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SOCIOECONOMIC REPRODUCTION OF FARMERS FROM THE EXTREME NORTH OF RIO GRANDE DO SUL-BR INSERTED IN SHORT FOOD SUPPLY CHAINS (SFSCs)¹

REPRODUÇÃO SOCIOECONÔMICA DE AGRICULTORES DO EXTREMO NORTE DO RIO GRANDE DO SUL-BR INSERIDOS EM CADEIAS DE ABASTECIMENTO DE ALIMENTOS (SFSCs)

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Abstract

The different markets accessed by farmers compose the strategies for remaining in the rural environment and, consequently, for the socioeconomic reproduction of the production unit. In this perspective, this work seeks to analyze the socioeconomic reproduction capacity at the agri-food production units of the Extreme North of Rio Grande do Sul, Brazil, from the income from short food supply chains. For operationalizing the research, the production systems approach was used, which has indicators capable of measuring the efficiency at different levels in the production units. Thirty-one farmers were interviewed from October to November 2019 and stratified into three groups. The income earned from the marketing of products/foods stemming from short chains was used as a stratification criterion. In all the groups, there is fresh and agro-industrialized production, and, besides production transportation through short channels, there are also products transported through conventional marketing channels. Production units that only develop seasonal outputs for direct marketing have, in short, lower efficiency levels, and external income is key for the reproduction of the family. Production units that seek insertion predominantly in short chains have higher efficiency levels per labor and usable area. Another piece of evidence is that only production units that earn four or more times the minimum wage of income per month, stemming from short chains, manage to reproduce economically and can have this activity as the sole source of income. It is understood that short chains comprise an equitable manner of production and marketing. However, among the farmers analyzed, considering the specificities of each production unit and/or system, other production forms are necessary to build the socioeconomic reproduction of the families.

Keywords: Agriculture. Economic assessment. Agricultural production. Short food supply chains.

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Resumo

Os diferentes mercados acessados pelos agricultores compõem as estratégias de permanência no meio rural e, conseqüentemente, de reprodução socioeconômica da unidade produtiva. Nessa perspectiva, este trabalho busca analisar a capacidade de reprodução socioeconômica das unidades de produção agroalimentar do Extremo Norte do Rio Grande do Sul, Brasil, a partir da renda de cadeias curtas de abastecimento de alimentos. Para operacionalizar a pesquisa, foi utilizada a abordagem de sistemas de produção, que possui indicadores capazes de medir a eficiência em diferentes níveis nas unidades de produção. Trinta e um agricultores foram entrevistados de outubro a novembro de 2019 e estratificados em três grupos. A receita obtida com a comercialização de produtos / alimentos oriundos de cadeias curtas foi utilizada como critério de estratificação. Em todos os grupos há produção in natura e agroindustrializada e, além do escoamento da produção por canais curtos, há também produtos transportados pelos canais convencionais de comercialização. As unidades de produção que desenvolvem apenas produtos sazonais para o marketing direto apresentam, em suma, níveis de eficiência mais baixos e a renda externa é fundamental para a reprodução da família. As unidades produtivas que buscam inserção predominantemente em cadeias curtas apresentam maiores níveis de eficiência por mão de obra e área útil. Outra evidência é que apenas as unidades produtivas que ganham quatro ou mais salários mínimos de renda por mês, provenientes de cadeias curtas, conseguem se reproduzir economicamente e podem ter essa atividade como única fonte de renda. Entende-se que as cadeias curtas constituem uma forma equitativa de produção e comercialização. Porém, entre os agricultores analisados, considerando as especificidades de cada unidade e / ou sistema de produção, outras formas de produção são necessárias para a construção da reprodução socioeconômica das famílias.

Palavras-chave: Agricultura. Avaliação econômica. Produção agrícola. Cadeias curtas de abastecimento alimentar.

Introduction

The globalization of the food system follows the standard of other economic sectors, and agroindustrial chains have also been configured by the scale gains, the expressive number of intermediaries, and the distancing between producer and consumer (MARS DEN; BANKS; BRISTOW, 2000). For this reason, one of the options found by small farmers is the insertion in alternative marketing channels such as short chains, for example.

Short food supply chains have as a principle to reestablish spatial, social, and value connections not recognized in conventional food markets (MARS DEN; BANKS; BRISTOW, 2000). They are characterized by being environmentally and socially more sustainable alternatives compared to global food systems and supply an income flow considered more reliable for farmers (MORGAN et al., 2018). Short food supply chains are conceptualized as a new business model capable of supporting small and medium-sized farmers to meet the growing demands for locally-grown foods, especially from buyers such as public institutions (hospitals, schools, etc.), restaurants, and supermarkets (MILLER; BROWN, 2008; BERTI; MULLIGAN, 2016).

Such chains encompass a wide array of configurations for production, distribution, and consumption of foods that comprise the markets of farmers, agricultural stores, fairs, community-supported agriculture (CSA), and consumer groups, among others (KOUTSOU; SERGAKI, 2019). This development of alternative forms of supplying food has affected both the offer and the demand: on one side, consumers are ever more interested in acquiring "localized" foods; on the other, farmers find, in these direct marketing forms, possibilities of better remunerations for the production (ILBERY; MAYE, 2005; MASTRONARDI et al., 2019). In this sense, short food supply chains represent the relationship among family agriculture, the local production dynamic, and the food supply, as well as a possibility of increasing the family income (SCARABELLOT; SCHNEIDER, 2012; RAMBO; FREITAS, 2019).

