

*Full Length Research Paper*

## Smallholder farming in Brazil: An overview for 2014

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The goal of this paper is to provide an update on smallholder farming in Brazil. Instead of using data from the last available Agricultural Census (2006), a database from the Ministry of Agrarian Development for 2014 was used. These data are extracted from a tax form called “Declaração de Aptidão ao Pronaf-DAP” (Declaration of Aptitude to Pronaf) that is mandatory for all farmers in Brazil and is used as a source of information to screen smallholders, also called “family farmers” in Brazil, applying for special subsidized public funds available to those in this category. Therefore, the DAP is a valuable source of information regarding this sector. The results show that family farming in Brazil continues to grow and is concentrated in the Northeastern region. The South and Southeast have the highest yields per hectare, up to seven times more than the Northeast. Most of the land is in the hands of a small group concentrated in the Northeast, while most of the income is in the hands of a small group concentrated in the South.

**Key words:** Family farm, economy, Brazil, agriculture.

### INTRODUCTION

The world’s agricultural market is expected to continue to grow over the next decade as the world population grows at an exponential rate. Brazil is among the world’s ten largest economies and has the fifth-largest surface area, and it plays an important role in agricultural exports in the international market. The country is the world’s second-largest agricultural exporter and the leading supplier of sugar, orange juice and coffee; furthermore, it is a major exporter of soybeans, tobacco, maize and rice (OECD/FAO, 2015).

Family farms in Brazil represent more than 80% of production units and were responsible for 38% of the

gross value of agricultural production in 2006, according to the Brazilian Institute of Geography and Statistics – IBGE (2006). There is no universal definition for family farming; for example, the Brazilian definition focuses on less affluent farms, while the US definition includes farms of all sizes, from farms with low revenue to those that are multi-million dollar enterprises. It is estimated that there are more than 570 million farms in the world, and more than 500 million of these are owned by families (Lowder et al., 2014). Brazilian law’s main points for defining a family farm are as follows: a farm managed by the owner and his or her family; smaller than four fiscal modules

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(one module may be between 5 and 110 ha depending on the locality); mostly family rather than hired labor; and the family's main source of household income (Government of Brazil, 2006).

As reported by the OECD/FAO (2015), Brazil is projected to maintain its role as a leading supplier to international food and agriculture markets over the next decade, bringing new opportunities for family farmers. In Brazil, family agriculture has become stronger in the last few years due to the success of certain public policies implemented, which inspired other countries in Africa to adopt similar programs. One of them is The National Program for the Strengthening of family farming (PRONAF), which provides low-interest credit and whose resources reached BRL 25 billion in 2014.

To gain access to that credit and other benefits from the government, family farmers are asked to maintain a register in the Ministry of Agrarian Development (MDA). They must complete a form known as the "DAP" (Declaration of Aptitude to Pronaf), in which they provide detailed information about themselves and their properties, such as age, sex, schooling, area of the farm, number of crops produced, income of each crop, total income, number of workers and other income sources on-farm and off-farm, among others. There are approximately 5 million DAPs registered in the MDA database, which creates a plentiful source of information about family farming in Brazil. A survey with information as detailed as that obtained through the DAP is not possible even with the Agricultural Census.

Most of the studies about family farms conducted in Brazil are based on the Agricultural Census, which was last conducted in 2006. Studies using the information from the DAPs are still scarce due to the difficulty and bureaucracy involved in obtaining the data from the MDA. The Agricultural Census data, meanwhile, is easily accessed by everyone. Playing a major role in Brazil's economy and in the international market, family farms need proper attention. This article aims to generate a portrait of family farming in Brazil in 2014 using the information declared by the farmers on the DAP to offer an analysis with a new perspective and more updated and complete data.

## MATERIALS AND METHODS

This article is based on information declared by family farmers on the DAP form obtained through the Ministry of Agrarian Development (MDA) from October 2014. Family farmers from every state in the country can fill in their declaration forms on authorized organizations and, after its correct completion, the form is immediately sent electronically to the MDA system. Subsequently, the DAP is checked to identify any mistakes or false information. The farmers must communicate any changes related to their properties and are not allowed to go for more than three years without updating their DAPs. Therefore, the data extracted from the system database contains information that may have been inserted on the same day or as far back as three years ago.

