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The decision-making process of the agents belonging to the biodiesel production chain in Southern Brazil

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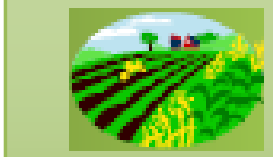
Introduction

- The Brazilian Biodiesel Production Program (PNPB) was established in 2005 in order to create the institutional bases necessary for the organization of the entire production chain (farmers, cooperatives, unions, research institutions, mills, refineries and distributors).
- The PNPB stipulates the obligation of using B2 (2% of biodiesel per volume of diesel oil) as from 2008, with this figure increasing to 5% (B5) as from 2013.
- The launch of the PNPB led to the rapid organisation of biodiesel production chains.
- There are already 10 biodiesel production plants in operation in Brazil. Another 27 plants are in the process of applying for licenses to operate, or under construction. Together it will result in a supply capacity of 1.9 billion litres of biodiesel per year in 2009.

Problem Statement

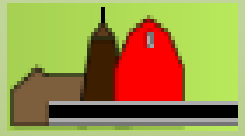
- The implantation of a biodiesel chain involves the supply of oil-bearing seeds from rural producers, the grain crushing mills, which are responsible for supplying the vegetable oil and the processing plants that carry out the trasesterification reaction that results in biodiesel. The biodiesel then goes to the oil refineries where it is mixed with diesel oil at the proportions stipulated by law (B2 or B5).
- Throughout the production and distribution process, the chain involves aspects related to agriculture, biotechnology, economics, social aspects, petroleum and commodities markets as well as environmental issues which demand a systemic vision on the part of the chain members.
- Given this complexity, the context and the process of decision-making by the actors involved in the production chain can be characterised by uncertainties, asymmetries and incomplete information, limited rationality and resources, multiplicity of objectives and the possibility of conflicts of interests among the agents.
- This complexity could lead to obstacles in the development of the production chain since disalignments in the decision-making processes of the different agents could compromise the supply of inputs, raw materials and the final product at the various stages of the process of production and distribution, thus compromising the efficiency and competiveness of the chain.