That said, other elements must be considered to evaluate how the development of local economies takes place based on alternative markets, such as the profitability of the production units inserted in such markets (ROSSI; JOHNSON; HENDRICKSON, 2017; AHEARN; LIANG; GOETZ, 2018). The combination of territorial proximity and short food supply chains helps strengthen the social bonds and promote fair merchandise exchanges and has contributed to greater productive and

economic autonomy of the actors involved (RAMBO; FREITAS, 2019). One of the main factors that motivate farmers to market in short chains is the perception that local marketing will result in greater profits (MILLER; BROWN, 2008; AHEARN; LIANG; GOETZ, 2018).

It is precisely due to the perception of promoting social, environmental, and economic equity that short food supply chains approximate an expectation of rural development because they refer to the possibility of autonomy or protagonism of the relationships developed among farmers, consumers, and local institutions at the location itself (RAMBO; FREITAS, 2019). It is understood that the rural development perspective is somewhat tied to the potential ways of marketing local foods, which promote approximation dynamics between production and consumption (SCHNEIDER; FERRARI, 2015; ROSSIL JOHNSON; HENDRICKSON, 2017; GRUCHMANN; SEURING; PETLJAK, 2019). They are capable of promoting an equitable development of farmers and their production units with the environment and the social, encompassing issues of economic autonomy (RAMBO; FREITAS, 2019; GRUCHMANN; SEURING; PETLJAK, 2019).

Another specificity of short food supply chains is the relationship of the production with the socio-biodiversity characteristics of each region, which generally stimulate the search for a deeper understanding of the regions (DINIZ; CERDAN, 2017). Especially in the state of Rio Grande do Sul, the dynamic of market insertion in different marketing channels is also a result of the strong presence of family farmers. They represent 85.7 % of the total number of establishments and occupy 30.5 % of the total agricultural area (IBGE, 2017).

Among the different regions that compose the state is the Extreme North. An area characterized by small municipalities and that has agriculture as its production base (NETO; BASSO, 2005). Among the characteristics that exist in the region, the same authors mention the diversified cultivations produced by family farmers, who use the production both for subsistence and for marketing. Therefore, such production activities configure the forms of economic reproduction and development of the region.

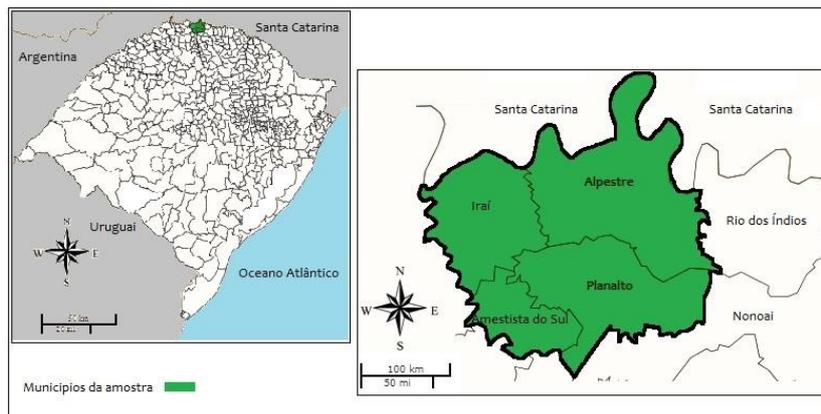
Due to the lack of rural administration practices, be it for production processes or accounting routines, and the difficulty to separate the activities, especially in small and medium-sized properties, farmers have adversities in accurately analyzing which activities prove to be most promising. This generates uncertainties when making a series of decisions regarding the productions, investments, and market orientation (LIMA et al., 2005). In this perspective, the objective of this work is to analyze the socioeconomic reproduction capacity⁴ in agri-food production units in the Extreme North of Rio Grande do Sul-BR from income from short chains.

Research Procedures

The sample comprised 31 farmers belonging to the Extreme North region of Rio Grande do Sul. The production units were chosen from a previous selection carried out with the Rural Family School of Alpestre and also with Cooperative Extremo Norte, both located in the municipality of Alpestre-RS, which comprises the region under study. The participation of directors from the cooperative and the school is a result of both the educational performance (school) aimed toward production systems in the region and the commercial performance (cooperative), which absorbs and enables the insertion of farmers in alternative chains. Early contact was made with the aim of carrying out a selection of farmers who marketed through short chains.

The sample may be classified as non-probabilistic and convenient (AAKER; KUMAR; DAY, 1995). Consequently, the theoretical saturation technique was performed, i.e., the interruption of the data collection once it was observed that the information began presenting repetitions (MINAYO, 2017). Data collection took place in October and November 2019 through a structured research script and was carried out in the respective Agricultural Production Units (APUs) of the farmers. The farmers who compose the sample concentrate in the municipalities of Alpestre (67.74 %), Ametista do Sul (16.13 %), Planalto (12.90 %), and Iraí (3.23 %). The location of the region and municipalities the study is carried out in is represented in Figure 1.

⁴ The capacity to generate sufficient income to remunerate the family needs and equipment wear, as well as enable the conduction of new investments in the production unit (LIMA et al., 2005; DUFUMIER, 2007).

Figure 1: Location of the municipalities covered in the field research

Source: drawn up by the authors (2020) based on IBGE data, 2017.

The municipalities in the region are characterized as being especially rural. The main products stem from fruit farming (oranges and grapes) and tobacco growing. Such productions are largely conditioned by the geographical characteristic, which presents intense undulations and restriction of the area appropriate for cultivation (ODERICH; MIGUEL, 2017). The mean area size in the municipalities is 14.17 ha, and the number of people employed averages 2.54 (IBGE, 2017).

