs and its organizational form (governance) (ZYLBERSZTAJN, 1995).

According to Williamson (2000), it is through governance that orderly transactions, conflict mitigation and opportunities for mutual gain among the agents are pursued. Accordingly, the choice regarding the governance structure occurs as a result of the factors that define the transactions, which can be behavioral assumptions (rational opportunism and opportunism) and attributes of the transaction (uncertainty, specificity and frequency) (SANTOS; PADULA, 2012).

Santos and Padula (2012) emphasize that bounded rationality “exists due to man’s inability to obtain all the available information and knowledge and foresee all the transaction-related events, resulting in transaction costs” (p. 182).

Considering that even when individuals believe that they act rationally, they do not do so, that knowledge is not available to everyone in the same way and that opportunistic actions occur when one agent tries to obtain advantages over another in a monopolistic way, contracts are considered to be important to the transaction in the sense of protecting the parties, reducing risks and mutualizing benefits

(ZYLBERSZTAJN, 1995; MOURAD; ZYLBERSZTAJN, 2012, SANTOS; PADULA, 2012).

According to Mourad and Zylbersztajn (2012), the PNPB's institutional arrangements can be spontaneous or induced, whereby the expansion of existing arrangements and the presence of a functional market, such as the soybean market, represent spontaneous arrangements and those arrangements stimulated by the government to promote a raw materials alternative to soybeans represent induced arrangements. Although one of the program's goals is to encourage the use of alternative raw materials (to soybeans) that are produced by family farmers in a chain that becomes sustainable, the industry has not pursued this option.

However, according to these same researchers, although the governance structure is not optimal (because the institutional environment that governs the program requires the use of contracts rather than direct transactions in the market), industries naturally tend to opt to work with an already traditionally cultivated raw material with consolidated technical knowledge and an established processing structure, which results in lower production and transaction costs compared with the arrangements for other raw materials.

The spontaneous formation can be exemplified with the expansion of institutional arrangements between industry and soybean farmers, considering that soy is a traditional crop in Brazilian agriculture and that there was already a functioning market around it. Thus, the industry spontaneously opted for the soybean (MOURAD; ZYLBERSZTAJN, 2012).

However, not only the industries but also the producers tend to prefer working with spontaneous arrangements and the security of working with a material that in addition to the known technologies has structured logistics. This context results in greater income for the producers while increasing their interest in being part of this chain.

Thus, Azevedo and Pereira (2013) emphasize the concentration of biodiesel raw materials suppliers in the South and Central-West, where family farmers are already integrated into the agro-industrial complexes (i.e., soybeans).



## Method

The research method used was the case study, which according to Gil (2009) is a qualitative method that facilitates the exhaustive and thorough study of one or a small number of research objects. The case in question is the PNPB in the municipality of Rio Verde (GO) from the perspective of the new institutional economics. The research was submitted to the Research Ethics Committee (Comitê de Ética em Pesquisa - CEP) of the Federal University of Goiás (Universidade Federal de Goiás - UFG) (number 186,688) and was approved on September 3, 2013 (consolidated opinion 381,797) for start the research and on November 10, 2015 was approved the final report.

After an initial review of the government regulations regarding the PNPB, interviews were conducted with key entities of the program in Goiás and Rio Verde (the Federation of Agricultural Workers of the State of Goiás (Federação dos Trabalhadores na Agricultura do Estado de Goiás - FETAEG) and the Union of Rural Workers of Rio Verde (Sindicato dos Trabalhadores Rurais de Rio Verde)) to collect information regarding the PNPB in the county and to identify cases of breach of contract (and the imposed penalties) and opportunism in the chain. Additionally, access to specific documents, such as contracts or other documents that could contribute to the research, was sought.

Subsequently, from September 2013 to January 2014, semi-structured interviews were conducted with the two agricultural cooperatives of family farmers active in the municipality and with representatives from four of the five companies that operate in the municipality's biodiesel industry and that have been awarded the SCS.

The survey conducted with the Rio Verde family farmers who belong to the PNPB was performed using an intentional non-probability sample. A total of 43 producers (both settled and traditional) were interviewed between November 2013 and March 2014. The settled farmers were distributed within the five settlements of Rio Verde, whereas the traditional producers were located in different regions and negotiate with four of five companies active in the city and the two cooperatives.

