

**Measuring the participation of local markets in the composition of agricultural income
in different productive systems in the northwest of Rio Grande do Sul- Brazil**

**Mensurando a participação dos mercados locais na composição da renda agrícola em
diferentes sistemas produtivos no noroeste do Rio Grande do Sul- Brasil**

**Medición de la participación de los mercados locales en la composición del ingreso
agrícola en diferentes sistemas productivos en el noroeste de Rio Grande do Sul- Brasil**

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Abstract

The objective of this study was to investigate the production and commercialization systems, focusing on the role of short food chains in the income formation of farmers in the northwestern Region of Rio Grande do Sul. These pieces of data were collected between January and March 2018, by means of a structured road map and an Agrarian Systems approach was used to economically estimate the systems of five farmers. The results show that incomes derived from the short supply food chains represent approximately 60% in two production units; more than 75% in two others; in only one of them the income is approximately 46% of the total income. This configuration in the income formation demonstrates the importance of this type of market in the socioeconomic reproduction of the analyzed farmers, especially when observing the income composition in a stratified form. The

forms of insertion in the local markets were motivated by different expectations such as: increased income, diversification of economic activities or even traditional and cultural aspects of the region.

Keywords: Agriculture; Agrarian systems; Family production; Economic analysis; Short food supply chains.

Resumo

O objetivo deste estudo foi investigar os sistemas de produção e comercialização, enfocando o papel das cadeias alimentares curtas na formação de renda de produtores rurais da Região Noroeste do Rio Grande do Sul. Esses dados foram coletados entre janeiro e março de 2018, por meio de um roteiro estruturado e uma abordagem de Sistemas Agrários foi utilizada para estimar economicamente os sistemas de cinco produtores. Os resultados mostram que as receitas oriundas das cadeias alimentares de abastecimento reduzido representam aproximadamente 60% em duas unidades de produção; mais de 75% em dois outros; em apenas um deles a receita é de aproximadamente 46% da receita total. Essa configuração na formação da renda demonstra a importância desse tipo de mercado na reprodução socioeconômica dos produtores analisados, principalmente quando se observa a composição da renda de forma estratificada. As formas de inserção nos mercados locais foram motivadas por diferentes expectativas como: aumento de renda, diversificação das atividades econômicas ou mesmo aspectos tradicionais e culturais da região.

Palavras-chave: Agricultura; Sistemas agrários; Produção familiar; Análise econômica; Cadeias curtas de comercialização de alimentos.

Resumen

El objetivo de este estudio fue investigar los sistemas de producción y comercialización, enfocándose en el papel de las cadenas alimentarias cortas en la formación de ingresos de los productores rurales de la Región Noroeste de Rio Grande do Sul. Estos datos fueron recolectados entre enero y marzo de 2018, por a través de una hoja de ruta estructurada y un enfoque de Sistemas Agrarios se utilizó para estimar económicamente los sistemas de cinco productores. Los resultados muestran que los ingresos de las cadenas de suministro reducidas representan aproximadamente el 60% en dos unidades de producción; más del 75% en otros dos; en solo uno de ellos los ingresos representan aproximadamente el 46% del total de ingresos. Esta configuración en la formación de la renta demuestra la importancia de este tipo de mercado en la reproducción socioeconómica de los productores analizados, principalmente

cuando la composición de la renta se observa de forma estratificada. Las formas de inserción en los mercados locales estuvieron motivadas por diferentes expectativas, tales como: aumento de ingresos, diversificación de actividades económicas o incluso aspectos tradicionales y culturales de la región.

Palabras clave: Agricultura; Sistemas agrarios; Producción familiar; Análisis económico; Cadenas cortas de comercialización de alimentos.

1. Introduction

The agrifood system can be defined as a dynamic and complex system operating within a larger system, influenced by different means, such as natural, institutional and social (Hubeau *et al.*, 2017; Coteur *et al.*, 2019). These systems are structured in order to interact with each other, and for this to occur, it is important to understand the context of geographic space (Sperat *et al.*, 2015). Thus, these places where the interactions occur are concrete and meaningful spaces and, in general, remain through the relationships existing in the short food supply chains, which tend to have fewer intermediaries between producers and consumers, maintaining beyond mercantile relations of trust and friendship (Dubois, 2018).

