

Journal of Rural and Community Development

Challenges And Opportunities For Market Access by Family Fish Farmers, Tocantins, Brazil

Authors: Simone Dias Farias, Diego Neves de Sousa, Palloma Rosa Ferreira, & Sergio Schneider

Citation:

Farias, S. D., de Sousa, D. N., Ferreira, P. R., & Schneider, S. (2026). Challenges and opportunities for market access by family fish farmers, Tocantins, Brazil. *The Journal of Rural and Community Development*, 21(3), 153–175.

Publisher:

Rural Development Institute, Brandon University.

Editor:

Dr. Doug Ramsey

Open Access Policy:

This journal provides open access to all of its content on the principle that making research freely available to the public supports a greater global exchange of knowledge. Such access is associated with increased readership and increased citation of an author's work.



Challenges And Opportunities For Market Access By Family Fish Farmers, Tocantins, Brazil

Simone Dias Farias

Federal University of Tocantins
Tocantins, Brazil
simonedfarias1@gmail.com

Diego Neves de Sousa

Embrapa Fisheries and Aquaculture
Brasilia, Brazil
diego.sousa@embrapa.br

Palloma Rosa Ferreira

Federal University of Tocantins
Tocantins, Brazil
palloma.rosa.ferreira@gmail.com

Sergio Schneider

Federal University of Rio Grande do Sul
Porto Alegre, Brazil
00009418@ufrgs.br

Abstract

Marketing is one of the main challenges faced by family farmers in the process of productive inclusion. In the case of family fish farming, despite the growth in fish production and consumption in the state of Tocantins, fish farmers still face barriers to accessing formal markets. As a result, associative organizations emerge as a viable alternative for the productive inclusion of fish farmers, facilitating their structuring and consolidation within the market. In this context, the objective of this article was to analyze the challenges and opportunities of market access for family fish farmers in Tocantins, Brazil. The study covered three fish farmer associations in the Palmas region and included 26 face-to-face interviews. The adopted methodology ensured precision in data collection and analysis, as well as in identifying the difficulties faced by family fish farmers in fish commercialization. The results indicate that family fish farmers' associations in the Palmas region are essential for organizing fish production and commercialization, facilitating access to markets, technical assistance, and public policies. However, it is observed that, so far, these actions remain predominantly individual rather than collective. Despite the potential of associations, challenges such as certification, poor infrastructure, and bureaucratic constraints limit the growth of family fish farming. To achieve this growth, it is necessary to develop financing strategies, simplify processes, and strengthen governance in order to enhance sector competitiveness, considering the specific characteristics of the fish supply chain, particularly its high perishability.

Keywords: family fish farming, associations, markets, regional development, policies

Défis et opportunités d'accès aux marchés pour les pisciculteurs familiaux, Tocantins, Brésil

Simone Dias Farias

Federal University of Tocantins
Tocantins, Brazil
simonedfarias1@gmail.com

Diego Neves de Sousa

Embrapa Fisheries and Aquaculture
Brasilia, Brazil
diegocoop@hotmail.com

Palloma Rosa Ferreira

Federal University of Tocantins
Tocantins, Brazil
palloma.rosa.ferreira@gmail.com

Sergio Schneider

Federal University of Rio Grande do Sul
Porto Alegre, Brazil
00009418@ufrgs.br

Résumé

La commercialisation constitue l'un des principaux défis auxquels sont confrontés les agriculteurs familiaux dans le processus d'inclusion productive. Dans le cas de la pisciculture familiale, malgré la croissance de la production et de la consommation de poisson dans l'État du Tocantins, les pisciculteurs rencontrent encore des obstacles d'accès aux marchés formels. Dans ce contexte, les organisations associatives apparaissent comme une alternative viable pour l'inclusion productive des pisciculteurs, facilitant leur structuration et leur consolidation sur le marché. Dans cette perspective, l'objectif de cet article était d'analyser les défis et les opportunités d'accès aux marchés pour les pisciculteurs familiaux au Tocantins, au Brésil. L'étude a porté sur trois associations de pisciculteurs dans la région de Palmas et a inclus 26 entretiens en face à face. La méthodologie adoptée a permis d'assurer la précision de la collecte et de l'analyse des données, ainsi que l'identification des difficultés rencontrées par les pisciculteurs familiaux dans le processus de commercialisation du poisson. Les résultats indiquent que les associations de pisciculteurs familiaux dans la région de Palmas sont essentielles à l'organisation de la production et de la commercialisation du poisson, facilitant l'accès aux marchés, à l'assistance technique et aux politiques publiques. Toutefois, il est observé que, jusqu'à présent, ces actions demeurent principalement individuelles plutôt que collectives. Malgré le potentiel des associations, des défis tels que la certification, les infrastructures insuffisantes et les contraintes bureaucratiques limitent la croissance de la pisciculture familiale. Pour favoriser cette croissance, il est nécessaire de développer des stratégies de financement, de simplifier les procédures et de renforcer la gouvernance afin d'accroître la compétitivité du secteur, en tenant compte des spécificités de la chaîne de valeur du poisson, notamment sa forte périssabilité.

