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ARTICLE

Beekeeping developed by family farming in Rio Grande do Norte: an analysis of the interaction with markets

Apicultura desenvolvida pela agricultura familiar no Rio Grande do Norte: uma análise da interação com os mercados

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Abstract: This article studies the logic of interaction between family farmers in Rio Grande do Norte, who dedicate themselves to beekeeping and different market types. This is qualitative research, from which data were obtained through interviews guided by a semi-structured script that considered market typologies: proximity, local and territorial, conventional, public and institutional. Ten participants took part in the interviews, the data were processed using NVivo® 11 software. The main market cited was the public/institutional one, highlighting the relevant role of public marketing policies. Middlemen occupy a contradictory role, since, at times, beekeepers respond to the need for rapid commercialization, even with lower financial returns, while for leaders, they pose a threat, weakening the associative logic. Nearby markets were not mentioned, although the productive and cultural profile of family farming suggests that this may constitute a unique form of interaction. The study highlights the importance of public policies in structuring this productive logic, which exhibits unique characteristics, as beekeepers are not guided by competitive strategies. Their marketing interactions fluctuate according to their immediate needs, the value placed on the associative process, and relationships with middlemen.

Keywords: beekeeping, family farming, markets, public policies.

Resumo: Este artigo estuda a lógica de interação dos agricultores familiares, do Rio Grande do Norte, que se dedicam a apicultura, com as diferentes tipologias de mercado. Trata-se de uma pesquisa qualitativa, em que os dados foram obtidos por meio de entrevistas orientadas por um roteiro semiestrurado considerando as tipologias de mercado: de proximidade, local e territorial, convencional, público e institucional. Participaram das entrevistas 10 sujeitos, os dados foram tratados com o uso do software NVivo® 11. O principal mercado citado foi o público/institucional, evidenciando o papel relevante das políticas públicas de comercialização. Os atravessadores ocupam um lugar contraditório, pois, em alguns momentos os apicultores respondem a necessidade de comercialização rápida, mesmo que com retornos financeiros menores; para as lideranças eles são uma ameaça, enfraquecendo a lógica associativa. Os mercados de proximidades não foram citados, embora o perfil cultural produtivo da agricultura familiar pudesse sugerir que se trata de uma forma de interação própria. O estudo evidencia a importância das políticas públicas para a estruturação dessa lógica produtiva, que apresenta características peculiares, pois os apicultores não se orientam pela estratégia competitiva. Suas interações mercadológicas, oscilam de acordo com suas necessidades imediatas, a valorização do processo associativo, e também se relaciona com atravessadores.

Palavras-chave: apicultura, agricultura familiar, mercados, políticas públicas.

1 Introduction

The text is part of a broader study that investigates beekeeping relationships considering three dimensions: social interactions (Polanyi, 2000), relationships with markets (Schneider) and the strategic dimension (Porter). The study on social interactions (Siqueira et al., 2022) revealed that beekeepers interact in a complex manner, articulating the three dimensions proposed by Polanyi, their demand for survival, and the types of cooperative values, creating combinations related to reciprocity, redistribution, and commercial exchanges, derived from a specific management style that is rarely discussed in mainstream management literature. Based on these findings, this text focuses on the implications of the management process in relation to different types of markets, using Schneider's proposition as a theoretical framework.

Brazil has the largest organic honey production capacity in the world. However, although it ranked eleventh as a producer in 2017, it accounted for only 4% of the global export volume (Vidal, 2020, p. 2).

Along the beekeeping agro-industrial production chain, the flow of goods and transactions from producers to consumers occurs through the intermediation of primary agents (beekeepers, warehouses, associations, or cooperatives), typically carried out by local beekeepers specialized in marketing. These agents can trade with processors/fractionators, wholesale and retail markets, and even sell honey directly to the final consumer (Vidal, 2020).

According to Lopes et al. (2008), the beekeeping production chain has created jobs and income flow primarily within family farming environment. It has also contributed to improving the quality of life for people in rural areas. This activity evolved over time, gained ground in the global market, and became a significant source of income for several families. Today, in addition to honey, rational beekeeping enables the production of products such as propolis, bee pollen, royal jelly, queens, pollination, apitoxin, wax, swarms, and offspring, as discussed by Silva (2024).

Public policies aim to stimulate and encourage the processing and commercialization of agro-industrial products in rural areas, while also helping to retain farmers and their families in the countryside. These policies contribute to a new model of sustainable development, attributing agricultural production, opportunities for inclusion, social engagement, and the recovery of social and cultural values to the rural environment (Cruz & Schneider, 2010). This government initiative resulted in an intense growth of agro-industrialization in the countryside, which is instituted both formally and informally.

Cruz (2020) highlights that these advances have not been sufficient to favor a wide insertion of family farmers in the formal market. The author adds that the informality of agro-industrial activities may be associated with the criteria required by health regulations, though this is not the only factor. Notably, informality has become an entry barrier for small family producers. The study by Siqueira et al. (2022) revealed that the logic of social interaction among beekeepers is distinct, suggesting a form of relationship with the formal market that is not well understood in management literature. On the other hand, Brito et al. (2022), in their bibliometric study on family farming and the honey chain, found that few studies have attempted to understand the productive logic of this system.

