



# ***Demographic transformations and work strategies: a longitudinal approach of family farming in Salvador das Missões – Rio Grande do Sul***

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## **Abstract**

This study aims to identify variations in the availability of family labor and analyze the work allocation strategies of family farmers. For that, besides to a literature review, primary data were collected through a field research with the same families, in 2003 and 2018, in Salvador das Missões city - Rio Grande do Sul (Brasil). The sample was systematically by community and families, in the first year of the study, were chosen by drawing. The data showed that there was a reduction in the average number of members and an aging of farming families, which implied a reduction in their work capacity. In front of it, families reduce the volume of work allocated to agricultural activities and expand the allocation of family work to non-agricultural activities. Besides, it was observed that the hiring of others works and the allocation of family work in agricultural activities outside of family establishments showed a little significant in the studied years.

**Keywords:** Family farming. Work. Agrarianization. Desagrarianization.

## **Transformações demográficas e nas estratégias de trabalho: uma abordagem longitudinal da agricultura familiar em Salvador das Missões – Rio Grande do Sul**

### **Resumo**

O presente estudo tem como objetivo identificar variações na disponibilidade de mão de obra familiar e analisar as estratégias de alocação de trabalho dos agricultores familiares. Para tal, além de revisão de literatura, foram coletados dados primários através de pesquisa de campo junto as mesmas famílias, no ano de 2003 e 2018, no município de Salvador das Missões – Rio Grande do Sul. A amostra foi do tipo sistemática por comunidade e as famílias, no primeiro ano da pesquisa, foram escolhidas através de sorteio. Os dados revelam que ocorreu redução do número médio de integrantes e envelhecimento das famílias agricultoras, o que implicou na redução da sua capacidade de trabalho. Frente a isso as famílias diminuem o volume de trabalho alocado em atividades agrícolas e ampliam a alocação de trabalho familiar em atividades não agrícolas. Além disso, observou-se que a contratação do trabalho de terceiros e a alocação de trabalho familiar em atividades agrícolas fora dos estabelecimentos familiares mostraram-se pouco expressivas nos anos estudados.

**Palavras-chave:** Agricultura familiar. Trabalho. Agrarização. Desagrarização.

## **Transformaciones demográficas y en las estrategias de trabajo: un estudio longitudinal de la agricultura familiar en Salvador das Missões - Rio Grande do Sul**

### **Resumen**

El presente estudio tiene como objetivo identificar variaciones en la disponibilidad de mano de obra familiar y analizar las estrategias de asignación de trabajo de los agricultores familiares. Para ello, además de revisión de literatura, se recogieron datos primarios a través de investigación de campo junto a las mismas familias, en el año 2003 y 2018, en el municipio de Salvador das Missões – Rio Grande do Sul. La muestra fue del tipo sistemática por comunidad y las familias, en el primer año de la investigación, fueron escogidas a través de sorteo. Los datos revelan que se produjo una reducción del número promedio de integrantes y envejecimiento de las familias agricultoras, lo que implicó la reducción de su capacidad de trabajo. Frente a esto las familias disminuyen el volumen de trabajo asignado en actividades agrícolas y amplían la asignación de trabajo familiar en actividades no agrícolas. Además, se observó que la contratación del trabajo de terceros y la asignación de trabajo familiar en actividades agrícolas fuera de los establecimientos familiares se mostraron poco expresivas en los años estudiados.

**Palabras clave:** Agricultura familiar. Trabajo. Agrarización. Desagrarización.

### **1 Introduction**

The present study focuses on the implications that demographic changes in rural areas generate for the availability of labor and also discusses the strategies related to the allocation of family work that are developed by family farmers. It is intended, with it, to provide updated information to several stakeholders involved in the dynamics of rural development, especially subsidizing the rural planning processes.

Family farming is understood as a social category that, in general, works in small areas of land and uses predominantly family labor, through which it generates agricultural production that is intended both to self-consumption and sale. The family farming is characterized by a specific form of work and production, where family interaction, established by kinship ties and community interaction, with other families, are quite intense and of high symbolic value (SCHNEIDER, 2016).

This social category has a dense presence in Brazilian rural spaces, as evidenced by data from the last Agricultural Census, which indicated that family farming represents 76.82% of agricultural establishments in Brazil and 80.50% in Rio Grande do Sul (IBGE, 2017). In this sense, both in the formulation and execution of planning actions and in understanding the dynamics of rural development, especially in territories where family farming is made present more densely, it is essential to consider these social subjects.

The narratives about Brazilian development, throughout the 20th century, were strongly marked by the bias of industrialization and urbanization, by putting second place to the importance of spaces and rural dynamics. However, since the end of that century, shows an approximation between the narratives of territorial and rural development, which promoted the understanding that rural and territorial development are dimensions that dialogue strongly with each other and the notion of territory cannot do without the discussion about historical and contemporary transformations in rural spaces (FAVARETO; BERDEGUÉ, 2018; LEITE, 2020).