Mots-clés: pisciculture familiale, associations, marchés, développement régional, politiques publiques

1.0 Introduction

Market access for family fish farmers is a critical aspect for economic viability and the strengthening of fish producer associations. These farmers face various challenges in placing their products in marketing channels, whether local or regional. Among the main obstacles are the lack of technical assistance, delays in the legalization of projects that could directly benefit the sector, difficulties in balancing supply and demand in commercialization, logistical challenges within municipalities, and limited access to rural credit, as noted by Lima (2020).

In the state of Tocantins, freshwater fish production, especially through cage systems installed in public waters of hydroelectric plants, has become an important practice for family aquaculture and represents an opportunity to expand production in the state. These cages, built with mesh structures and fed with feed, allow fish confinement, providing a controlled environment that promotes growth and productivity. This model takes advantage of the water infrastructure and strategic location of the plants, such as in Lake Palmas, to boost fish farming activities and generate income.

However, dependence on factors such as water levels and climatic conditions requires constant monitoring, posing challenges for small producers (Schulter & Vieira Filho, 2017). Public policies, such as the Tocantins Aquaculture Development Plan, are essential to support fish farmers by promoting sustainable practices and facilitating market access (Costa & Sousa, 2025).

Additionally, market-related issues such as low product valuation, difficulties in commercialization, and high production costs represent significant barriers that limit investment and the expansion of the fish production chain (Schreiber et al., 2021; Meante & Dória, 2018; Vidal, 2016). Conversely, the growing demand for foods with high nutritional value has created favorable opportunities for fish commercialization, making aquaculture an important source of income diversification for family farmers. Beyond improving household livelihoods, fish production contributes to local economic dynamism through employment generation, circulation of resources within rural territories, and the strengthening of regional development processes (Debus et al., 2016). Moreover, fish is widely recognized as an important source of high-quality protein, essential fatty acids, vitamins, and minerals, factors that have stimulated consumer demand for fish products (Martins et al., 2021).

These trends create opportunities for family fish farmers to access both conventional and differentiated markets, potentially increasing product value and economic returns. However, realizing these opportunities requires overcoming persistent production, organizational, and market constraints, while strengthening collective arrangements capable of improving bargaining power, reducing transaction costs, and facilitating market access (Costa & Sousa, 2025; Sousa et al., 2026).

The case of family aquaculture in Tocantins is particularly relevant to debates on markets, rural development, and community organization. The state has experienced significant growth in aquaculture production in recent years, while a large share of producers remains linked to family-based farming systems characterized by limited scale, restricted access to commercial channels, and strong dependence on collective forms of organization (Costa & Sousa, 2025). In this context, producer associations play a strategic role in coordinating commercialization processes, accessing institutional and differentiated markets, and strengthening social capital within rural communities. Thus, Tocantins provides an important empirical setting for understanding how collective action

can mediate the relationship between small-scale producers and markets, influencing both economic inclusion and territorial development outcomes.

Therefore, analyzing the conditions that shape market access is essential for understanding the factors that constrain or enable the integration of family fish farmers into value-generating markets. Such an analysis contributes not only to improving the economic and social sustainability of producer associations in the Palmas region but also to advancing broader discussions on rural development strategies based on collective organization and market inclusion.

Against this background, this study seeks to provide a comprehensive understanding of the factors influencing the market insertion of family fish farmers in Tocantins, with the aim of supporting strategies that address existing barriers and enhance opportunities for growth, value addition, and sustainable development. Accordingly, the objective of this study was to analyze the challenges and opportunities related to market access faced by family fish farmers in the state of Tocantins, Brazil.

2.0 Structure and Functioning of Markets

The process of commodification, driven by the weakening of distinctions between urban and rural spaces, has increased market competitiveness (Polanyi, 2000). This phenomenon has resulted in unfair competition, with reduced prices paid to producers and higher prices for consumers, especially due to the intervention of intermediaries in the distribution chain, causing losses for both rural producers and end consumers (Matzembacher & Meira, 2020).

However, markets are not formed solely by economic mechanisms, but by social relations established among various participants. These relations, based on trust, power, mutual dependence, and social ties, influence individuals' economic behavior, as they act to maintain their social position and meet cultural expectations, in addition to pursuing their own interests (Fligstein & Dauter, 2012). Thus, material goods are valued not only for their utility but also for their potential to satisfy social and cultural purposes, demonstrating that non-economic motivations also guide the economic system (Polanyi, 2000).

In the same perspective, Appadurai (2013) argues that when spending on commodities is organized around traditionally accepted market forms, it begins to reflect collectively shared values. Consumption is therefore not guided by the notion of scarcity or limited goods, but by the interest in enjoying the range of offerings available in the market. He explains that group identity, the pursuit of homogeneity and certain economic equality, combined with a logic of shared pleasure, form a value system in which many goods originating outside the group are seen as irrelevant or even threatening to social cohesion. Nonetheless, the collective regulation of demand is a deliberate strategy by wealthier groups to prevent social differentiation from generating tensions and internal divisions (Appadurai, 2013).

Another relevant point is the fundamental role of government policies in structuring and operating markets. Governments can promote, suppress, or even create markets, and this process involves multiple social actors, such as public managers, political leaders, farmers, and consumers, who shape market dynamics (Schubert & Schneider, 2016). In the context of modern capitalism, markets depend not only on legislation and government interventions but also on broader cultural and social understandings (Fligstein & Calder, 2015).