According to Schneider (2016), from the point of view of family farmers, markets are not limited to economic activities. Family units treat the economic, productive and social dimensions as part of a symbiotic system that also influences the cultural dimension and their positions in relation to the social relations resulting from these practices. Therefore, understanding how family farming interacts with the market, specifically the honey production chain, may help explain the challenges and opportunities of this process. The economy guiding family farming

may be based on different values than those guiding employers' actions, resulting in distinct forms of interaction with markets and management logic.

The research gap that this text addresses is the articulation between the management logic of family farming and the choices they make to interact with markets, aimig to understand whether this relationship is a concious decision by farmers who resist insertion to the logic of capital, thus, choosing markets where their values can be preserved, or if such choices are driven by economic limitations or a lack of knowledge about the process.

In this context, the study can contribute to ensuring that farmers' strategies for insertion into the honey chain are observed through a logic of coexistence between isonomic systems and economic systems, allowing the market's centrality not to be the guiding principle of such practices, as proposed by Guerreiro Ramos (1989) and Polanyi (2000). Considering this context, this work focuses on analyzing the honey chain, particularly on how family farmers establish interactions with the market (Schneider, 2016). Thus, the following research question arises: Does the management logic of family farmers limit the type of market with which they interact? The objective of this study was to identify the types of markets with which beekeepers interact.

To present this discussion, the text begins by outlining market typologies, drawing on the work of Polanyi (2000) and Wilkinson (2010) as theoretical contributions, culminating in Schneider's (2016) proposal, which will guide the theoretical categories of analysis. Next, it discusses how the value logic of family farming production interacts with market typologies. To conclude the theoretical debate, the dynamics of the honey chain are presented. The following section addresses the methodological aspects guiding the research. Subsequently, the research results are presented, highlighting the relationship between the empirical field and the theoretical propositions, concluding with the final considerations that relate the research problem, objectives findings.

2 Theoretical Foundation

2.1 Market typologies and family farming

Relying on market typologies is fundamental to understanding the different forms of social interaction in economic activity, whether through social, political, or institutional relations. In this context, the sociological perspective of Economy is taken as a reference, with contributions of Polanyi (2000), Schneider (2016), and Wilkinson (2010), in order to understand the prevailing economic system up to the present day.

According to Schneider (2016), the conventional market concept focuses on the purchase and sale relationships, where prices are determined by the supply *versus* demand. In these markets, the agents involved compete for their bargaining power with the aim of achieving greater profitability. The author adds that such a definition "does not explain where markets come from, who are the agents who participate in its formation and functioning, nor does it show how asymmetries exist in the relationships of those who participate in these markets" (Schneider, 2016, p. 97), which could be fundamental for understanding the existing relationships.

For Polanyi (2000), in the 19th century, a self-regulating market emerged devoid of social values. It was capable of subordinating society to its rules and precepts in order to transform labor, land and money into commodities, which he called "fictitious goods" because they could not be treated as real ones. Polanyi (2000) points out that a society guided only by market demands is not capable of establishing balance between social, cultural and economic dimensions.

Resigning to this, as stated throughout the text, the author defends the coexistence of different forms of social interaction which relate to each other in various environments, even opening space for family farming.

Market typology represents the relationships of these different forms of interaction considering the space (locus), the ordering, and the social construction of each market structure (Schneider 2016). Wilkinson (2010), addressing the issue of family farming in Brazil, identifies six market typologies capable of providing opportunities for the insertion of family farmers: commodities, (niche) specialties, organic, artisanal, solidarity, and institutional (Table 1).

Table 1. Typologies of family farming markets according to John Wilkinson

Market	Profile	Challenges
Commodities	Old and new local and remote markets.	Standardization, legislation, minimum quality, and scale.
Specialties (niche)	Broken down by degree of association with locality/tradition.	Competition from new players.
Organic	Degree of association with health and/or with a specific mode of production.	Certification, scale, and research.
Artisanal	Denomination of origin or not.	Quality, technical standards, authenticity, and collective action.
Solidarity	Identification or not with family farming, high and low income markets.	Scale, variability, and quality.
Institutional	Tenders, offer for retail.	Quality, variability, and scale.

Source: Wilkinson (2010, p. 17).

Table 1 presents the association of each market to a profile and a specific challenge of its segment. Wilkinson (2010) seeks to show the conditions and possibilities created by alternative markets, suggesting the presence of forms of integration of farmers in the transactional relationships now developed. For Schneider (2016), the types of markets highlighted by Wilkinson reveal a hegemonic overview focused on the segmentation of existing marketing channels and do not delve into the origins of the interaction mechanism between transaction agents. Thus, Schneider (2016) underscores the need to explain the dynamics of interaction and processes of differentiation of the social category of family farmers in the face of the market. For Schneider (2016), a market typology is defined by theoretical references and indicators that allow defining its elements in a relational way. The author defines four types of markets: (a) proximity markets, in which exchange relations through reciprocity prevail, and whose circulation is restricted to nearby locations and requires little travel (Schneider, 2016); (b) local and territorial markets characterized by monetized exchanges according to the regularity of supply, driven by commercial self-interest, with such exchanges carried out through intermediaries responsible for expanding movement outside their production location; (c) conventional markets, guided by the supply and demand of products, goods, and merchandise, traded at all market levels with the aim of achieving a greater profitability. These markets, in the terms of Polanyi (2000), are markets of high risk and uncertainties, and therefore difficult to control and regulate; and finally (d) public and institutional markets, which have been increasingly attracting family farmers in Brazil through programs encouraged by the State or public bodies. These markets centralize the transactions practiced fairly, and Schneider (2016) argues that they are the result of a social construction, as they are promoted by public authorities and guided by the principles of transparency and dialogue as elements of governance.