In the midst of agri-food changes, environmental concerns, increased demand and market integration, efforts are needed for sustainable forms of production and permanence in the markets (Coteur *et al.*, 2019; Hubeau *et al.*, 2017) and the short food supply chains tend to decrease the distances traveled by the food. Sperat *et al.* (2015) present the SFSC as a differentiated market, which is a consequence of the type of productive system, as well as the alternative means that farmers seek to insert in the markets. Renting, Marsden and Banks (2003), mention three forms of short chains, namely: face to face, spatial proximity, and spatially extended.

The most typical and usual form found in European countries is face-to-face, that is to say, shaped by the one in which farmers interact directly with consumers, creating bonds of trust and authenticity between the two (Renting *et al.*, 2003). The second form relates to the spatial proximity of the products produced which are distributed in a specific region. This form is characterized by the demands of the consumers in the places of production or even in the place of commercialization. Another form is called spatially extended chains, characterized by the need for transmission and translation of values and information around products and production sites to consumers outside the agricultural region, this form is used of quality or origin seals, as well as the use of certificates (Renting *et al.*, 2003).

This aspect is also corroborated by Berti and Mulligan (2016), in their study comprising a vast bibliographical review on the subject, since they consider the foods marketed through differentiated short agrifood chains in the market. Through this differentiation a reconceptualization of local foods is occurring, that is, it is a means of spatially distributing social values through an economic activity (Brinkley, 2017; Rucabado-Palomar & Cuéllar Padilla, 2018).

In Brazil, results obtained by Schneider and Ferrari (2015) in the state of Santa Catarina show that the short chains are characterized by rooting food practices in local eco-social relations, creating new economic spaces, conforming, through the production and commodification, a relationship of trust between producers and consumers. For the author, the emergence of these short chains results from processes of proximity, with significant relation with the construction of networks by the farmers.

The chains analyzed are mainly characterized by the notions of relocation, embeddedness and a turn to quality. The short food supply chains are a competitive strategy that uses shared value, especially for small family farms, which struggle to interface with conventional markets (Berti & Mulligan, 2016). Sonnino and Marsden (2006) argue that short supply circuits, although inserted within conventional circuits, can provide new relations between producers and consumers and are thus able to promote resocialization or re-spatialization of food. Although SFSCs are alternative channels, these markets should not be exempt from economic analysis and calculations (Ploeg, 2016).

In addition to factors related to the relationships of trust, reciprocity and food safety, from a business perspective, economic analyzes contribute to the role of the short food supply chains, both at the micro level, at the level of the production unit, and at the mesoeconomic scale, as they may influence local / regional development. In the same way, production takes place in differentiated spaces, unlike those produced industrially and in large scale by the agri-food system, a reality described by Murdoch (2000) and Marsden and Sonnino (2008).

In this perspective, there are five family farmers in a municipality in the Northwest Region of the State of Rio Grande do Sul, which have agricultural and livestock production units that trade from the totality of the production through the use of short food supply chains. Thus, the objective of this article is to investigate the production and marketing systems, focusing on the role of short food supply chains in the income formation of farmers in the Northwest Region of Rio Grande do Sul.

2. Research Procedures

This study consists of quantitative research of correlating scope, in that it offers a prognosis, explaining and quantifying the relationship between variables, allowing correlating them to understand the problem and analyze the developments (Hernández Sampieri, Fernández Collado & Baptista Lucio, 2013). This research involved an interview with farmers in a municipality in the northwest region of the state of Rio Grande do Sul, Brazil. From the total of seven farmers who worked in the fair of the Palmeira das Missões-RS until the month of January of 2018 and were members of the Association of Farmers, five families of farmers were identified that acted, at least once a week, in the direct commercialization, and also production. Data collection took place between January / 2018 and March / 2018, through a structured road map, at farmers' production units. The questions were answered by at least two family members. For identification purposes throughout the analysis, a letter-number combination was assigned to each farmer interviewed.

The method used for economic analysis in this work focuses on the Approach to Diagnosis of Agrarian Systems - ADSA - (Mazoyer & Roudart, 2010). This approach is flexible, as it allows for initial analyzes at broader levels such as a given region and possible filtrations at more specific levels such as municipalities and agricultural production units (APUs). At the level of production units, it allows to capture the particular phenomena, characterized by the cultivation and breeding systems (INCRA / FAO, 1999; Lima *et al.*, 2005; Dufumier, 2010; Mazoyer & Roudart, 2010). In addition to studying the phenomena of agrarian realities, ADSA seeks to understand the relations between the parties and the ecological, technical and social facts that clarify the current reality of regions and/or production systems (Lima *et al.*, 2005; Dufumier, 2010). For the purpose of analysis, the following evaluation indicators of the agricultural production units were defined (Table 1).