This current scenario suggests that the market has become the center of social relations, subordinating society to its demands rather than the other way around.

Commodification of the sector has forced family farmers to adapt to market demands, adjusting their production practices, diversifying their products, and developing new productive and social strategies. In this sense, the adaptability of these farmers is directly related to the importance of the family group and social institutions in organizing economic relations and formulating strategies that strengthen this category in rural areas (Deggerone & Schneider, 2021).

Fligstein and Calder (2015) define markets as social constructions, formed by interactions between buyers and sellers, which follow formal rules and informal understandings. These rules, based on principles of supply, demand, and free competition, provide stability to trade and define products and exchanges. Modern society is predominantly a market society, and social relations and interactions are organized and mediated by the logic of exchange and market rationality (Cassol et al., 2024).

The modern food system has been structured based on a division between strategies that treat food as commodities governed by market logic and policies that subordinate food markets to national food security objectives and cultural values associated with production methods and consumption habits (Wilkinson, 2015). However, price-forming markets are diverse and mutable, not unique or homogeneous. While some reinforce social ties, others weaken them, favoring certain social categories over others. To understand their dynamics, it is essential to consider their forms of institutionalization, the role of social agents, and the strategies they use to achieve varying levels of legitimacy (Garcia-Parpet, 2021).

2.1 Market Typologies

Markets are spaces composed of a diversity of individuals or groups engaged in the regular commercialization of products or services, while other individuals or groups are motivated to acquire the offered goods (Garcia-Parpet, 2021). These markets can be understood as socially constructed arenas, organized through formal and informal rules that regulate exchange relations between buyers and sellers (Fligstein & Dauter, 2012).

Belik and Fornazier (2016) emphasize that commodity exchange is a complex process requiring a comprehensive approach, especially when considering the challenges faced by different types of producers. Family farmers, for example, generally deal with obstacles such as irregular production, lack of adequate equipment and packaging, and delayed implementation of public policies that could benefit them. In contrast, more capitalized and professionalized producers have greater capacity to engage with other markets and advance more rapidly, deepening the differentiation among farming families.

Van der Ploeg (2011) distinguishes two main types of markets: globalized and liberalized commodity markets, which generate market failures such as inequality and environmental degradation, and emerging markets, which are characterized by an emphasis on differentiated products with superior quality, known origin, and new relationships between producers and consumers. These emerging markets also involve new infrastructures and social arrangements, being governed differently from traditional commodity markets.

Market globalization has weakened local food production, distancing producers from consumers by extending distribution chains, which has exacerbated food insecurity (Rover & Darolt, 2021). Biodiversity loss and climate change are also factors that may threaten long-term food and nutritional security (Flexor et al., 2023).

In this scenario, markets play a crucial role not only in economic processes but also in the formation of values, culture, and institutions, generating conflicts and disputes. By mediating social interactions, markets shape economic life and sociability, influencing attitudes, values, and individual behaviors (Gazolla & Rufino, 2021). This contemporary perspective considers that both markets and institutions are social constructions, an understanding widely accepted among economists and sociologists (Cassol & Schneider, 2021).

Based on this approach, Schneider (2016) proposed a market typology focused on family farming (see Table 1), offering a practical and intuitive categorization that aligns with the social sciences literature on rural contexts. This typology provides a broader and more diverse view of the markets with which family farmers interact, organizing them into four types:

1. *Proximity Markets*: These are characterized by predominant interpersonal relationships, mobilized through kinship, familiarity, and reciprocity. In this type of market, the value and quality of exchanged goods take precedence over profit, operating mainly through direct exchanges with minimal physical displacement. Management is marked by autonomy and self-management practices, with exchanges occurring in rural villages or small municipalities. These exchanges are embedded in social relations, functioning as mechanisms of control and regulation. Examples include solidarity economy initiatives and direct sales conducted “door-to-door” or “face-to-face.”
2. *Local and Territorial Markets*: These represent the transition to an economy guided by supply and demand, with monetized exchanges and quantitative criteria. While retaining the values of proximity markets, agents in these markets produce to achieve financial gains, forming a simple market economy. The presence of intermediaries is notable, and control mechanisms, such as certifications and differentiated pricing, are common. These markets are distinguished by the territorial and symbolic identity of products, where reciprocity and familiarity coexist with devices such as prices and competition. Examples include local fairs and auctions, which combine competition with social values like trust and reputation.
3. *Conventional Markets*: These markets are driven by the law of supply and demand, dominated by large private agents operating at multiple levels to maximize profit opportunities. Unlike local and territorial markets, conventional markets do not require specific physical locations, being considered “placeless.” However, they maintain strong connections with distribution and circulation regions, reaching national and global spheres. These markets are characterized by high risk and uncertainty, with intermediation mechanisms based on complex contracts, representation agreements, and regulation of property rights. Farmers participating in these commodity markets heavily depend on these contracts and face challenges in control and regulation.
4. *Institutional Markets*: They are characterized by increasing involvement in supporting family farming and its collective organizations. These markets are driven by public demand, with a prominent role for governmental and non-governmental agents promoting practices such as fair trade. Highly regulated, they operate through laws, bidding rules, and public procurement, classified by Polanyi (2000) as redistribution markets associated with the political organization of societies. These markets offer higher prices and payment guarantees, making them attractive to family farmers. Examples include programs such as school feeding programs and

food acquisition programs intended to supply basic food baskets or public equipment for nonprofit organizations.

