

Artículos

Family Farming in the Brazilian Amazon: Trends for Different Types of Families*

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Abstract:

This paper proposes a new typology to analyze trends among family and nonfamily farms in the Brazilian Amazon between 2006 and 2015. We highlight two opposite trends: a decreasing number of family farmers linked to commercial production; and an increasing number of family farmers dedicated to subsistence agriculture. We discuss two main factors that help to explain these trends. First, the legislation limits the total income obtained outside the farm so as to be eligible for public policies targeted at family farms. Second, family farms that are still strongly labor-intensive have faced severe difficulties in a competitive and dynamic agricultural sector that emerged in the Brazilian Amazon.

Keywords: family farming, multiactivity, North region.

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Agricultura familiar en la Amazonia brasileña: Tendencias de los distintos tipos de familias

Resumen:

Este trabajo propone una nueva tipología para analizar las tendencias entre las explotaciones agrícolas familiares y no familiares en la Amazonia brasileña entre 2006 y 2015. Destacamos dos tendencias opuestas: un número decreciente de agricultores familiares vinculados a la producción comercial; y un número creciente de agricultores familiares dedicados a la agricultura de subsistencia. Discutimos dos factores principales que ayudan a explicar estas tendencias. En primer lugar, la legislación limita la renta total obtenida fuera de la explotación para poder acogerse a las políticas públicas dirigidas a las explotaciones familiares. En segundo lugar, las explotaciones familiares que siguen siendo fuertemente intensivas en mano de obra se han enfrentado a graves dificultades en un sector agrícola competitivo y dinámico que surgió en la Amazonia brasileña.

Palabras clave: agricultura familiar, multiactividad, región Norte.

Introduction

Changes in the Brazilian economy have pronouncedly affected the rural society. The rural exodus of the 1970's, driven by the agricultural sector's productive transformations, underwent a gradual decrease due to the relatively advanced demographic transition and urbanization stage. Although the number of rural households has remained relatively stable from 2004 to 2015, the number of people who left farming continued to grow (Garcia, 2014; Maia, 2014; Del Grossi, 2017).

The current dynamics of Brazilian rural areas is part of what has been called “new rurality”, which stands for more significant economic, social, and cultural heterogeneity in rural areas. In this new rurality, the relations between the countryside and the city are increasingly similar and intertwined, far from being homogeneous. Moreover, differently from what many scholars have considered, these relations are more complementary than antagonistic. Members of rural families would be occupied in the most diverse economic sectors, and no longer just in agriculture, thus reinforcing the role of multiactivity in the diversification of income sources (Carneiro, 1998; Wanderley, 2000; Rodrigues, 2009).

These socio-economic changes are already noticeable in the Amazon biome, incorporated into the agribusiness chain in the early 2000s. The expansion of the agricultural frontier would be contributing to the formation of basically two scenarios. The first would be the growing number of family farms that combine farming and non-farm activities (multiactivity) among their members as an alternative to diversify and strengthen the family income. Multiactive families would be more frequent among the poorest rural families. The second scenario would be the growth in the number of families in subsistence agriculture (Herrera et al., 2014; Vieira Filho et al., 2013).

The expansion of the agricultural frontier in the Amazon biome may have several impacts on family farming. The modern agriculture may accentuate productive inequalities and heterogeneity among farmers. Buainain et al. (2013), also contend that the intensive use of modern technologies in Brazilian agriculture has contributed, on the one hand, to substantial gains in productivity and, on the other hand, to aggravate heterogeneities and inequalities among rural farmers. This process results in an intense selectivity so that farms without technical and economic conditions would be close to what the author calls the frontier of marginalization. Maia and Sakamoto (2014), also indicate that technological and economic changes have increased the share of hired agricultural jobs and nonfarm workers within family farms.

Although multiactivity has a recognized role in strengthening family farming, the introduction of Act 11, 326/2006 (regulated by the Decree from 2017) – called the Family Farming Act – may impose limits on farming families to become multiactive. One of the Family Farming Act requirements is that the amount of income earned inside the farms is, at least, equal to the amount of income earned outside the farms (income from multiactivity). For a share of family farmers, especially low-income family farmers that pursue multiactivity as a means of overcoming family difficulties, this requirement may be unfeasible. When they become multiactive families, whose income, in general, is higher than that derived from internal activities in the farm, they may become ineligible regarding the income criterion.

The legal requirement of the Family Farming Act may also, to some extent, push a significant number of farmers towards subsistence agriculture as a means to be eligible for accessing those public policies aimed at family farming. According to Buainain and Dedecca (2010), subsistence agriculture is more intense among family farms that benefit from social policies. One hypothesis is that cash transfers may increase the opportunity cost of working in agriculture for family farmers.

The rural areas in the North of Brazil, where the Amazon biome prevails, have recently been impacted by profound economic and social changes. Traditional activities and smallholder family farming began to compete directly with commercial production, especially with the cultivation of grains on the southern border regions. According to the Agricultural Census 2017, the North region has 580,613 farms, and 82.7% are family farmers. Family farmers in the region also use diverse strategies for income generation, which, in most cases, are not restricted to agricultural activities (Belik, 2015).

This study advances the discussion on the economic and social heterogeneity of the rural region of the North, highlighting the need to rethink territorial and non-sectoral rural development policies that consider the diversity of the Amazon region of Brazil. Schejtman and Berdegúé (2004), highlighted that territorial diversity requires public policies to abandon the idea of rural as synonymous with agricultural.

