



# “Will Brazil's ethanol ambitions undermine its agrarian reform goals? A study of social perspectives using Q-method”



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## ABSTRACT

Brazil's agrarian reform policies are on a possible collision course with its ethanol policies. The paper explores tensions between one critical aspect of agrarian reform settlements—food security and safety—and sugarcane mills by focusing on analysis of social perspectives of key actors regarding the possible conflict between ethanol and agrarian reform. We used Q-method to determine empirically four social perspectives regarding ethanol-agrarian reform conflicts, focusing specifically on food security and safety: (1) the sugarcane sector harms family farming; (2) family farming suffers from flawed public policies; (3) family farmers are entrepreneurs and cheap labor for mills; and (4) work in sugarcane is a necessary evil for family farmers. The findings indicate more diversity in social perspectives than the dichotomy between small-scale and agribusiness farming, which is commonly reported in Brazilian media. Moreover, the findings indicate areas for improvement in the ethanol certification process, which relies partially on concepts and measures of food security and safety. Findings suggest the need to implement a broader notion of food security and safety for certification and new methodological approaches for measurement.

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## 1. Introduction

The need for agrarian reform in Brazil responds to long-standing demands for more equitable land distribution, to produce food for markets, and to improve the livelihoods of the hungry and the poor (Melo, 1980; Graziano da Silva and Takagi, 2003; Wolford, 2010). Indeed, agrarian reform responds to long-standing historical debates on the maldistribution of land and the expansion of large-scale agriculture (Prado, 1972; Pinto et al., 2005; Mattei, 2006). For many authors, agrarian reform is essential to improvements in social well-being and the maintenance of family farming. During the second half of the twentieth century, numerous social movements targeted improved access to land for landless workers and improved working conditions for sugarcane laborers (Rogers, 2010; Welch, 2006; Wolford, 2010).

Brazil is the second leading global producer of ethanol because of past and present government policies and strong demand for renewable energy in domestic and foreign markets (Goldemberg,

2007; Oliveira, 2008; Sparovek et al., 2009). Brazil's sugarcane area is predicted to reach 13 million hectares of sugarcane by 2017, a large increase over 9 million hectares in 2014. An additional 200 ethanol mills are foreseen. Annual ethanol output is predicted to reach 58.8 million m<sup>3</sup> compared to 26.6 million m<sup>3</sup> in 2014. Estimates also put Brazil's domestic consumption of ethanol at about 15% through 2017, meaning that more than four-fifths of production will be exported (Brazil MAPA, 2009; Brazil MME, 2008).

However, sugarcane cultivation required for ethanol is potentially contradictory to family farming and agrarian reform because both rely on state support through a national development bank (Banco Nacional de Desenvolvimento; BNDES) for capital investments. Moreover, the large labor force for sugarcane production is potentially drawn from family farmers and sugarcane monoculture demands large expanses of land that may compete with family farming. More broadly, ethanol has been subjected to numerous criticisms on the basis of poor labor conditions and migratory labor that encourages abusive labor relations. In addition, scholars have noted the negative impacts on food production, biodiversity, and water resources resulting from sugarcane cultivation (Bastianoni and Marchettini, 1996; OECD, 2007; UNCTAD, 2008; Goldemberg and Guadabassi, 2009; Martinelli and Filoso, 2008). Finally, indirect effects of sugarcane expansion for ethanol

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are thought to include the expansion of the cattle frontier in Amazonia (Lapola et al., 2010; Walker, 2011).

Global pressures for voluntary certification policies within agro-industrial sectors have encouraged “roundtable” initiatives as a means to reduce negative social impacts of industrial-scale shrimp, soy, and palm oil production (Angel et al., 2007; Laurence et al., 2010; de Man and Burns, 2006; Vandergeest, 2007). Similarly, sugarcane ethanol certification processes aim to legitimize the international ethanol market (Smeets et al., 2008). For example, the Roundtable on Sustainable Biofuels (RSB) offers a Green Gold Certificate including the claim that “biofuels production should assess regional and local risks for food security and mitigate negative impacts from its operations” (MRCS, 2010, p.17).

The potential of increased ethanol production to undermine Brazil’s agrarian reform efforts is a critical problem. For example, social movements, elected representatives, family farming organizations, and scholars have pressured the sugarcane industry for the roundtable on sustainable biofuels out of concerns that include negative impacts of biofuels on food security and safety. Specific impacts of ethanol expansion on agrarian reform and food production have been documented (Wilkinson and Herrera, 2010; Novo et al., 2010; Fernandes et al., 2010). By contrast, a growth model for food and ethanol suggested no conflict (Gauder et al., 2011).