This typology proposed by Schneider (2016) provides a useful tool to understand the diversity of ways in which family farmers interact with markets, while also revealing the complexity and particularities of these relationships in the context of family farming.

3.0 Methodology

The study was conducted through research of an exploratory nature, with both qualitative and quantitative approaches. Data collection was carried out via field research between November 2023 and February 2024, with the participation of 26 members from three family fish farmer associations located in the Palmas-TO region.

The data were collected through semi-structured interviews, guided by a previously developed interview protocol and administered using an electronic questionnaire. However, unlike fully structured interviews, there was room for additional questions to be formulated as needed, exploring emerging aspects during interactions with the interviewees.

The data were collected and processed with the support of the ODK Collect application, which enabled cross-referencing of the information obtained, as well as the organization, tabulation, and mapping of results. This organizational tool facilitated data analysis, ensuring accuracy in identifying marketing patterns and the difficulties faced by the family fish farmer associations.

The interviews were conducted with 26 family fish farmers who agreed to participate in the study (see Figure 1). Of this group, 10 are members of the Association de Brejinho de Nazaré, 8 belong to the Association Bom Peixe, and 8 to the Peixe do Segredo Association.

Figure 1. Research data collection: conducting interviews.



Source: Authors (2024).

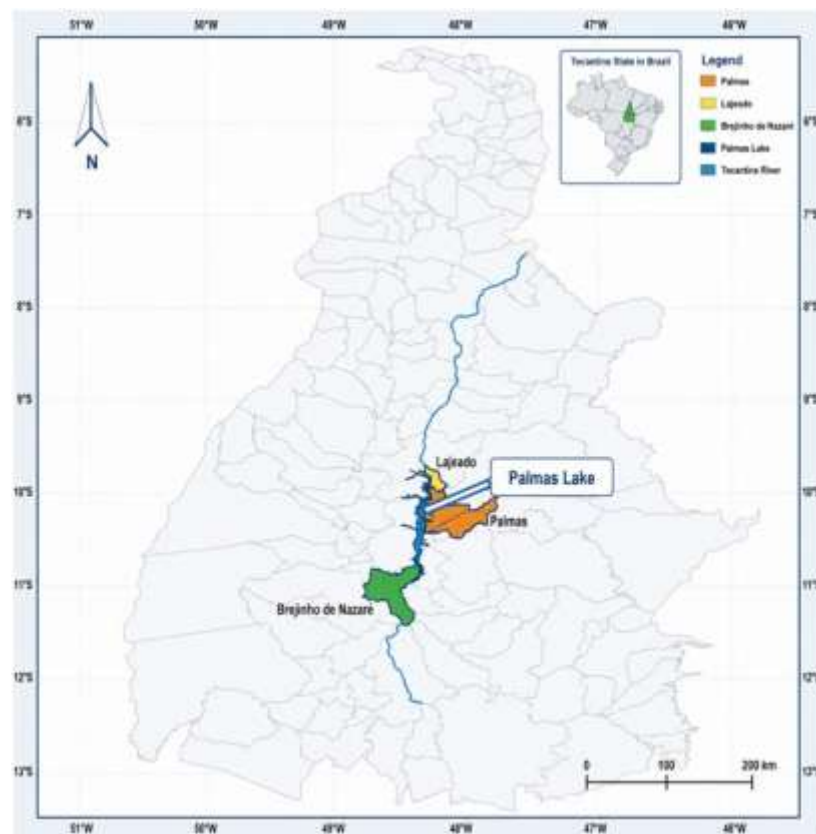
Table 1. *Typology Model of Family Farming Markets*

Market typology	Type of family farmer	Locus and/or spatial scope	Nature of exchanges/ business model	Form of regulation	Marketing channels
Proximity markets	Peasant farmer; surplus producer	Spot; direct sale; strictly local	Interpersonal + solidarity-based	Trust + friendship	On-farm (pick-your-own harvesting); At home; Roadside sales; Direct delivery; Local fairs; Consumer groups
Local and territorial markets	Family farmer; simple commodity producer	Spot; local, regional and territorial	Diversified + complementary	Reputation / trust + origin + prices	Regional and national fairs; Sales networks; Events; Specialty stores; Restaurants; Sales associations; Produce markets
Conventional markets	Commodity producer	Non-territorial; placeless/unbound	Competitive	Contracts + prices	Intermediaries; Cooperatives; Agroindustry; Private companies; Internet; Supermarkets
Public and institutional markets	All types of suppliers	Multi-spatial	Public procurement/ bidding processes	Public contracts + laws	School feeding programs; Fair trade; International organizations (FAO; WFP); Non- Governmental Organization (NGOs); Hospitals, universities, armed forces; Social assistance entities; Government food stocks

Source: Adapted from Schneider (2016).