Schneider (2016) points out that the forms of interaction exist both at the input (input) and at the output (output) of the production chain operation process, and that they can be identified by the interactions required from the relationships between suppliers (inputs, consumables, technology, technical assistance, credits) and, especially, by the relationships offered.

Schneider (2016) emphasizes that the locus where the exchange relations (reciprocal or mercantile) between the transaction agents are instituted can determine its form and the degree of interaction with the market. The typology of the market can be classified by the greater or lesser degree of interaction with the market and by the purpose or destination of what was produced, whether for personal use or for sale.

However, Schneider (2016) corroborates Polanyi's (2000) idea that all markets, to their extent, are immersed in social and cultural relations with rules, regulations and guidelines established by the institutions that govern the market in their respective generic contexts. Schneider (2016), then, sought to build a typology for family farming markets capable of dialoguing with more general scientific studies on markets in the social sciences. His contribution was designed to be both easy to understand empirically and, at the same time, allow an understanding of the specificities of the market. Thus, they were organized into four types (Schneider, 2016), as presented in Table 2.

Table 2. Typologies of family farming market according to Sergio Schneider

Type of market	Type of family farmer	Locus and or spatial range	Nature of exchanges/ business models	Form of regulation	Marketing channels
Nearby markets	Farmer; surplus producer	Spot; direct selling; only local	Interpersonal + Solidarity	Trust + Friendship	- On property (pick-pay) - At home - On the side of the road - Direct delivery - Local fairs
Local and territorial markets	Family farmer; simple commodity producer	Spot; local; regional, and territorial	Diversified + Complementarity	Reputation/ trust + Origin + Prices	- Consumption groups - Regional fairs - National fairs - Sales networks - Events - Specialized stores - Restaurants - Sales association
Conventional markets	Goods producer	No definite place; placeless/ Unbound	Competitive	Contracts + Prices	- Produce markets - Intermediaries - Cooperative - Agribusiness - Private company - *Internet*
Public and institutional markets	All types of suppliers	Multispatial	Bidding; public selection	Contracts + Laws	- Supermarkets - School meals - *Fair trade* - International bodies (FAO; WFP) - NGOs - Hospitals, universities - Armed forces - Assistance entity - Government stocks

Source: Schneider (2016, p. 127)

Given the context above, this research draws on the market typologies suggested by Schneider (2016) due to their conceptual and complementary scope in relation to the relevant work of Wilkinson (2010) in Brazil, who highlighted in his typologies the marketing channels into which family farming can be integrated. Considering that the relationship with the market is influenced by factors related to competitiveness and, therefore, action strategies, the following section discusses competitive forces.

2.2 The management logic of family farming and access to markets

Family farming has an organizational structure that differs from most profit-oriented organizations as its central focus is subsistence production, the use of family labor, product diversity, and small-scale operations. These factors, which characterize this production system, can constitute elements that hinder access to markets, particularly those where industrial-scale agriculture predominates. (Abramovay, 2012).

As discussed in the previous section, family farming, and beekeeping more specifically, can be associated with different types of markets. However, each type presents its own potentialities and limitations, depending on the management profile of the family farmer. In this context, the question arises: to what extent should the family farmer invest efforts to enter every type of market, or should they specialize in those that are most aligned with their profile? Wanderley (2003) I already raised this question, warning that certain forms of market integration respond to a political-ideological agenda aimed at legitimizing rural businesses, which is far removed from the productive logic of family farming. Therefore, when discussing the ways in which family farming engages with the market, we are not only addressing a technical and economic issue.

Several authors, such as Souza et al. (2020), Schneider & Ferrari (2015), Loconto et al. (2018), argue that family farmers, including beekeepers, should focus their efforts on short production chains and local agri-food systems.

According to Souza et al. (2020), the integration of beekeepers, as small farmers, into the production chain faces challenges because, in many cases, these actors require intermediaries to access markets due to organizational difficulties. In this sense, they argue that it is essential to reduce the distance between producers and consumers through local agri-food systems.

Similarly, Schneider & Ferrari (2015) emphasize the importance of short chains and cooperation as a means to improve product quality and add value. They argue that associations and cooperatives provide greater autonomy, in addition to valuing traditional knowledge and preserving biodiversity.

In the same context of promoting short chains and local agri-food systems, Loconto et al. (2018) introduce the discussion of agroecology as a field that integrates cultural, social, technological, and economic dimensions. The authors particularly highlight the cultural dimension, asserting that this production system is a social movement that positively alters the meaning of production systems.

Another perspective on market integration, mediated by the State, involves the proposition of public policies that facilitate farmer's access to markets, such as the Food Acquisition Program (PAA) and the National School Feeding Program (PNAE).

Grisa & Schneider (2014) when analyzing the history of these policies, showed that only in their third stage did the focus shift to creating markets guided by food security and environmental sustainability.

Souza-Esquerdo & Bergamasco, (2014) consider these programs relevant; however, they face problems related to farmers' lack of information and the difficulty in providing prices that are

compatible with the costs of family farming. On the other hand, Grisa et al. (2014) hightlight the difficulties faced by farmers with lower incomes and provide guidance on overcoming bureaucratic obstacles to entering the program. Therefore, while institutional markets represent an important achievement, they still deserve a deeper debate on their operationalization and sustainability. Another dimension that complicates the inclusion of some family farming products, particularly honey, is the certification process, as the lack of certification prevents the expansion of the geographic area for marketing (Khan et al., 2014).