Table 1 - Valuation indicators used for analysis of production units.

Indicator	Formulas	Indicador Description
Liquid Aggregated Value (NVA in U\$)	$NVA = GP - IC$ (1)	Refers to the balance obtained from NV discounting the depreciation
<i>In natura</i> agriculture income or agroindustrialized (RA em U\$)	$RA = NVA - Arr - DF - Imp - \frac{S}{E}$ (2)	It's the economic result that evaluates the gain obtained by the UPA, either by selling <i>in natura</i> and or agroindustrialized products.
Leases and Retirements income (RAA in U\$)	$RAA = RT - ROA - RSFC$ (3)	Income share from leases and retirement (RAA) regarding <i>in natura</i> and or agroindustrialized products
Total Income (RT em U\$)	$RT = RAT + RAA$ (4)	Liquid result available at the production unit after discounting all production costs added to lease income and external transfer.
Agriculture income from other activities (ROA em U\$)	$ROA = RAT - RSFC$ (5)	Evaluates income participation of other agriculture activity not related to <i>in natura</i> and/or agroindustrialized products.
Short Channel Income (SFC in U\$)	$RSFC = RAT - ROA$ (6)	Evaluates the income share of short channels (RSFC) regarding <i>in natura</i> and agroindustrialized products
RAT land productivity (U\$/S)	$\frac{RAT}{S}$ (7)	Income of <i>in natura</i> and agroindustrialized products divided by the number of hectares used in production
RAT work productivity (U\$/Worker)	$\frac{RAT}{Worker}$ (8)	Income from <i>in natura</i> and agroindustrialized products divided per labor units
RSFC land productivity (U\$/S)	$\frac{RSFC}{S}$ (9)	Income from Short supply channels (RSFC) divided by the number of hectares used in production
RSFC work (PW) productivity (U\$/Worker)	$\frac{RSFC}{Worker}$ (10)	Income from Short supply channel (RSFC) divided by labor units
System intensification level	$\frac{D}{Worker}$ (11)	Technologies used in the production as a labor function, that is, the higher this indicator, the more technician the production is

Note: VA = Value Added; GP = Gross Product; IC = Intermediate Consumption; D = Depreciation; Am = - Arr = lease - DF - Imp = Taxes - S / E. S = Useful Agricultural Land
 Source: Prepared from Lima et al. (2005).

The calculations are presented in two steps and were estimated in dollars, referring to the average quotation rate for the month of March, 2018 verified at the Central Bank of Brazil (Central Bank of Brazil, 2018). The first considers the economic measurement of the production unit in a global way, based on indicators such as: Gross Product (revenues); Intermediate Consumption (variable costs); Distribution of Value Added (Due to the difficulty of realizing the apportionment, the values related to depreciation, financing, labor, and taxes were allocated to the activities related to the short agrifood chains, since the activities are responsible for the higher income), part of the resources used to pay taxes, depreciation, leases, interest (approximation with fixed expenses) and income from all agricultural and / or processing (RAT) activities.

The second stage, for the purpose of analyzing the income share of the short food supply chains in total income, was to classify the incomes of the production units analyzed according to their origin. An indicator related to the income of the short food supply chains (RSFC) was created, which includes the production and commercialization of products in the form of direct sale in fair, households, supply of local restaurants and supermarkets; Income from other agricultural activities (ROA), derived from the sale of soybeans, integrated pig farming, fish farming, among others; External income (AAR) arising from pensions and leasing to third parties; agricultural income and processing of agricultural products (RAT), obtained from the sum of the incomes of other agricultural activities and the transformation of agricultural products and the Total Income (RT) obtained from the sum of all incomes.

3. Characteristics Production System and Economics Indicators

The combinations of crops and breeding, as well as processing, either for production or self-consumption, once measured in terms of production / productivity and economic, generates a set of indicators that allows, in due proportion, to estimate the efficiency, as well as the long-term economic and social reproduction capacity of the analyzed production units. The monetary values described (Table 2) refer to all productive activities, regardless of the channel used for commercialization by farmers, that is, they present values related to the agricultural and / or agroindustrial activity of the production unit. Considering all the agricultural activities developed in the production units, it can be inferred that all the farmers receive an agricultural income and of transformation of significant agricultural products, standing out the farmers F1, F2 and F4.