The research area encompassed family fish farmer associations located in three municipalities along the shores of Lake Palmas (see Figure 2), formed by the construction of the Luís Eduardo Magalhães Hydroelectric Plant on the Tocantins River. In 2013, this region was included in the implementation of Aquaculture Parks (AP) in Lake Palmas by the Ministry of Fisheries and Aquaculture (MPA). Among the parks included are PA Sucupira, in the municipality of Palmas; PA Miracema/Lajeado, in Lajeado; and PA Brejinho II, in Brejinho de Nazaré. These parks provide strategic infrastructure for family fish farming in cage systems, offering a solid foundation for the development of the activity in Tocantins.

Figure 2. Location of the Associations Across Municipalities in Tocantins State.



Source: Instituto Brasileiro de Geografia e Estatística (IBGE) (2026).

Thus, within the Lake Palmas AP, the three associations studied were:

1. Association of Fish Producers of the Sucupira Aquaculture Park Bom Peixe, based in the city of Palmas – TO, founded in 2015, operates in the commercialization of fresh fish, and has 12 members. According to IBGE data (2022), Palmas, the capital of Tocantins, has a population of 302,692 inhabitants.
2. Brejinho de Nazaré Aquaculture Association – TO, located along the Boa Sorte Settlement, on the left bank of the Tocantins River, in the city of Brejinho de Nazaré. Established in 2018, its main focus is on supporting freshwater aquaculture activities, and it has 14 members. Brejinho de Nazaré, located 107 kilometers from Palmas, had a population of 4,725 inhabitants in 2022 (IBGE, 2022).

3. Peixe do Segredo Association, recently established in 2022 following the split from Association Bom Peixe. Located in the city of Lajeado, this association has nine members and is 65 km from the capital, with a population of 3,357 inhabitants in 2022, according to IBGE (2022).

Table 2 presents an overview of the three associations included in the study.

Table 2. *Survey Population and Interview Data*

Association	Location	Total Number of Members	Year Founded	Number of Members Interviewed	Interview Date
Bom Peixe	Palmas	12	2015	8	Nov. 2023
Brejinho de Nazaré	Brejinho de Nazaré	14	2018	10	Jan. 2024
Peixe do Segredo	Lajeado	9	2022	8	Feb. 2024

Source: Research data, authors (2024).

Note: The data were systematized and analyzed as percentages, based on the total number of fish farmers interviewed within each of the studied associations.

4.0 Results and Discussion

4.1 Types of Markets Accessed by Family Fish Farming in Palmas and Surrounding Region

The analysis of markets through the lens of the typology proposed by Schneider (2016) makes it possible to identify and understand the different markets accessed by family fish farmers, highlighting the heterogeneity of the strategies adopted by the associations. The findings reveal distinct patterns of market integration, ranging from participation in short marketing circuits to a greater dependence on intermediaries, as shown in Table 3.

In the Bom Peixe Association, there is a strong presence in proximity markets, which account for 62% of the sales reported by interviewed fish farmers. This performance is mainly supported by municipal fairs in Palmas, which constitute the primary marketing channel for fish. The conventional market represents 25% of sales, based on transactions with intermediaries, while the territorial market accounts for 13%, accessed through specialized retail stores. The institutional market, in turn, is not accessed by any of the interviewed producers.

In the Peixe do Segredo Association, the proximity market also predominates (62%) among interviewed fish farmers, particularly through door-to-door sales and transactions carried out at the production site or association headquarters, which are the main channels used. This market is further strengthened by the use of digital tools, especially WhatsApp, which facilitates communication and customer retention. The territorial market accounts for 38% of sales, mainly directed to local restaurants, whereas both the conventional and institutional markets are not accessed.

In contrast, in the Brejinho de Nazaré Association, the conventional market is predominant, representing 70% of the interviewed producers' sales, mainly conducted through a local fish processing plant. Although this arrangement reduces producers' autonomy and generates dependence on a single buyer, it is sustained by trust-based relationships and informal contracts that provide stability for product flow. The territorial market accounts for 30% of sales, directed to specialized stores, while proximity and institutional markets are not used.

Table 3. Types of Markets Accessed

Market types	Main channels	Bom Peixe Association	Peixe do Segredo Association	Brejinho de Nazaré Association
Proximity market	Municipal fairs, door-to-door sales, and direct sales at the property/association headquarters, supported by WhatsApp	62%	62%	0%
Territorial market	Supply to local restaurants, fish shops, and regional specialty stores	13%	38%	30%
Conventional market	Sales via intermediaries (middlemen) and direct sales to a local processing plant	25%	0%	70%
Institutional market	Government purchases (PAA and PNAE programs)	0%	0%	0%
Total		100%	100%	100%

Source: Authors (2024).

The results also show the complete absence of participation in institutional markets across all analyzed associations. This scenario reveals a structural limitation in accessing public procurement policies such as the Food Acquisition Program (PAA) and the National School Feeding Program (PNAE), indicating the need for simplified bureaucratic procedures and strengthened institutional support to expand fish farmers' participation in public procurement and, consequently, improve their marketing conditions and income.