Thus, the interactions between family farming and markets depend on a broader understanding of the role of these subjects in the socio-cultural context and their potential for constructing alternative approaches to the logic of markets that are exclusively regulated by economic factors.

2.3 Beekeeping activity and the honey chain

Beekeeping, i.e., the rational creation of bees, is a sustainable activity "proven to be profitable and which can be developed in virtually any geographic space that has favorable soil and climate conditions and an exuberant vegetation rich in flowers" (Santos & Ribeiro, 2009, p. 4). Honey is the main byproduct sold in the beekeeping and can be produced by small rural producers or family farmers (Landau, 2020), who, through participation in agricultural associations and cooperatives, form one of the links in the agro-industrial beekeeping production chain.

As shown in Figure 1, this activity began to be developed in Brazil in 1839, with the introduction of Apis mellifera (European black bee) into the country, followed by the introduction of other species (Khan et al., 2014). The development of beekeeping, management techniques and the improvement of the production structure were facilitated by interactions between producers and researchers through meetings and conferences; financing for the activity; Brazil's participation in international events; investment in research in the area; creation of the Brazilian Apiculture Confederation in 1967; and progressive appreciation of bee products (Lopes et al., 2008).

According to Khan et al. (2014), between 2001 and 2004 there was an accelerated growth in honey production in the Northeast region, driven by a large international demand that was met efficiently, due to the availability of appropriate technology and highly productive bees. During this period, the potential for certification of organic honey, originating from native flowers, was recognized. From 2005 onwards, the sector received new investments to improve the management and infrastructure.

Khan et al. (2014) mention that due to the development of beekeeping activity in Brazil, especially spurred by export demand, companies supplying inputs for honey production emerged to serve the numerous apiaries distributed across the country. Production varies according to region, the level of organization, and the technologies adopted by each producer, reflecting the existing inequality between the producing classes, such as small producers/family farmers and entrepreneurs.

In order to understand the operation of the beekeeping activity, it is essential to describe the honey production and commercialization process, from input suppliers to the final consumer, thus characterizing the production chain (Khan et al., 2014). The productive chain represents a set of economic activities gradually linked, starting from the acquisition of raw materials through the stages of product elaboration, commercialization, and ending with delivery to the consumer. For Silva (2005), the production chain of agricultural products is composed of the following agents: input suppliers, farmers, processors, merchants, and the consumer market, as Figure 2 shows.

Figure 1. Timeline of beekeeping activity in Brazil.
Source: Khan et al. (2014).

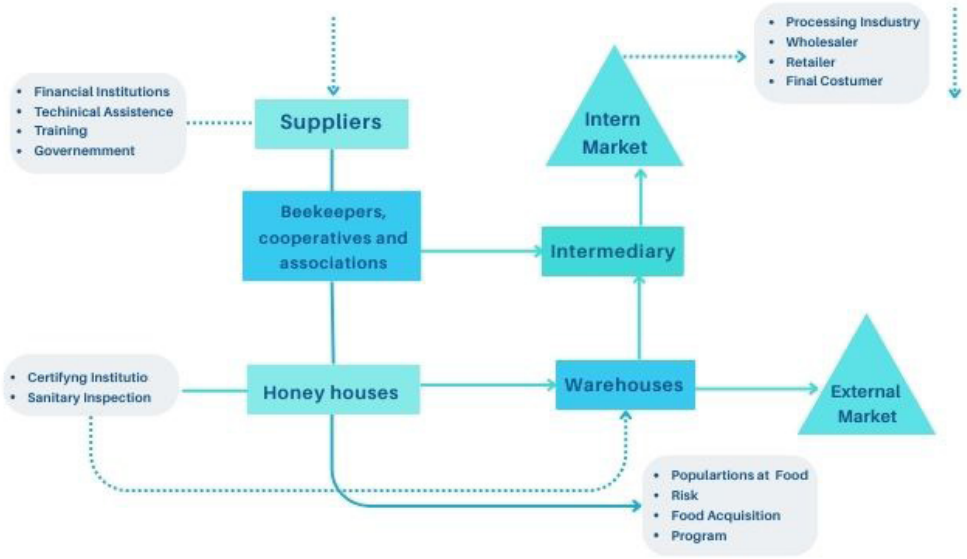

Figure 2. Honey production chain.
Source: adapted from Khan et al. (2014).

After receiving inputs from suppliers, honey producers organize themselves into associations or cooperatives to proceed with the extraction of honey from the hives in what are called honey houses. Next, they either process or fractionate the honey in warehouses in their region or sell it in bulk to intermediaries or middlemen, who will then sell it for processing and packaging in either the internal or external market. This process follows the flow depicted in Figure 2 until the honey reaches the final consumer. Other actors involved in the chain provide services related to intermediary activities, technical or financial support, and legal responsibilities, such as certification institutions (Khan et al., 2014).

Further, Khan et al. (2014, p. 88) state that the interaction between the chain links takes place within an Institutional Environment, "comprising health legislation, market regulation, culture, traditions, education, customs etc., and the Organizational Environment, understood as cooperatives, beekeeper associations, and financial institutions." In Rio Grande do Norte, beekeeping is developed primarily by family farmers (Aquino et al., 2020).