This article analyzes the occupational trends among rural agricultural families in the North region of Brazil between 2006 and 2015. The North region is the most representative region of the Amazon biome in Brazil. Our analyses highlight how the permanence of family farmers in rural activities aimed at supplying market demands will face increasing difficulties in a context of higher competitiveness in agriculture and higher attractiveness of hired farm and nonfarm jobs. We also emphasize how the Family Farm Law may have reduced the number of family farms by imposing a minimum income from farm activities.

We use the microdata from the National Household Sample Survey [PNAD] of the Brazilian Institute of Geography and Statistics [IBGE] to develop a typology of rural families dedicated to agricultural activities. This typology allowed us to compare the characteristics of family farms with other types of non-family farms. The paper has five sections, including this introduction. Section 2 presents the literature review on farming families and pluriactivity, highlighting trends and prospects based on the legal definition. Section 3 describes the methodological strategies used to classify the types of families. Section 4 presents the results, and section 5 discusses the main findings. Finally, we present the final considerations of the study.

Literature review

Agricultural households in family farming: trends and prospects

An increasing number of rural members have left agriculture as the primary source of occupation and income, which coincides with the emergence of nonfarm activities in rural areas. According to Del Grossi (1999), between 1981 and 1995, the non-agricultural economically active population showed strong growth. The number of people occupied exclusively in agriculture decreased in all Brazilian regions. Since then, the more than proportional increase in the number of persons employed in nonfarm activities contributed to the rural population's relative stabilization. Thus, numerous other activities emerged, being responsible for most jobs, especially in the regions with more modern agriculture, which implies that it is no longer possible to consider the rural only from the families and the agricultural activities.

The growth of the rural population employed in non-agricultural activities was initially observed in developed regions (Anderson & Leiserson, 1978; Fuller, 1990; Arkleton Trust, 1992; Hill, 1999; Van Der Ploeg et al., 2000; Ellis & Biggs, 2001; Terluin, 2003; Irwin et al., 2010; Chase, 2010; Zakeviciute, 2019). One main recommendation of these studies is that public policies for rural areas would consider the diversity of activities in these areas, rather than focusing exclusively on the farming activities (Ellis, 1998, 2000; Schejtman & Berdegúé, 2004). This debate was also present in Latin American countries (Grammont & Martinez Valle, 2009).

The configuration of such new dynamics has reflected, particularly, on the number of families residing in rural areas and, consequently, in the rural exodus mitigation observed in the 1960s and 1970s. The number of rural households grew significantly from the 1990s, due to the growth in non-farming and multiactive families and non-occupied persons, with relative stabilization from 2004 to 2014 (Laurenti, 2014; Maia, 2014; Del Grossi, 2017). However, the rural population occupied in agricultural activities exclusively continued to decrease throughout this period.

According to Kageyama (2008), this new context formation closely relates to new rural roles. Among the new functions we highlight: the *productive function*, which, previously restricted to agriculture, is integrated by a set of non-agricultural activities, especially rural agro-industries, handicrafts, tourism, environmental conservation, which become responsible for a significant share of employment in these areas; the *population function*, as the rural area also becomes a place of residence for families not dedicated exclusively to agricultural activities; the *environmental function*, which demands from rural families the preservation of the environment and forest assets and that, in many cases, becomes an opportunity for occupation and income generation.

The rise of non-agricultural activities as a source of occupation and income has led to new lifestyles in rural areas, reflected in the substantial economic, social, and cultural diversity. Many families started to combine agricultural and non-agricultural activities among their members to diversify their occupation and income portfolio, contributing to the emergence of multiactivity within rural families. Income diversification and stabilization, in addition to the containment of the rural exodus, are pointed out as the main advantages of the heterogeneity that came to develop in the rural environment, especially among the most impoverished family farmers (Nascimento, 2009; Schneider, 2009; Escher et al., 2014).

Within family farming, these transformations have been visible through the different family types and groups that emerge in the new rural landscape and the reproduction strategies adopted by family groups. Del Grossi (2017)

shows that the number of families in family farming in Brazil, between 2004 and 2014, remained stable due to the strong growth in the number of families dedicated to subsistence agriculture as compared to the reduction in the number of families conducting commercial production. In regional terms, the Northeast Region saw the most significant growth in families with activities focused on subsistence agriculture. Still, there was also a positive evolution in the North and South regions of the country.

Grisa et al. (2010), define subsistence agriculture as a diversification strategy used by family units to guarantee minimum conditions required for their socio-economic reproduction, especially regarding food autonomy. In addition to its role in generating food and diversifying their livelihoods, the authors point out that subsistence agriculture works as a kind of “non-monetary income” by enabling families to save resources producing goods in the family unit instead of acquiring them in the (super)market.

According to Neder (2008), between 1995 and 2006, there was high participation of rural people in family agriculture for subsistence, especially women, spouses, with few hours worked. The explanations for the growth in subsistence agriculture among rural families are the most diverse. According to Buainain and Dedecca (2010), besides income transfers, such as Bolsa Família and rural social security, the policies to incentivize family production would generate a kind of “opportunity cost” of working in agriculture. Family members who benefit from these policies and programs would be less willing to work in temporary and low-paid jobs.

Notwithstanding the authors above’ considerations on development conditions of subsistence agriculture, Schneider and Cassol (2014) show that family farming in Brazil is quite diverse and heterogeneous. According to the authors, family farming comprises at least three groups: the first group, highly specialized, has a large portion of the revenues generated in the economic activities related to agriculture; the families in the second group have multiple sources of income, mostly from nonfarm activities and pensions; in the third group, families obtain revenues mainly from nonfarm activities and carry out sporadic agricultural activities.