To collect data on the producers, semi-structured interviews were conducted using a questionnaire. The interpretative descriptive technique was used for the data analysis. Using an inductive process, the goal of the research was to present an overview of the surveyed groups.

## Results and discussion

Goiás uses a standard contract to satisfy PNPB regulations and to protect the parties. This standard contract is the result of a combined effort by FETAEG, the Head Office of the Family Agriculture Cooperatives of the State of Goiás (Central de Cooperativas da Agricultura Familiar do Estado de Goiás - CECAF), the Unions of Agricultural Workers, the farmer cooperatives of the municipalities that participate in the program and the companies that operate in the state. The contract is available at the FETAEG website (FETAEG, 2013).

To reduce uncertainties regarding the execution of contracts and to limit opportunistic actions by the parties, the previously cited entities involved in the Goiás PNPB periodically update the standard model.

As a pricing criterion, the average price is used, considering the company in question and two other companies in the market that are from the municipality, that have the best price and that produce biodiesel.

In Goiás, the current bonus awarded to the producer that markets biodiesel corresponds to 4.5% plus the fixed amount of R\$ 1.00 of incentive per 60 kilo bag if the soybeans are genetically modified and R\$ 2.00 if the soybeans are conventional. For example, a hypothetical average price of R\$ 50.00 per bag would represent 2% or 4% more, respectively, than the average price. Regarding the 4.5% bonus, 0.5% was deducted from the producer's share for the 2013 harvest and forwarded to FETAEG by the company itself.

Thus, we sought to determine the governance structure through the PNPB contracts from the perspective of the companies, cooperatives and producers involved in the program.

### **The PNPB contract from the perspective of the companies and cooperatives**

Of the four surveyed companies, only one company operates through one of the cooperatives. One company works directly with the producers and through one of the cooperatives. Another company only operates directly with the producers (without the intermediary of cooperatives). The other company started to operate only through the cooperatives beginning with the 2013/14 harvest and ceasing its practice of forming individual contracts directly with the producers. For the company that contracts only directly to the producers, the goal

is to avoid various middlemen, whereby the savings is not passed on fully to the producers.

According to research conducted with cooperatives and companies, the rate of producer infidelity (i.e., a producer who signs the contract but tries to deliver his or her crop or part of it to third parties) is low, generally from 0 to 2%. Only one company reported an infidelity rate up to 30% on direct contracts with the producers. However, to reduce this rate, it began to deal only with cooperatives.

When asked about the delinquency rate of the producers, according to the cooperatives, this index is low. The intentional default is 0%, and the default that results from a harvest reduction caused by poor weather reached 6%. For the companies, the rate remained at 0% for intentional defaults and up to 2% in the case of crop failure.

In the cases in which the producer cannot honor the contract or pay the furtherance for planting as a result of decreased productivity or crop failure, both the companies and the cooperatives stated that they usually negotiate. After the warranty price contract (i.e., a futures contract) is made, a producer can be replaced by another who wants to deliver the soybeans under the contracted conditions (i.e., the price). However, if the soybeans have a higher price during the contract's period of completion, the producer must cover the difference if the producer has accepted to supply at a lower price. If a producer cannot cover the received furtherance, each case is studied, and the producer typically receives a new furtherance to continue producing and thus can honor previous debts in future years.

Regarding breach-of-contract penalties, although there is a clause in the standard contract that stipulates a penalty for total or partial non-execution of the contract by either party, with fines of 10% and interest of 1% per month, this provision has never been applied in Rio Verde. Because the program is based on the principle of inclusion, the cooperatives and the companies have preferred not to apply this clause, although it is their right, to avoid confrontations with the producers. In this connection, Mourad and Zylbersztajn (2012) identified the tendency of companies to minimize opportunistic behavior in producers using "informal mechanisms of trust and reputational capital" (p. 337): "... as companies depend on farmers to obtain the seal, a judicial execution could compromise the company's image before the other farmers. Thus, the farmer is punished with the loss of reputational capital that prevents the continuation of future transactions".

In addition to the penalty clause, a fidelity clause was included in the standard contract for the 2013/14 harvest to prevent the

producer from using the service center or receiving the furtherance of one company or cooperative and marketing with another. Additionally, this clause prevents the producer from using multiple technicians from different companies or cooperatives in the same area. The area of an enrollment can only be sold to a single company (individually) or through the cooperative with as many partners as the cooperative has, according to information from companies and cooperatives.