Table 2 - Monetary values of the main indicators per UPA (in U\$\$ / year *).

F	GP	IC	DEP	GVA	NAV	VAD	RAT
F1	117.721,25	30.735,57	3.502,38	86.985,68	83.483,30	12.251,06	71.232,24
F2	98.120,86	23.232,60	3.927,35	74.888,26	70.960,91	17.484,40	53.476,50
F3	20.703,96	2.057,88	1.130,59	18.646,08	17.515,49	7.477,40	10.038,09
F4	76.638,52	16.157,52	1.476,00	60.480,99	59.004,99	9.428,77	49.576,22
F5	26.715,94	6.412,25	1.320,79	20.303,69	18.982,90	12.758,76	6.224,14
Total	339.900,52	78.595,82	11.357,12	261.304,70	249.947,58	59.400,39	190.547,19

Legend: GP = Gross Product; IC = Intermediate Consumption; Dep = Depreciation; GVA = Gross Aggregate Value; NAV = Net Added Value; VAD = Value Added Division; RAT = Agricultural Income of in natura and agro industrialized agricultural products.

Source: Research data (2020).

The activities carried out in the production units are diversified and the forms of commercialization take place through conventional channels and alternative channels, making possible a diversification in the sources of income. The production sold to the market through conventional channels is that of soybeans, silage maize, beans, cattle breeding (F1; F3); part of these farmers transforms a small fraction of the production, however, the horticulture and fruit farming activities predominate, from which they obtain the highest values of gross product, which are the total amounts of both commercialization and self consumption produced in the APU; Farmer F3 leases part of the area to third parties; Farmer F5 produces exclusively vegetables.

The Farmers F2 (silage production for dairy production, fish farming and integrated pig farming) and F4 (production of soybeans, wheat, maize and oats), also in products of traditional chains, stand out for producing agroindustrialized agricultural products. It is the transformation of agricultural products that derive the highest values in terms of gross product, although vegetables and also fruit production contribute, to a lesser extent, in the composition of income.

Considering the production units studied, on the one hand, the region's widely used activities are identified, such as the cultivation of grains, mainly soybeans (high inversion machines, equipment and supplies or outsourcing), dairy production (high labor turnover) and integrated pig farming.

4. Role of the Short Food Supply Chains in the Income Composition of Farmers and Market Insertion

It is a complex task to stratify productive activities, as well as their respective incomes, in production units, especially the diversified ones (Lima *et al.*, 2005; Mazoyer & Roudart, 2010; Miguel & Mazoyer, 2014). Based on this evidence, table three below shows how the total income of each farmer is formed.

Table 3 - Income composition (U\$\$) of the farmers considered in the research, by category.

F	ROA (R\$)	ROA (%)	RSFC (U\$\$)	RSFC (%)	RAT (U\$\$)	RAT (%)	RAA (U\$\$)	RAA (%)	RT (U\$\$)
F1	11.160,41	14,29	60.071,83	76,94	71.232,24	91,23	6.843,79	8,77	78.076,03
F2	26.915,10	47,3	26.561,40	46,68	53.476,50	93,99	3.421,89	6,01	56.898,40
F3		-	10.038,09	60,27	10.038,09	60,27	6.617,37	39,73	16.655,45
F4	16.129,52	28,59	33.446,70	59,28	49.576,22	87,87	6.843,79	12,13	56.420,01
F5		-	6.224,14	100	6.224,14	100		-	6.224,14
Total	54.205,03	-	136.342,16	-	190.547,19	-	23.726,83	-	214.274,02

Legend: ROA (Income other activities); RSFC (Income from short agri-food chains); RAT (Agricultural income of in natura and agro industrialized agricultural products); RAA (Rent of leases and retirements); RT (Total Income).

Source: Research data (2020).

In broader terms, approximately 85% of the income comes from agricultural activities and / or from the transformation of agricultural products, among the activities developed at the level of production unit (Table 3). The exception is in F3, which has monetary inflows from leases and pensions. When taking each individual category as a starting point, according to table 4, it can be seen that in all the analyzed production units the income derived from the insertion of alternative markets, through short food supply chains, represents an important role. With the exception of the F2 farmer, who has integrated pig farms, in the other production units analyzed, the income derived from the commercialization of typical agro-food chains accounts for the greater part of the total income (variation between 59% and 77%).