The method employed for obtaining and analyzing the economic-productive data from the production units was based on the Agrarian Systems Approach, more specifically, the identification and analysis of production systems. The methodology is based on understanding the relationship between the parties and the ecological, technical, and social facts that contribute to understanding the current reality of regions and/or production systems (LIMA et al., 2005).

The first step of the analysis consisted of the systematization and economic calculations to appraise the different activities carried out in the production units. Production and marketing data from the production units were estimated. Then, the products transported directly through short food supply chains and economically valued were selected. The indicators used are exposed in the chart below.

Chart 1: Evaluation indicators for analyzing the production units

Indicator	Formula	Indicator description
Gross Value Added (GVA in R\$)	$GVA = GP - IC$ (1)	Describes the generation of wealth after discounting the basic production inputs.
Net Value Added (NVA in R\$)	$NVA = GVA - D$ (2)	Refers to the balance obtained from the GVA discounting depreciations.
Income from agriculture and/or agro-industrialization (TAI in R\$)	$AI = NVA - Lse - DF - Tax - S/E$ (3)	It is the economic result that assesses the gain obtained by the APU, be it for the marketing of fresh and/or agro-industrialized products.
Agricultural income from other activities (OAI in R\$)	$OAI = TAI - SCI$ (4)	Participation of the income from other agricultural activities (OAI) with no relation to the income from fresh and/or agro-industrialized products.
Short Chain Income (SCI in R\$)	$SCI = TAI - OAI$ (5)	Participation of the income from Short Chains (SCI) relative to the income from fresh and/or agro-industrialized products
Income from leases and pensions (LPI in R\$)	$LPI = TI - OAI - SCI$ (6)	Participation of the income from leases and pensions (LPI) relative to the income from fresh and/or agro-industrialized products
Total Income (TI in R\$)	$TI = TAI + LPI$ (7)	Result obtained from the sum of all incomes at the APU
Land productivity of the TAI (R\$/UAS)	TAI/UAS (8)	Income from fresh and agro-industrialized products divided by the number of hectares used for production
Labor productivity of the TAI (R\$/MWU)	TAI/MWU (9)	Income from fresh and agro-industrialized products divided by the number of labor units
Land productivity of the SCI (R\$/UAS)	SCI/UAS (10)	Income from the Short Chains (SCI) divided by the number of hectares used in production
Work productivity (WP) of the SCI (R\$/MWU)	SCI/MWU (11)	Income from Short Chains (SCI) divided by the number of labor units
Annual minimum wage per person employed (MWMWU)	$MWU * 1,039.005^{*13}$ (12)	Minimal level of remuneration considered per person employed at the APU. Below this level, the systems will not be properly remunerating the labor.

Source: adapted from Lima et al. (2005).

Note: VA = Value Added; GP = Gross Product; IC = Intermediate Consumption; D = Depreciation; Am = - Lse = lease - DF - Tax = Taxes - S/E. UAS = Usable Agricultural Surface; MWU = Man Work Unit.

Subsequently, the production units were stratified according to the income level obtained in the production and marketing through Short Food Supply Chains (SCI) for 2018/2019. For comparison purposes, the SCI was converted into the number of times the monthly minimum wage, derived from the short food supply chains (MSCI). For the clustering, the SCI value obtained per year was used. With this, the following calculation was used to obtain the minimum monthly income (in number of times the minimum wage) from short food supply chains (MSCI) per APU:

$$MSCI = \frac{\left(\frac{SCI}{12}\right)}{1.039,00} \quad 1)$$

After this procedure, the APUs were stratified considering the strata of the income obtained in the overall classification of the Brazilian Institute of Geography and Statistics (IBGE) by ranges of the number of times the minimum wage (IBGE, 2018), as described below:

- ✓ Up to two times the minimum wage: 10 APUs. Represents the smallest values in terms of agricultural income obtained from the production and marketing through short chains. As a result, the activity may be derived from seasonal products/foods or represent the marketing of the surplus production.
- ✓ Over two to four times the minimum wage: 11 APUs.
- ✓ Over four times the minimum wage: 10 APUs. The IBGE classifies from four to ten times the minimum wage. However, no APUs were found in the sample that presented values over ten times the minimum wage, so they were classified as over four times the minimum wage.

For analysis purposes, the activities related to short food supply chains were separated from those in which the production and marketing are strictly related to the conventional chains (long). To estimate the value of the depreciation, intermediate consumption, dividends, and financings for those activities that shared machines, equipment, and funding, the values were apportioned for each activity and/or marketing channel, estimated by the level of use in each activity.

The following section comprises the analysis and discussion of the results found.

Characterization of the groups of farmers stratified by the Monthly Income from Short Chains

⁵ Minimum wage amount in the data collection period (October-November 2019).

The mean age of the respondents is 34 years, with 48.42 % of the 31 farmers being in the age range of 14 to 24 years. The predominance of young people, unlike the observed in the Brazilian rural environment (IBGE, 2017), stems from a significant percentage of respondents who market through short chains, have children who studied and/or study in the Rural Family School of Alpestre (87.52 % of the respondents), and actively participate in the production and marketing. The pedagogical model of the school fosters the interaction between theory and practice and has contributed to the permanence of the young people in the rural environment. Upon functioning in an alternation system, the youngsters study one week at the school and remain for two weeks at the APUs, developing the "life projects" with the family as well as conducting activities of production, management, and marketing.