Although the institutional environment is a significant subject, the study by Camargo Walger et al. (2024) revealed that the formalization of the honey chain is an area that remains underexplored and requires further research.

3 Methodology

This is a qualitative study, a method that seeks to understand social phenomena from the perspective of the subjects, emphasizing subjectivity, context and the interaction between the researcher and the object of study. The approach is descriptive, active and interpretative, aiming to reveal the multiple dimensions of social reality (Triviños 1987). To collect the data, the interview technique with a semi-structured script was used (Triviños, 1987).

The structure of interview scripts was developed based on the categories described in Table 2. Three scripts related to the subjects' profiles, were used. Some questions appear in more than one script in order to promote an analysis from different perspectives: the perspective of farmers/beekeepers, the perspective of owners of honey houses and warehouses, and the perspective of inspection bodies.

The research project was submitted to the Research Ethics Committee (CEP) in Rio Grande do Norte and approved in December 2021 under opinion nº 5,156,449. The informed consent and the conduction of the interviews ensured the anonymity of interviewees.

The research subjects (Table 3) are agents involved in the honey production chain in Rio Grande do Norte, mapped in the municipalities of São Rafael, Apodi, Caraúbas, Alto do Rodrigues, Serra do Mel, and Natal. They are categorized as family farming producers/beekeepers, owners of honey houses, warehouse owners, and representatives of certifying bodies. Among the owners of honey houses or warehouses are honey associations and cooperatives.

Access to the subjects was gained through cooperatives, followed by associations, which led to their members. As the subjects were interviewed, they suggested additional participants, who were evaluated according to the research criteria, to take part in the interview process. Thus, the research employed snowball sampling (Vinuto, 2014). Access to the representatives of regulatory bodies was obtained through direct contact with the institution (via telephone), which provided the telephone numbers and email addresses of the subjects and their roles.

Table 3. Research subjects

Category	Criterion
Family producer/beekeeper	Operate with honey houses and warehouses in Rio Grande do Norte
Honey house owner	Possess or have possessed registration/certification
Warehouse owner	Possess or have possessed registration/certification
Certification body representatives	Acting in Rio Grande do Norte (Idiarn and Mapa)

Source: prepared by the authors.

The following list, names the ten research subjects ensuring a better understanding of the statements:

- S1L – Subject 1- Leadership
- S2L – Subject 2 - Leadership
- S7L – Subject 7 - Leadership
- S8L – Subject 8 - Leadership
- S10L – Subject 10 – Leadership
- S3A – Subject 3 - Beekeeper
- S6A - Subject 6 - Beekeeper
- S9A – Subject 9 - Beekeeper
- S4R - Subject 4 - Regulator
- S5R - Subject 5 – Regulator

The criteria for selecting the subjects were defined by accessibility and the number of subjects in each category, considering a perspective of exhaustion. Nevertheless, some additional factors were taken into account in defining the subjects: active involvement with the honey production chain (link with associations/cooperatives or secondary agents), beekeeping experience, and geographical distribution in at least three different locations. The variability in the subjects' characteristics was intended to address different perspectives on the research problem and provide a robust description of the phenomenon under study. The researchers considered it relevant to include a diversity of perspectives (leaders, beekeepers and regulators) to assess whether different interpretations of the issues proposed in the study would emerge.

The data analysis technique employed was interpretative analysis, as it seeks to understand the meanings and subjective experiences of the participants, going beyond a mere description of the data. (Brasil et al., 2018). For a better overview of the data and as a way of establishing connections between the analyzed dimensions, the NVivo® 11 software was used with a license acquired by the Universidade Federal Rural do Semi-Árido/Federal University of the Semi-Arid Region (Ufersa).

Thus, from recordings the interviews, the subjects' responses were fully transcribed into text format (Word files) and then entered into the NVivo® software for analysis. The interviews were imported and classified by subject, and the dimensions and their categories and subcategories, now referred to as "nodes," were registered in the software. The next step was to map and associate the subjects' responses, with the theorectical model's structure of analysis, focusing on the three theoretical dimensions adopted in this research: Social Integration, Market Typologies, and Competitive Forces.

After processing the data in NVivo® 11, the entries were extracted to create analysis figures for the theoretical categories and subcategories. The figures were modeled using case association options and structured maps through the "nodes" linked to each theoretical dimension.

Table 4 presents the relationships between dimension, category, and subcategory of analysis.

Table 4. Survey dimensions, categories, and subcategories

Dimension	Category
Market typologies	Nearby markets Local and territorial markets Conventional markets Public and institutional markets

Source: prepared by the authors.

4 Results and Discussion

Market typologies refer to the various forms of market structures that have developed over time. In the analyzed context, markets permeate the productive social processes of family farming and find ways to integrate into the characteristic relationships of the social environment. Schneider (2016) categorized the market typologies of family farming into four types: proximity markets, local and territorial markets, conventional markets, and public and institutional markets.

4.1 Nearby markets

Nearby markets are developed by producers who sell their surpluses directly and immediately in a given local market. The nature of this commercialization is characterized by an interpersonal and solidarity-based relationship, regulated by friendship and trust. The production flow may occur on the property (pick and pay), at home, on the side of the road, through direct delivery, at local fairs, or within consumption groups (Schneider, 2016). In this research, the responses from the interviewed subjects did not mention the practice of nearby markets in the commercialization of honey in the region. The absence of references to nearby markets suggests that, although producers operate within the framework of family farming, emphasizing solidarity and exchange, the beekeeping sector prioritizes more structured markets.