Biodiesel production chain



Agriculture

Grains

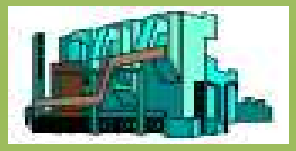


Grain crusher

Refined oil

Ethanol

ou



Transesterification Mill

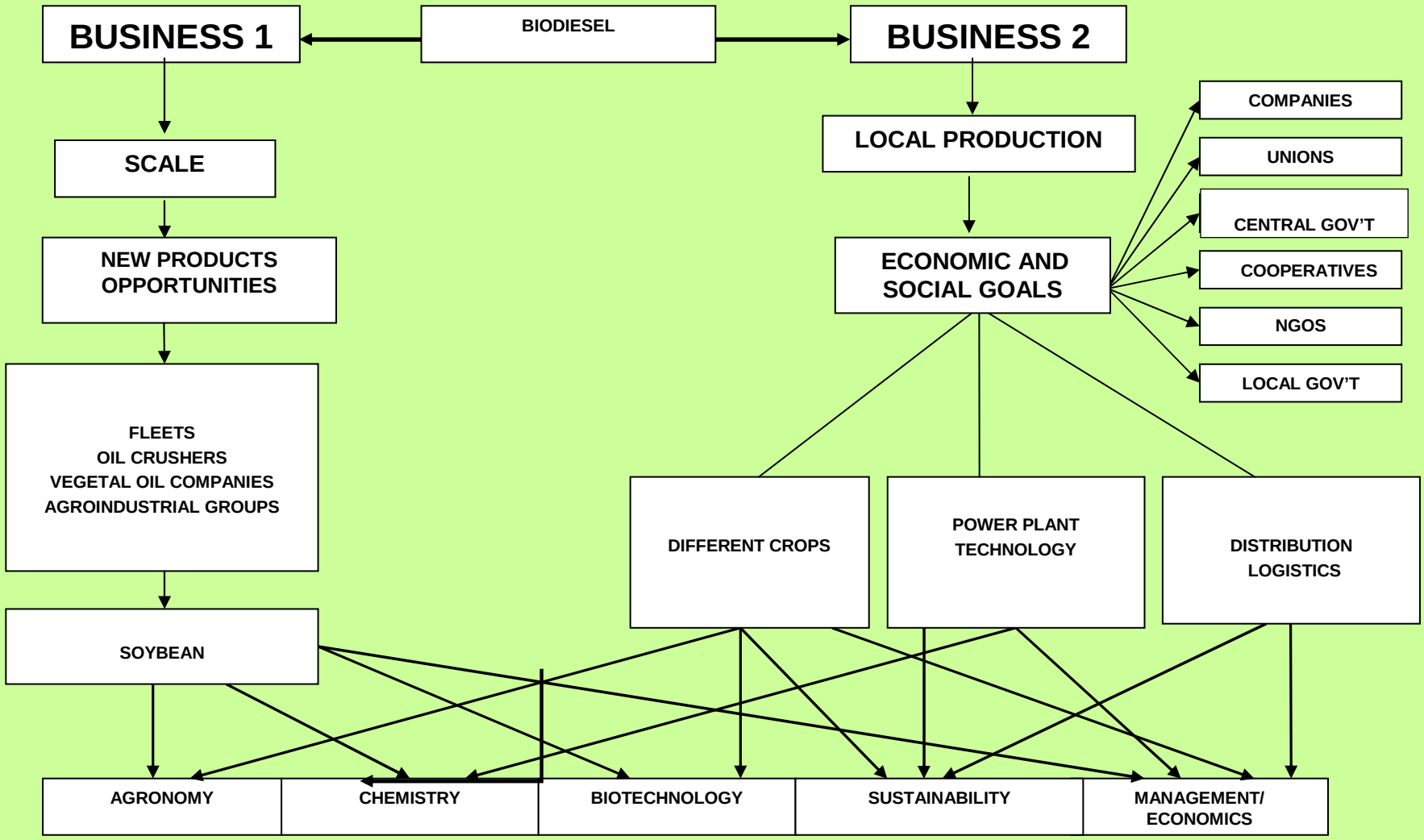
Biodiesel

Distributor

B2/B5 Mix

By-products

Biodiesel Value Chains in Brazil



Source: Padula, Benedetti, Rathmann – IAMA, 2007

Objectives

- The state of Rio Grande do Sul (RS) is located in Southern Brazil and produced approximately 268 million litres of biodiesel in 2008.

- The objective of the present study is to characterise and analyse the decision-making process in the biodiesel chain in Rio Grande do Sul.