Furthermore, it was observed that in the Bom Peixe and Peixe do Segredo associations, individual marketing strategies predominate, based on direct relationships with consumers, although the associations play an important role as collective governance structures or as entities primarily focused on mediating access to information, public policies, joint purchasing, and market opportunities. In contrast, in the Brejinho de Nazaré Association, despite a similar organizational structure, collective actions are more prominent, since most fish farmers market their production through a common channel intermediated by the association.

4.2 Public Policies on Credit Access and the Difficulties in Benefiting from These Initiatives

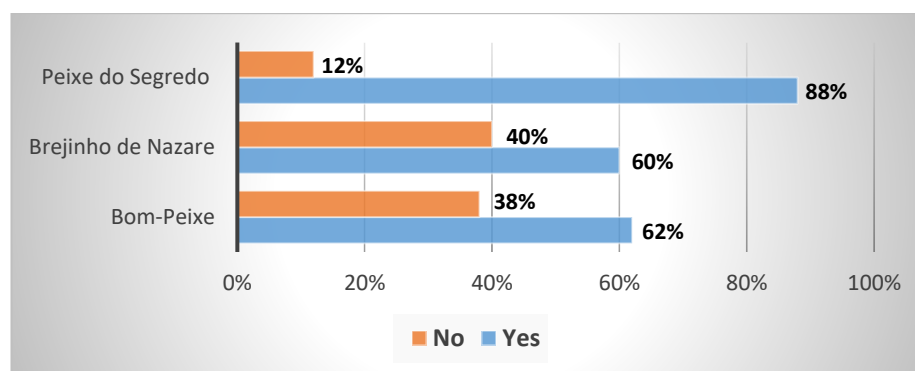
Public policies aimed at family farming establish a specific agenda for the sector, stemming from a political project that requires coordinated action from social actors, involved organizations, and society as a whole (Schneider & Escher, 2011). In this context, the Programa Nacional de Fortalecimento da Agricultura Familiar (Pronaf), created in 1996, is an important milestone in Brazilian public policies, offering an accessible line of credit to farmers previously excluded from traditional agricultural financing (Grisa, 2018).

To access Pronaf, family farmers must present the National Family Farming Registry (CAF), which is an essential document for accessing support programs and public policies directed at the sector. With the CAF, farmers can seek guidance from professionals or Technical Assistance and Rural Extension (ATER) entities for the preparation of budgets, plans, or technical projects. After this step, the necessary documents must be submitted to the financial institution with which the farmer has a relationship (Ministério da Agricultura, Pecuária e Abastecimento, 2020).

According to data obtained during the research, the Peixe do Segredo Association presents the highest proportion of fish farmers holding the CAF, reaching 88% of its interviewed members. In the Bom Peixe Association, this proportion corresponds to 62% of the surveyed producers, while in the Brejinho de Nazaré Association it reaches 60% of the interviewed fish farmers. The CAF is a key instrument for enabling access to institutional markets. As shown in Figure 3, a significant share of fish farmers remains excluded from this market due to the absence of this document, which limits their participation in programs and policies aimed at the development of family farming. As noted by Souza-Esquerdo and Bergamasco (2014), the lack of documentation among farmers is one of the factors that undermines the effectiveness of government programs, restricting opportunities for expansion and access to broader markets.

In the state of Tocantins, 47.7% of fish farmers hold the CAF, revealing a significant gap in access to public policy benefits directed at family farming (Ruraltins, 2020). Consequently, more than half of fish farmers in the state still lack this essential document required to access credit and incentive programs. This scenario contrasts with the higher CAF coverage observed among farmers affiliated with associations.

Figure: Fish farmers who possess the National Family Farming Registry (CAF).



Source: Research data, authors (2024).

In the analysis of financing, loans, and price guarantees, it was found that the interviewed fish farmers had varied experiences in accessing credit. In the Association Brejinho de Nazaré, none of the respondents were able to obtain loans, which may indicate challenges related to a lack of credit or bureaucratic difficulties in the region. In contrast, the Association Bom-Peixe stood out as the most successful group in this regard, with 83% of its members obtaining loans, possibly due to greater internal organization or easier access to credit compared to the other associations. This scenario reinforces the importance of facilitated credit conditions for sector development. In the Peixe do Segredo Association, 25% of the fish farmers obtained loans, showing that part of the membership was able to overcome bureaucratic barriers.

This situation contrasts with data from the Fish Farming Census (Ruralins, 2020), which indicate that in Tocantins, 76% of fish farmers reported never having carried out financing projects for their productive activities, suggesting that most do not use the available financing mechanisms, limiting the development of fish farming and hindering investments in infrastructure, technology, and production expansion.

It is important to highlight that although Pronaf is targeted at family farming, which includes fish farmers, it has consolidated as a public policy focused on productivity, benefiting mainly professionalized family farmers with greater financial capacity. Pronaf financing is frequently directed to crops in agro-industrial chains, controlled by a few companies and dependent on modern inputs (Grisa, 2010). Thus, despite differentiated credit conditions, Pronaf resembles the traditional rural credit model. It is evident that family fish farmers from the three associations studied benefit only partially from this policy, as they lack material guarantees, which makes accessing Pronaf difficult and increases inequalities in rural areas.

