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Markets and commercialization channels in the central region of Rio Grande do Sul: relevant factors for fruit and vegetable producers

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ABSTRACT: This article presents statistical analysis that verified the diversity of markets and marketing channels used by family farmers in the central region of Rio Grande do Sul/ Brazil, examining the occurrence of variables associated with the number of channels accessed. The non-probabilistic sample included 129 family farmers who produce fruits and vegetables in four municipalities in the Central Region of Rio Grande do Sul, Brazil, in the years 2019-2021. Nonparametric tests and bivariate statistical analysis were used, considering the significance level (≤) of 0.05. There was an average number of 2.4 channels in the Local and Conventional Markets, and 3.1 for the Local/Territorial and Public/ Institutional Markets. However, a maximum of three channels is used in 75% of establishments. There was a low negative correlation between the mean age of the family farmers and the degree of diversification of the channels used to market the products and a positive correlation between infrastructure and diversificationof channels adopted and,family work and diversification. Finally, a dependency relationship was reported between the number of public policies accessed and the diversification of channels.
Key words: local market, labor, age, public policy, infrastructure.

Mercados e canais de comercialização na região central do Rio Grande do Sul: fatores relevantes para os produtores de frutas e hortaliças

RESUMO: Este artigo apresenta análise estatística que visa verificar a diversidade de mercados e canais de comercialização utilizados pelos agricultores familiares na Região Central do Rio Grande do Sul, Brasil, examinando a ocorrência de variáveis associadas ao número de canais acessados. A amostra não probabilística incluiu 129 agricultores familiares que produzem frutas e hortaliças em quatro municípios da Região Central do Rio Grande do Sul nos anos 2019-2021. Foram utilizados testes não paramétricos e análise estatística bivariada, considerando o nível de significância (≤) de 0,05. Houve um número médio de 2,4 canais nos Mercados Local e Convencional, e 3,1 para os Mercados Local/ Territorial e Público/Institucional. No entanto, um máximo de três canais é utilizado em 75% dos estabelecimentos. Houve baixa correlação negativa entre a idade média dos agricultores e o grau de diversificação dos canais utilizados para comercialização dos produtos e uma correlação positiva entre infraestrutura, e a diversificação dos canais adotados e mão-de-obra familiar e diversificação. Por fim, descobriu-se uma relação de dependência entre o número de políticas públicas acessadas e a diversificação de canais.
Palavras-chave: mercado local, mão-de-obra, idade, política pública, infra-estrutura.

INTRODUCTION

Marketable surplus production is one of the fundamental characteristics that allow us to differentiate systems of production that are based on simple replication of factors of production (especially land and labor) from those ordered via markets. In a manner that agricultural and food production from rural families is no longer oriented to meet both household needs and productive unit, turning it designed for sale, the commercialization becomes the main objective which coordinates by the end the activities and decision-making of such social and productive units (PINGALI, 2019, BAGCHI et al., 2021).

The more complex societies, the higher the division of labor and social mobility (POLANYI, 1977). Consequently, the individual position within the economic structure becomes more heterogeneous, leading to an increased rate of exchange as well as the exchange of goods and commodities. In this vein, the production of marketable surpluses becomes a necessity but also a compulsion. Because both individuals and families seek to obtain consumer goods that satisfy their preferences and needs, thus

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being compelled to produce exchangeable products that allow exchange equivalents (money) generation. Therefore, producing marketable surpluses to sell or trade generates an exchange-based economy, in which the markets control and mold social life (SCHNEIDER, 2016).

As previously claimed by POLANYI et al. (1957), markets mold the social structure relations and become institutions from which rules, norms, and conventions control exchange activity (OSTROM, 2005). The analysis of markets as institutions is characterized by the understanding on the social construction of such structures, thus contrasting other perspectives that analyze markets as converging points between suppliers and demander of goods and products, which are mediated by relative prices (HEBINCK et al., 2014).

