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The organizational arrangement of castor bean family farmers promoted by the Brazilian Biodiesel Program: A competitiveness analysis

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ABSTRACT

The organization of family farmers into associations or cooperatives gains importance within the biodiesel industry in Brazil. This research evaluates the competitiveness of the castor bean agricultural production sector, organized around the biodiesel agro-industrial system (AIS). This research presents some of the challenges in the way of enjoying the benefits of the National Biodiesel Production and Use Program (PNPB), concerning the sectoral coordination of small castor bean producers in Minas Gerais and Bahia states and the position of the biodiesel and ricin chemical industries. Desk research, document analysis, and interviews with stakeholders are used to that end. The main results are: the detailing of the institutional environment around the PNPB; the mapping of the biodiesel AIS and of the castor bean organizational arrangement promoted via PNPB, as well as their contractual relations. It appears that the organizational arrangements of castor beans (OACB) exist only as a geographical concentration of producers and cooperatives. Although there are transactions, relations are still too fragile for the cooperation and coordination of collective actions. As part of a sectoral strategic agenda, however, there are actions that can be encouraged for building a horizontal coordination among producers.

1. Introduction

The number of countries using renewable energy has been increasing all over the world (Amigun et al., 2011). The replacement of fossil fuels by biofuels in the matrix of several countries has been guiding especially by government policies in recent decades (Sorda et al., 2010). It is estimated that the world production of biodiesel will grow about 4.5% annually in the next years reaching the amount of 41 Mm^3 in 2022 (OECD, 2013).

The largest world producers and consumers of biodiesel in 2015 were the United States and Brazil (MME, 2016). But considering the grouping of countries, it is expected that the European Union (EU) remains the number one in production and consumption. Besides, other important players – as Argentina, Thailand and Indonesia – have grown in the biodiesel market (OECD, 2013).

In USA, biodiesel is used in mixtures ranging from 2% to 100%, depending on the application and the consumer. In addition, there are many regional and statewide policies that favor the biodiesel sector (Ubrabio, 2016). Most EU countries also have binding mix targets. Besides, there is also a policy with tax incentives and taxation under petroleum derivatives (EBB, 2017). Southeast Asia has also been encouraging biodiesel additions. Malaysia and Indonesia currently schedule B10 and B20, respectively, for 2017, which tends to generate significant growth to the biodiesel market (BiodieselBr, 2017).

In Brazil, the National Program for Production and Use of Biodiesel (PNPB, as per its acronym in Portuguese) was launched in 2004, to implement the production and use of biodiesel in Brazil. This federal program created the normative basis for the commercialization of biodiesel in the country, which involves tax benefits and social inclusion policies. Currently, according to Law No. 13.263/16, the mixture will go from B7 to B8 in 2017, B9 in 2018, and B10 in 2019 (Brazil, 2016).

Concerning to social aspects, the organizational arrangements of castor beans(OACBs)for biodiesel purposes in Brazil are part of an institutional environment that has PNPB, as its main regulator. In addition to encourage the production of and domestic demand for biodiesel, the PNPB also aims to promote social inclusion, regional development, and diversification of oleaginous supply (Pousa et al., 2007; Garcez and Vianna, 2009; César and Batalha, 2010a, 2013; Leão et al., 2011; Stattman et al., 2013; Bergmann et al., 2013; Costa et al., 2013; Silva, 2013; César et al., 2013; Stattman al, 2013; Stattman and Mol, 2014; Cremonez et al., 2015).

In this scenario, the Social Fuel Seal (SFS) was the main instrument created by the PNPB to ensure the inclusion of family farmers in

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Table 1
List of interviews carried out.
Source: Created by the authors.

Group	Region	Position	Organization
Producer associations and cooperatives	BA	President	COPAGRIL
	BA	President	COPERGRÃOS
	MG	Director	COOPERSAM
Government agencies involved in the PNPB	BA and MG	General Coordinator of Biofuels	CGBIO/ SAF/ MDA
	MG	Consultant Responsible by Southeast Region	CGBIO/ SAF/ MDA
	BA	Consultant Responsible by North East Region	CGBIO/ SAF/ MDA
	BA and MG	Agroenergy Coordinator	SPAE/ MAPA
Industry representative agencies	–	Technical Assistant	APROBIO
	–	CEO	UBRABIO
	–	Manager of Economy	ABIOVE
Extension technicians	BA	Agricultural Technician	UTD Morro de Chapéu e Copagril
Biodiesel representatives	BA	Agricultural Technology Manager	PetrobrásBiocombustível (PBio)
	BA	Agricultural Development Manager	
	BA	Coordinator of Central I Semiarid Agricultural Production	
	MG	Coordinator of Central II Semiarid Agricultural Production	
Ricin chemical industries	Bahia	Commercial Manager	Bioóleo
Employer farmer	Bahia	Owner	–
Family Farmers	Bahia	Six Owners	–

organizational arrangements with biodiesel plants and, consequently, the development of disadvantaged regions (Pousa et al., 2007; Garcez and Viana, 2009; César and Batalha, 2010a, 2010b; Watanabe et al., 2012; Stattman and Mol, 2014). Basically, the SFS guarantees the purchase of a minimum percentage of raw materials from family farmers, as well as the provision of technical assistance to these producers (Brasil, 2005a, 2005b, 2009, 2012, 2014a).