4.2 Local and territorial markets

In local and territorial markets, the family farmer sells products immediately in local, regional and territorial markets. The nature of commercialization in this context is characterized by diversification and complementarity, regulated by reputation, trust, origin, and pricing. Products can be sold at regional and national fairs, sales networks, events, specialized stores, restaurants, sales associations, and grocery stores (Schneider, 2016).

S2L reveals the honey commercialization process at the beginning of the cooperative's journey, when it was still exploring ways to interact with the market. In this account, characteristics of local and territorial markets emerge as an initial means of market insertion:

> [...] we managed to sell a lot of honey by participating in practically all the fairs that existed at that time. We participated in all existing family farming fairs, in Brasília, Rio de Janeiro, São Paulo. And from then on, we modernized, got to know the market better, and founded a brand, the Mel Potiguar, which still exists today. (S2L).

Beekeepers also negotiate with marketing centers; however, respondents rarely mention this perspective.

> From here it goes to Natal. We send it to the Family Agriculture Commercialization Center, Canto do Sertanejo, and other supermarkets in Natal; at least two more points in Natal buy from us. (S1L).

The beekeeper trades with formal markets; and solidarity markets are also included, such as the Family Agriculture Commercialization Center[1].

[1] These centers are called short-chain marketing; they are organizations conceived two decades ago by governments or civil organizations and are a strategy for organizing the agri-food system, guided by values that advocate fairer forms of consumption (Amaral et al., 2020).

This marketing perspective, which establishes a closer relationship with the consumer, can also be called short chains, as discussed by Schneider & Ferrari (2015) and Loconto et al. (2018).

4.3 Conventional markets

Conventional markets are formed by commodity producers who operate in various locations. The nature of commercialization in these markets is based on competition, regulated by contracts and prices. Production is distributed through middlemen, cooperatives, agribusinesses, private companies, the internet, and/or supermarkets (Schneider, 2016). Thus, the characteristics of this market reveal some similarities with the structure of the honey production chain, particularly in terms of production flow, which involves agents such as middlemen, cooperatives and associations, private companies, and supermarkets.

S2L mentions that the figure of the middleman in monetized exchange relationships, besides posing a risk to the buyer, also threatens to the legal producer:

> I'll confront the middleman right away, right? It will never cease to exist. This space needs to be ours too. We already receive honey with quality problems, fermented honey, for example. I don't know if you know what fermented honey is; we already received fermented honey and we had to return it to the producer. That producer went there and the middleman bought it, right? So, this honey has gone somewhere, someone has lost this honey. That honey damaged some product somewhere. It wasn't in our place, but somewhere it was damaged. (S2L).

> [...] but the middleman buys this [inappropriate] honey. It buys honey with ants inside it, buys everything in the world. There is no commitment to quality. Illegality will always harm those who work legally. It is also one of our difficulties. There are producers who don't want to hear about this; there are producers who don't want to follow these procedures. (S2L).

This account reveals that the presence of middleman threatens the role of cooperatives and associations, as it tends to weaken the organizational process and even makes it possible to sell a product that is not of adequate quality for consumption.

From another perspective, the speeches of S6A and S7L show that the middleman remains an outlet channel that illegally favors some producers:

> We've already fought hard for a honey house, but we couldn't get it; each one of us gave its share and we built a building there, we bought equipment... Then the trade, we don't have a license, so we sell to middlemen. (S6A).

> [...] this honey usually leaves here illegally, you know, because there's no registration, there's nothing; so usually the buyers who come are from Ceará... People from Ceará take it, take it from here through Apodi and then enter Ceará. That's it, all this honey here comes out as if it were from Ceará... I just know that we are working like this: take it out and do this; we harvest the honey in our little house that we built and sell it to the middleman, and that's it, it goes to Ceará and that's it. I work like this, unfortunately, it is illega"l. (S6A).

The issue of middlemen is not restricted to the State of Rio Grande do Norte. Arruda et al. (2011), analyzing the case of Aracati and Fortim in Ceará, report that these agents occupy a link in the production chain as intermediaries, buying small productions to compose larger batches for commercialization to processing companies. They are autonomous professionals, paid on commissions, and use their proximity and knowledge of local beekeepers. According to the authors, what allows this agent to act is the difficulty of beekeepers in producing on a

large scale, not having certification, and not knowing the structure of the market. The issue of middlemen and intermediaries in some cases is related to excessive bureaucracy, financial difficulties and lack of assistance, as analyzed by Grisa et al. (2014).

Even for certified honey houses, the marketing problem is not solved since the issue of production scale and knowledge of the market structure is unresolved, as Arruda et al. (2011) reported:

> *We have a certified unit where there is basic equipment needed for harvesting; we collect honey in the field in the most hygienic way possible, in the way we learned in training; we extract honey in the extraction unit itself, but direct sales are very difficult. It is not feasible for us to process this honey. So it's better to pass it on to the company that buys everything at once* [middlemen]. *(S8L).*

The great problem in conventional markets lies in the organizational structure of beekeepers, who need to advance in certifications and work together to establish a viable production scale to negotiate with processing companies. Thus, it is understood that the strongest negotiation agent in the conventional markets is the middlemen; however, even so, there is a commercialization process in fairs and supermarkets.