A relevant advancement in this context in the state of Tocantins is the sanction of Complementary Law No. 144, of June 14, 2023, which amended Complementary Law No. 13, of July 18, 1997. This legislation exempts fish farmers with areas of up to 5 hectares of water surface in excavated and/or above-ground ponds, rainwater accumulation dams up to 50 hectares, and cage systems with a capacity of up to 10,000 cubic meters of water from environmental licensing and water use authorization (Tocantins, 2023). Additionally, the law exempts registration fees and water use rights, although it requires registration with the Instituto Natureza do Tocantins (Naturatins). This measure can help improve access indicators to public policies aimed at the fish farming sector, facilitating access to financing and commercialization in the institutional market.

Bureaucratic difficulties faced by family fish farmers and their collective organizations remain one of the main obstacles to accessing credit policies, as reported by the producers themselves. This issue was identified in all the associations studied, corroborating data from Sepea (2024). The study indicated that 87% of producers in the aquaculture parks Brejinho de Nazaré 2, Lajeado Miracema, and Sucupira, located in the same research region, did not have access to credit lines, while only 13% managed to access them at some point since starting the activity, reflecting a situation of inequalities similar to that identified in this study.

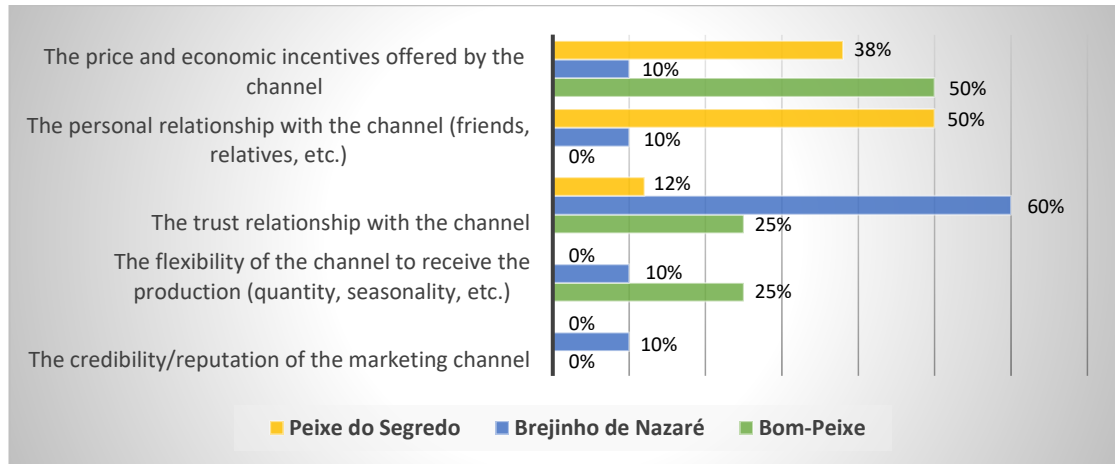
The results indicate that family fish farmers' access to public credit policies remains limited and uneven, being strongly influenced by CAF ownership, the organizational structure of associations, and bureaucratic barriers. Although PRONAF represents an important policy instrument supporting family farming, its effectiveness is constrained by documentary requirements and the difficulties producers face in meeting them. Consequently, a significant share of fish farmers remains excluded from financing mechanisms, which hinders the expansion and modernization of production and reinforces existing rural inequalities. This pattern also highlights a tension between the formal role assigned to associations and the predominantly individual nature of the strategies adopted by fish farmers in practice.

4.3 Motivations for Sales in the Predominant Marketing Channels

The choice of marketing channels by fish farmers reflects a range of strategic factors that vary among the three associations, highlighting significant

differences in how each group prioritizes market aspects, as shown in Figure 4. These differences can be attributed to factors such as the internal organization of the associations, proximity to markets, and access conditions to distribution networks. The analysis of marketing channels reveals how fish farmers adapt their strategies to meet the specific demands of each market segment, seeking to maximize the efficiency of their operations.

Figure 4: Motivations for market channel selection among fish farmers.



Source: Research data, authors (2024).

The criteria analyzed for fish farmers' choice of marketing channels include credibility, flexibility, trust, personal relationships, and economic incentives. Regarding channel credibility or reputation, only the Brejinho de Nazaré Association shows some concern with this factor, with 10% of interviewed fish farmers indicating its importance. The absence of this criterion among fish farmers from Bom Peixe and Peixe do Segredo suggests that, in these cases, confidence in marketing channels is not grounded in reputational aspects but rather in more practical or relational dimensions.

Channel flexibility in receiving production is more highly valued by fish farmers in the Bom Peixe Association, with 25% of respondents identifying this characteristic as essential. This indicates a strong emphasis on ensuring a continuous and adaptable product flow, which is crucial for financial sustainability. In contrast, the Peixe do Segredo Association does not report concern with this factor, possibly due to alternative mechanisms that ensure product distribution.