In addition, regional development was pursued by the Federal Government through the organization of biodiesel productive poles with the following objectives: articulation of local agents; development of a strategic plan for achieving the goals; and the formation of oleaginous trading cooperatives (MDA, 2010).

Biodiesel production poles in Brazil are related to the concept of local productive arrangements (LPA). The LPA can be understood as the territorial agglomeration of economic, political, and social agents, focusing on a specific set of economic activities, which have some link, often involving the participation and interaction of companies (Santos et al., 2004; Lastres and Cassiolato, 2005). Obtaining the benefits and advantages of LPA depends on the agents' coordination capacity (Caldas et al., 2005) and alignment of interests aimed at good governance (Amorim et al., 2004). Thus, a sense of community should be encouraged (Erber, 2008).

Organizational arrangements promoted for family farming by the PNPB have been documented by several authors (César and Batalha, 2010a, 2013; Wilkinson and Herrera, 2010; Leão et al., 2011; Padula et al., 2012; Florin et al., 2013; Leite et al., 2013, 2014). However, despite the social bias of the PNPB, the structural weaknesses of the poorest regions of the country (i.e., the North and Northeast) became more expressive (Wilkinson and Herrera, 2010).

In 2015, the families benefited by the PNPB totaled 72,485, with 85.38% from the South, 5.42% from the Northeast and 9.20% from other Brazilian regions (MDA, 2016). Farmers are more organized in the South, which consequently contributes to facilitate transactions with biodiesel plants (César, 2012). In 2015, the acquisitions of families of producers from the South amounted to a value of 82.70% of the total, while the ones from the Northeast accounted for 0.34% (MDA, 2016).

At the same time, while soybean answered to 99,62% of social acquisitions to PNPB in 2015, the castor beans was responsible by 0,33% (MDA, 2016). So, there is a huge concentration on soybean as the main feedstock for biodiesel plants, and the 'social soybean' is mainly produced in the south of Brazil.

Therefore, the Northeast Region concentrates the castor bean cultivation, or the OACBs for biodiesel, in places with economic vulnerability. The cost of implementing projects is very high in this region because small farmers are much spread and there is no tradition in cooperatives and production on a large scale. Besides, due the climatic restrictions (mainly semiarid), the castor bean is the only crop available that still can produce in water stress conditions and, in some cases, can be the main income of these small families (César, 2012).

In this scenario, the process of family farmers organizing in associations or cooperatives so that they act collectively has gained importance in the PNPB. Thus, this research is directed towards checking the working dynamics of the OACB in Minas Gerais and Bahia states for PNPB purposes. The study presents the difficulties of the consolidation of these arrangements in LPA, assesses the competitiveness of agricultural production in the castor bean segment, and proposes sectoral actions to strengthen the social proposal of the PNPB.

In this sense, the material is divided into five sections, starting with this introduction. The second section presents the methodological procedures. The third section presents the OACB before and after the PNPB. The fourth section provides information from the field and the last section presents the final considerations and policies implications.

2. Method

This study was guided by secondary data, gathered from literature review, and by primary data, obtained through the conducting of in-depth interviews with key stakeholders, totaling 24 professionals. The interviews took place from November 2015 to April 2016 and permeated six distinct groups: organizations that facilitate transactions, such as producer associations and cooperatives (three professionals); government agencies involved in the PNPB (four professionals); industry representative agencies (three professionals); extension technicians (one professional); biodiesel representatives(five professionals); ricin chemical industries (one professional); employer farmer (one professional); and castor bean family farmers (six professionals) (Table 1).

Initially, the mapping of the biodiesel agroindustry system (AIS) or production chain (Zylbersztajn, 1995; Batalha, 1997; Neves, 2005; Zylbersztajn and Farina, 2010) and the delimitation of OACBs were performed to identify the participating agents in the states of Bahia (BA) and Minas Gerais (MG), where lies the part of the semiarid region that was announced in the social proposal of thePNPB (César and Batalha, 2010a). The largest castor bean producing micro-regions were also identified in these states (Fig. 1): Irecê and Jacobina (for BA) and Januária, Janaúba, and Montes Claros (for MG).

BA accounted for 89% of the national production of castor beans in 2014, and its micro-regions, Irecê and Jacobina, representing 73% and