The inclusion of farmers in the markets is a daily given and notorious fact (SCHNEIDER, 2016). Scarce are the farmers that live in an autochthonous way and either do not exchange or are in touch with more complex markets. Markets are part of the social production process and reproduction of both economic activities and family units, which influence people's behavior, values, and culture, shaping and modifying institutions, thus being a reason for conflicts, protests, and disagreements. In rural areas, especially in small farmers-predominant countries, the work process and production have deeply changed in recent years (KRZYWORZEKA, 2021). The commercialization of products from family farmers becomes essential both for their social reproduction and economic growth and development (SORI & ADUGNA, 2022).

Although, the processes previously described are widely known, current studies have mainly focused on aspects related to the development of technologies that enables increases in the yield of goods and products to be further commercialized. Or, even though, on public policies that assisted in with such beneficial changes, as well as in the infrastructure (roads) and relative prices. Thus, studies have focused on the yield and initiation of producers in the market, but the market assessment per se has ended up in the background or was merely understated. Commercialization and exchanges became stages of supply and demand by both producers and consumers, respectively. Moreover, few studies on markets have focused on the analysis of their relative prices and intermediating factors, such as information, technologies, logistics, among others (BRANDÃO et al., 2020).

Moreover, it has been incipient the discussion and analysis of how and who builds markets, as well as dominates and rules such institutions (SCHNEIDER & CASSOL, 2021). Given these gaps, it is sensible and necessary to take up studies on the farmer's marketing channels used to access trades and better understand how they are generated and governed. Issues such as conditions that affect the choice of the marketing channel for a given product sale - as well as rules and norms that regulate exchanges between suppliers and buyers - are topics that need to be exploited to better understand how they are structured and the way that such markets work and operates (CARMONA et al., 2021; MWANGI et al., 2021; LOW et al., 2021).

Several scholars state that there must be adequate management of operational factors (GARCÍA-CORNEJO et al., 2020) to adopt marketing and production strategies that add value, leading farmers to more resilient development paths and highlighting the relevance of agency factors in decision-making. The complex relationship between these factors (farmers' capacities and preferences) and diversification decisions are not well understood yet (YOSHIDA et al., 2019). Studies that help understand these factors are necessary to reduce information gaps between producers, consumers, cooperatives, traders, and other market participants (DESSIE et al., 2018). In this context, task diversity, farmer autonomy, their role in decision-making, infrastructure conditions, labor availability, among others, challenge the understanding of the markets and the future of agricultural markets in particular and must be considered (DUPRÉ, 2017).

Studies have considered it crucial to understand marketing efficiency, which can be related to both operational and price efficiency. MGALE & YUNXIAN (2020, p.4) both efficiency factors are strongly related to marketing channel selection, which is a vital farm household decision and has a significant impact on household income (MMBANDO et al., 2015).

It is argued that producers try to create and occupy spaces of relative autonomy in the markets (HENDERSON, 2019), facilitated by the higher diversity of marketing channels. Thus, the choice of marketing channel is related to an important decision for a farming family to sell its products in the expectation of satisfactory returns (SHEWAYE, 2016).

We understand markets as mechanisms or devices of control or governance based on formal (laws, contracts, standards) and informal/tacit (values, habits, customs) rules and practices that work as guidelines, references and conventions

to orient or exert pressure and coercion on the exchange of goods and commodities (SCHNEIDER, 2016). The marketing channels (KOTLER, 2000) are interdependent devices endowed with physical (material infrastructure), technological, and informational resources that allow a product, good, or service to be transferred from one agent or space to another through purchase or any other exchange form.

The markets can be analyzed from different perspectives according to the theory. In economic sociology the formal relations (in this case, market channels) and informal relations of the markets (the power relations and governance, etc) consider the social rules established from social interactions (HODGSON, 2007). Thus, markets are created based on institutions that allow multilateral exchanges. With there is, simultaneously, as set of formal rules (e.g. regulation, conflict resolution system, etc) informal rules (tacit codes of conduct) and people with their respective beliefs and values about the way the rules will be applied and the characteristic of the market under construction (OLIVEIRA et al., 2020). For this reason, our study of the markets is done by characterizing how many channels are accessed and how they are accessed.