The method used to analyze the data was exploratory, with the

purpose of verifying the behavior of family farming in 2014. To carry out the analysis, the database was refined by removing cases with missing values or very distorted values (outliers) to minimize errors in the results. Approximately 133 thousand DAPs were excluded, and the final database used for this study contained approximately 4.7 million cases.

The database analyses were conducted using the statistical software R (R Core Team, 2017), given its capacity to process large amounts of data.

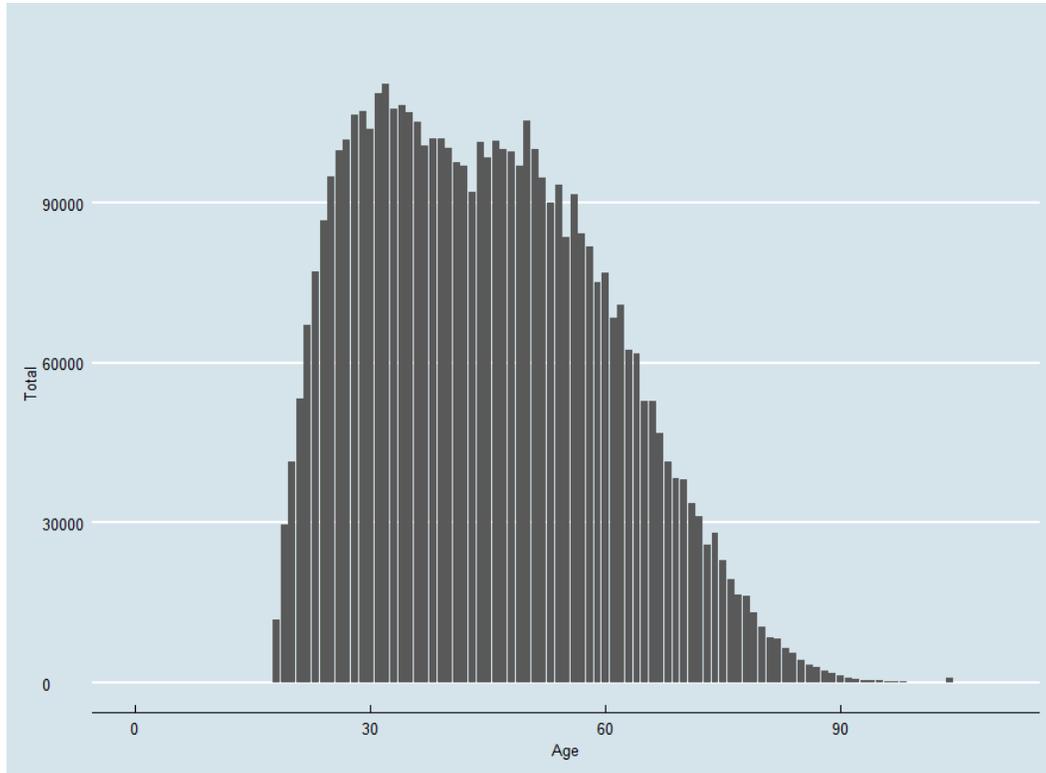
## RESULTS AND DISCUSSION

First, it is important to highlight that Brazil's size means that it contains many different climates, biomes and cultures, which affects agribusiness throughout the country. Therefore, it would not be correct to analyze the data and assume that the average values reflect the reality of the whole country. There are five main regions in Brazil, and each has its own importance, particular characteristics and productive structures. Thus, it is interesting to conduct analyses on a national level as well as on a regional level to develop a more micro perspective and better understand the reality of family farming in Brazil.