The fidelity clause was created to prevent opportunistic attitudes among the producers and the companies. Because the producers receive technical assistance and in some cases furtherance from a company or cooperative, the clause prevents the producers from conducting business with another company or cooperative at the time the product is delivered. There have been cases in which the producer contracts with more than one company for the same product. Regarding the companies, the clause prevents harassment of the producer who produces relatively steadily and without requiring investments in technical assistance. It also encourages the company to offer more to such producers, thus persuading these producers to sell it their product.

Non-compliance with this clause results in the producer's disqualification for the PNPB, and the nullity of the contracts of the company that made the purchase. That is, the purchased product may not be considered to be the product of family farming and therefore will not be counted toward the minimum volume that the company must purchase from family farms to qualify for priority in the government auctions (companies with an SCS) in addition to other applicable penalties by the Ministry of Agrarian Development (Ministério do Desenvolvimento Agrário - MDA).

Several respondents stated that they seek to work only with those producers who genuinely want to work with them and who comply with the contract in addition to qualifying as true family farmers. Such respondents wish to avoid infidelity on the part of the producers and the subsequent non-application of this volume toward participation in SCS auctions as well as possible sanctions by the MDA. One company representative stressed the importance of rigor at the time of confirming a producer as a family farmer and the issuance of the DAP by the responsible agencies to avoid future problems with the MDA.

When asked for their opinions of the inclusion of the fidelity clause, overall, the respondents from the companies and the cooperatives considered it to be positive. However, one respondent noted that this clause has advantages and disadvantages. "The benefit

for the company, which knows that the contracted volume (with the exception of losses due to weather, pests, diseases, etc.), will be entirely to the company. On the other hand, it becomes disadvantageous for the producer for he becomes tied, and companies are at times up, at times low, and as they operate according to the market, they cannot define the price in relation to the highest one [i.e., price], as some organs wish”.

In addition, this interviewee defended the need for a better way to control the contracting with producers to hinder those who have already contracted with another company or cooperative using a system of instantaneous information, which has not yet been introduced. A second interviewee noted that this clause was little known among the producers.

The price of soybeans for sale by the producer can be established through price guarantee contracts (i.e., pre-fixed; typically made before planting and based on the planned productivity for that area and including a percentage that covers at least the producer's costs) for a market price on the delivery date and when the soybeans are sold on deposit. Importantly, the market price for the Rio Verde PNPB is the average of the contractor company's price plus the best two prices of the companies that produce biodiesel in the municipality.

Based on the selling options of the commodity (particularly soybeans on deposit) and because of a large number of complaints about the low price (considered below the market price of the county biodiesel companies that pay better, primarily the Mixed Cooperative of Rural Producers of Southwest of Goiás Ltd. (Cooperativa Mista dos Produtores Rurais do Sudoeste Goiano Ltda. - COMIGO)) offered by several companies, the producer completely lost bargaining power because the soybeans had already been delivered to a certain company (FETAEG and the unions of Rio Verde and Jataí). Thus, for the 2013/2014 harvest, to avoid maneuvering by these companies, it was required that COMIGO be included as a price definer in addition to the contracting company and a third company that is a PNPB member and active in the municipality.

Regarding whether the contract protects the parties, one respondent could not provide information. The others replied affirmatively but with caveats. One respondent noted that the bureaucracy that characterizes the contracts for companies is based on company updates. A second respondent remarked that because no judicial enforcement of the contracts has been attempted, its effectiveness remains unknown. A third respondent believes that the contract favors the producer. A fourth believes that the contract

prevents opportunism by companies, primarily with respect to the price issue. Another interviewee emphasized the importance of the revisions that are performed because of unanticipated occurrences and noted that the standard contract used in Goiás is one of the best ones in Brazil.

When asked about the type of furtherance to producers, all of the companies and cooperatives reported providing some form of financial advance and in certain cases brokering with input companies (resellers). In such situations, the company itself is responsible for paying the reseller, and the producer owes to the company. Alternatively, the producer negotiates directly with the reseller and owes directly to it but relies on the endorsement of the company or cooperative. Additionally, the entire production of the respective crop can be promoted to the producer using a supplied “technology package”.