4.4 Public and institutional markets

Public and institutional markets comprise a wide variety of suppliers in a multispatial context. There markets operate through bidding processes and public selections, regulated by contracts and the current legislation. Marketing channels include school feeding programs, fair trade, international organizations such as the Food and Agriculture Organization (FAO) and the World Food Program (WFP), non-governmental organizations (NGOs), hospitals, universities, armed forces, assistance entities, and government stocks (Schneider, 2016).

The producer/beekeeper forms part of the group of suppliers in this market. However, one of the difficulties of remaining in the niche is highlighted in the speech of S1L:

> We supply honey even to the IFRN. We have already participated in two public notices. Now I may not participate, because it will be online, this whole process. It is harder... Do you understand? It gets complicated... that school feeding program came in and bought honey. (S1L).

The account demonstrates that technological factors make it difficult to access virtual hiring platforms and online public notices, as well as the registration and participation process. These limitations hinder beekeeper's interaction with this market. Chaves (2023) emphasizes these challenges, arguing that bureaucratic issues impede farmers from accessinf such markets.

The reports from S2L and S3A highlight the importance of institutional contracts for the performance of the activity in the region and the relevance of cooperatives in accessing this market:

> [...] Coopapi was the first cooperative to carry out a PAA project in the state, creating a stock for distributing honey in schools. The first cooperative in the State of Rio Grande do Norte to add honey to school lunches was Coopapi, more precisely in 2004/2005. (S2L).

> [...] the institutional market is still our strongest market, and we have slightly changed the perception that honey is only for those who are sick; we have, in Natal, for example, Cecaf. I don't know if you've already visited, but if you can, visit it; we have a space there and I sell

> a lot of honey every week, you know, they are very trustworthy people, and they 'fight' for the legalities straight away. (S3A).

The participants' reports reveal the State's interest in adding honey to school lunches, as well as the weight of the institutional market in honey producers' revenues. This indicates a low diversification of customers, which increases the business's risk. In addition to cooperatives, other institutional agents play an important role in marketing. However, they focus on individual beekeepers, as reflected in S7L's account: "[...] there is direct purchase, where we make the sachet for direct purchase, and currently it happens through Emater, the State Government; the person sells individually and not via association" (S7L).

Another institutional agent identified in the interviews was the National Supply Company (Conab), which, in addition to contributing to collective marketing, also provided structure for honey packaging.

> [...] we also sold honey to Conab at the time, that was when we could sell honey to Conab; the seal was not required, you know, of quality, so we also sold honey to them. It was where we bought this sachet machine, at the time the government lent the money to Apismel for us to stock up on honey, and then we could pay little by little, right? I had a stock of honey, I made the sachets, and took them for school lunches, and paid with this honey. (S10L).

Institutional markets appear in the interviews as key agents that facilitate beekeepers' access to the market. In some cases, they strengthen cooperatives and associations, while in other instances, they contribute with resources to improve the sector's infrastructure. In this regard, the relevant role that public policies play in redirecting the market, some what hijacked by middlemen, toward a market with the potential to strengthen the cooperative perspective within the supply chain is evident, as shown in Table 5 below.

Table 5. Summary of findings in the size categories of market typologies

Dimension	Category	Findings
Market typologies	Nearby markets	Not identified
	Local and territorial markets	Family farming fairs and marketing centers
	Conventional markets	Supermarkets and middlemen
	Public and institutional markets	Government notices, Emater, Conab

Source: prepared by the authors.

5 Summary of results

Figure 3 shows the interaction of subjects with the market typologies dimension. It shows that there is a predominance of recognition among the subjects (S1L, S2L, S3A, S4R, S5R, S6A, S7L, S8L, S9A and S10L) regarding the category of public and institutional markets, followed by the category of conventional markets, with subjects (S1L, S2L, S5R, S6A and S7L) also recognizing this category.