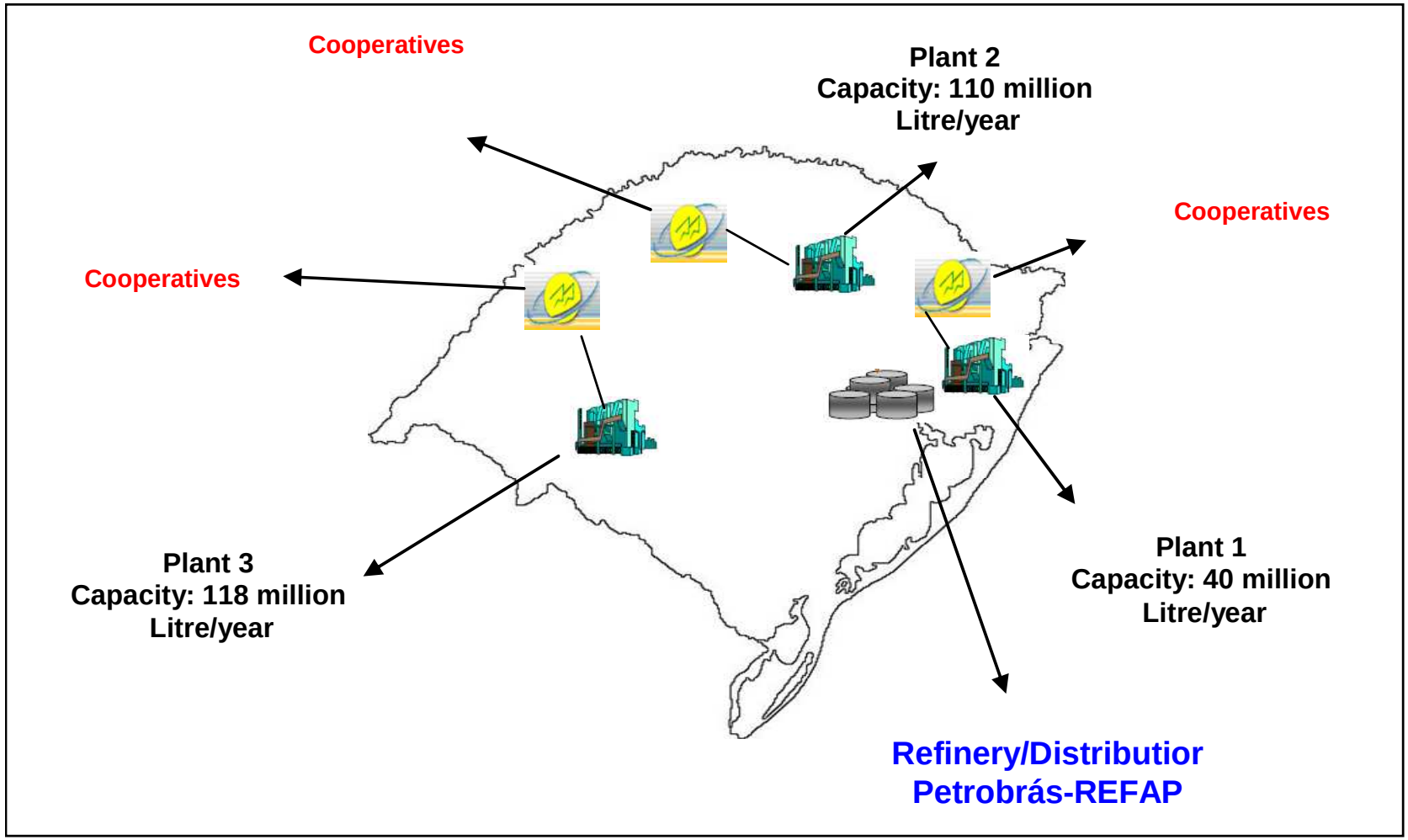
- This study will make it possible to identify alignments and/or disalignments in the decisions of the different agents and the possible consequences for efficiency, competitiveness and sustainability in the way in which the biodiesel chains are structured and function.

Procedures

- The analytical framework that guided the identification and the characterisation of the decision-making process involved in the biodiesel production chain was constructed based on three theoretical approaches: a) **The Decision-making Process**: styles of decision-making, level of information and the decision-making experience, assumptions and models of decision-making (Simon, 1945); b) **The Factors that Influence the Decision-making Process in Agricultural commodity-based Production Chains**; and c) **The Transaction Cost Economics**.

- The biodiesel production chain in Rio Grande do Sul state (BPC/RS) consists of three main actors: a) the soybean farmers organized into 11 (eleven) cooperatives that have contracts to supply grains to the processing plants operating in RS; b) the 3 (three) biodiesel production plants operating in the state and; c) the Petrobras Refinery (REFAP) which blends the biodiesel with mineral diesel oil at a proportion of 2% (B2) or 5% (B5) and distributes the product.

Biodiesel Chains in Rio Grande do Sul (Brazil) 2007



Results

Decision-making process….