Family farming is historically characterized by its internal diversification, especially concerning its economic and productive aspects. Nonetheless, family farming still lacks yet specific policies for each segment. Multiactivity has presumably a vital role in the lowest segment by providing the strengthening and diversification of income sources. However, this group of more impoverished farmers would fundamentally depend on public policies that value the diversity of family demands and potentialize farm and nonfarm activities (Kageyama, 2001; Mattei, 1999; Schneider, 2009; Sacco dos Anjos, 2003; Nascimento, 2008; Cardoso, 2013; Delgado & Bergamasco, 2017).

Public policies and the Family Farming Act

Some authors argue that the model of agricultural development adopted in Brazil has fostered the large agricultural properties, while leaving a large group of impoverished smallholder family farmers unattended by the public policies (Grisa & Schneider, 2014). Nonetheless, the number of family farms in Brazil is still remarkable. At the same time, this group requires more equitable and differentiated public policies, especially in the sense of valuing the diversity and heterogeneity typical to their composition.

The creation of the National Program for Strengthening Family Farming [PRONAF] in 1995 reflects part of the protagonism assumed by social movements and organizations in family farming in seeking a more inclusive development model. The discussions that emerged in the academic and political spheres of that period, which strongly emphasized the importance of family farming for the Brazilian economy, also contributed to critical institutional changes (Delgado & Bergamasco, 2017).

According to Wanderley (2017), PRONAF represented, in fact, a significant advance for family farming in terms of public policy. However, the institutional change did not mean structural changes from the model of agricultural development based on large farms, nor did it have an equal reach for all farmers. The policies remain, according

to the author, linked “to a model of agriculture with a certain degree of productivist rationality and participation in the market [...]” (p. 71).

From this same perspective, Aquino et al. (2018), reinforce that PRONAF, created to reach all family farmers, regardless of their technical and economic condition, has frequently reproduced the same patterns of modernization process in agriculture. As a result, there has been an intensification of inequality within family farming itself, as one group has material conditions and a considerable standard of living. In contrast, another segment has precarious survival conditions, making them dependent on public policies.

The core of the matter is that, over the years, while recognizing the heterogeneity of ways of life within family farming itself, the various attempts to reduce inequalities by “including” the most varied types of family farmers, such as PRONAF, were successful only in relative terms. That is because there is a clear tendency to benefit the most dynamic and modern segment to the detriment of the more underdeveloped segment, thus reproducing the same patterns observed in the agricultural modernization. With some frequency, one discusses if the most impoverished family farming would result from the public policies that unintentionally weaken it instead of strengthening it (Carneiro, 1997; Nascimento, 2008; Aquino & Schneider, 2011; Aquino et al., 2018).

Law 11, 326/2006, regulated by Decree 9,064/2017, establishes the foundations of the national policy for this category of family farming. Nonetheless, the Law put into question the effectiveness of public policies to include historically marginalized family farms. Besides excluding several farmers from the policies’ coverage, the regulations mentioned above impose limits on family farming to become multiactive. The Law requires that at least half of the family farm’s income comes from economic activities. The limitation of this criterion stems from the fact that in intersectoral (and traditional) multiactivity, the revenue generated *outside* the family unit is higher than that earned internally.

Accordingly, those not complying with this criterion (and with the other criteria) are considered as non-family farmers and are, therefore, excluded from actions aimed at strengthening family farming. Many family farmers will fall under this situation not because nonfarm income (or farm income generated at another farm) is necessarily high, but because the agricultural income generated by these farmers is meager.

Possibly, the decreased number of family farms, from 4,300,000 to 3,900,000 units (presented by data from the 2017 Census of Agriculture) could be explained, in part, by the exclusion of many multiactive families with higher nonfarm incomes than farm incomes. These families are classified as non-family farming because they do not meet the Law’s criteria, thus being excluded from the public policy scope.

In a way, the definition provided by Act 11, 326/2006 does not match the diversity of the dynamics of Brazilian agriculture in recent years, widely discussed in the literature, in which the various sources of occupation and income would have a fundamental role in improving the families’ living conditions. According to Delgado and Bergamasco (2017), the legal recognition of family farming strengthens this category that has been historically excluded from public policies in Brazil. Still, it ignores a significant portion of new players that emerged from the “new” Brazilian rurality, such as hired employees in nonfarm activities.

Material and methods

Data and variables

We use microdata from PNAD of the IBGE for the seven states from the North Region in Brazil: Acre, Amapá, Amazonas, Pará, Rondônia, Roraima and Tocantins. We restricted our analysis to period 2006-2015 for two main

reasons. First, our analysis starts in 2006, when the Family Farming Act came into force in Brazil (IBGE, 2015). Second, PNAD (IBGE, 2015), introduced several methodological changes after 2015, which might compromise our historical comparison.

We identified the types of families that meet (and others that do not) the criteria of Family Farming Act 11,326 dated July 24, 2006, regulated by Decree 9,064 dated May 31, 2017. The Family Farming Act defines the following criteria for classifying the family farmer:

- Art. 3 the UFPA [Agricultural Production Family Unit] and the family farming enterprise must comply with the following requirements:
- I - having, in any capacity, an area of up to four fiscal modules;
 - II - using at least half of the family workforce in the production and income generation process;
 - III - earning at least half of the family income from economic activities in their farm or enterprise; and
 - IV - the farm or enterprise being strictly family-led.