The relevance of planning in rural spaces is highlighted among the narratives that support the necessity to reconfigure food systems for sustainable development (CARON et al., 2020). The planning must be understood as a fundamental part of the rural development process, especially in the context of climate changes and societal challenges crystallized in the Sustainable Development Goals, which point out the importance of turning the ways of production, consumption, processing, storage, recycling and disposal of biological resources, from the perspective of eco-economy and the production of sustainable places (MARSDEN; FARIOLI, 2020).

In this context that the challenge of planning rural areas must be located at the same time, taking into account their connections with non-rural spaces in increasingly urbanized societies (PREISS; SCHNEIDER, 2020). The planning must include from the global dynamics of food production and distribution, to the productive processes developed under the agricultural production units. This is an action carried out by different agents, public and private, who act at different spatial scales, whether globally, such as food empires (PLOEG, 2008), or locally, such as family farming in their production units. Thus, in global terms, there is a necessity for policies that drive the transition to the sustainability and promote the reconfiguration of agricultural-food conglomerates (FAVARETO, 2019). Furthermore, in more local and regional terms, the resilience of production systems and rural communities must get to be strengthened and food sovereignty promoted, as well as territorial markets and the agro ecological transition of agricultural models (PLOEG, 2020; ANDERSON et al. al., 2021).

The planning actions, understood as a continuous and systematic process in which the actions to be carried out are defined in advance and the necessary resources are projected and the way to mobilize them to reach certain goals (CHIAVENATO, 1995), are developed in the most diverse territorial contexts, where force fields are configured in which different stakeholders interact, making it necessary to consider social and economic inequalities, as well as to overcome the current vision of conceiving and planning territories simply as administrative political spaces, or as just social and economic receptacles (FREITAS et al., 2020). In this sense, one of the fundamental tasks of planning processes in rural spaces is to identify the several stakeholders and their peculiarities, as well as the dynamics that must be considered in the planning processes, among which population dynamics stand out.

The Brazilian population dynamic, especially the rural population, is marked by the forceful process of rural exodus observed in the 20th century and, on a recurring basis, the implications of the process of conservative modernization of agriculture, associated with the process of industrialization of the economy, are highlighted, such as explanatory factors of this phenomenon. The literature also highlights that in the last two decades this process of rural exodus has cooled down, but it is still ongoing, being marked recently by a more selective process, whose profile of migrants is no longer by complete rural families to be composed, especially, by the younger and female rural population (CAMARANO; ABRAMOVAY, 1999; ANJOS; CALDAS, 2005; FROELICH et al., 2011).

In addition to the migration process of younger people, the aging process of the rural population is associated with a double movement, which involves the

historical reduction in fertility rates and the increase in Brazilian life expectancy, both in rural and urban areas. With this, there is a reduction in the total number of people in the age strata from 0 to 14 years old and in the older stratum, which increases, the male presence becomes predominant, constituting the process of aging and masculinization of the countryside, also considering the fact that women live longer than men (ANJOS; CALDAS, 2005; ALVES; CAVENAGHI, 2012).

Several authors have focused on the Brazilian population dynamics, highlighting the process of aging and masculinization of the countryside (CAMARANO; ABRAMOVAY, 1999; ANJOS; CALDAS, 2005; FROELICH et al., 2011; ALVES; CAVENAGHI, 2012; MAIA, 2014; ANJOS et al., 2014; COSTA et al., 2015; HEIN; SILVA, 2019; MARZULO et al., 2020), but none of them discuss the implications of these changes in the availability of labor force of agriculture families and the strategies related to allocation of work by rural families.

In this perspective, the aim of this study is to identify the changes that have occurred in the demographic profile and in the availability of labor and analyze the work allocation strategies of family farming in the Northwest region of Rio Grande do Sul. Through a longitudinal study, data were collected together the same families, in 2003 and 2018, which enabled the comparison of panel data to answer the following questions: what changes have occurred in the profile of families? What variations occurred in the availability of labor and in the strategies for allocating family work? What are the implications of these changes for planning practices in rural spaces?

In addition to contributing to the understanding of the contemporary dynamics of transformation of rural spaces, it is intended to provide subsidies for public authorities, third sector entities, farmers' organizations and other institutions of interest in rural issues. It is believed that such subsidies allow to qualify the planning processes, from understanding of recent changes in the dynamics and strategies related to the dimension of work in family farming.

This article consists of four sections, besides this introduction. Next, the main features of the demographic scenery are highlighted and the recent changes in labor dynamics in Brazilian agriculture. After that, it is about presenting the studied context and the methodology used in data collection and treatment. Then, the results of the study are presented and discussed and, finally, the final considerations.