On the results of Table 4, a particular look at the share of rental income and pensions, in which, as the results of this study allow us to verify that their contribution share is relatively low, compares the others. However, it is important to recognize that its differential is in safety and regularity of entry, unlike other incomes, which are exposed to other risks,

such as weather and price. In a detailed way, the RAA is a fixed value, even if its participation has less proportionality.

A simple projection of performance, considering the availability of hand and land use, makes it possible to obtain expressive results through the short food supply chains. Regarding labor productivity, considering the regional minimum wage in Rio Grande do Sul, during the period of the survey (U\$\$ 356.11), the highest profitability is observed in farmer F2, where the product processing activity predominates and farmer F1. These farmers earn income equivalent to 2.7 to 3.8 monthly minimum monthly salaries. In this respect, farmer F5 still does not earn the necessary income for the remuneration of labor. However, it has recently started the activity, and one of the labor units is hired, which influences, to some extent, the short-term economic result, considering this question.

In terms of land productivity, for example, farmer F1, which has its activity in terms of alternative channels based on horticulture, has a land use income of U\$\$ 14.953,64 (Table 4). This productivity, transformed into soybeans, the main agricultural activity in the region, means that this farmer "harvested" approximately 750 sacks of soybeans / hectare in the year 2018, which indicates the effectiveness of land use efficiency with activities to food production. Even the farmer (F5) who obtains the lowest land remuneration received an income of approximately 72 sacks of soybeans per net hectare in that year.

Table 4 - Contribution of the short agri-food chains to the production unit's performance. (U\$\$ / year).

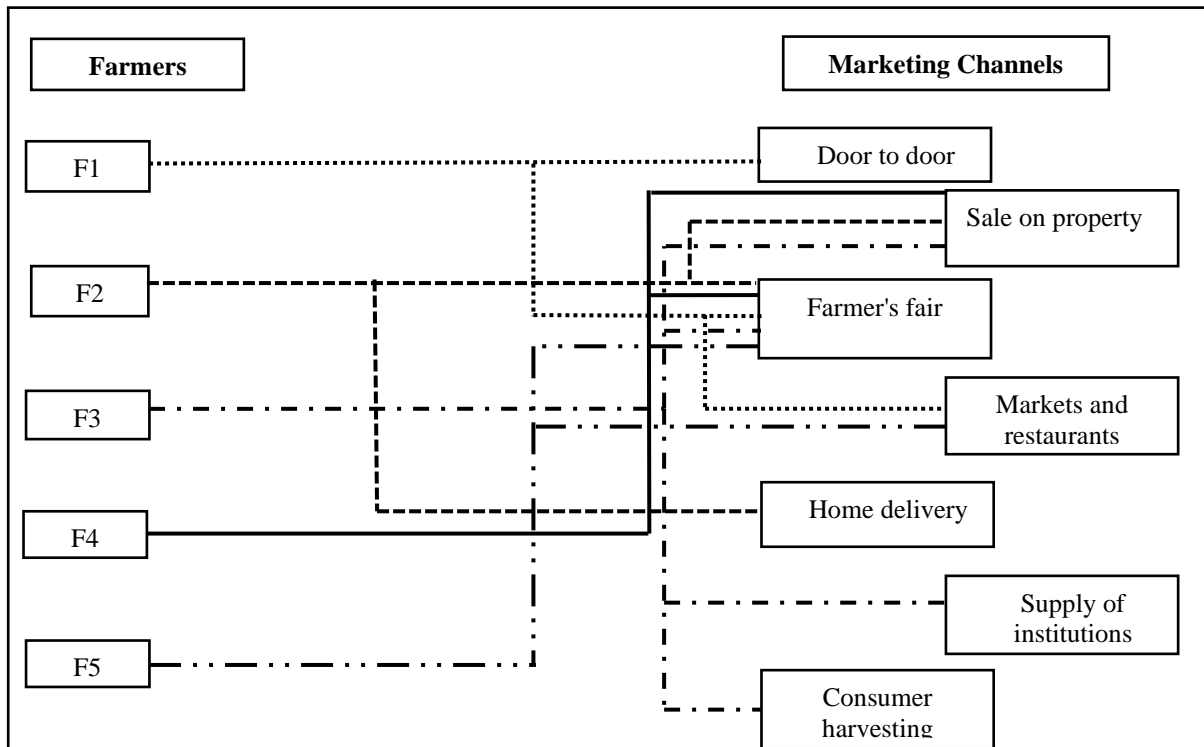
F	Worker (und)	S (ha)	RSFC (U\$\$)	RSFC/Worker (U\$\$/Worker)	RSFC/S (U\$\$/ha)
F1	5	4	60.071,83	12.014,37	15.017,96
F2	4	1	26.561,40	6.640,35	26.561,40
F3	1,75	7	10.038,09	5.736,05	1.434,01
F4	2	6,5	33.446,70	16.723,35	5.145,65
F5	2,5	1,2	6.224,14	2.489,66	5.186,78