Recent work on the relationship between biofuel and food production aims to compare different fuels (sugarcane ethanol and soy biodiesel) and often results in superficial analyses because scholars simplify complex issues of use of arable land to food availability or to energy balances without considering food security and nutrition in a deeper sense (Sparovek et al., 2007; Martinelli and Filoso, 2008; Martinelli et al., 2010; Goldemberg et al., 2008; Garces and Vianna, 2009; Novo et al., 2010; Rathmann et al., 2010; Wilkinson and Herrera, 2010; Gauder et al., 2011). For example, Sparovek et al. (2007) simulated sugarcane expansion in a context of agrarian reform and reported good likelihood for compliance with certification schemes. This literature, however, often ignores the perceptions of the agents involved in the fuel-food controversy because of a preference for modeling approaches or excessively general metrics such as crop area, output, and yield.

Some scholars have opted to consider social perceptions relating to sugarcane ethanol, even though they did not consider food security and safety as it is defined in Brazil. Huertas et al. (2010) studied the perceptions among producers of sugarcane ethanol in the context of diverse certification schemes for biofuels. They reported optimistically on the willingness of the ethanol sector to adopt certification standards, but they neglected to study the perceptions held by family farmers, social movement representatives, and state officials. Fernandes et al. (2010) reported on conflicts between agrarian reform settlements and sugarcane mills in São Paulo state, but they did not give attention to the social perspectives outside the agribusiness-social movement tensions regarding biofuels and agrarian reform.

Given this state of knowledge, it is important to study food security and safety in the context of biofuel expansion in Brazil by the use of a transparent and well established methodology. Moreover, the discourses of agrarian reform and agribusiness representatives dominate the political agenda, marginalizing social groups with different perceptions, discourses, and postures regarding food-energy conflicts. It is necessary, therefore, to focus on food security and safety, as adopted in Brazil, using transparent methods that permit respondents to reflect on their reality and the diversity of social concerns so that better public policies may be formulated. Moreover, the certification imperative represents a window of opportunity for the creation of frameworks capable of

evaluating the influence of sugarcane expansion on food security and safety.

However, little is known about social perspectives of key actors regarding the predicted conflicts between food security and safety and sugarcane production. Previous studies either use a narrow definition of food security, or they fail to determine social perspectives from sites of agrarian reform settlements located within expanding sugarcane ethanol production. In this study, we empirically determine social perspectives regarding food-ethanol conflicts in a site of rapid expansion of the sugarcane sector. Q method, an intensive (small- $n$ ) and quantitative technique in which  $n$  tests measured by  $m$  individuals, was used to determine four empirically significant social perspectives: (1) the sugarcane sector harms family farming; (2) family farming suffers from flawed public policies; (3) family farmers are entrepreneurs and cheap labor for mills; and (4) work in sugarcane is a necessary evil for family farmers. We consider the implications of these findings in terms of the ethanol certification literature.

## 2. Materials and methods

We carried out the study in a site strongly influenced by sugarcane farming and with agrarian reform settlement populated by family farmers engaged in subsistence and market-oriented production (Fig. 1). This southwestern portion of Mato Grosso do Sul has received national prominence as a new frontier in the expansion of sugarcane farming.

Brazilian agrarian reform settlements intend to provide food and nutritional security, through the provision of housing and farm land, to families lacking access to land. We selected the Andaluçia agrarian reform settlement as representative of agrarian reform settlements in the Nioaque municipality, Mato Grosso do Sul state. These settlements were established because rural workers and their organizations struggled to obtain land; the Brazilian government delivered land to settlers in Andaluçia in 1993. By the early 2000s, with the rise of Brazil’s ethanol production, settlers in the region began competing with ethanol production in terms of access to fertile farmland, access to labor within the settlements, and access to capital for technical assistance, infrastructure, and socio-economic development.

The Andaluçia settlement consists of 167 parcels (mean = 18.15 ha), totaling 4946 ha and a population of approximately 700 people. We purposively (e.g., non-random) sampled 40 families by a household survey covering production (subsistence and market-oriented) and food security and safety indicators. All households (mean = 4.2 persons/household; mean age = 43 years) produce food for subsistence. 42.5% of households included people who worked in the ethanol sector in addition to the family plot; these households reported a mean annual household income of R\$11,937 (SD = R\$7429), compared to full-time farmers ( $n = 23$ ; 57.5%) relying exclusively on their plots who reported a mean annual income of R\$13,149 (SD = R\$7649). Manioc accounted for more than half household income, while nearly one-quarter of households collected edible fruits from native Cerrado vegetation. One-third of households surveyed received benefits from some type of government program, especially the conditional-cash-transfer *Bolsa Família* program that targets poor households, while 25% received a state or federal retirement pension.

We defined food security and safety as regular and permanent access to quality food in sufficient quantity without compromising access to other essential needs (Brazil, Lei 11.346/2006). Considering this definition, 50% of households surveyed in this research were in the “mild insecurity” category, 5% in “moderate insecurity,” and 7.5% in “severe insecurity.” However, there was no statistically significant difference in measures of food security and safety

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