Table 1: Classification of the APUs delimited by the criterion of the number of times the minimum wage earned by marketing products through short chains

GROUPS	APU	IVEG (R\$)	TAGRI (R\$)	SCI (R\$)	APU TAI (R\$)	% SCI under the UPA TAI	No. MSCI
Over 4 times the minimum wage (month)	13	12.091,66	83.063,54	95.155,20	131.767,33	72,21%	7,63
	17	52.281,65	30.653,59	82.935,24	114.837,33	72,22%	6,65
	21	69.171,03	10.570,30	79.741,33	81.371,33	98,00%	6,40
	11	10.565,18	65.776,82	76.342,00	76.342,00	100,00%	6,12
	18	8.278,43	65.823,20	74.101,63	126.303,00	58,67%	5,94
	14	8.390,18	62.347,85	70.738,03	85.727,67	82,51%	5,67
	25	9.621,07	57.206,73	66.827,80	69.746,33	95,82%	5,36
	4	26.402,51	37.998,82	64.401,33	64.401,33	100,00%	5,17
	10	8.095,84	45.516,77	53.612,60	85.759,83	62,51%	4,30
	20	22.053,58	31.394,82	53.448,40	95.100,81	56,20%	4,29
Over 2 and up to 4 times the minimum wage (month)	31	11.752,21	35.226,89	46.979,10	53.291,50	88,15%	3,77
	26	46.265,90	0,00	46.265,90	97.252,50	47,57%	3,71
	19	1.434,50	43.229,65	44.664,15	113.118,50	39,48%	3,58
	29	4.570,26	34.217,78	38.788,04	59.110,83	65,62%	3,11
	24	35.226,47	1.010,86	36.237,33	36.237,33	100,00%	2,91
	12	4.629,76	30.452,68	35.082,44	42.503,50	82,54%	2,81
	9	0,00	34.012,76	34.012,76	34.012,76	100,00%	2,73
	5	7.264,36	24.579,70	31.844,06	66.500,17	47,89%	2,55
	15	15.699,13	16.008,41	31.707,54	85.964,00	36,88%	2,54
	30	8.297,76	20.692,86	28.990,63	90.424,67	32,06%	2,33
8	3.705,53	23.196,05	26.901,58	47.221,50	56,97%	2,16	
Up to 2 times the minimum wage (month)	23	7.863,64	14.505,40	22.369,04	85.873,57	26,05%	1,79
	27	1.377,38	13.090,12	14.467,50	14.467,50	100,00%	1,16
	6	4.873,39	8.774,02	13.647,41	29.154,00	46,81%	1,09
	16	12.479,36	1.087,82	13.567,18	23.769,00	57,08%	1,09
	2	5.387,63	3.944,49	9.332,12	13.201,33	70,69%	0,75
	7	6.846,33	119,67	6.966,00	6.966,00	100,00%	0,56
	22	6.292,74	0,00	6.292,74	39.496,67	15,93%	0,50
	1	2.457,33	0,00	2.457,33	2.457,33	100,00%	0,20
	28	- 2.177,54	- 5.039,96	- 7.217,50	- 7.217,50	100,00%	-0,58
	3	- 4.343,91	- 3.207,32	7.551,24	- 11.811,00	63,93%	-0,61

Source: drawn up by the authors, 2020.

IVEG = Total agricultural income only from vegetable marketing through short chains. TAGRI = Total agricultural income from only the agroindustrial marketing through the short chains. % TAISC under the UPA TAI = Percentage that represents the total agricultural income of the short chains relative to the total agricultural income of the production unit. No. MSCI = Number of times the minimum wage corresponding to the total income generated through short chains.

The first group earns over four times the minimum wage and represents 33 % of the total number of farmers considered in the research (Table 1). In such production units, the income derived from short food supply chains represents over 56 % of the total annual agricultural income. In APUs 4, 11, 21, and 25, this percentage surpasses 90 %. Despite the similarities in income, the differences are in the production system because, in APUs 11 and 25, over 86 % of the SCI is earned from agroindustrial productions (dairy products such as cheese) marketed both in the Extreme North of Rio Grande do Sul and in the state of Santa Catarina. In this group, the marketing activities of agroindustrial products are responsible for over 85 % of the SCI in six production units. In APU 13, the farmers also conduct the marketing of animal derivatives (87.29 %) such as salami and pork sausages.

Such productions reinforce the importance of the addition of value from the transformation of the raw material. Moreover, the proximity relationships, which comprise the marketing of agro-industrialized products, refer to bonds of trust, quality, reputation, and loyalty, i.e., moral values

present in the relationship between farmer and consumer that in turn waives formal guarantees (NIEDERLE; SCHUBERT; SCHNEIDER, 2014; SCHNEIDER; FERRARI, 2015). Likewise, such activities may be considered innovative in the sense of generating new products, as well as keep developing or rediscovering old/traditional products/foods (BELLETTI; MARESCOTTI, 2012; MARSDEN; BANKS; BRISTOW, 2000).

At APU 21, the farmers market mostly fresh products (86.74 %), and the highest amount is obtained from the sale of watermelons and tomatoes. Other vegetables are also part of the portfolio of products marketed door-by-door and at the fair. Such products, along with the marketing of cheese and honey, compose the TAGRI (R\$ 10,570.30). The total agricultural income of the short food supply chains represents 98.00 % of the total income produced at the production unit; the other 2 % derive from the traditional growing of fruits, in this case, oranges. Such pieces of evidence largely reveal that even alternative productions require scale and production intensification to generate significant income.