Regarding the forms of guarantees from the manufacturer, in addition to the pledge of grain and a guarantor requirement, the rural product note (for grain) (Cédula de Produto Rural - CPR) with notarization and, when the value is low, promissory notes (below R\$ 10,000) are used. However, the most widely used guarantee by both companies, cooperatives and resellers is the CPR.

The respondents were also asked about the use of possible actions aimed at producer loyalty management. In addition to the mandatory technical assistance service for the program, companies said they try to offer various incentives to producers. These incentives vary among the companies. They range from the previously mentioned production furtherance to an allowance for transportation to more distant producers to making storage units available in nearby areas.

Incentives for loyalty on the part of unions were also addressed. On the one hand, there is the design of projects for accessing the Pronaf, however, without costs for the producer. On the other hand, there is the provision of a “technology package” for producers without credit so they can produce and pay only at harvest and in grain, and there is furtherance during the harvest.

Despite being the least expensive credit for family farmers, the Pronaf does not fully satisfy the needs of the producer, who often must negotiate the financing for chemical treatments with resellers, whether through the companies, through the cooperatives or directly. In addition, producers who cannot obtain credit from the Pronaf (because of defaults (i.e., bank debts) or a problem with an area’s legalization) or producers without equity must obtain financial furtherance from the

companies or cooperatives to cover the cost of seeds and fertilizers and finance their agrochemicals with the resellers.

### Profile of the Sample of PNPB-member Family Farmers from Rio Verde

The age of the producers in the study sample ranged from 25 to 82 years. The number of years that they have farmed is presented in Table 1. The greatest concentration (approximately 84%) occurs in the periods that range from 11 to 50 years of activity.

**Table 1:** Duration of Farming Activity (years)

Length (years)	Up to 10	11 - 20	21 - 30	31 - 40	40 - 50	+ 51
No. Producers	3	9	10	9	8	4

Source: Research data.

The education level of the respondents is presented in Table 2, whereby participation in professional training and higher and graduate education (complete or incomplete) was not indicated.

**Table 2:** Education level of producers

Education Level	Illiterate	Incomplete Primary	Complete Primary	Incomplete Secondary	Complete Secondary	Complete Higher
No. Producers	3	17	6	4	8	5

Source: Research data.

Although most respondents had a low education level, the duration of their farming activity provided them with substantial practical and technical expertise. During the research, it was noted that the younger farmers were seeking to improve their education level, even completing higher education. The importance that respondents place on higher education for their children was also noted.

Of the 43 surveyed producers, 20 reported having a computer at home with Internet access. Four reported having a computer without Internet access, and 19 did not own a computer. It was understood that access by producers to information enables increased knowledge regarding their farming activity, markets, business strategies and the PNPB. It was also recognized that better business opportunities could be created.

Regarding the monitoring of farming activities, 32 producers stated that they currently perform some type of record keeping. Among the 24 producers who own a computer, only nine use it to perform monitoring. Of the respondents, 11 producers stated they do not perform any type of activities monitoring. Among the 32 producers who keep records as a means to monitor their farming activities, 15 started their records after joining the PNPB. Only two producers reported that they kept records regarding their activities prior to joining the PNPB.

Regarding the frequency of participation in training courses, lectures, field days and other technical training events, 35 producers stated that they participate more than once a year, whereas seven stated that they participate at most once a year, and one producer declared that he does not participate in technical training events.

The producers were asked if they had participated in management training to improve the administration of their estates. Sixteen producers replied yes and stated that they would like to participate again. Two stated they have attended and do not want to participate again. Twenty-one stated they have not participated but would like to. Four had not participated in management courses and had no interest in participating.

The data collected in relation to technical training and management corroborate the discussion presented by Batalha et al. (2004): an effort is being made to diffuse technologies, processes, materials and products and services in Brazil. However, this effort lags behind the efforts being made to disseminate management and information technology and to explain its suitability for family farmers. In addition, these researchers note the difficulty of applying management techniques, even among producers who have acquired a high degree of productive technicization.

When questioned about the affiliation to rural cooperatives in the municipality, all of the respondents stated that they are affiliated with at least one cooperative. Twenty-five are affiliated with a cooperative of only family farmers. Twelve belong to two cooperatives. Of these 12, seven belong to a cooperative of family farmers and the COMIGO, whereas the remaining five are affiliated with two cooperatives of family farmers. Six of the interviewed producers are affiliated with the three previously mentioned cooperatives. Santos and Padula (2012) emphasize the importance of the role of cooperatives in the biodiesel chain with respect to the support for family farmers in their transactions.