- One of the elements that had a significant correlation and that most contributed towards explaining the decision of the cooperatives (C1, C2,....,C11) to participate or otherwise in the Biodiesel Production Chain in RS is their incomplete decision-making process, which lacks the intelligence and conception phases (SIMON, 1945). The elements contained in these phases, which maybe the view of the market environment, the collection and processing of information, as well as the formulation and analysis of the action plan based on these variables, are not found or appear incomplete. This situation explains the decision on the part of the cooperatives to offer a large part of their soybean production for the purposes of biodiesel production, though with lower profitability, given that the cooperatives are, in general, responsible for the freight costs.

Results…

Decision-making process….

- The decision-making process of the biodiesel production plant managers (P1, P2, and P3) exhibits the full practice of the intelligence and conception phases. Thus, it can be seen that they themselves collect and process information with the purpose of identifying opportunities and threats in the markets in which they operate. The interviewees have a wide experience in agro-industrial production chains, as revealed by the length of time holding management positions in P1, P2 and P3, and they highlighted the need to collect and process information for each decision.
- Lastly, the decision-making process of the manager of Petrobras refinery (REFAP), the link that exercises governance in the biodiesel production chain, was analysed. It was found that all the steps of the decision-making process, from the intelligence, to the conception, selection, revision, and finally the feedback phases were followed. Given this fact, it can be seen that the decisions of the refinery are very close to objective rationality (SIMON, 1945).

Results

Motivations…..

- The analysis of the content of the responses given by the Cooperatives´ managers made it possible to identify that the following factors motivated their participation in the biodiesel chain: a) the guarantee of a reliable demand; b) the tax incentives mechanisms offered by the federal government; and c) the “subsidy” offered with the Social Fuel Seal.
- For the biodiesel production plants participation in the biodiesel production chain is considered a good option because of: a) the incentives currently offered by the federal government; b) the potential future expansion of the market; c) the existence of a captive consumer demand for biodiesel guaranteed by law. In the light of this context, the interviewees revealed that the production of biodiesel constitutes one more product in their portfolio, which also includes other products, such as soy oil, lecitin, among others. Therefore, price is the mechanism that guides their decisions, so that if the price of biodiesel is higher they produce biodiesel and if the price of edible oil is higher they produce edible oil.
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Results

Motivations…..

- For the Petrobras refinery (REFAP), participation in the biodiesel production chain is not considered the best option given that H-Bio appears to be the best alternative for the company. The content analysis of the interviewee´s responses also revealed that the production of biodiesel is perceived as economically unfeasible. Biodiesel is produced because of the institutional obligation of Petrobras to do so (state monopoly). The manager from REFAP states that H-Bio is a better fuel, from both the point of view of fuel specifications (technical), and economic feasibility.

Concluding Remarks

- The diversity of the agents, factors and variables involved in decisions regarding technological, investment, location and production organization makes decision-making a complex process for the actors belonging to the biodiesel production chain.
- With regard the decision-making process of the cooperatives, it is centered on the decision to offer, or otherwise, oil-bearing crops for the production of biodiesel. Their decisions emphasize operational and short-term aspects.
- In contrast, in the plants producing biodiesel, their decision to produce this fuel is associated with the addition of one more product to their market portfolio, and is correlated with a long-term view and the search for economic efficiency. In these firms, the decision to produce biodiesel or edible oil depends on their market prices.
- For the Petrobras refinery (REFAP), to blend biodiesel with diesel oil (B2, B5) is not attractive and it is related to the legal obligation (state monopoly) to mix the fuels.

Concluding Remarks…

In summary, the results show the existence of different characteristics linked to the decision-making process and a significant lack of synchronicity in the aims and motivations of the agents' decisions. This state of decisional misalignment, associated with the fragilities of government policy, leads to heightened uncertainty regarding the sustainability of the Brazilian Biodiesel Production Program.

Thank you very much…

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