The second group is configured by APUs that earn an income of "Over two to four times the minimum wage" derived from short food supply chains (MSCI), with 35 % of the farmers considered in the research occupying an intermediary level according to the clustering criterion. However, this does not imply that short chains are not representative in the production units.

For example, for APUs 24 and 9, the income earned from short chain products represents the total agricultural income thereof. At APU 9, the marketed products are of animal origin (cheeses, salami, and honey). At APU 24, vegetable products stand out (97.21 %), such as the marketing of sweet potato and pecans. However, the agroindustrial production derives from the production of milk and dairy products such as cheeses. The products from both the APUs are marketed door to door by order, and the products from APU 24 specifically are also marketed in fruit shops and supermarkets. Short chains have a wide configuration of marketing channels (MILLER; BROWN, 2008; BERTI; MULLIGAN, 2016; KOUTSOU; SERGAKI, 2019).

APUs 15 and 30 present the lowest percentages of SCI relative to the Total Agricultural Income of the APU (36.88 % and 32.06 %, respectively). At APU 15, the productions are divided into approximately 50 % of vegetable production (fruits and vegetables) and 50 % agroindustrial production (cachaça), marketed at the fair. For APU 30, 71.38 % of the income from short chains results from the agroindustrial activity (marketing of chicken and quail eggs and, seasonally, fish).

It is worth stressing that, in this group, the production and marketing of agro-industrialized products predominate in 72.73 % of the eight APUs. Among those that present the largest portion of the marketing of such products, the percentage of SCI relative to the total agricultural income of the APU is significant (> 70 %); for 37.50 % (three farmers), the products transported through long chains have a larger participation in the formation of the TAI. An example of this is APU 30, for which 71.38 % of the agricultural income comes from agroindustrial products. However, along with the agroindustrial activities, this APU also has those related to the long chains (integrated pig farming), and the participation of this activity is R\$ 90,000.00 of the annual income.

In the Northern region of Rio Grande do Sul, the participation in the production of commodities (grains) and integrated pig and poultry farming is significant. Therefore, it is relatively common to find units that diversify the activities between this production profile and products typical of short food supply chains (VANDER et al., 2016; DEON; AZEVEDO; ALMEIDA-NETO, 2017; AGUIAR; DEL GROSSI; THOMÉ, 2018). Such a setting meets the assumptions by Berti and Mulligan (2016) when explaining that the agri-food systems of long chains, vertically integrated and dominated by large private companies, contribute to achieving higher food production and productivity levels. However, the farmers are also aware of the need for production diversification, necessary for self-consumption and the insertion into alternative markets. Likewise, this generates a reduction of market risks that a single production activity or marketing channel may cause (BERTI; MULLIGAN, 2016).

The third group is the one that has up to two times the minimum wage of income from short food supply chains (Table 1). The dynamic of such production units demonstrates that the percentage of SCI relative to the total agricultural income (TAI) in five APUs is over 70 %, and indicates that the agricultural income is generally low. APU 28 is a case that elucidates this situation: 100 % of its agricultural income stems from short chains in which agroindustrial production predominates, represented by the direct sale of beef. APU 7 also has a similar dynamic in terms of income (100 % of the TAI of the APU derives from SCI). However, the production is of vegetable origin (98 %), and

the growing of beans and manioc intended for school meals (National School Feeding Program - PNAE) stands out. Another developing crop is that of strawberries marketed door to door.

The lowest values found are for APUs 3, 28, and 1. For APU 1, the only production intended for direct marketing, watermelons, is sold at the unit itself and also at the urban center. Other vegetable productions are intended for companies, such as oranges and bergamot. At APU 3, honey and corn sales are the income sources obtained through direct marketing at the property. In the case of APUs 28 and 3, the agricultural activities have not been enough to remunerate the farmers since, upon discounting the capital investments and inputs used for production, the incomes become negative (LIMA et al., 2005). In such APUs, the farmers depend on non-agricultural income and external transfer to make themselves viable. This situation was identified by Miller and Brown (2008), with farmers in part-time regimens dedicated to agricultural activities obtaining lower marketing values in local markets compared to full-time farmers. In these APUs, marketing activities through short chains are largely a production aimed towards self-consumption, and the marketing of the surplus is a strategy for obtaining extra income.

Another factor related to the low percentage of participation of short chains in such production units is the low level of value addition. This happens because the productions are fresh (40.00 %) and mixed (40.00 %), without necessarily having specialization in a given production system. However, short chains are generally evident examples of alternative food systems characterized by the absence of intermediaries, and they potentially provide to farmers greater returns, even when the marketing activities are only of surplus production (BENEDEK; FERTO; MOLNÁR, 2018).

The developments found at the production unit level reflect the strategies to achieve the economic objectives of the farmers and communities, with social and cultural aspects also being important (BENEDEK; FERTO; MOLNÁR, 2018). In this region, there is a considerable presence of immigrants, and the tradition in the food production and processing forms has been maintained. The short chains may also enhance the environmental balance, at times unknowingly, through production diversification, sustainable agro-environmental regimens, the local processing of products, and, lastly, marketing in the region (BERTI; MULLIGAN, 2016; GRUCHMANN; SEURING; PETLJAK, 2019). However, in addition to these factors, the remuneration of work for the maintenance of families in rural areas is an important link with regard to the growth and development of rural communities.