## **2 The Brazilian rural scenery and demographic changes**

According to what is pointed out by Anjos and Caldas (2005), when considering the population dynamics of Brazil southern, one of the defining features of population dynamics that directly implies the dynamics of contemporary rural planning and development is the aging process and the masculinization of the countryside. In this same perspective, in a study on population dynamics in the central region of Rio Grande do Sul, Froelich et al. (2011) also point out the aging process of the rural population between 1996 and 2007, where stands out the reduction in the number of younger rural residents and an increase in older ones.

This rural aging process, according to what is pointed out by Maia (2014), also occurs at the national level, as the average number of retirees per rural

household gradually increased between the years considered in the last three Demographic Censuses, having passed from 0.25 in 1991 to 0.36 in 2000 and 0.46 in 2010, that is, it almost doubled in that period. Resulting from this aging process of the rural population, especially since the legal framework of the Federal Constitution of 1988, which changed the rural social security system, expanding and ensuring the right to retirement

rural families for women and men in the amount of a monthly minimum wage, there is an increase in the importance of income obtained through retirement among rural families.

When analyzing the changes in the Brazilian agricultural labor market, from 2004 to 2015, Silveira (2017) also points out the increase in the average age of the employed population, indicating out that during this period there was a strong expansion of the cultivated area and production, however there was a reduction of a quarter of the population employed in agriculture (about 5 million fewer jobs), which can be attributed to the intensification of capital in agriculture. Furthermore, in relation to the agricultural labor market, the same author observes that there was a smaller reduction in the number of self-employed workers (where family farming predominates) and an increase in occupations focused on self-consumption, from where it can be pointed out the resilience of family farming in the context of an agribusiness and reduced demand for labor.

Increasing the historical perspective, it can be pointed out that the 60s and 80s of the 20th century was reached of conservative modernization. This process demarcated not only changes in the technical basis of agricultural production, but it was configured as one of the most important vectors of social change which, in a context of increasing market liberalization and the internationalization of agricultural production and trade, drastically reduced the rural character of the Brazilian society. One of the evidences of this process has been the growing importance of non-agricultural activities among the rural population, where agriculture, as a productive activity, it is still part of the rural world, but in some regions there is a decrease in its importance in generating employment and occupation (SCHNEIDER, 2003). According to Sakamoto et al. (2016), considering the national situation, since the data from the PNAD 2001 to 2013, despite an improvement in employment and agricultural income throughout the 2000s, the historical rate of reduction of families with exclusively agricultural activities was maintained.

The compiled data Escher et al. (2014) leave no doubt about the importance of the phenomenon of pluriactivity in Brazil, since that 37% of the total number of rural establishments were pluriactive, whereas 34.1% of family establishments were pluriactive and among non-family establishments this figure reached 51.9%. In other words, in one-third of rural family establishments and a little more than half of non-family rural establishments, non-agricultural activities were used to obtain income, showing the great magnitude of this phenomenon. Hoffmann (2011), considering the 2009 PNAD data, points out that 44.7% of employed persons residing in rural Brazil had a non-agricultural activity as their main activity. It should be emphasized that pluriactivity does not only occur in Brazil, it is a phenomenon of international magnitude (SCHNEIDER, 2003).

The pluriactivity is understood as a strategy of social reproduction carried out by family farmers in contexts where their inclusion in the social division of labor allows the combined development of agricultural and non-agricultural activities, not restricted to the agricultural sector or the rural space, representing a social form of work organization and production with many characteristics, but based on this combination between agricultural and non-agricultural work. It is not just an isolated analysis of non-agricultural income earned by individuals, but a focus on rural dynamics and activities, where the family of farmers and their strategies are taken as the unit of analysis (SCHNEIDER, 2001; 2003).

In the Brazilian case, considering the 1980s and 1990s, Graziano (1997) already pointed out that the Brazilian rural could no longer be defined as specifically agricultural, emphasizing non-agricultural activities as part of the dynamics of rural development. More recent studies, such as Lui (2013), who in a longitudinal study with farmers in the northern region of Brazil, find that there is a growing diversification and disconnection between the ways of life of farmers with the execution of agricultural activities, that is, the delimitation of what is an agriculture family is can no longer be specifically limited to space and purely agricultural dynamics. Villwock's work (2015; 2018) in southwestern Paraná support this perspective, pointing to the performance of non-agricultural activities as one of the present elements in the reproduction strategies of farmers.