PNAD, unfortunately, has no information about who manages the farm. However, we believe that it is unlikely that a self-employed family will hire an administrator. As self-employed families correspond to practically 98% of the total Family Farming (the rest are families of employers with up to two employees), we understand that the lack of this information in the PNAD (enterprise management) does not preclude the investigation proposed here.

Thus, we defined the types of family farms based only on Criteria I, II, and III. Two essential precautions have also become imperative concerning the incomes earned by the members of the family units:

- 1) We considered incomes from *wages* earned in *agriculture* by family members from the *Family Farming* group (mostly self-employed, traditional multiactive families) as incomes obtained *outside* the farm; and
- 2) We observed that a significant portion of family units of self-employed rural workers, in addition to farm activities, also pursue *nonfarm* activities (intersectoral multiactive families). However, this study's database – PNAD – does not allow us to know precisely the location of these (nonfarm) activities, whether in rural or urban areas. However, it enables knowing whether or not the families carried out such activities within the rural farm. For 2015, we found that about 14% of the people from self-employed rural families in the North region who pursued nonfarm activities performed these activities “at the home where they lived” (code 3 of variable v9054). Therefore, because they are from rural families developing this type of work at home, in this case, we consider that the families obtained incomes from these activities *within* the farm. For the remaining 86% of the cases, we suppose the respective gains as earned *outside* the farm.

We considered as family farming only (i) the extended families of employers with up to 2 employees, and (ii) the self-employed families in which both family types met, simultaneously, the three previously mentioned criteria (I, II, and III). The types of families are:

- 1) *Non-family farms of employers* have an employer in the family and hires any number of employees (one or more) and that, also, either have their farms with *more than four fiscal modules* or, even having up to four fiscal modules, do not meet at least one of the other two Criteria (II, III) of the Act of 2006 and Decree of 2017. Therefore, this is a *non-family* type of family (or farm);
- 2) *Non-family self-employed farms* have no employer among its members and, besides, either has a farm with more than four fiscal modules or, even having up to four fiscal modules, does not meet Criterion III of the 2006 Law/2017 Decree (Criterion II, on the workforce, is satisfied because this family group does not hire workforce). Therefore, this type of family is not considered as family farming by the 2006 Law and the 2017 Decree;
- 3) *Family farms* are self-employed farmers or employers with up to two employees that comply with Criterion I, of having up to 4 fiscal modules, and, also, simultaneously meet the Criteria II and III (workforce and income). Family Farming is mostly composed of self-employed families, practically 98% of the total (the remaining 2% corresponded to employers families with up to two employees).

4) *Family of employees* are the family type with no employer or self-employed members, but they contain at least one person occupied as a hired farm employee. This group, therefore, is not classified as family farming.

We also subdivided the family farms (group 3) according to the type of activities they develop (farm, nonfarm, and multiactive):

a) *Family farming with commercial production* has at least one member occupied in agriculture, conducting one or more agricultural enterprises;

b) *Family farming with subsistence agriculture* are family farms with no member in the categories of employer, self-employed, or hired agricultural worker, but they have with at least one member working in subsistence agriculture.

c) *Agricultural families* are those with at least one member working in farm activities, and no other member engaged in nonfarm activities;

d) *Non-agricultural families* are with at least one member working in nonfarm activities, and no other member engaged in farm activities;

e) *Multiactive families (traditional or intersectoral)*: *traditional multiactive families* have at least one member working in the family farm (as self-employed or employer) and at least one other member working in another farm as a hired agricultural laborer; *intersectoral multiactive families* have at least one member at least one member working in the family farm (as self-employed or employer) and at least one other member working in a nonfarm activity (inside or outside the farm).

Empirical strategy

We use exponential functions to identify trends in the types of families. Initially, we assumed that expected population of each family type k in the year t is given by:

$$E(Y_{k_t}) = \varphi_k e^{\theta_k t} \quad (1)$$

Where Y_{k_t} is the population of family type k in year t , φ_k is the expected value when $t = 0$, and θ the annual growth rate of Y_k . Equation (1) can also be represented by:

$$\ln Y_{k_t} = \ln \varphi_k + \theta_k t + \varepsilon_k \quad (2)$$

Where ε is the random error not explained by the model. The average percentage rate of annual growth is given by $(e^{\theta_k t} - 1) \times 100$.

We introduced a binary variable d in equation (2), which assumes 0 between years 2006–2009 and 1 between 2011–2015. This variable controls structural breaks in the annual growth trend due to changes in rural areas' delimitation. The municipal government may modify the urban perimeters in their respective municipalities, which consequently changes the number of rural residents. IBGE updates the rural areas in the Demographic Censuses, which, in our case, occurred in 2010. The equation will then be given by:

$$\ln Y_{kt} = \ln \varphi_k + \theta_k t + \alpha d_t + \varepsilon_k \quad (3)$$

Results and Discussion

Trends in family farming

The rural families in the Brazilian North Region, more recently incorporated into the agricultural frontier, have shown relevant structural changes. First, we highlight the remarkable increase (significant at 5%) in the number of families: 1.8% per year from 2006 to 2015 (table 1). Second, although the number of family farms remained nearly constant over the period of analysis (positive but insignificant growth rate of 1% per year), we found remarkable differences within the subgroups of family farms. For example, the number of family farms with market-oriented production showed a *negative* growth rate (-0.8% per year), while group of linked to subsistence agriculture showed a relevant and significant *increase* (12.1% per year) between 2006 and 2015.