Socioeconomic reproduction of the production units that conduct marketing through short food supply chains

When developing production systems at the APUs, the farmers have family reproduction as the main purpose. This is related to the capacity to generate enough wealth to remunerate the labor and carry out new investments (LIMA et al., 2005). Based on this, this topic analyzes, under different indicators, how each production system contributed to the generation of wealth at the production units, based on the classification of average income from short food supply chains.

Table 2: Means of the indicators for the group that earns over four MSCI of the total production unit, from the activities in short chains and activities in long chains (OAI)

Over four MSCI			
Indicators	APU Total	Only SC	Only OAI
NVA (R\$)	120.767,18	92.546,65	28.220,54
GVA (R\$)	127.651,30	97.918,30	29.733,00
AI (R\$)	93.135,70	71.730,36	21.405,34
TI (R\$)	96.900,50	75.495,16	25.170,14
UAS (ha)	17,78	10,00	3,92
MWU	2,95	2,95	2,95
GVA/UAS (R\$)	8.634,41	14.459,67	12.202,32
UAS/MWU (R\$/ha)	6,41	3,56	1,16
AI/MWU (R\$/MWU)	34.189,89	27.321,64	6.868,25
GP/UAS (R\$/ha)	4.717,84	5.795,67	7.082,03
IC/UAS (R\$/ha)	810,02	874,74	1.659,77
D/MWU (R\$)	2.098,85	1.520,31	578,55
(WP) = VAU/MWU (R\$/MWU)	42.919,89	34.129,93	8.789,96
AI/UAS (R\$/ha)	6.734,84	11.149,00	9.912,33

Source: drawn up by the authors, 2020.

In this group of farmers, the mean net value added (NVA) of the APU is significant (R\$ 120,767.18). Considering only the activities directly related to the short chains, the NVA is, consequently, the most representative in this group (R\$ 92,546.65) and corresponds to 76.63 % of the entire NVA generated in the year. Therefore, the AI/UAS, i.e., the income generated per hectare used to produce, corresponds to R\$ 11,149.00.

Here, the short chains are evinced as the main production activity; however, activities that are traditional in the region are carried out at a lower intensity, such as fruit growing. Such pieces of evidence corroborate the findings of Aguiar, Del Grossi, and Thomé (2018) when they explained that farmers involved with short chains have a higher degree of autonomy. However, this characteristic does not induce them to work in isolated markets because they also experiment with other marketing forms; in this case, the conventional markets, even if they do not obtain high profitability. For the productions marketed through short chains, there is a reduction in the number of intermediaries between the production phase and that of the purchase by the final consumer. This allows farmers to retain a greater portion of the value added to the product, increasing the profit margins and allowing the proper remuneration of the production factors (MASTRONARDI et al., 2019; KOUTSOU; SERGAKI, 2019).

The IC/UAS (R\$ 810.02) of the short chain productions is lower than when the other agricultural activities are considered (R\$ 1,659.77) and demonstrates a characteristic of the generation of products transported through long chains: the more considerable and costly demand for inputs. Such behavior tends to be related to the fact that the conventional productions in this group are also concentrated in smaller usable areas, which, consequently, influences the increase of the cost per hectare. Generically, conventional products assume economies of scale. For there to occur a reduction of unit costs, a production increment is necessary, and the small-scale productions naturally tend to create an evident cost disadvantage (FARINA, 1997; NICOLELI; MOLLER, 2006). Comparatively, table 3 shows the mean of the indicators of the group of "Two to four MSCI".

Table 3: Means of the indicators for the group that earns from two to four MSCI of the total production unit, from the activities in short chains and activities in long chains (OAI)

From two to four MSCI

Indicators	APU Total	Only SC	Only OAI
NVA (R\$)	82.147,02	47.184,56	34.962,47
GVA (R\$)	89.480,05	51.842,86	37.637,18
AI (R\$)	65.967,02	36.497,59	29.469,43
TI (R\$)	97.554,48	68.085,05	61.056,88
UAS (ha)	19,91	12,49	2,36
MWU	3,48	3,48	3,48
GVA/UAS (R\$)	5.931,01	9.725,69	27.833,56
UAS/MWU (R\$/ha)	5,77	3,26	0,63
AI/MWU (R\$/MWU)	21.265,19	11.899,96	9.365,23
GP/UAS (R\$/ha)	10.921,33	25.533,25	19.053,76
IC/UAS (R\$/ha)	2.828,39	9.670,63	5.096,54
D/MWU (R\$)	2.253,39	1.496,50	756,90
(WP) = VAU/MWU (R\$/MWU)	27.151,38	15.606,75	11.544,64
AI/UAS (R\$/ha)	4.291,64	7.225,82	22.141,57

Source: drawn up by the authors, 2020.

This group gathers APUs that earn between two to four MSCI and present a mean NVA of R\$ 82,147.02. Largely, the activities have no expressive preponderance in this group, even though the values earned through short food supply chains present higher agricultural income. One of the assumptions of this characteristic may be explained by the larger usable area available (19.91), which generally enables diversifying the productions concerning both short and long chains.

However, in the overall mean, the AI/UAS is only higher when the activities transported by long marketing channels are computed, given that the integration of swine and grape growing earn high values per area. Hence, while the direct marketing channels in smaller production units is significant and even one of the only ways to maintain relations with the market, medium-sized farmers recurrently use such markets to diversify the marketing channels, which work as a market risk reduction strategy (MASTRONARDI et al., 2019). That said, table 4 comprises the average indicators of the "Up to two MSCI" group.