Therefore, this researchverified the diversity of markets and commercialization channels used by farmers in the extreme south of Brazil, examining the variables that may be associated with the number of channels accessed. The study hypothesis is that there are factors that influence the choice of marketing channels, as evidenced in different aspects by surveys conducted with wheat farmers in the Bale area (USMAN, 2016) and onion farmers, also in Ethiopia (HAILU & FANA, 2017); corn and bean farmers in Tanzania (MMBANDO et al., 2017); vegetable (MUKARUMBWA et al., 2018) and peanut farmers in Zimbabwe (MANGO et al., 2018); sunflower farmers in the North West province, South Africa (NXUMALO et al., 2019); poultry farmers in Kenya (KIPROP et al., 2020); vegetable farmers in Beijing (ZHANG et al., 2017); organic pineapple farmers in Uganda (KYOMUGISHA et al., 2019); and milk producers in the Punjab region of Pakistan (BRAR et al., 2018).

The concern with the distribution and circulation of products is scarce in studies on family farming in Brazil (SCHNEIDER, 2016). As a result, there is a lack of empirical data showing how farmers relate to markets and marketing channels, establishing parameters that allow the analysis of efficiency and the obstacles that help maintain this category. Although, this productive segment has a leading role in the Brazilian agrarian structure, as it is the main social category, accounting for 77% of the total farmers units according to the Agricultural Census conducted in 2017, which means an absolute number of 3,897,408 units (IBGE, 2017). The majority of people working in agriculture in Brazil are family farmers, since small holder farms generate 10.1 million jobs, which represents 67% of the total economically active population employed in agricultural establishments. Such factors justify this research.

MATERIALS AND METHODS

Participants

This study has an exploratory character and a quantitative approach. The choice of municipalities was non-probabilistic for convenience and consisted of the responses of 129 fruit and vegetable farmers from the Central Region of Rio Grande do Sul, south of Brazil, in the municipalities of Cachoeira do Sul (N = 59), Novo Cabrais (N = 24), Cerro Branco (N = 17), and Paraíso do Sul (N = 29). In these four municipalities, all commercial fruit and/or vegetable producers, regardless of scale, participated in the survey. Therefore, we work with a census (totality). For this purpose, the 'Snowball' technique was used (VINUTO, 2014). All respondents were georeferenced (Figure 1).

In Rio Grande do Sul, fruit and vegetable production takes place in small and medium-sized rural propertiescharacterized as family farming, it represents 84% of vegetable-producing farms and 86% of fruit-producing of fruits-producing farms are characterized as family farmers (IBGE, 2017). A similar distribution occurs in the central region (FONTANA et al., 2019). In 2020, there were 1006 rural farms producing fruit and vegetables in the 35 counts in the central region (SPECHT et al., 2020). These farmers trade their products *in natura* or processed and the relevance varies from being the main activity to complementarity in the income generation of the rural farms (DUTRA et al., 2019). In a survey about farmers' access to fruit and vegetable markets in the largest count in the Central region, it has been verified that the Proximity Markets are most frequently accessed by farmers (BRANDÃO et al., 2020).

The assessed farmers conducted a production activity with a commercial focus, regardless of the scale of sales. Data collection was performed in a mobile phone application between December 2019 and the first quarter of 2021. The productive characterization of the surveyed establishments,

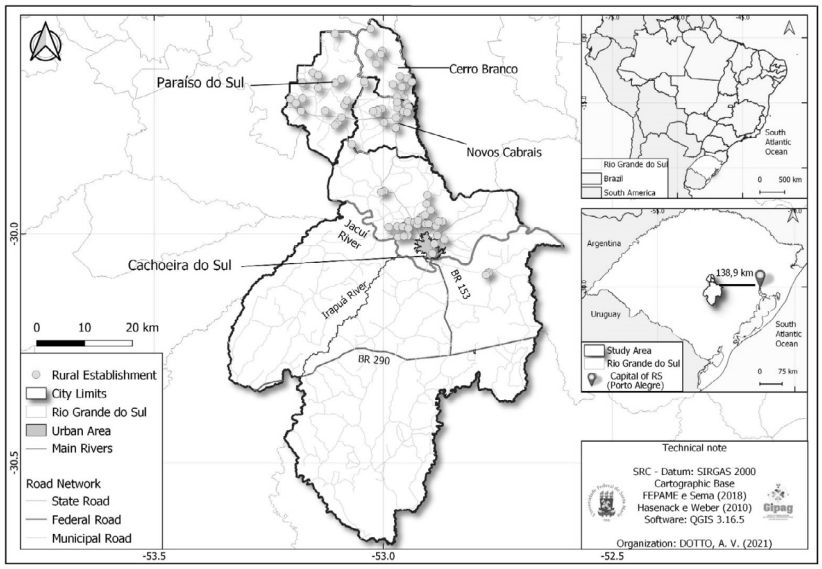

Figure 1 - Rural establishing in central Region of Rio Grande do Sul.