TABLE 1.
TYPES OF RURAL EXTENDED FAMILIES ENGAGED IN AGRICULTURE, NORTHERN REGION, 1,000 FAMILIES IN 2006-2015

Type of Family	2006	2007	2008	2009	2011	2012	2013	2014	2015	Δ (%p.a.) 2006/2015
Employer	17	10	25	24	12	11	12	11	14	10.2
Agriculture	8	7	14	12	4	6	7	7	7	15.1**
Multiactivity	9	3	11	13	7	5	5	4	7	6.2
Self-employed (non-family farming)	72	67	69	68	84	87	87	106	97	2.7
Agriculture	4	9	7	4	5	4	5	8	8	11.5
Multiactivity	69	58	63	64	79	84	82	98	89	2.2
<i>Traditional</i>	11	13	9	5	13	6	7	12	9	-9.0
<i>Intersectoral</i>	58	45	54	59	66	78	75	86	80	4.2
Family farming	345	378	355	384	466	457	462	443	477	1.0
With commercial production	307	339	318	332	413	395	370	358	393	-0.8
Agriculture	263	282	272	277	355	343	330	313	343	-0.7
Multiactivity	44	57	46	54	58	52	40	45	50	-1.6
<i>Traditional</i>	7	9	11	10	10	10	9	8	14	6.4
<i>Intersectoral</i>	37	48	34	45	48	41	31	38	36	-3.7
With subsistence production	37	39	37	52	53	62	92	85	83	12.1**
Employees	173	182	181	205	182	179	176	186	190	2.5*
Agriculture	134	143	139	142	140	134	124	130	142	0.6
Multiactivity	39	39	42	63	42	45	51	56	47	8.0*
TOTAL	607	638	630	681	743	734	737	746	778	1.8**

Source: own source based on the PNADs / IBGE Microdata (2015)

Note: Asterisks (**, *) express significance at 5% and 10%, respectively. The two dashes (-) mean the types of families with less than 6 observations in the sample

On the one hand, this result may suggest that the expansion of the agricultural frontier in rural areas in the Amazon (reflected in the increased total number of families under analysis in table 1) did not stimulate the growth of commercial family farming, probably due to the intensification of competition in agricultural activity. On the other hand, this result may suggest that the expansion of the frontier was associate with the growth of the most vulnerable type of family farming, which is linked exclusively to the subsistence agriculture. Although these results do not establish a cause-effect relationship, they indicate important and opposite trends for extreme groups of family farms in the Brazilian Amazon.

Table 1 also highlights divergent trends for the non-family farms of employers (group 1) and employees (group 4). On the one hand, the number of employer non-family farms grew at a positive and significant rate– 15.1% per year (significant at 5%), – which may be associated with the expansion of the agricultural frontier in the Amazon. On the other hand, the number of families of employees remained nearly constant. In other words, the expansion of the agricultural frontier may have increased the number of farms, but based on the intensive use of labor-saving technologies, which may explain the lack of a significant trend of growth in the families of agricultural employees.

Table 2 shows the trends for the relative participation of the family types. The family types with the most significant relative gains were: families of employers (group 1, 15% per year), and family farming with subsistence agriculture (group 3-B, 10% per year). While the former group (employers) represented a small share of the population in 2015, approximately 1%, the latter group (subsistence agriculture) represented 11% of the total rural families in the North region. The family farming linked to *commercial* production presented the most significant loss (2.6% per year).

TABLE 2.
RELATIVE PARTICIPATION (%) OF THE TYPES OF EXTENDED RURAL FAMILIES IN THE OVERALL
TOTAL OF EMPLOYED FAMILIES IN AGRICULTURE, NORTHERN REGION, 2006 TO 2015

Type of Family	2006	2007	2008	2009	2011	2012	2013	2014	2015	Δ (% p.a.) 2006/2015
Employer	2.8	1.6	3.9	3.6	1.5	1.4	1.6	1.5	1.8	8.2
Agriculture	1.3	1.1	2.3	1.7	0.6	0.8	0.9	1.0	0.9	13.0*
Multiactivity	1.4	0.5	1.7	1.9	1.0	0.6	0.7	0.5	0.9	4.3
Self-employed (non-family farming)	11.9	10.5	11.0	10.0	11.3	11.9	11.9	14.2	12.5	0.9
Agriculture	0.6	1.5	1.1	0.5	0.7	0.5	0.7	1.1	1.0	9.5
Multiactivity	11.3	9.1	9.9	9.4	10.6	11.4	11.2	13.1	11.5	0.4
<i>Traditional</i>	1.8	2.0	1.4	0.7	1.7	0.8	1.0	1.6	1.1	-10.7
<i>Intersectoral</i>	9.5	7.0	8.5	8.7	8.9	10.6	10.2	11.5	10.3	2.3
Family farming	56.8	59.3	56.4	56.4	62.7	62.3	62.7	59.4	61.3	-0.9
With commercial production	50.7	53.1	50.5	48.7	55.5	53.9	50.2	48.0	50.6	-2.6**
Agriculture	43.4	44.2	43.2	40.7	47.7	46.8	44.8	41.9	44.2	-2.5**
Multiactivity	7.3	8.9	7.3	8.0	7.8	7.1	5.4	6.1	6.4	-3.4
<i>Traditional</i>	1.2	1.4	1.8	1.5	1.3	1.4	1.2	1.0	1.8	4.5
<i>Intersectoral</i>	6.0	7.6	5.5	6.5	6.5	5.6	4.3	5.0	4.6	-5.4
With subsistence production	6.2	6.2	5.9	7.7	7.1	8.4	12.5	11.4	10.7	10.0**
Employees	28.5	28.5	28.7	30.1	24.5	24.4	23.9	25.0	24.4	0.6
Agriculture	22.0	22.4	22.1	20.8	18.8	18.2	16.9	17.5	18.3	-1.2
Multiactivity	6.5	6.1	6.6	9.2	5.7	6.2	7.0	7.5	6.1	6.1
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Source: own source based on the PNADs / IBGE Microdata (2015)