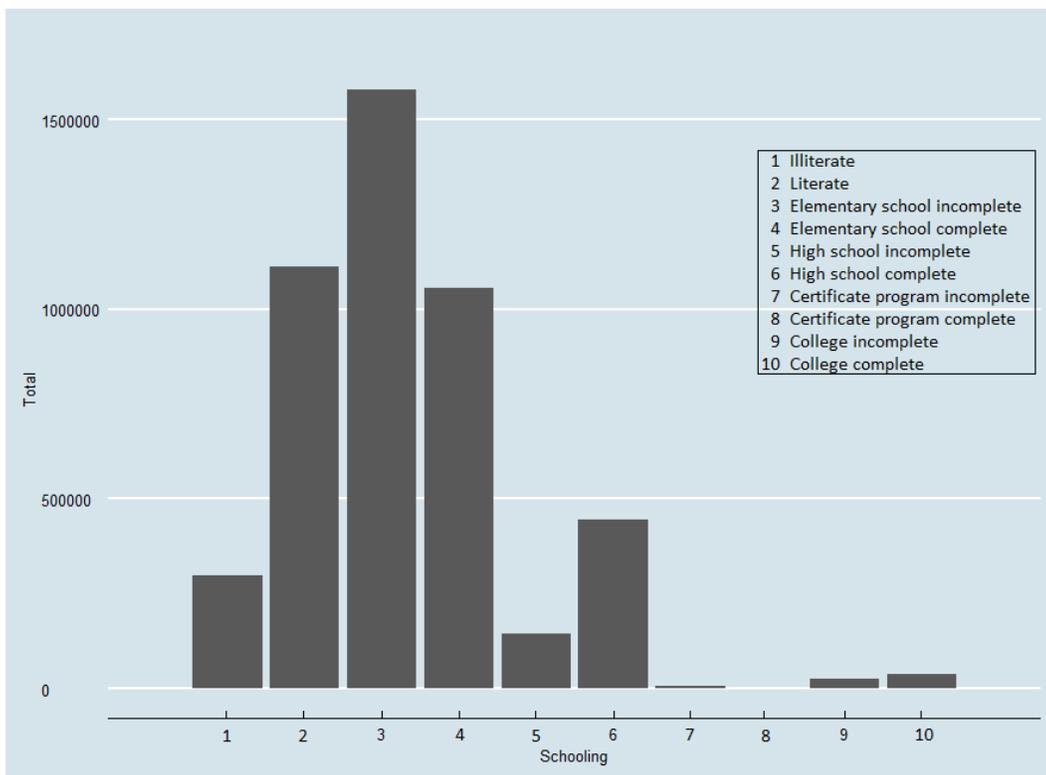
Going through the profile of the DAP owners, there are approximately 2.9 million males, representing 62.8%, and more than 1.7 million females, forming 37.2% of farmers. Studies conducted in Ghana, Kenya and Cotê D'ivoire demonstrated a higher number of male smallholder heads: 70, 80.6 and 85.2% respectively (Martey et al., 2012; Kiplimo et al., 2015; Lawin and Zongo, 2016). The age distribution is very wide-ranging, from 18 – the age of majority in Brazil - to 100 years old. Figure 1 indicates that most family farmers are between 20 and 55 years old. These results are similar to the mean age between 31 and 50 found by Kiplimo et al. (2015) in a study conducted with 600 family farmers in Kenya.

Schooling levels draw attention to the fact that most smallholders have a low level of education, ranging from having completed elementary school to literate, according to Figure 2. This scenario is true for all regions of the country, as none of them stands out with high levels of education. According to Lawin and Zongo (2016), most of agricultural household heads in Cotê D'ivoire have not been to school and, as in Brazil, the level of education of family farmers is in general very low.