In the context of family farming, Batalha et al. (2004) draw attention to cooperativism as a potential tool for the farmer. This tool facilitates the increase in scale required for market competitiveness and increases bargaining power, which also improves competitiveness and thus improves farmer income.

### **The PNPB Contract from the Perspective of the Rio Verde Family Farmer**

The length of respondent participation in the program is provided in Table 3. The contracts are for single harvests. The program began in Rio Verde with the 2006/07 harvest, and the limit of the research was the 2012/13 harvest.

**Table 3:** Length of Signed PNPB Contracts (years)

Length (years)	1	2	3	4	5	6	7
No. Producers	4	7	7	7	3	6	9

Source: Research data.

Of the 43 interviewed farmers, 36 signed contracts for the program through a cooperative. Six producers indicated that they had previously signed contracts either individually (directly with the company but with the consent of a union representative) or through a cooperative. Only one producer stated that he started to make contracts only directly with the company.

The transaction frequency attribute of producers with the same cooperative and the companies that work with these cooperatives, for the PNPB, was investigated. In addition, whether this attribute has generated loyalty between the parties was examined. Thus, the respondents were asked if they always worked with the same cooperative and companies and how many business partners they are currently working with. Of the 43 respondents, 28 have maintained their business partners since entering the program. The remaining 15 indicated a change in the choice of business partners. However, the producers indicated that maintaining their business partners did not mean exclusivity but they retained the same business options, even in business situations that involve more than one cooperative and company.

By studying the transaction as a structuring factor in the biodiesel supply chain in Rio Grande do Sul, Santos and Padula (2012) identified in one of the studied chains the absence of fidelity between

producers, cooperatives and companies. This infidelity occurred because the transactions between these actors follow economic logic, in which the sale is made with those who offer the best price.

In this study, the fidelity to a certain cooperative or company was primarily identified in producers who were in financial difficulties and could rely on the furtherance of a particular company or cooperative to produce. Several of these producers stated that they were not bothered if they received slightly less than if they sold to the competition because of prior experience. In such cases, the fidelity generated the frequency.

There were cases in which the producer stated that he worked with the same cooperative and company (or companies) because he did not have any trouble, thus preferring to maintain the link. In this sense, whereas certain producers emphasized the importance of the partnership established with the cooperative and company (or companies), others emphasized the search for better conditions (e.g., support services) and the market prices as important.

Santos and Padula (2012) also observed that in cases of transaction frequency, depending on the confidence in the fulfillment of contracts and the conduct of the members, the reputation of the agents is established according to the foundations of ECT, which generates fidelity.

In relation to support services provided by companies or cooperatives, 40 producers reported that they receive some type of support, which is offered as a program requirement, such as technical assistance, or as a way to manage producer loyalty. Six producers stated that they did not receive technical assistance service from the cooperative or company, and of the 37 producers who receive technical assistance, four stated that they were dissatisfied.

Mourad and Zylbersztajn (2012) address the technical assistance provided by the companies to soybean producers in Goiás for the PNPB. These companies would be making a particular investment and could be subject to a delay by those producers who (not having made a specific investment) could try to benefit by forcing companies to pay more for the product to avoid losing the investment. However, contrary to the assertion of the authors, in this study, this capacity of the producers to delay was not identified. The price stipulated in the futures contract cannot be changed and that is the market price on the date of delivery or soybeans on deposit. It is the companies that put pressure on producers because of the locational specificity of soybeans.

In Table 4, the support services received by the respondents are presented. However, although certain services (such as inputs and seeds, funding or advances) are provided by the companies or cooperatives, the producers do not always have an interest in using them, whether because they possess their own sources for such services (or less expensive sources, such as the Pronaf) or because they prefer to negotiate directly with resellers.

**Table 4:** Support Services Provided by Companies and Cooperatives

Support Services	Technical Assistance	Inputs and Seeds	Harvest	Transport	Funding	Others (Advances)
No. producers	37	12	0	5	6	9

Source: Research data.

Typically, producers use more than one funding source for the production of raw material for biodiesel (Table 5). Of the 43 interviewed producers, nine use a single funding source, four stated that they only use company resources, one uses reseller resources, one uses a bank (while not specifying Pronaf-Costing), one uses Pronaf, one uses a cooperative, and one uses his own source.