Note: Asterisks (**, *) express significance at 5% and 10%, respectively. The two dashes (-) mean the types of families with less than 6 observations in the sample

The results in tables 1 and 2 suggest that we had substantial changes in the composition of the types of families during the expansion of the agricultural frontier in the Amazon. Moreover, this change – as it is worth emphasizing in this article – is observed mainly within family farming, which, on the one hand, has become less focused on commercial production and, on the other hand, has been more targeted to the subsistence agriculture.

Table 3 details the composition of self-employed families and family farming. While the non-familiar self-employed families are mostly represented by pluriactivite families (91.9%, in 2015), the familiar self-employed families are mostly characterized by the commercial production (87.3%, in 2015).

TABLE 3.
RELATIVE PARTICIPATION (%) OF THE TYPES OF EXTENDED RURAL FAMILIES
IN THE TOTAL OF EACH FAMILY TYPE, NORTHERN REGION, 2006 TO 2015

Type of Family	2006	2007	2008	2009	2011	2012	2013	2014	2015	Δ (%p.a.) 2006/2015
Self-employed (non-family farming)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Agriculture	5.1	13.8	9.9	5.4	5.8	4.2	5.7	7.7	8.1	8.6
Multiactivity	94.9	86.2	90.1	94.6	94.2	95.8	94.3	92.3	91.9	-0.5
<i>Traditional</i>	14.9	19.2	12.7	7.1	15.4	6.4	8.5	11.0	9.1	-11.5
<i>Intersectoral</i>	80.0	66.9	77.4	87.4	78.8	89.4	85.8	81.3	82.8	1.4
Family farming										
With commercial production	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Agriculture	85.7	83.2	85.6	83.6	85.9	86.9	89.2	87.4	87.3	0.1
Multiactivity	14.3	16.8	14.4	16.4	14.1	13.1	10.8	12.6	12.7	-0.8
<i>Traditional</i>	2.4	2.6	3.5	3.0	2.4	2.7	2.3	2.1	3.5	7.2
<i>Intersectoral</i>	11.9	14.2	10.8	13.4	11.7	10.5	8.5	10.5	9.1	-3.0
With subsistence production	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Source: own source based on the PNADs / IBGE Microdata (2015)

Note: Asterisks (**, *) express significance at 5% and 10%, respectively. The two dashes (-) mean the types of families with less than 6 observations in the sample

Table 4 classifies family farms according to the size of the property/farm. In rural areas in the Amazon region, both self-employed (non-family farming) and family farming families are concentrated in farms with a maximum size of 10ha: in 2015, 68.8% of self-employed families and 68.6% of family farming families. One critical result is that all the self-employed (non-family) families in farms with up to four fiscal modules are multiactive families, especially in up to 100ha. Reiterating that, as pointed out in the Methodology section, for the case of self-employed families (*non-family farming*) the range of 100ha and more *does not* have the limit of four fiscal modules, as it has for Family Farming.

TABLE 4.
DISTRIBUTION (%) OF RURAL HOUSEHOLDS OF FAMILY FARMING AND NON-FAMILIAR SELF-EMPLOYED FARMS, ACCORDING TO THE LAND SIZE, NORTHERN REGION, 2006-2015