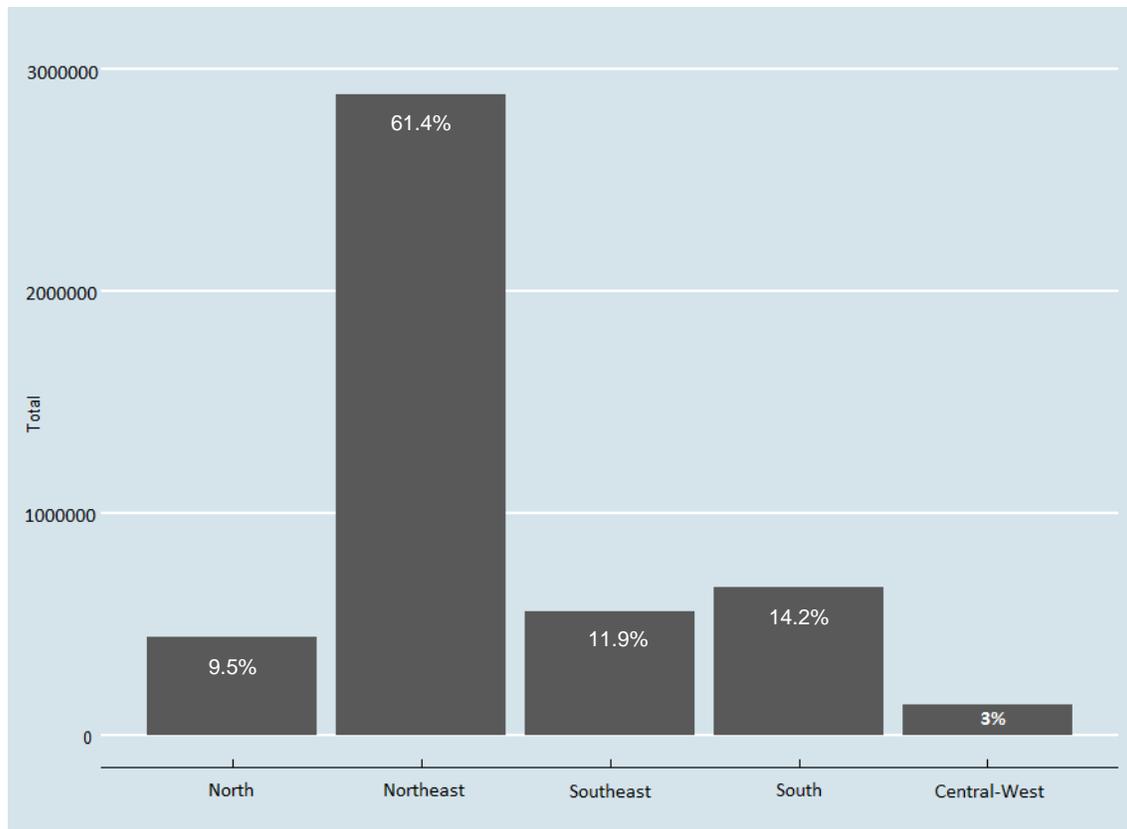
The results also show a low number of family farmers who are members of agricultural cooperatives, only 5%. Those who seek technical assistance or for formal education make up only 7.6%, and these numbers are similar to the ones found by Guanziroli et al. (2012). Partnership arrangements are considered to be the reason for the strengthening and resilience of smallholders in regions as eastern Spain and it is also regarded as a very important factor for family farmers in Ghana which mostly belong to a farmer association (Moreno-Perez et al., 2011; Martey et al., 2012). The results present evidence of the continuity of the profile of



**Figure 1.** Age distribution of smallholder heads based on the Declaration of Aptitude to Pronaf (DAP).



**Figure 2.** Schooling levels of smallholder heads.



**Figure 3.** Distribution of family farms by main regions in Brazil.

family farmers in Brazil already described in the IBGE 2006 Agricultural Census.

The average size of smallholder's farms in Brazil is 19.06 ha, however there are major differences between the five main regions. The Central-West and North have the biggest averages, 41.07 ha and 39.67 ha respectively. Whereas the Southeast, Northeast and South have an average size of 17.08 ha, 16.02 ha and 15.51 ha respectively. Those results suggest that the average size of smallholder's farms in Brazil are bigger than those in other regions such as eastern Spain (5 ha), central-east Kenya (2 ha), Republic of Macedonia (1.7 ha) and Malawi (0.4 ha) (Moreno-Perez et al., 2011; Kikulwe et al., 2015; Angelovska and Ackovska, 2012; Denning et al., 2009).