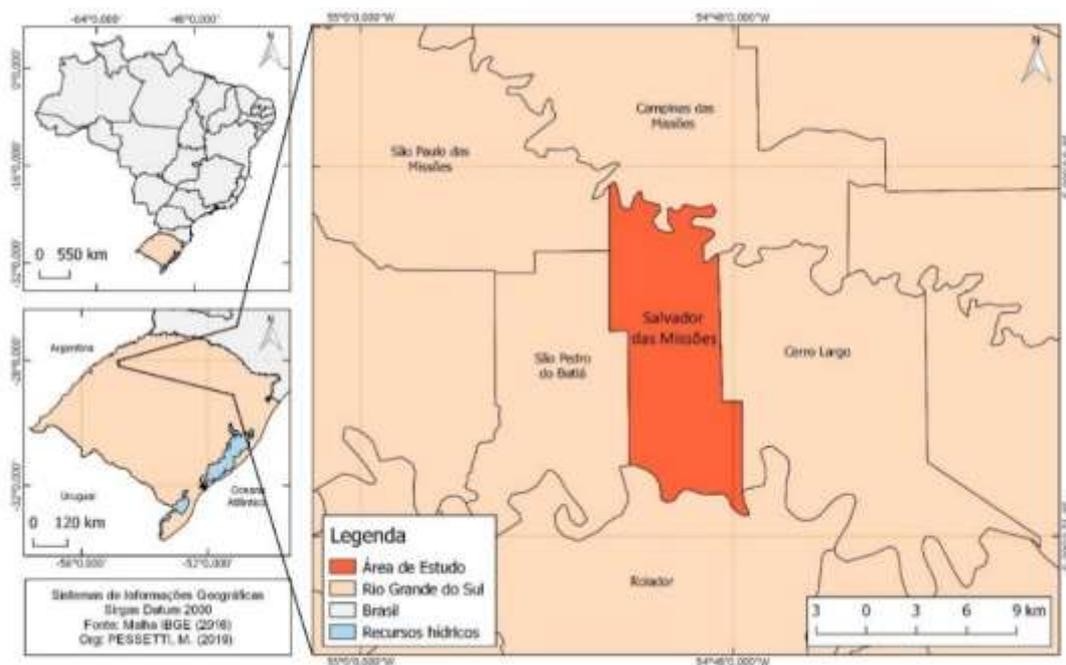
In the case of Rio Grande do Sul, Schneider's work et al. (2006) and Anjos and Caldas (2007) emphasize the importance of pluriactivity in the distinct territorial development dynamics in four regions of Rio Grande do Sul, including the Northwest region. In spite of regional differences, the studies point to the importance of non-agricultural income and pluriactivity among the researched families, emphasizing that farms that developed non-agricultural activities tended to present higher socioeconomic indicators than exclusively agricultural ones, with pluriactivity being associated with families' size, education and access to productive resources.

### 3 The studied area and the research method

The data that support this research were collected in the city of Salvador das Missões, which was founded in March 1992 and it is located in the micro-region of Cerro Largo, in the northwest of Rio Grande do Sul (RS), as shown in Figure 1.

The population dynamic of Salvador das Missões is marked by the stability of the total population between 2000 and 2010, which went from 2,665 to 2,669 people. However, in proportional terms the changes are expressive, as in the same period the rural population of the municipality dropped from 68.11% to 59.01%. In micro-regional terms, the total population showed an absolute decrease (from 140 thousand to 132 thousand) and the relative participation of the rural population also dropped (from 54.17% to 48.07%) (IBGE, 2000; 2010).

Figure 1 - Location of the municipality of Salvador das Missões in the State of Rio Grande do Sul



Source: own elaboration

In Salvador das Missões, family farming has a dense presence, as it represents 86.19% of agricultural establishments, occupies 75.16% of rural areas and answers for 75.29% of the value produced by municipal agriculture (IBGE, 2017). The production of soy and milk is recurrent among family farmers in southern Brazil, and, in the case of soy, in RS 84.7% of producing establishments are family farms and answer for 35.7% of total production, besides of being responsible for 84.7% of Rio Grande do Sul's milk production (GRANDO, 2012). Soy and milk are the main agricultural activities in Salvador das Missões, with an expressive participation of family farming in these productive activities (LIMA et al., 2012).

It exposes the representativeness of Salvador das Missões, both in terms of the density of the presence of family farming, as the production configuration systems and population dynamic, which justifies its choice to carry out the study.

The research had an inductive character and combined the historical and comparative method, so tried to understand the dynamic of the present through the historical phenomena analysis and, at the same time, considered the similarities and differences between social groups to explain the differentiation of their configurations through time (MARCONI; LAKATOS, 2010). In this sense, we attempted to understand the changes that occurred in the profile and family dynamic from a longitudinal perspective (PLOEG, 2017).

Besides of literature review and checking secondary data sources, this study is supported by primary data obtained from field research. The field research was carried out with 58 agricultural families in Salvador das Missões city, and it is important to emphasize that the data were collected from the same families, in the year 2003 and 2018<sup>1</sup>.