considering the most relevant economic activity of each establishment, is made up of Olericulture (58%); Fruit production (39.6%); Processing of vegetable origin (1.6%); poultry (0.8%).

Questionnaire development and procedure and data analysis

A structured questionnaire was used by the research project team, denominated "The dynamics of the Agrifood Markets in Rio Grande do Sul: mapping and socioeconomic analysis". After successive meetings between the project participants, a version of the questionnaire was tested with five producers who participate in an extension project at the University where the research was carried out. As with the other questionnaires, the test questionnaires were applied in visits made by the project's researchers to rural establishments. After applying the test questionnaire, the questions decreased from 48 to 36. The research instrument was composed of 36 questions distributed in three sections:socio-structural, productive and commercialization. The questionnaire data were stored in the Power Bi software and statistically analyzed using the SPSS - Statistical Package for the Social Sciences software (Statistics Subscription Trial). Nonparametric tests and bivariate statistical analyzes were employed, specifically the chi-square test (χ^2) and Spearman's correlation analysis (P), considering the significance level inferior or equal ($\leq$) to 0.05.

The typology used to classify the markets and marketing channels accessed by farmers is based on SCHNEIDER (2016), available in table 1. Proximity marketing is linked to the local context in which the exchange relationship is based on reciprocity and inter-knowledge, so trust and friendship dominate the regulation of established social relations. Territorial marketing has a regional scope and is characterized by a higher production that is mostly destined for sale. The forms of regulation are based as much on trust and reputation as on indicators of origin and price. Conventional marketing is characterized by a competitive structure and is based on price and contracts between buyers and sellers, with a national and primarily global amplitude. Finally, public and institutional marketing is that one that presupposes sales to the government via institutional buying schemes. It is strongly regulated by laws and contracts that do not prioritize agent's competition but comply with technical and regulatory requirements through legal instruments, such as public notices and legislation.

The analysis variables used were selected considering similar studies: distance from urban centers (MUKARUMBWA et al., 2018); the number of family members (PEI-AN et al., 2017) and availability of family labor (GARCÍA-CORNEJO, 2020); age (KIPROP et al., 2020); equipment and infrastructure (MANGO et al., 2018; HAILU & FANA, 2017); access to information and communication technology

Table 1 - Types of markets, producers, special reach, and commercialization channels.

Type of Market	Type of Producer	*Locus* and/or special reach	Commercialization channels
Proximity markets	Farmer	Spot	On the property
			At home(house to house)
		Direct sale	Road side
	Surplus producer		Direct delivery
		Only local	Local fair
			Consumption groups
Local and territory markets	Family farmer	Spot	Regional and/or national fair, events
			Sale networks
			Specialized store
	Simple merchandise producer	Local, regional, and territorial	Restaurants
			Sales association
			Grocery stores
Conventional markets	Merchandise producer	No defined location	Middlemen;
			Cooperative
		Placeless	Agro-industry
			Private company
		Unbound	Internet
			Supermarkets
Public and institutional markets	All types of suppliers	Multi-spatial	School food
			International bodies
			NGOs
			Governmental bodies

Source: Adapted from SCHNEIDER (2016).

(MUKARUMBWA et al., 2018); and access to public policies (NXUMALO et al., 2019).

RESULTS AND DISCUSSION

Different markets and their marketing channels were found, the most significant of which were (1) Local market (72.9%); (2) Conventional Market (59.7%); (3) Local and territorial markets (31.0%); (4) Public and institutional markets (14.7%). Producers are inserted in more than one type of market, as can be seen in table 2, where the sum of the values is greater than 100%.