Land size /Type of Family	06	07	08	09	11	12	13	14	15	Δ (% p.a.) 06/15	
Self-employed families (non-family farming)											
[0 to 10ha]	62.4	46.8	60.3	65.7	73.1	74.1	71.5	76.0	68.8	0.7	
Agriculture	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	
Multiactivity	62.4	46.8	60.3	65.7	73.1	74.1	71.5	76.0	68.8	0.7	
<i>Traditional</i>	8.4	5.6	7.8	4.0	9.2	5.3	4.9	8.7	4.3	-12.4	
<i>Intersectoral</i>	54.0	41.2	52.5	61.7	63.9	68.8	66.5	67.3	64.4	2.1	
]10 to 100ha]	27.4	29.9	26.9	24.0	17.5	18.9	18.7	12.2	20.0	-2.7	
Agriculture	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	
Multiactivity	27.4	29.9	26.9	24.0	17.5	18.9	18.7	12.2	20.0	-2.7	
<i>Traditional</i>	4.8	12.2	3.9	2.8	5.7	0.8	3.1	1.8	3.4	-	
<i>Intersectoral</i>	22.6	17.8	23.0	21.2	11.8	18.0	15.6	10.4	16.6	1.1	
]100ha to highest]	10.2	23.3	12.9	10.3	9.4	7.0	9.9	11.7	11.3	4.0	
Agriculture	5.1	13.8	9.9	5.4	5.8	4.2	5.7	7.7	8.1	8.6	
Multiactivity	5.2	9.5	2.9	4.8	3.7	2.8	4.2	4.0	3.1	-4.1	
<i>Traditional</i>	1.8	1.5	1.1	0.4	0.5	0.2	0.5	0.5	1.3	-	
<i>Intersectoral</i>	3.4	7.9	1.9	4.5	3.1	2.6	3.7	3.6	1.8	-	
Family farming (commercial e subsistence)											
[0 to 10ha]	46.9	53.0	51.4	57.3	67.4	68.2	72.4	67.6	68.6	2.1	
Agriculture	41.9	45.7	45.4	49.3	59.4	61.2	66.9	61.7	62.7	2.4 *	
Multiactivity	5.0	7.3	6.0	7.9	8.0	7.0	5.5	5.9	5.8	-1.4	
<i>Traditional</i>	0.4	0.8	0.8	1.2	1.2	1.3	0.8	1.0	1.2	10.5	
<i>Intersectoral</i>	4.6	6.5	5.2	6.7	6.8	5.7	4.7	4.8	4.6	-3.2	
]10 to 100ha]	42.3	38.6	42.0	37.0	27.9	26.6	23.7	28.4	26.9	-1.1	
Agriculture	36.8	32.6	35.9	31.3	24.1	22.7	20.8	24.5	22.9	-1.5	
Multiactivity	5.5	6.0	6.1	5.7	3.8	3.9	2.9	4.0	4.0	1.3	
<i>Traditional</i>	1.2	1.1	2.2	1.1	0.7	0.8	1.0	0.7	1.5	13.3	
<i>Intersectoral</i>	4.3	4.9	3.9	4.6	3.1	3.1	1.9	3.2	2.5	-3.1	
]100ha to highest]	10.8	8.5	6.6	5.8	4.7	5.2	3.9	4.0	4.6	-8.8	
Agriculture	8.5	6.5	5.8	4.9	3.9	4.5	3.6	3.4	3.9	-7.4	
Multiactivity	2.3	2.0	0.7	0.8	0.8	0.7	0.3	0.6	0.7	-	
<i>Traditional</i>	0.6	0.4	0.2	0.2	0.3	0.2	0.1	0.0	0.2	-	
<i>Intersectoral</i>	1.7	1.6	0.6	0.6	0.4	0.5	0.2	0.6	0.5	-	

Source: own source based on the PNADs / IBGE Microdata (2015)

Note: Asterisks (**, *) express significance at 5% and 10%, respectively. The two dashes (-) mean the types of families with less than 6 observations in the sample

Another issue that may further aggravate family farming's fragility, besides the limited availability of land pointed out in previous comments, is the farmer's land tenure condition. A joint analysis of tables 4 and 5 shows that, in 2015, more than two thirds (68.6%) of family farmers (commercial and subsistence agriculture) in rural areas in the North region had farms with a maximum of 10 hectares of area (table 4). Almost half (45.8%) of these family farmers did not own these lands (table 5). When concerning families of family farms with commercial production, the percentage of families that do not own the land dropped to 27%, which is still relatively high.

TABLE 5.
DISTRIBUTION (%) OF RURAL HOUSEHOLDS IN FAMILY FARMING (COMMERCIAL AND SELF-
CONSUMPTION), ACCORDING TO PRODUCER CONDITION AND AREA SIZE RANGE: RURAL NORTH, 2015

Land Size	Producer Condition	2015
Family farming (commercial only)		
[0 to 10ha]	Owner	73,0
	Others	27,0
]10 to 100ha]	Owner	87,7
	Others	12,3
]100ha to highest]	Owner	94,8
	Others	5,2
Family farming (commercial e subsistence)		
[0 to 10ha]	Owner	54,2
	Others	45,8
]10 to 100ha]	Owner	87,7
	Others	12,3
]100ha to highest]	Owner	94,8
	Others	5,2

Source: own source based on the PNAD / IBGE Microdata

Discussion

We used the criteria of family farming defined by the 2006 Law (and the 2017 Decree). In this respect, the trends could be different if the implications of the 2006 Law on family farming were different. For example, we classified the group of self-employed families as non-family farming. This groups presented positive growth rates in practically all family types (agriculture, 11.5% per year, and multiactive, 2.2% per year, as shown in table 1). As a consequence of the requirements of the 2006 Law, not only family farming has reduced its contingent – loss of 97,000 families in 2015 (corresponding to self-employed families, non-family farming, as per the Law above) – but also registered less dynamism (only 1.0% per year).

The implications of the criteria of the 2006 Law on the definition and classification of family farming – concerning self-employed families (self-employed families correspond to the vast majority of family farming, around 98.0%, as explained in the methodology section) – are associated with property size (criterion I) and incomes obtained outside the farm (criterion III). Criterion III reflects directly in cases of (traditional and intersectoral) multiactivity among self-employed families. We showed in table 3 that application of the 2006 Law's criteria implied in a remarkable difference in the composition of familiar and non-familiar families: the former characterized by the commercial production, the later characterized by the self-subsistence.

Family strategies to seek alternative sources of income from work – nonfarm and hired farm labor – outside the family farm, referred by the specialized literature as multiactive strategies (intersectoral and traditional, respectively), are seen as a possible and vital way for family farming to face adverse economic conditions. However,

the creation of the 2006 Law may result in unfeasible or limited adoption of multiactive strategies by self-employed families intended to be classified in the family farming group, since the 2006 Law requires that the income obtained from activities outside the farm be lower than the farm income.