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<sup>1</sup> It should be noted that, in 2003, the data were collected as part of the research project Family Farming Local Development and Pluriactivity in RS and referred to the 2002 agricultural year. This project was carried out in partnership between the Federal University of Rio Grande do Sul (UFRGS)

For the collection of information, the same procedures were adopted in two years of data collection, using a semi-structured questionnaire, with several quantitative and qualitative questions. The questionnaire was assembled from a matrix consisting of seven thematic axes, namely: family characterization, production factors land, capital and labor, production processes, information on the value generated, territory characterization and the social environment and local economic, in addition to general aspects of relations with the State and public policies. This study will be considered especially the information related to the first axis.

The sample was of the systematic type by community and the families were defined by drawing lots. It was defined by a sample of 10% of rural properties in the municipality, which resulted in the number of families consulted. All families surveyed in 2003 were found and participated in the survey in 2018, although part of them have transferred their homes to other municipalities. After organizing the information collected data were analyzed by comparing panels (GIL, 2008) and using descriptive statistics.

The labor force was measured in Man Power Unit (MPU) considering the recommendations of Lima et al. (1995), where it is defined that a MPU is equivalent to 300 working days of eight hours. This variable measures the amount of work (labor) available in each family, being calculated considering the age and time of each individual who is dedicated to productive activities. As for age, it was considered: 1.0 MPU (age 18 to 59 years); 0.75 MPU (age 14 to 17 years, or over 60 years); 0.5 MPU (age 7-13 years); in the case of a family member studying a shift, it was accounted for only 50% of these amounts.

The calculation of economic variables income and capital also followed the methodological procedures recommended by Lima et al. (1995). It is important to stand out that all monetary values collected in 2003 were updated for 2018, through the General Market Price Index (GMPI) of the Getúlio Vargas Foundation (GVF).

#### 4 Changes in the families' profile

The total number of people in the 58 families went from 250 in 2002 to 181 in 2017. With it, the average number of people per family went from 4.31 to 3.12. The average age of all residents increased from 37.1 to 49.33 years. In other words, in the period considered, on average, it shows an aging and a reduction in the size of the studied families, as has been stand out in other research studies (MAIA, 2014; ANJOS et al., 2014).

The reduction in the size of the surveyed families can be seen more detail in Table 1. In 2002, there was no family with only one member and, in 2017, there were seven families of this size. Two other family size strata showed growth, with two and three members, showing that the frequency of families to three members have increased. On the other hand, in relative terms, the number of families with four

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and the Federal University of Pelotas (UFPEl). The data collection, in 2018, was carried out through a partnership between UFRGS and the Federal University of Fronteira Sul (UFFS – Cerro Largo) and refers to the 2017 agricultural year. Consider the reader that the results here will refer to the agricultural years 2002 and 2017 and not the year of data collection.

members dropped from 29.31% to 18.97%. During this period, families with five members had a small reduction, remaining, in both years, around 16%. In turn, the families with six and seven members had more significant reduction, showing a decrease in the frequency of larger families.

Table 1 - Distribution of surveyed families, in 2002 and 2017, according to strata of the total number of members

| Strata of the total number of members | 2002     |              | 2017     |              |
|---------------------------------------|----------|--------------|----------|--------------|
|                                       | Absolute | Relative (%) | Absolute | Relative (%) |
| 1                                     | 0        | 0            | 7        | 12,07        |
| 2                                     | 10       | 17,24        | 15       | 25,86        |
| 3                                     | 10       | 17,24        | 13       | 22,41        |
| 4                                     | 17       | 29,31        | 11       | 18,97        |
| 5                                     | 10       | 17,24        | 9        | 15,52        |
| 6                                     | 7        | 12,07        | 2        | 3,45         |
| 7 or more                             | 4        | 6,9          | 1        | 1,72         |
| Total                                 | 58       | 100          | 58       | 100          |

Source: AFDLP Research (UFRGS; UFPEl; CNPq, 2003) and 2018 field research.

Under another angle of analysis, by separating the family size strata that increased from those that decreased, from 2002 to 2017, the number of families increased up to three members and the number of families with four or more members decreased. Based on the data collected, when adding the number of families that had from one to three members in the first year of the study, it appears a total of 20 families and, in the second year of the study, 35 families. In the same period, the amount of the number of cases with four or more members were from 38 to 23 families.

The Aging Rate (AR)<sup>2</sup> of all population of Salvador das Missões varied from 7.24% to 9.27% and then to 12.7%, among 1991, 2000 and 2010, expressing the growing aging process of the population of the municipality. The AR of the studied group varied from 13.6% to 25.97%, showing more intense aging of this group of families in relation to the population of the municipality.