**Table 5:** Funding Sources Used by Producers to Finance Production

Funding Sources	Pronaf-Costing	Company	Own	Reseller	Coop	Bank (Others)
No. Producers	16	18	17	25	4	2

Source: Research data.

A notable number of producers use or have recently used resellers as a funding resource (25). Here, the producer obtains the inputs but provides the payment only after the harvest, paying interest rates for this period and using the CPR as a guarantee. According to a cooperative representative, depending on the PNPB and the support of companies and cooperatives, resellers now regard the family farmer as a potential client and seek business with these producers. However, as previously mentioned, the Pronaf budget is insufficient to cover all of the crop expenses.

Regarding the forms of negotiation and the criteria for fixing the price of raw materials, producers primarily use pre-fixation contracts (futures), typically up to a level that ensures the crop costs. Only three

producers stated that they use a single form of negotiation, whereas 31 use at least two forms, and eight use up to three forms of negotiation. One respondent could not reply. The criteria for determining the price and the number of businesses in each of the forms are listed in Table 6.

**Table 6:** Criteria Used by Producers to Fix the Price of the Raw Material

Criteria	Market at Delivery Date	Contracting Company	Pre-fixation Contract (Futures)	Soybeans on Deposit (Board)
No. Producers	32	1	40	16

Source: Research data.

However, of the 43 respondents, 19 indicated dissatisfaction with the price charged by certain companies for soybeans on deposit (board) or the market price at the delivery date. They claimed that these companies, when they already have the soybean in their storage units, pay a price below the market price (compared with biodiesel companies that pay better in Rio Verde and with COMIGO). Thus, in the end, the bonus and the incentives are fully or partially lost. There have been cases in which, including the bonuses and incentives, the producer received less for the biodiesel program than if he or she had sold to a large local cooperative. For these producers, these companies act opportunistically because once the soybeans are stored in the company's storage facility, the producer loses bargaining power.

Whereas many of the contracts for the sale of raw material by the producer are made through the cooperatives, negotiations are performed individually. That is, each producer chooses the moment at which he or she wants to enter into futures contracts, depending on that day's value and the volume to be delivered. Additionally, regarding soybeans in storage, it is the producer who determines on which day he or she wants to make the sale (considering the negotiation deadlines of each company for the period). Thus, there is no increase in marketing scale for the producer in relation to volume if the total volume was negotiated through the cooperative.

There was also a report that certain companies would be taking larger discounts for impurities, rot and moisture in times of better soybean prices. Depending on the discount, producer results could be lower. Generally, the producers stated that they seek to avoid companies that try to use opportunism and seeking better alternatives for the next harvest.

When asked if they know the benefits of the program, 37 producers replied yes but overall only the bonus plus incentives and the technical assistance. It was noted that many producers do not know the scope of the program. One producer asked if biodiesel was being manufactured and sold. Another stated that he did not know that he was part of the program. Thus, whereas companies and unions have claimed that the involved producers understand the program and its advantages and obligations (such as loyalty during harvest to a single cooperative or the company or companies with which he or she works), this understanding has not been demonstrated.

Regarding contract fulfillment by the companies, 37 producers stated that the companies generally comply with the terms of the contract. However, they reported attempts at maneuvering by several companies with respect to the price charged or the evaluation at storehouses. Two producers stated that the companies did not comply with the contract, and two did not reply.

Although only three producers have experienced conflict with the contracting company, 15 producers stated that they have experienced difficulties in the relationship with the company during their time in the program. Four of these producers provided more than one reason for their difficulties. Twelve cases were related to the price charged, which according to the producers were below market for the same period and compared with the prices of the biodiesel companies with the best prices in the municipality and COMIGO. Two cases occurred because of delayed payments. Two cases related to the evaluation of contamination of conventional soybeans. In one case, it was reported that when the producer had an additional requirement, the company claimed that the producer was not on schedule and could not satisfy the agreement. One producer reported difficulty accessing the company, and in one case, it was alleged that the company operates only when the price is low.