There were eighteen different marketing channels, considering the establishments investigated. The average number of channels for local and conventional markets was 2.4, and 3.1 for the local/territorial and public/institutional markets. The minimum number of channels accessed is one and the maximum five. A maximum of three channels is used in 86.82% of the establishments, regardless of the market. In a similar study conducted in the same region, the authors found farmers use only one marketing channel in 49% of cases, two in 32%, three in 16%, and four or more channels in only 2% (BRANDÃO et al., 2020). Regardless of the market used, the most significant was the sale from house to house (19.4%), regional supermarkets (16.3 %), local/municipal open markets (12.4%), and sale in rural establishments (11.6%).

We propose the following classification of the results: (1) exclusive or specialized - when the farmer uses only one marketing channel; (2) diversified - when using two to three channels; (3) super diversified - when accessing from four to five channels. Thus, the sample studied showed that 32.6% are exclusive/specialized, 54.3% diversified, and 13.2% super diversified.

An average distance between the rural establishment and the municipality's market was 10.8 km, with a minimum of 0.2 and a maximum of 38 km. However, no significant correlation was found between the distance and the number of channels in the large group, except in Cachoeira do Sul ($P = 0.299$; $P = 0.022$), which showed a weak positive correlation, differing from studies conducted by DESSIE et al. (2018) and MUKARUMBWA et al. (2018). Research showed that specific marketing channels (and not

Table 2 - Market and respective marketing channel.

Market	----------Channel----------
Proximity markets (72.9%)	House to house 43%
	Local fair 26%
	On the property 26.0%
	Consumption groups 3%
	Association 2%
	Other 2%
Conventional Market (59.7%)	Supermarkets 58%
	Private company 28%
	Agro-industry 8%
	Cooperative 3%
	Middlemen 3%
Local and territorial markets (31.0%)	Grocery stores 43%
	Regional fair 29%
	Restaurants 14%
	Sale networks 9%
	Specialized store 5%
Public and institutional markets (14.7%)	School food 91%
	Governmental bodies 9%

the number of channels used) are influenced by the distance from the nearest municipality (MANGO et al., 2018; HAILU & FANA, 2017). The perishability of fruits and vegetables, as well as the quantity available for sale influence this choice (BRANDÃO et al., 2020).

Family farmers presented an average of 3.3 members, ranging from 1 to 7 individuals. However, refuting PEI-AN et al. (2017), no significant correlation was found between family size and marketing channels' diversification. When analyzing the family labor available in the rural establishment for productive activity (an average of 2.6 individuals), there is a low positive correlation regarding the diversification of the channels used (P = 0.166; P = 0.031). In other words, regardless of the number of individuals residing in the establishment, families with a higher number of individuals working in rural activity access a higher number of channels.

There was a low negative correlation between the families' average age (42.8 years) and diversification (P = 0.176; P = 0.047). That is, families with more advanced age diversify less (Table 3), as corroborated by BRAR et al.(2018), NXUMALO et al. (2019), MANGO et al. (2018); KIPROP et al. (2020), and ZHANG et al.(2017) since age has an impact on the farmer's choice of marketing channels.

The results showed a positive association between channel diversification and the possession of equipment and/or storage infrastructure (existing in 41.9% of establishments) ($\chi^2 = 11.168$; P = 0.025). Thus, establishments with equipment/infrastructure are more diversified in marketing channels (MANGO et al., 2018; HAILU & FANA, 2017).

All farmers had access to TV, radio, and other information and communication technologies (ICTs); 97.7% had cell phones, 80.6% had internet access; 24% reported reading the newspaper and other printed media; and only 1.6% had a landline. However, access or not to ICTs showed no correlation with the diversification of marketing channels. However, it is argued that rural extension should take advantage of ICTs to provide market information, aiming to reduce the asymmetries between demand and supply (MUKARUMBWA et al., 2018). This occurs because information costs were statistically significant in the choice of marketing channels (KIPROP et al., 2020).

Finally, farmers had access to an average of 1.5 public policies, of which 60.5% accessed one type of public policy; 29.5% accessed two types of public policy; 7.8% accessed three; and 2.3% accessed four or more public policies. A dependency relationship was reported between the number of public policies accessed and diversification ($\chi^2 = 18.167$; P = 0.006). In other words, when the farmers used more public policies, the number of channels accessed increased. Public policies are essential to improve farmers' access to markets and significantly

Table 3 - Descriptive analysis of the establishment's profile.