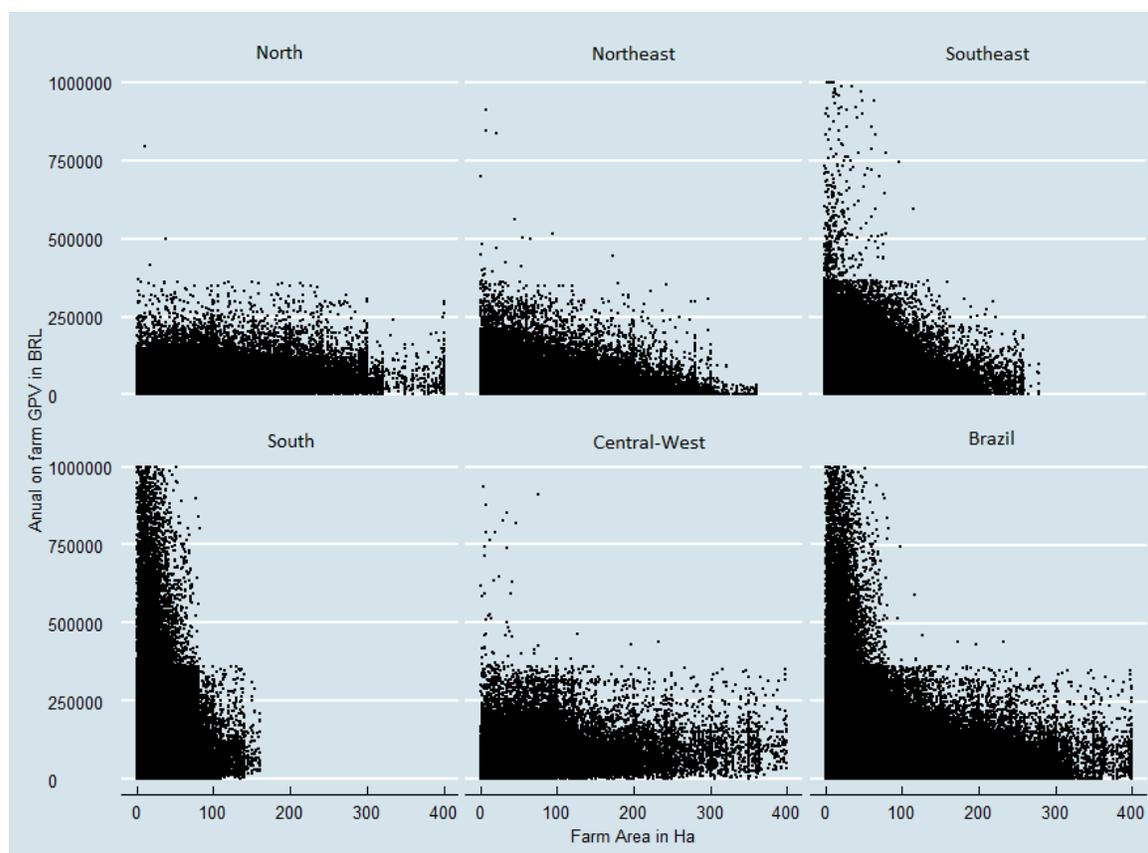
According to the database, more than half (61.4%) of Brazilian family farmers are located in the Northeast region, as shown in Figure 3. On the Agricultural Census (2006) this amount was approximately 50.1%. Following in second place is the South region followed by the Southeast, North and Central-West, respectively. The Central-West region is known as an area of large industrial farms and for its focus on producing commodities for exportation, with little space for family farmers.

Notably, even though the large majority of family

farmers are located in the Northeast, the region is not the leader in gross production value (GPV). Instead, the South region is responsible for the largest proportion of the GPV, approximately 38.6%. The GPV analyzed considers all on-farm income sources that include agriculture and livestock production, agro-industry, handicraft and agrotourism. This reveals greater production efficiency in the South, which can be seen on Figure 4. The difference between the regions in Brazil are impressive: while the South has an average productivity of BRL 3,225.55/ha, that of the Northeast region is BRL 410.57/ha. According to Guilhoto et al. (2007), the structure observed in the South is strongly related to the form of colonization of the region and to the culture that settled there due to the European immigration to Brazil.

Furthermore, the South, Southeast and Central-West regions are areas with a higher rainfall rate, better soil fertility and, consequently, more expensive land. On the other hand, the Northeast region is an area that experiences long dry periods and is less developed, with high levels of social inequality. The productivity increase in this region is strongly related to investments in irrigation.