All of the 43 interviewed farmers intend to continue marketing for PNPB, and several declared the maintenance of benefits as a goal because these benefits actually reach the producer. In this regard, it is noteworthy that after the fulfillment of the contract (deferred to the harvest), if there are no pending issues (e.g., debts with the company or cooperative), the producer is free to contract with new business partners for the next harvest if they can better satisfy the producer's expectations. Thus, when asked about the reasons that would induce them to remain in the program, 32 farmers replied that the main reason for remaining members was the price (i.e., considering bonus plus incentive). For seven respondents, the main reason was the

technical assistance. For two producers, it was the guaranteed sales. For one producer, the funding was decisive, and only one producer did not define what would be most important to his remaining in the program. This producer stated that he did not depend on the program and had another market for his soybeans.

As previously noted, the highest number of transaction-related complaints by farmers concerned the price charged by several companies, which were considered below the market. Also in connection with these companies, there were other complaints by producers regarding the evaluation of soybeans in delivery and the various quality-related discounts, which were considered disproportionate. There was one complaint according to which storehouses would discount more than those who work outside the PNPB, considering that the product from the same producer was harvested under the same conditions and delivered both within the PNPB and outside of the program (which enabled the comparison by this producer).

Another point raised by farmers was the lack of clarity in the information by companies and cooperatives. A number of producers stated that information is disclosed only according to the interest of the companies and cooperatives. Thus, the producer must make decisions based on only limited information and often does not obtain the best terms. Furthermore, these producers stated that companies and cooperatives have a “strong link”. Therefore, they behave according to their own interests and not for the benefit of the family farmer. There were also complaints that there are too many intermediaries and that the benefit is lost on the chain.

Certain producers view loyalty management (i.e., negotiation with only one cooperative and the companies that work with it) as an attempt at manipulation by the companies and cooperatives and are afraid to sign a contract and then be compelled to deliver their product at a price below what they would receive from another company or large local cooperative.

The family farmers who are more independent and technically adept have greater autonomy in the marketing choice and can exert greater bargaining power because they do not depend on the furtherance of the companies and cooperatives and the services offered.

## Final Considerations

The PNPB's contract-based governance structure seems efficient in Rio Verde because of the instrument's constant evaluation and revision, which is primarily the result of possible opportunistic attitudes among the parties. However, there remain situations that are considered by producers to be opportunistic and that may threaten their continuing participation in the program.

According to the companies and cooperatives, the rate of breach of contract on the part of the farmer is low. However, the number of complaints by the producers about attempts to maneuver by the companies and cooperatives was notable. Thus, the producers feel insecure about loyalty management with a certain cooperative or company because the information to which they have access is partial and because they have previously experienced unfavorable treatment, particularly in relation to price.

Generally, producers who require greater financial support or who require it at the beginning of their participation in the program tend to exhibit greater fidelity to the company or cooperative that provides (or provided) the furtherance of their production, which enables their membership or continuing participation in the program. In this case, the frequency is not responsible for the producer's loyalty of the producer but vice versa.

If, on the one hand, the producer can obtain greater guarantees as a result of the contract, on the other hand, the producer is bound by this instrument. Therefore, the contract precludes a better negotiation for the period, and the producer can change business partners only for the following harvest. However, for the family farmer, every value that is discounted "in addition" or that is not received significantly affects the farmer's income. It may also affect the off-season harvest, the next harvest, and the sustenance and of the farmer's family.

Future research could verify the effectiveness of the fidelity clause and its results and consequences for the Goiás PNPB. More specifically, it would be useful to investigate whether the inclusion of COMIGO as a price definer was effective for biodiesel in Rio Verde and to determine COMIGO's impact on the satisfaction and continuing participation of PNPB producers.

## Financial Support

The Foundation for Research Support of the State of Goiás (Fundação de Amparo à Pesquisa do Estado de Goiás - FAPEG) and

the Federal Institute of Education, Science and Technology Goiano - Rio Verde Campus.

## References

ANP. Boletim Mensal de Biodiesel – Mês de referência: Março/2014 [Monthly Biodiesel Bulletin - References month: March/2014]. Available at:

<<http://www.anp.gov.br/?pg=70331&m=&t1=&t2=&t3=&t4=&ar=&ps=&cachebust=1398428258140>>. Accessed on: Apr. 24, 2014.

AZEVEDO, A.M.M.; PEREIRA, N.M. Conception and execution of an energy innovation program: top-down and bottom-up analyses of the Brazilian National Program for Production and Use of Biodiesel. **Journal of Technology Management & Innovation**, v. 8, n. Special Issue ALTEC, p. 13-25, 2013. Available at: <<http://www.jotmi.org/index.php/GT/article/view/1204/775>>. Accessed on: Apr. 09, 2014.