Table 4: Means of the indicators for the group that earns up to two MSCI of the total production unit, from the activities in short chains and activities in long chains (OAI)

Up to two MSCI			
Indicators	APU Total	Only SC	Only OAI
NVA (R\$)	42.042,33	21.355,37	20.686,96
GVA (R\$)	49.123,40	26.160,00	22.963,40
AI (R\$)	19.635,69	7.433,06	12.192,57
TI (R\$)	51.627,29	39.424,66	44.184,17
UAS (ha)	12,91	4,81	3,66
MWU	2,51	2,51	2,51
GVA/UAS (R\$)	3.847,38	9.094,14	6.523,00
UAS/MWU (R\$/ha)	5,37	1,99	1,46
AI/MWU (R\$/MWU)	7.366,75	2.785,28	4.575,72
GP/UAS (R\$/ha)	10.867,06	25.309,89	7.906,54
IC/UAS (R\$/ha)	2.543,55	5.747,20	1.447,46
D/MWU (R\$)	3.667,85	2.604,74	1.063,11
(WP) = VAU/MWU (R\$/MWU)	16.808,79	8.785,19	8.023,60
AI/UAS (R\$/ha)	1.198,50	3.127,02	2.711,72

Source: drawn up by the authors, 2020.

In the group composed of farmers who earn up to two times the minimum wage of monthly income, the short chains work as a complementation of the income. The incomes of both long and short chains take on a role of complementarity, also being the area intended for such equivalent activities. The agricultural income per hectare (AI/UAS) is greater for short chains compared to the long production chains due to the intensification of the activity. This group is also the one that determines lower total monetary values in the production unit, which assumes the need for income stemming from other activities outside the production unit or non-agricultural.

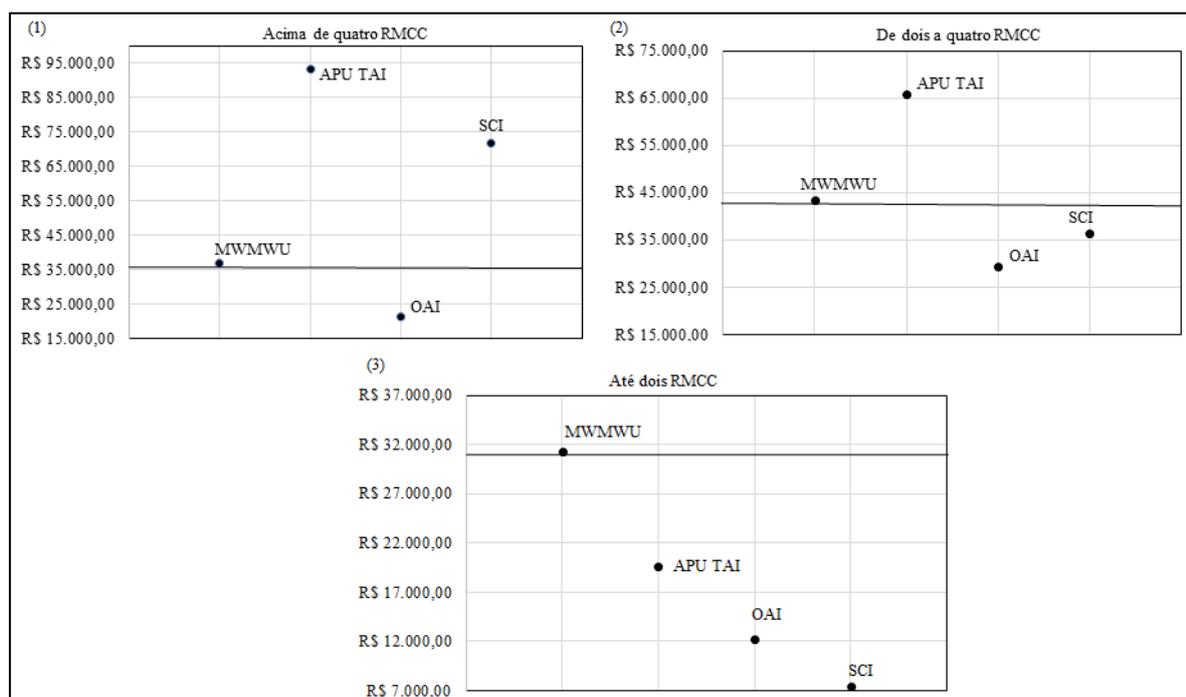
In these production units, the area (UAS) available (on average 12.91 ha) is small and limits the profitability of vegetable activities transported through long chains (DEON; AZEVEDO;

ALMEIDA NETTO, 2007; ROSSI; JOHNSON; HENDRICKSON, 2017). However, productions directed towards short food supply chains are basically fresh and seasonal, which results in marketing only in some months of the year, such as the watermelon production, for example.

In this group, the short food supply chains take on characteristics different from the other groups: they are conducted by young people (70.00 %) that implement it through the "life project" at the Rural Family School of Alpestre as a way to obtain their own income and carry out rural succession. However, because the production units in which they are inserted have limited economic resources, they also induce the development of activities with low capital investments. The short chain is seen, in this perspective, primarily as a strategy for social reproduction and economic autonomy (SCARABELOTTI; SCHNEIDER, 2012; ROSSI; JOHNSON; HENDRICKSON, 2017; GRUCHMANN; SEURING; PETLJAK, 2019). In this perspective, Malak-Rawlikowska et al. (2019) clarify that there exists a predominance of small production units involved in short chains.