		----------Degree of diversification----------					
Variables	Parametric	Exclusive	Diversified	Very diversified	Total	Statistics	Significance (P - value)
Distance	Mean	10.8	11.1	9.8	10.8	Spearman's Rho = -0.055	0.533
	Median	10.0	10.0	7.0	10.0		
	Standard deviation	7.1	6.9	9.4	7.3		
	Mini- Maximum	0.5 -35.0	0.2 – 30.0	1.0 – 38.0	0.2 – 38.0		
Family size	Mean	3.0	3.4	3.5	3.3	Spearman's Rho = 0.155	0.079
	Median	3.0	3.0	3.0	3.0		
	Standard deviation	1.3	1.3	1.2	1.3		
	Mini- Maximum	1.0 – 6.0	2.0 – 7.0	2.0 –6.0	1.0 – 7.0		
Manpower	*M*ean	2.9	2.8	2.9	2.9	Spearman's Rho = 0.189	0.032*
	Median	2.0	2.0	3.0	2.0		
	Standard deviation	3.2	1.2	1.0	2.0		
	Mini- Maximum	1.0-22	1.0 – 8.0	2.0 – 5.0	1.0 – 22.0		
Age	Mean	46.8	42.0	36.5	42.8	Spearman's Rho = -0.176	0.047*
	Median	49.5	38.3	32.0	39.3		
	Standard deviation	17.6	14.3	11.0	15.3		
	Mini- Maximum	0.0 –70.5	15.8 – 72.3	21.6 – 60.0	0.0 – 72.3		
Acess to ICTs (quantity)	Mean	2.9	3.1	3.0	3.0	Spearman's Rho = 0.138	0.118
	Median	3.0	3.0	3.0	3.0		
	Standard deviation	0.7	0.6	0.6	0.7		
	Mini- Maximum	2.0 – 5.0	2.0 – 5.0	2.0 – 4.0	2.0 – 5.0		
Public policy	Mean	1.2	1.6	2.0	1.5	Chi-square 18.167	0.006**
	Median	1.0	1.0	2.0	1.0		
	Standard deviation	0.5	0.8	0.9	0.7		
	Mini- Maximum	1.0 – 3.0	1.0 – 4.0	1.0 – 4.0	1.0 – 4.0		
Infrastructure	Yes	26.2%	44.3%	70.6%	41.9%	Chi-square 11.168	0.025*
	No	73.8%	54.3%	29.4%	57.4%		
	Do not know	0.0%	1.4%	0.0%	0.7%		

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

influence the choices in marketing channels (NXUMALO et al., 2019).

CONCLUSION

The type of market most used by the family farmers surveyed is the Local Market. However, farmers who use the Local/Territorial and Public/ Institutional Markets have demonstrated access to a greater diversity of marketing channels.

This study demonstrated that the evaluation of different types of markets via analysis of farmers marketing strategies can shed light on the marketing channel accession conditions. In this sense, this trial supports the hypothesis that a broader and more diversified portfolio regarding marketing channels may represent better production conditions, especially concerning infrastructure and human resources. This demonstrated that production units that present a larger workforce as well as productive assets, generally access a higher number of marketing channels, which reflects into less external dependence.

We proposed that future studies contemplate that the variables be analyzed through in-depth

interviews to understand the context and the explanatory factors in the choice of channels. The study focused on the analysis of the association of variables taken in pairs (bivariate analysis), which was sufficient to meet the proposed objectives, but has the limitation of not considering all the variables studied in an integrated manner. In this sense, for future studies, it becomes relevant to start from a multivariate analysis, through a regression model that allows analyzing the influence of the studied variables on the degree of diversification of the establishments. In addition, a multivariate study enables a cluster analysis, identifying types of establishments with their own characteristics defined from the study variables. Another limitation is the geographic scope, as it does not have information on all municipalities in the Center region.

DECLARATION OF CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORS' CONTRIBUTION

The authors a contributed equally to the manuscript.

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