Legend: RSFC (Income from short agri-food chains); Worker (Human Work Unit); S (Useful Agricultural Area)

Source: Authors, (2020).

In this sense, it is important to note that, although diversification plays an important role in mitigating climatic and market risks, the main source of income derives from products that are traded through alternative channels, in typical places and configurations of SFSC (Table 4), distributed basically to the local economy (Figure 1).

Figure 1 - Channels used for insertion in the market of alternative products.



Source: Authors, (2020).

The predominant form of market insertion in terms of the production of horticultural products and agro industrialized products of farmers is based on the farmer's fair. However, farmers with an economic base from horticulture (F1, F3 and F5) also market, although in proportion to their size, smaller, in markets and restaurants. Farmers who have their production backed by agroindustrial products (F2 and F4), in addition to the fair, sell on their own properties, the farmer F4 still activates the institutional markets, in this case the National School Feeding Plan (PNAE).

The demand for local food production, which is expressed in various ways, either by supplying local farmer fairs and institutional purchasing. These forms were for farmers F1, F3 and F5 the stimulus to start productive and commercial activities. Farmer A1 mentions recalling how he started his activities: "I got involved in bringing food to the people of the city when I was still studying and I liked it, at the age of 18 I started with a greenhouse and I did not stop." Thus, direct marketing, in the case of these five farmers surveyed, is a strategic way of entering the markets and obtaining significant income for their social reproduction.

5. Discussion

In broader terms, as analyses in the sphere of the farm, it is important to understand the activities undertaken, with due regard for the proportions, are derived from the combination of economic, social, historical and cultural factors (Chía *et al.*, 2003; Fiorelli *et al.*, 2007). The number of farmers still considered in the survey is small, these are differentiated in many respects, raised in a different analysis (schooling, succession perspective, access and adequate reading of information, production system), that to a greater or lesser extent results in different production and marketing strategies (Ondersteijn *et al.*, 2003; Wright & Brown, 2018; Brown *et al.*, 2019).

Considering the five farmers surveyed, a general characteristic that emerges is the diversification of productive activities, and because of the commercialization channels accessed. Thus, although the income from activities traded in short channels predominates, also the farmers (F1, F2, F3 e F4) produce commodities and access long channels. This configuration evidences the strength of commodities over the familiar forms of production, and how global markets are intertwined with local markets (Anjos & Caldas, 2017; Renting *et al.*, 2003) are evidenced in other studies in Rio Grande do Sul (Bert *et al.*, 2016; Matte *et al.*, 2018).

In general, the activities implemented in the production units reveal a combination of productive and economic influences, but also from the tradition and way of life of the farmers. From the productive economic point of view, diversification, kept to the right proportions, contributes to cushion possible risks of production and markets, as well as demonstrates the flexibility of farms to adapt to different market situations (Batalha and Silva, 2009; Sperat *et al.*, 2015).

The cultivation of soybeans, for example, in small properties, is derived from a combination of factors, among them the easiness of access to the commercialization channels and guarantee of acquisition, availability of credit, mainly for costing the crop, appropriation of techniques and relative ignorance of production costs (Wesz Junior, 2008). In addition, grain production in the northwestern region of Rio Grande do Sul is strongly linked to the family routines, it composes the identity of the local population and, therefore, it is incorporated into the activities of family farming (Bert *et al.*, 2016; Deon *et al.*, 2017).

On the other hand, the cultivation of horticultural crops, fruit growing and processing of agricultural products are activities incorporated in the region through the colonization, especially of Germans and Italians, which took place from the second half of the 19th century

onwards. Introduced as a production of self-consumption, these activities have now become an important economic alternative for family farmers. In this context, this type of activity assumes a relevant economic and social role at the unit level of production. From the economic point of view, the availability of fresh food of known origin by consumers, since they are produced locally, allows to obtain an important income, in terms of the overall income composition of the APUs; from the social point of view, there is a strategy of supplying the family with fresh, quality food, which plays an important role in the farmer's identity and also enables the farmers to remain in the rural environment (Brunori, 2007; Guske *et al.*, 2017).