The Dependency Ratio (DR)<sup>3</sup> showed a slight reduction among the researched group, from 53.37% to 50.83%, that is, for each 10 economically active people, in the first year of the study, there were 5.34 inactive and 5.08 in the second

<sup>2</sup>The aging rate is given by the ratio between the population aged 65 or over and the total population, and is a sign of the reproduction capacity of society as a whole, through the consideration of the proportion of elderly people in the population as a whole, where high values indicate populations. more aged.

<sup>3</sup>According to the IBGE (2019), DR is defined as the relationship between the population considered economically dependent (0 to 14 years old - Pop 0 to 14 and also those aged 65 and over - Pop 65) and the potentially active population (15 to 64 years old - Pop 15 to 64), where  $DR = (Pop\ 0\ to\ 14 + Pop\ 65) / Pop\ 15\ to\ 64 * 100$ . It should be noted that the IBGE and other research bodies use age groups with some variations for this framework. In any case, this indicator indicates “the economic burden” exerted by children and the elderly on the productive segments of the social group, in which high values indicate that the active population must support a large proportion of dependents.

year. Despite the slight reduction in the DR of the studied group, between 2002 and 2017, a high proportion of inactive subjects over the active ones remains when compared to the DR of the municipality group, where there was a significant reduction, from 50.82% to 39.59% between 2000 and 2010. That is, in municipal terms, considering the age variable, there is a significant improvement in the proportion between active-inactive, while in the studied group this proportion remained higher over time.

The number of residents by age group can be observed in Table 2. It can be seen that in the younger strata there was a reduction in the total number of residents between 2002 and 2017, being this reduction quite expressive in the group aged up to 15 years old. In the 15 to 30-year-old group, a smaller reduction was observed, but there was a very strong reduction in the 31-45-year-old group. From this age group, the trend is inversed, with a very intense increase in the total number of residents and in the relative participation in older age groups.

Table 2 - Absolute and relative value of the number of family members by age stratum in 2002 and 2017

| Age Strata          | 2002     |              | 2017     |              |
|---------------------|----------|--------------|----------|--------------|
|                     | Absolute | Relative (%) | Absolute | Relative (%) |
| Until 15 years      | 53       | 21,22        | 14       | 7,73         |
| From 15 to 30 years | 40       | 15,92        | 26       | 14,36        |
| From 31 to 45 years | 64       | 25,31        | 22       | 12,15        |
| From 46 to 60 years | 49       | 20,00        | 58       | 32,04        |
| Above 60 years      | 44       | 17,55        | 61       | 33,70        |
| Total               | 250      | 100,00       | 181      | 100,00       |

Source: AFDLP Research (UFRGS; UFPel; CNPq, 2003) and 2018 field research.

By considering the gender composition of families, it is observed that, between 2002 and 2017, the total number of women decreased from 116 to 93 and the number of men from 129 to 88. For both men and women, there was a decrease in the absolute number of members, however, among men, this reduction was more intense, because, in relative terms, men were 52.65% in the first year of the study and passed to 48.62% in the second year. With this, there is a trend of feminization of the researched group, since in relative terms women increased from 47.35% to 51.38% of the total number of family members.

The identified feminization process diverges from the results of studies that indicate a trend of masculinization in the countryside (ANJOS; CALDAS, 2005; FROELICH et al., 2011; MAIA, 2014; ANJOS et al., 2014), which is an important result of the research. This follows from a strong trajectory of non-agrarian (THIES, 2020) that was followed by seven families, all of them composed only of widowed women of high average age (71 years old). In the absence of successors and depending on the old age, these women choose to urbanize, sell or lease their land and distance themselves strongly from agricultural activities, starting to live basically on the resources derived from retirement. Thus, the high degree of non-agrarian, it can be said that these families have discontinued their links with agriculture.

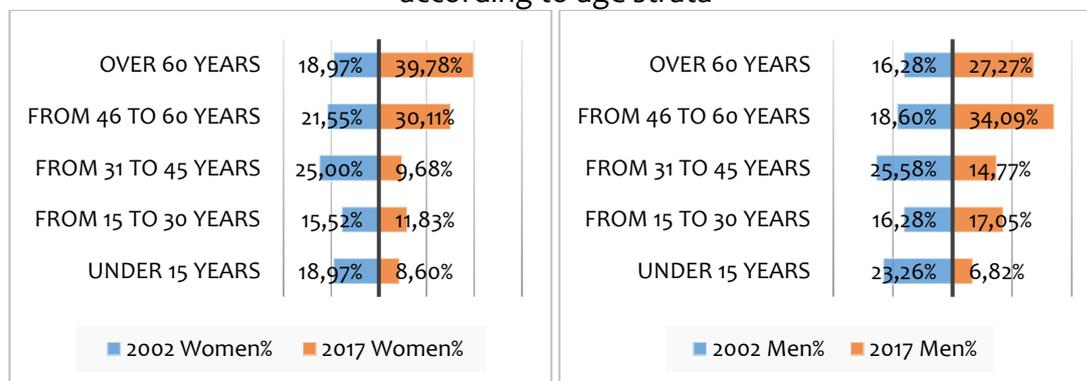
Discounting this group of non-agrarian women from the other study families, it results that, in the second year of the study, there would be male predominance among the families - men would represent 50.57% of the group. Nevertheless, it is