Short food supply chains are essential for generating jobs and income for small farmers and the supply of healthy foods, and they foster the proximity markets and local economies (RAMBO; FREITAS, 2019). Hence, Figure 1 presents three scatter plots establishing a relationship among the total agricultural Income of the APUs, the agricultural Income obtained from short chain activities, the Agricultural Income from other production activities, such as long marketing chains (OAI). The measure of remuneration is one time the minimum wage (MWMWU) of each labor unit (MWU) per month in one year.

Figure 2: Socioeconomic reproduction capacity of the different groups of annual MSCI



Source: drawn up by the authors, 2020.

Lima et al. (2005) explain that a minimum income necessary for the reproduction of the farmer must allow a minimum level of food, housing, health, and education. As a minimum income criterion, the value of one time the regional minimum wage (R\$ 1,039.00) per labor unit of one man or family member (MW*MWU) in the period of thirteen months (considering the thirteenth salary) was established. Hence, this value is considered the opportunity cost of the work, i.e., agricultural income below this value means that it does not remunerate the labor employed in the agricultural activities (LIMA et al., 2005).

Regarding the group of APUs that earn over four MSCI, both the APU TAI and the SCI were positioned over the minimum value established (Figure 1). This result indicates that income generation through short chains as exclusive activities at the APU could remunerate all the members employed in the agricultural activities. In this case, the prices practiced in the alternative markets can supply the operational costs and generate a fair return on the farmer's work, leading to financial benefits (LIMA et al., 2005; RAMBO; FREITAS, 2019).

The indicators of economic reproduction of these farmers demonstrate that those more "specialized" in the production and marketing through short chains earn productivity gains; thus, such farmers may dedicate themselves exclusively to the agri-food alternative (ROSSI; JOHNSON; HENDRICKSON, 2017). The results agree that short chains are beneficial to the social and economic reproduction of the family farmers and may play a central role in the rural development patterns (MARSDEN; BANKS; BRISTOW, 2000; MORGAN et al., 2018).

The total agricultural income of the APUs (over four times the minimum wage) indicates that the agricultural income activities and the activities of other productions (OAI) "combined" remunerate the production factors employed in the activities. However, when only the income from other activities (OAI) is observed, it is below the minimum remuneration established and indicates that the income from such activities alone would not be enough to ensure the social and economic reproduction of the family.

In the case of the APUs that earn from two to four times the minimum wage of income stemming from short chains (MSCI), only the total agricultural income provides remuneration over the minimum established. Both the income from just the short food supply chains and that from other activities is not enough to generate an agricultural income above the MWMWU. Therefore, in this group, the social and economic reproduction is obtained from the complementarity relationship between the two forms of market insertion. This piece of evidence corroborates the exposed by Niederle, Schubert, and Schneider (2014) that short chains are not necessarily responsible, on their own, for the emancipating characteristics of family farmers. In this case, the short and long chains interact with each other, the farmers see them as complementary (MUNDLER; LAUGHREA, 2016), and, in general, under such conditions, the socioeconomic reproduction depends on this complementarity relationship.

Regarding the group that has up to two times the minimum wage of Income from Short Food Supply Chains (MSCI), it is observed that the total agricultural income (TAI) is not enough to remunerate the labor. Hence, the income level obtained through the agricultural activities, regardless of the marketing channel used, cannot guarantee the social and economic reproduction with agroindustrial activities alone. Such characteristics implicate the impossibility of carrying out investments and the expansion of activities in the production system (LIMA et al., 2005) and would result in economic and social vulnerability without the presence of non-agricultural income and external transfers, which represent approximately 60.00% of the total income, with pensions standing out.

Final considerations

The objective of this article was to analyze the socioeconomic reproduction capacity in agri-food production units in the Extreme North of Rio Grande do Sul-BR from income from short food supply chains. For calculation purposes, the indicators provided in the agrarian systems approach were the starting point, subsequently segmented in different sources of revenue, cost, and income due to the specificities of the production type and production unit structure.

Overall, the contribution of the short chains in the total income of the farmers denotes the different productive, economic, and social strategies at a production unit level. The farmers who earn expressive monthly incomes (over four times the MSCI) stemming from short chains are those for whom this activity is relatively specialized, incorporates value through agro-industrialization, and earns gains at scale, even in direct marketing. Hence, market access through short chains is efficient and allows the social and economic reproduction of the family with this pattern of activity.

At the other extreme are the farmers whose income from the chains takes on a role of complementarity in the family economy. On one side are the farmers for whom it represents a considerable value of agricultural income, i.e., they are important in terms of income stemming from farming, but the socioeconomic reproduction comes from external incomes and social transfers. This refers to the new configurations of the rural environment, in which the pluriactivity and the rural as a space of housing stand out; hence, the reproduction of the family is not necessarily connected to the farming activities.

The farmers who work in the production and marketing in long chains and short chains adopt an income diversification strategy, protect themselves from production and price fluctuations, especially in long chains, and optimize the available agricultural areas. However, since none of the production and marketing patterns can single-handedly remunerate all the production factors, the complementary relationship is fundamental for the economic and social reproduction of the farmers.

Beyond the socioeconomic reproduction, by this set of farmers who market through short chains pass elements connected to tradition, culture, interpersonal relations, and the territory. In a broader perspective, for the vast majority of the farmers considered in the research, the short chains represent an important means of economic development beyond the production units and constitute a circuit of production and marketing that boosts the economy at a local and/or regional level.

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