BATALHA, M.O.; BUAINAIN, A.M.; SOUZA FILHO, H.M. Tecnologia de gestão e agricultura Familiar [Technology Management and Family agriculture]. *In*: XLII Congresso Brasileiro de Economia e Sociologia Rural – SOBER [XLII Brazilian Congress of Rural Economics and Sociology - SOBER], 2004, Cuiabá. Dinâmicas setoriais e desenvolvimento regional [Sector dynamics and regional development]. Rio de Janeiro: SOBER, v.1. 2004.

BRASIL. Portaria nº 60, de 06 de setembro de 2012. Dispõe sobre os critérios e procedimentos relativos à concessão, manutenção e uso do selo combustível social [Ordinance No. 60 of September 06, 2012. Provides the criteria and procedures related to the granting, maintenance and use of the Social Fuel Seal]. **Diário Oficial da República Federativa do Brasil**, Brasília, Sep.10, 2012. Available at: <<http://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?jornal=1&pagina=63&data=10/09/2012>>. Accessed on: Jan. 09, 2013.

FETAEG. Download. 2013. Available at: <<http://fetaeg.org.br/site.asp?secao=download>>. Accessed on: Nov 27, 2013.

GIL, A.C. **Como elaborar projetos de pesquisa [How to prepare research projects]**. 4 ed. São Paulo: Editora Atlas, 2009. 175p.

GUILHOTO, J.J.M.; SILVEIRA, F.G.; ICHIHARA, S.M.; AZZONI, C.R. A Importância do agronegócio familiar no Brasil [The importance of



the Family agribusiness]. **Revista de Economia e Sociologia Rural**, Rio de Janeiro, v. 44, n. 3, p. 355-382, Jul/Sep. 2006. Available at: <<http://dx.doi.org/10.1590/S0103-20032006000300002>>. Accessed on: Dec. 06, 2013.

IBGE. Cidades@. 2012. Available at: <<http://cod.ibge.gov.br/1N5EH>>. Accessed on: Dec. 08, 2013.

MDA - Ministério do Desenvolvimento Agrário [Ministry of Agrarian Development]. Cartilha do Programa Nacional de Produção e Uso de Biodiesel (PNPB) - inclusão social e desenvolvimento territorial - até 2010 [Manual of the National Program for Production and Use of Biodiesel (PNPB) - social inclusion and territorial development - until 2010]. Brasília, 2012. Available at:

<<http://www.mda.gov.br/portal/saf/programas/biodiesel/2286313>>  
Accessed on: Oct. 05, 2012.

MOURAD, C.B.; ZYLBERSZTAJN, D. Regulação sobre sistemas agroindustriais de produção de biodiesel: uma análise comparada [Regulation of agribusiness systems of biodiesel production: a comparative analysis]. **Organizações Rurais & Agroindustriais**, Lavras, v.14, n.3, p. 326-342, 2012. Available at: <http://purl.umn.edu/146687>>. Accessed on: Nov. 06, 2013.

SANTOS, M.S.; PADULA, A.D. A transação como fator estruturante da cadeia de suprimento do biodiesel no Rio Grande do Sul [Transaction as a structuring factor of the biodiesel supply chain in Rio Grande do Sul]. **Revista Eletrônica de Ciência Administrativa**, Campo Largo, v. 11, n. 2, p. 178-192, 2012. Available at: <<http://revistas.facecla.com.br/index.php/recadm/article/view/1176>>. Accessed on: Nov. 23, 2013.

WILLIAMSON, O.E. The New Institutional Economics: taking stock, looking ahead. **Journal of Economic Literature**, v. 38, n. 3, p. 595-613, sept. 2000. Available at: <<http://www.jstor.org/stable/2565421>>. Accessed on: 11 Mar. 2014.

ZYLBERSZTAJN, D. **Estruturas de governança e coordenação do agribusiness: uma aplicação da Nova Economia das Instituições [Governance structures and agribusiness coordination: an application of New Institutional Economics]**. 1995. 239 p. Thesis (Free-docency in Management), University of São Paulo [Universidade de São Paulo], São Paulo, 1995. Available at:

<<http://www.fundacaofia.com.br/pensa/anexos/biblioteca/63200715534.pdf>>. Accessed on: Jan. 21, 2014.