important to emphasize that this process of masculinization of the countryside, which is determined by the migration process of elderly women, is an unprecedented result of the research, which needs to be observed in other studies on rural demographic dynamic, to verify its reach in other regions, because until then the process of masculinization in the countryside was attributed especially to the migration of younger women.

In the graph 1 shows the relative distribution of the members of the study families, by age group and separated by gender. In the younger age group, both for men and women, there was a significant reduction, evidencing a strong proportional decrease in the presence of children and teenagers, especially in the case of men. This same intensity of reduction was observed in the range of 31 to 45 years, however, in this case, it is more intense for women. In the age groups from 46 to 60 years old and above 60 years old, there was a strong increase, both for men and women. The age group that presented the smallest relative oscillation, in both genders, was 15 to 30 years old.

Adding the relative participation of the age groups over 46 years old, in the second year of the study, about 70% of women and 62% of men were more than 46 years old and less of 10% of women and the men were under fifteen years old. This aging of the population implied an increase in the importance of retirement resources in the composition of the total income of families, and, among the study years, in relative terms, the retirement has gone from 16.18% to 19.36% of the total income earned. by the group of families.

Graph 1 - Relative distribution by gender of family members in 2002 and 2017, according to age strata



Source: AGDLP research (UFRGS; UFPel; CNPq, 2003) and 2018 field research.

By observing the age composition and families' size, comparing data from 2002 and 2017, it can be said, in summary, that there was a strong reduction in the families' size and a significant aging process. The two trends observed are quite clear, because, on the one hand, there was a reduction in the number of people in younger age groups and in the number of families with a great number of members. Moreover, and in the opposite direction, there was an increase in the number of people in the older strata and in the number of families with fewer members.

The aging process and the increasing importance of retirement resources among the studied group confirms the results of the study by Maia (2014) and Delgado (2015), which attest to the increasing importance of pension resources for the rural Brazilian population. The following section is discussed the implications

that changes in the demographic profile have generated on the work capacity of families and analyzes the strategies developed by them.

## 5 Availability of labor and family work allocation strategies

As evidenced in the previous section, aging and numerical reduction of the studied families were observed, which implied a decrease in their work capacity. In the first year of the survey, all families had 171.84 MPU and, in the second year, this number dropped to 121.8 MPU, representing a 29.12% reduction in the total availability of family labor, as shown in Table 3.

It's about a change of a large scale for planning processes and also for rural dynamic, because the work is one of the fundamental elements in any production process. In the case of agriculture, the reduction in family labor capacity requires families to reconfigure their strategies. In theoretical terms, this reduction can be offset by hiring an overtime, or by investing in new technologies, to raise the productivity of family work that is still available. These two strategies involve an increase in production costs. In addition, in the first case, it will be necessary to find qualified labor available in the local market and, in the second, it will be necessary to have its own capital to carry out the investments, or it will have to get investments in the financial system. That is, they are not easy ways to go through and should be chosen by diagnostic and long-term planning of the production unit, which strengthens even more the importance of farmers having access to tools and services to support rural planning.

In the studied cases, in front of the reduction in their labor force, the families significantly reduced the amount of work allocated to agricultural activities, which reveals one of the adopted strategies, which is faced with the reduction in their work capacity, families choose to reduce the volume of family work allocated in agricultural activities. In the Table 3 can be seen the absolute values of the reduction in family work allocated to agricultural activities (in relative terms, the reduction was 37.63%). In relation to non-agricultural activities, the families' strategy was inverse, as it can be seen in the referred table, there was an increase (in relative terms of 23.79%) in the volume of family work allocated to this type of activity. That is, in front of the reduction in the total work of families' capacity, they strategically choose to increase the proportion of work allocated to non-agricultural activities and reduce the proportion of work allocated to agricultural activities.

In relation to investment in capital and the use of bank credit, a two-way movement was observed among the studied families. About 55% of them (32 families) developed a strategy to agrarian expansion (THIES, 2020), maintaining and intensifying agricultural activities, increasing the value of the capital mobilized in these activities (it was, on average, from approximately R\$ 84,000 to R\$164 thousand/family) and the average from banks also increased (an average of R\$40 thousand to R\$102 thousand/family). In the case of these families, the prioritization of the allocation of family work to agricultural activities is observed (non-agricultural activities absorbed around 18% of the family labor force in the second year of the study). The main sources of income of these families are: agricultural income (71%), non-agricultural income (15%) and retirement income (11%).