The division of family farms according to the farm size (table 4) highlighted a concrete problem arising from the imposition of a legal barrier to the family farming strategy of becoming multiactive. It is no coincidence that all the self-employed families (non-family farming) in farms with up to four fiscal modules are multiactive families, especially in up to 100 hectares, where multiactivity compensates for the difficulty of generating income exclusively within the property. However, as previously mentioned, this strategy disqualifies thousands of families since it reduces the family farming contingent through this legal route, opening the possibility of cuts in the budget of policies aimed at this historically fragile social segment.

Therefore, many smallholder self-employed farmers may not be able to access any resources from public policies due to the restrictions imposed by the Family Farming Act. The context of poor access to land, on the one hand, and of limitations for adopting multiactivity, on the other hand, may hinder the capacity of a share of family farming to produce for the market and, consequently, contribute to the growth of the share of farmers dedicated to subsistence agriculture. Ciaian et al. (2018), also noted a strong correlation between land fragmentation (agrarian reform), diversification of food production, self-consumption of food by subsistence farmers, and increased nutritional security.

These elements show that the dynamics of this type of occupation in the region relates to aspects other than the greater availability of land and high productivity of agriculture identified by Grisa et al. (2010), in the case of Rio Grande do Sul. Low availability of land and the legal requirements are other elements that may be decisive for increasing subsistence agriculture in the North Region. As Maia and Sakamoto (2014) pointed out in the Brazilian Northeast case, subsistence agriculture probably relates to the low productivity of agriculture and laggard employment of capital, land, and labor.

Some authors (Sacco dos Anjos et al., 2010; Buainain & Dedecca, 2010) point out that the increased number of families conducting subsistence agriculture is associated with policies to strengthen family farming and income transfer (such as Bolsa Família and rural retirement). These policies unintendedly raise the opportunity cost of agriculture work because families may become ineligible for the cash transfers once they have any source of income. Nevertheless, we believe that subsistence agriculture emerges, under these conditions, as a form of strategy for the most impoverished farmers, lacking economic and financial resources, to deal with the process of intensifying impoverishment.

Regarding the lack of economic and financial resources among family farmers, Crépon et al. (2011), highlighted the importance of microfinance to raise the level of food self-consumption of low-income rural families. Iorga & Toma (2013) also emphasized the importance of self-consumption in improving the income and consumption structure of the low-income rural population. Ascione (2015), observed that self-consumption fulfills an essential role in stabilizing income and reducing rural family costs.

We understand that the legal barrier (2006 Law and 2017 Decree) to multiactivity may push family farming towards subsistence agriculture. With little land and, therefore, little access to credit lines for production, multiactivity could be an alternative source of income to support part of the output. The use of multiactivity as a possible source of financing for agricultural production, especially for small farmers, is pointed out by several scholars (Mattei, 1999; Schneider, 2009; Nascimento, 2009; Escher et al., 2014) on the subject.

However, the legal barrier to multiactivity may remove the possibility of financing the production for the market. Therefore, it may be foster the trend of an increasing part of family farming producing only for self-consumption. This trend can be identified from the two distinct evolutions of family agriculture with commercial production and family farming exclusively with subsistence agriculture in rural areas in the Amazon (tables 1 and 2).

Final considerations

The article analyzed the trends of rural family types occupied in agriculture (especially family farming) in the Brazilian Amazon, from 2006 to 2015. At the core of this analysis, the focus was on the potential effects of Act 11, 326/2006 (regulated by Decree 9,064 of 2017) on the dynamics of family farm types in family farming.

The number of rural families occupied in agriculture grew in the period analyzed. However, family groups showed different dynamics. For example, the number of families of employers remained grew faster than the number of families of employees. This result may point to the growth of labor-saving farms. Similar trend occurred with family farming. The number of families of family farmers remained nearly constant. However, the number of families of family farms dedicated to commercial production decreased while the number of subsistence agriculture increased remarkably.

These results point to two fundamental issues. The first is that subsistence agriculture growth may be due to policies to strengthen agriculture and income transfer (Bolsa Familia and rural retirement), increasing the opportunity cost of the agricultural work. The second issue is that the expansion of the agricultural frontier to the Amazon, based on intensive labor-saving technologies, may pose two challenges that end driving subsistence agriculture: on the one hand, the insertion of families in the agricultural labor market, and on the other, the loss of competitiveness of commercial production in family farming.

The difficulties of the most fragile segment of family farmers may intensify as the Family Farming Act determines a series of criteria for a production unit to be considered as such. Among these criteria, at least half of the rural family enterprise's income needs to come from the family farm's economic activities. Thus, family farms with nonfarm activities may not be eligible for accessing the public policies aimed at family farming.

In this context, multiactivity, which is widely discussed as a viable strategy and alternative to overcome the socio-economic difficulties of the most impoverished farming families, could be severely compromised. In case the nonfarm income generated outside the farm by (intersectoral and traditional) multiactivity tends to be higher than the farm income, these families will have difficulties to be eligible for public policies targeted to family farming.

Family farmers who exceed the income and area size limits established by the legislation are now considered non-family farmers, which would explain the increasing trend of non-family self-employed farmers. It is not surprising that these farmers (non-family self-employed farmers) are mostly multiactive, regardless of the farm size. On the other hand, family farmers are concentrated in the smallest area range, conducting activities associated exclusively with agriculture, mainly subsistence agriculture.

In general, the data suggest substantial heterogeneity in rural areas of the Brazilian Amazon. They are composed, on the one hand, of a small group with technical and economic conditions to keep up with the productive transformations and, on the other hand, of a large majority without resources and legally constrained, in the search for viable alternatives for income generation, primarily with the diversification of income sources (multiactivity).

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Notes

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