In addition, products / foods intended for marketing by alternative channels are also generally part of the family's food, thus forming, for self-consumption, seasonal foods and more perishable than products marketed by conventional channels. This relationship, while providing the family quality food, represents a condition of autonomy, since it has little dependence on the market. These productive units are committed not only to economic values and diversity, but also to the supply of their own subsistence, based on principles such as the quality of the products consumed (Friedmann, 2016; Brunori, 2007; Guske *et al.*, 2017).

In general, productive systems in family production units tend to be the most appropriate and suitable for diversification, as well as for the production and commercialization of agrifood through the short food supply chains. According to Wilkinson (2008), regardless of the degree of diversification, there are three to four characteristic components present in the familiar APUs: production for self-consumption, commercialization of traction products, production of grains to feed the breeding system, and such as agroindustrial production. In a broader perspective, these components are, to a greater or lesser extent, present in the analyzed APUs.

Specifically considering the short food channel and typology of Renting *et al.* (2003), it is possible to identify farmers that prevail face-to-face trading, but also trading through the geographically extended channel (F1, F3, F5). The diversification of channels, in this case, is associated to the scale of production, as well as to the diversity of products / foods produced (Sperat *et al.*, 2015), especially at certain times of the year, which tends to be larger than capacity absorption of the producer's fair.

In this context, access to markets, through the fair, in the production unit itself, markets and restaurants and institutional markets is a crucial point for virtually all production units, as it contributes to the economic viability of these family farmers. At the same time as this production makes them economically viable, it also allows the family to provide quality

food and low market dependence, mainly for self-consumption products, as well as supplying the urban sector with locally produced products.

6. Final Considerations

Recognizing that the objective of this article was to investigate the production and marketing systems of farmers in a municipality in the Northwest of Rio Grande do Sul, it can be seen that agrifood markets have an important role in favor of the socioeconomic reproduction of the respective farmers, noting the diversity of forms of production and marketing among farmers.

Thus, the systemic approach, which corroborates the analysis of agricultural production systems, especially with regard to estimates for the elaboration and analysis of productive, economic and social indicators, has proved to be an important tool for the analysis of productive diversity, especially when it is of interest to analyze in a stratified way the incomes of the different commercialization channels. This method, by analyzing the external and internal environment of the production units, makes it possible to verify to what extent the different production systems contribute to the economic viability of the production units, as well as the analysis of different commercialization channels accessed and forms of production insertion in markets.

Considering the production units analyzed, it can be assumed that all of them are made feasible by the agricultural income, and in four of them, the income from the commercialization of products through short food supply chains is significant and the results allow us to conclude that derived incomes of the short food supply chains represent approximately 60% in two production units, more than 75% in two others, and only one of them is approximately 46% of the total income. This configuration in the income formation demonstrates the importance of this type of market in the socioeconomic reproduction of the analyzed farmers, especially when observing the income composition in a stratified form. The forms of insertion in the local markets were motivated by different expectations such as: increased income, diversification of economic activities or even traditional and cultural aspects of the region.

Thus, increasing demand boosts the production of local food, in the same way that the productive diversification generates greater economic stability, minimizing the climatic and market risks, creating possible conditions to increase the agricultural income of these productive units. The diversified production unit plays an important role in terms of climate

and market risk reduction. As a farmer's production and marketing portfolio is composed of products from different seasons and production cycles, income tends to be relatively stable, especially if it is considered that in natura products that are marketed weekly or every three days.

In view of these results, it is possible to recognize that studies that analyze the composition of income in a stratified way, makes it possible to understand with greater accuracy the socioeconomic organization of production units, and with this it is possible to rethink the promotion to different productive activities, especially in family units. In addition, the results allow us to conclude that the family farmers analyzed seek to diversify productive activities, as well as commercialization spaces, avoiding, in addition to monoculture, also "monocomercialization".

However, these results are specific to a region and a group of farmers. Therefore, it is recommended that further studies be developed, both to improve the method used, and to perform comparative analyses of the results found in each region. In the same context, applying the same method with the same farmers is important because it compared the results of the same sample in a different time period. For future studies, it is recommended to analyze short chains for different products and contexts, which will allow the comparison between realities and the identification of variables that infer about local markets.

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