Unfortunately, inequality is a constant problem in Brazil and is also present in family farming. The database shows that only 10.6% of family farmers own farms with



**Figure 4.** Relationships between farm area and gross production value (GPV) by main regions in Brazil.

**Table 1.** Distribution of large properties and bigger incomes.

Region	Area more or equal to 50 ha				Income more or equal to BRL 50K			
	Quantity	%*	Area ha	%*	Quantity	%*	GPV	%*
North	131,320	2.8	13,160,219	14.7	33,617	0.7	2,748,977,336	3.2
Northeast	254,536	5.4	24,536,925	27.4	34,062	0.7	2,863,856,517	3.3
Southeast	44,173	0.9	3,652,725	4.1	135,131	2.9	12,907,695,540	14.9
South	29,587	0.6	1,946,875	2.2	200,104	4.3	23,583,617,590	27.3
Central-West	38,823	0.8	4,004,729	4.5	39,820	0.8	3,993,244,645	4.6
<b>Total</b>	<b>499,439</b>	<b>10.6</b>	<b>47,301,473</b>	<b>52.8</b>	<b>442,734</b>	<b>9.4</b>	<b>46,097,391,628</b>	<b>53.3</b>

\* Percentage in relation to the total of family farmers analyzed.

an area greater than or equal to 50 ha and they occupy 52.8% of the total area owned by family farmers in Brazil. Most of these are located in the Northeast region, as shown on Table 1. It was found, however, that 9.4% of family farmers have 53.3% of the total annual GPV and the large majority of them are in the South and Southeast regions. Again, the superior capacity of production per hectare of the South and Southeast regions can be verified. Moreover, these figure draw attention to the fact that perhaps millions of hectares in the Northeast are not

being used to their fullest capacity. Angelovska and Ackovska (2012) found a similar problem of uncultivated lands in the Republic of Macedonia, there, among other reasons; this problem is related to the lack of cooperativism amidst family farmers. This may also be the reason for the low productivity in large areas in the Northeast region, however further studies need to be conducted in order to diagnose the causes of this problem in the region.

A study conducted by Guanzirol et al. (2012) also

found a small group of 400,000 family farmers that were responsible for 69.5% of the total production and concentrated most of the revenue, but this study did not specify where in Brazil this group was located.

Although we cannot confirm that all family farmers in Brazil are registered on MDA and have a DAP, the number of DAPs analyzed in this article (4.7 million) is greater than the total number of family farmers found by the 2006 Agricultural Census (4.3 million). It is possible to assume from these figures that the number of family farmers has been increasing in Brazil. More than half of them are located in the Northeast, which has the largest properties; however, this region has one of the lowest revenues, which clearly demonstrates a problem of inequality that has also been identified by other authors and still persists.

The huge productivity gap between regions needs to be carefully assessed. Brazil is expected to remain one of the largest agricultural exporters in the world and will therefore need to rely on family farm production, which has already proved to be voluminous and important for the country. One of the solutions may be investing in and encouraging the education of family farmers. Although the low level of schooling is prevalent in all states and some states have high levels of productivity per hectare despite low education levels, the promotion of education would be beneficial for the entire sector.

The problem of income concentration by a small portion of family farmers has already been described by Guanziroli et al. (2012), who attribute it to the fact that there are subgroups of family farmers: industrial, non-industrial and peasant. Industrial family farmers seem to have access to the most lines of credit. Therefore, it is necessary to adjust the public policies for strengthening family farming that are actually creating inequity and strengthening a small group rather than all.

## Conclusions

The analyses show that family farming continues to grow and plays an important role in Brazilian agricultural production. The existence of a disproportional distribution of family farmers, which are highly concentrated in the Northeast region, was observed. Another main point is the low level of schooling found for the vast majority of family farmers in all regions of Brazil. In addition, the data revealed an enormous inequality in the distribution of land and income. Among Brazilian family farmers, 10.6%, mostly from the Northeast, own 52.8% of the land. In contrast, 9.4% of family farmers, mostly in the South, concentrate 53.3% of the total income of the sector.

Further studies are necessary to diagnose the causes of low productivity in the Northeast region, this may be a key point for increasing agricultural production of family farmers in Brazil. In addition, it is important that new studies continue updating the data of the sector rather

than analyzing information from the Agricultural Census of 2006.

## CONFLICT OF INTERESTS

The authors have not declared any conflicts of interest.

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