The other group, composed of 26 families, developed a non-agrarian strategy (THIES, 2020), distancing themselves from agricultural activities, through the reduction of capital mobilized in agriculture (an average approximately from R\$35,000 to 9,000/family), the discontinuity of agricultural financing and the allocation from a slice of impressive much more of family labor capacity in non-agricultural activities (absorbed about 36% of the family labor force in the second year of the study). The main sources of income for these families are: retirement income (57%), non-agricultural income (22%), land lease income (11%) and agricultural income (8%).

Already hiring a labor force, which could also be a strategy used to supply the reduced availability on families' work, was not actively used. In 2002, 34 families hired 5.87 MPU (average of 0.17 MPU/family) and, in 2017, 32 families hired 8.54 MPU (average of 0.27 MPU/family). This represents an increase in the total number and average quantity per family of contracted MPU, but in absolute terms, this increase was not equivalent to a reduction in the families' labor force that was previously allocated to agricultural activities. As a result, among the studied years, the total agricultural labor force fell significantly (about one third), as shown in Table 3.

Table 3 – Quantification of the different types of families' work studied between from 2002 and 2017

| Years | Quantification of family labor (MPU) | Family labor in agriculture activities (MPU) | Total agricultural labor force (MPU) | Family labor in non-agricultural activities (MPU) |
|-------|--------------------------------------|--|--------------------------------------|---|
| 2002  | 171,84                               | 147,18                                       | 153,05                               | 22,03   |
| 2017  | 121,8                                | 91,79  | 100,33                               | 27,27   |

Source: AFDLP Research (UFRGS; UFPel; CNPq, 2003) and 2018 field research.

The allocation of family labor force in agricultural activities outside the family production unit showed a little variation (from 2.63 to 2.74 MPU), and this type of work has a peripheral participation, in two years of study, in terms of the total work capacity of the families.

## 6 Final notes

Demographic changes affected all families, significantly reducing family labor capacity, as a result of the reduction on average number of members and the increase on average age of family members. These changes confirm the aging process of the rural population and the reduction in the size of farming families, which directly affects the planning processes, which must be done considering these changes in the families' profile, as they reconfigure, over the years, a determining factor of rural dynamic, which is the availability of work among family farmers.

In the studied case, as one of the contributions of the study that deserves deepening in new studies, the process of abandonment of agriculture and the rural space stand out by a significant group of widowed women of high average age. In the absence of successors, these women migrate from rural to urban spaces,

contributing to the process of masculinization in the countryside, which stand out that this process is driven by the migration not only of young women, but also of elderly ones.

By considering the trajectory of the families' group, it is observed that the strategies for hiring a labor force and allocating family labor in agricultural activities outside the family unit of production had a small increase. However, there is a slightly smaller number of families that invest in these two types of work and, in relative terms, they were, in the two years studied, quite secondary in the families' work allocation strategies. This implies that, in the planning practices of rural spaces specifically related to family farmers, both the allocation of family work and in agricultural activities outside the productive establishment of the families, as the hiring of labor force in agricultural activities in the family production units, did not constitute very attractive strategies for the studied farmers, which allows to aim that these are not very relevant ways, in strategic terms, in rural development planning.

The planning processes of rural spaces must take into account that, in terms of the family work allocation strategy, the two most important work modalities for the studied family farmers, in the two years considered, are agricultural and non-agricultural work.

In the face of the reduction in the family work availability, the studied group differed substantially in terms of work allocation and capital investment strategies. Part of the families choose for an agrarian strategy, with a strong agricultural bias, increasing the capital mobilized in this activity and also the volume of agricultural financing taken from the banks, in addition to prioritizing the allocation of family labor in agricultural activities in own establishment. The other group follows an inverse trajectory, taking an unpleasant strategy, reducing the value of capital mobilized in agricultural activities, stopping the use of agricultural credit and investing a significant part of family labor capacity in non-agricultural activities outside the establishment. This second group, agricultural production destined only for self-consumption and the lease of land to others become stronger. Moreover, the retirement and non-agricultural incomes come to predominate, making farming income quite secondary.

In this way, rural planning practices must consider that the families of the family farmers have become smaller and older, which has led to a reduction in their work capacity. In this view, it is essential to understand the differentiation of farming families, because part of them follows agrarian trajectory, with a strong agricultural bias in their future perspective, while another group follows the opposite ways, developing a trajectory of non-agrarian, with a future perspective that maintains rural links, but keep them away from agricultural activities.

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