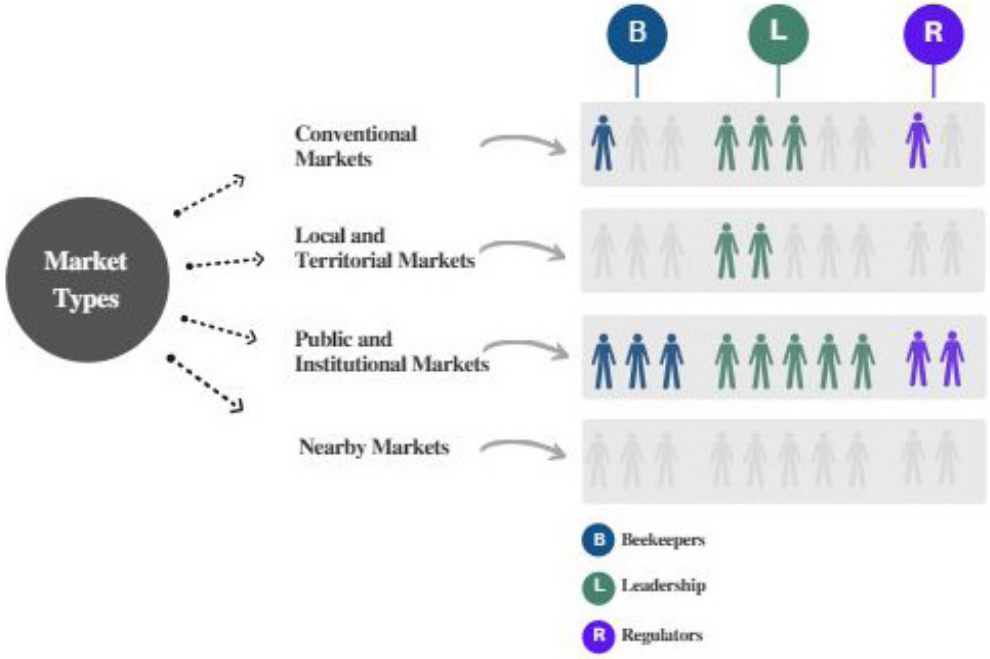

Figure 3. Interaction of subjects with the market typologies dimension.
Source: prepared by the authors.

On the other hand, local and territorial markets are recognized only by S1L and S2L, and proximity markets are not identified by any of the interviewed subjects.

The results suggest that public and institutional markets are central to the subjects' market interaction. Public policies that have emphasized this type of commercialization represent an important step in bringing family producers closer to society, as demonstrated in the study by Grisa & Schneider (2014) and Chaves (2023). However, bureaucratic difficulties and discontinuities in public notices mean that the figure of the middleman is not entirely eliminated in the commercialization process, as described by Souza-Esquerdo & Bergamasco (2014) and Grisa et al. (2014).

Survival needs sometimes require rapid commercialization processes, reinforcing the role of the middleman as an alternative, which, in turn, weakens cooperative ties. This ambiguous role of middlemen is evident when beekeepers refer to them as an alternative, while leaders and regulators identify them as an obstacle to cooperation. As suggested by Souza et al. (2020) and Schneider & Ferrari (2015), short chains can contribute to minimizing this problem by bringing producers closer to consumers, strengthening cooperative ties, and reducing the role of marketing intermediaries.

It is noteworthy that nearby and local markets were rarely mentioned. This is significant, as the conceptual framework of family farming, rooted in solidarity, exchange relations, and other principles, would suggest that these markets could be an alternative to public and institutional markets.

6 Conclusions

The forms of interaction of humans with the natural and social environments reveal biases that transcend the capitalist economy. These forms of interaction can be associated with the ways people seek to meet essential needs. They guide what can be called "development," which may acquire a particular meaning for each individual or group. In this context, the objective of this study was to identify the types of markets with which beekeepers interact.

Considering that beekeepers are involved in production processes, the market typology addressed in this research was based on Schneider's (2016) theory. This approach, contextualized in family farming, demonstrates the different forms of interaction between farmers and the market, namely, markets that escape capitalist logic.

Regarding the identification of the types of markets with which farmers interact, this study shows that beekeepers prioritize public and institutional markets, as these were the most frequently cited by the research subjects and represent a strengthening link in the structure of the honey production chain in the State of Rio Grande do Norte. The research emphasizes the relevance of public policies in the development of the activity in the region. Additionally, the research subjects indicate interaction with conventional markets, where production flows primarily through middlemen and/or supermarkets. It is worth mentioning that some beekeepers also engage with so-called territorial markets, such as traditional family farming fairs and marketing centers, where they offer their products in smaller quantities.

Although competitiveness is not the primary focus for beekeepers in the honey production chain in Rio Grande do Norte, it cannot be stated that beekeepers entirely reject values that prioritize sociocultural dimensions other than profit and productivity as driving factors of action. The reports indicate that some beekeepers lean toward individualistic attitudes and the preponderance of market values that address their most immediate needs. On the other hand, this may simply characterize the concept of a substantive economy, where process results in a continuous supply of material means to meet human needs.

This study, however, provides insight into the evolution of the behavior and subjective values of family producers in relation to market dynamics that shape the beekeeping activity in the State of Rio Grande do Norte. It reinforces the idea that in relationships imbued with subjectivity, there exists a barrier to capitalist absolutism.

Regarding the contributions of this study, several findings were relevant.

From the perspective of public policies, the research highlighted the need to rethink how lower-income farmers can access public notices and emphasized the necessity for more active intermediation by local bureaucrats.

In relation to beekeepers, it was evident that the management logic is driven by survival needs. These individuals act according to daily contingencies, not viewing the activity as a business to be managed, nor do they express an intention to do so.

About theoretical contributions, the study reveals that the understanding of markets is still closely linked to the conventional business model. There is a need to deepen studies that reflect management practices beyond a market-centric conception.

Regarding the limitations of the research, while the number of subjects does not compromise the findings, it may be limiting a factor. Nonetheless, the research offers a starting point for further exploration and the development of quantitative tools for the next phase of the process.

In future studies, it would be interesting to further investigate local markets, the relationship between commercialization and institutional markets, the reasons why beekeepers do not invest in organic honey production, and the role of local bureaucrats in helping to minimize the difficulties of accessing institutional markets.

Authors' contributions

ABCS: Data collection, Data analysis and interpretation, Study conception/design. ESS: Study conception/design, Manuscript writing, Critical revision, Data analysis and interpretation. FCN: Study conception/design, Data analysis and interpretation. VSF: Study conception/design,

Manuscript writing, Critical revision, Data analysis and interpretation. ESM: Study conception/ design, Data analysis and interpretation.

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The research data is available upon request, via email: eulit_@hotmail.com

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