The trust criterion in the marketing channel emerges as the most relevant across the associations, particularly in the Brejinho de Nazaré Association, where 60% of interviewed fish farmers highlight its importance. This data reflects the prominence of security and stability in transactions, which may be related to long-term engagement or positive past experiences with the marketing channels. As Giddens (2013) states regarding late modernity, increasingly complex social relations require rapid adaptation, and trust is a fundamental mechanism for generating security in volatile contexts. In Brejinho de Nazaré, where the conventional market predominates, fish farmers rely on the regularity of payments due to an almost exclusive relationship with a single processing plant. This exclusivity provides predictability and stability, crucial factors for the economic sustainability of this commercial dynamic.

Personal relationships with the marketing channel emerge as an important factor among fish farmers in Peixe do Segredo, with 50% valuing these direct

connections. This suggests that strong social ties play a significant role in facilitating sales, easing negotiations, or ensuring favorable agreements. According to Sabourin (2015), direct contact between producers and consumers fosters the establishment of human relationships, contributing to the building of social bonds and stimulating feelings of closeness, friendship, and mutual recognition. These aspects reveal the interdependence between the economic and social dimensions, where solidarity and cooperation are essential for organizing these communities.

Finally, price and economic incentives offered by the channel are decisive factors for 50% of Bom Peixe farmers and 38% of Peixe do Segredo farmers. These data indicate a more pragmatic orientation focused on maximizing financial return. In contrast, Brejinho de Nazaré places less priority on the economic aspect, with only 10% of fish farmers indicating its relevance, possibly due to economic stability already ensured by the exclusivity with the processing plant.

These variations in the criteria for choosing marketing channels reflect the market conditions and strategies of each group. While Brejinho de Nazaré primarily values trust-based relationships, Bom Peixe balances flexibility and economic incentives, and Peixe do Segredo relies on personal relationships and financial benefits. Such differences reveal how fish farmers shape their strategies according to the internal and external dynamics of each association. While some groups prioritize relational aspects, such as trust and personal ties, others emphasize more pragmatic factors, including price and flexibility in product distribution. These differences indicate that marketing decisions are not homogeneous, as they are shaped by local experiences, collective organization, and market conditions. This pattern also reinforces the tension between the formal role attributed to associations and the predominantly individual practices adopted by fish farmers.

4.4 Price Determination in the Main Marketing Channel

The analysis of price determination by fish farmers reveals differences among the associations, highlighting the role of autonomy and local conditions in marketing decisions.

In Peixe do Segredo, 75% of fish farmers set the selling price of their products, reflecting a high degree of pricing autonomy, especially considering that 62% of respondents sell through the proximity market. This market allows greater control over prices and facilitates the elimination of intermediaries, reducing logistics and transportation costs. Autonomy and control over pricing are factors that, according to Câmara et al. (2020), increase producer profitability, as the proximity market offers more flexibility and a direct relationship with consumers without intermediary pressure.

Schneider's (2016) approach to the typology of family farming markets is also relevant to understanding this context, as it describes the dynamics of territorial and proximity markets as more autonomous, in contrast to conventional markets, which involve greater dependence and integration with larger markets. The predominance of local markets in Peixe do Segredo aligns with this logic of autonomy and independence in price setting.

In Bom Peixe, only 12% of fish farmers set prices themselves, indicating greater dependence on external factors, such as buyers or larger markets. In Brejinho de Nazaré, no fish farmers reported being responsible for setting prices, reinforcing the idea that pricing is determined by external factors and buyers.

Additionally, in Association Bom Peixe, 50% of fish farmers believe that prices are determined by collective agreements, such as fair commissions, demonstrating a form of collaborative pricing. This factor is related to the dynamics of fairs, the main marketing channel for this association. Overall, regarding price determination by buyers, the only percentage reported was in Bom Peixe, with 12% of fish farmers stating that the buyer sets the price.

Direct negotiation with buyers also presents differently: 90% of fish farmers in Brejinho de Nazaré consider negotiation essential for determining prices, which may reflect high competition and buyer pressure. This scenario is typical of conventional markets, where prices are often pushed down by intermediaries, as noted by Veiverberg et al. (2021). This phenomenon is also reflected in the low profitability faced by fish farmers, as prices offered by wholesalers and retailers frequently do not cover production costs, leading many producers to sell at a loss to avoid wasting the perishable fish.

Regarding external references for price determination, 13% of Bom Peixe fish farmers reported using market information, while in Peixe do Segredo and Brejinho de Nazaré, this practice was not mentioned.

Concerning competitive advantages, 63% of Bom Peixe fish farmers consider delivery in large volumes an essential factor to ensure competitiveness. In Brejinho de Nazaré, this percentage is 50%, while another 40% highlight specialized knowledge and the cultural or territorial characteristics of their products as differentiators, emphasizing the value of local practices. In Peixe do Segredo, 50% of fish farmers consider this factor relevant, while 25% mention large-volume delivery as a competitive element. Additionally, other differentiators were cited by 37% in Bom Peixe and 13% in Peixe do Segredo. On the other hand, 10% of fish farmers in Brejinho de Nazaré and 12% in Peixe do Segredo report having no competitive advantages.

These results highlight the diverse forms of market insertion and the different strategies adopted by fish farmers in the three associations, with particular emphasis on pricing autonomy in Peixe do Segredo Association and dependence on intermediaries and buyers in Brejinho de Nazaré. These different configurations reflect distinct forms of market insertion, in which factors such as collective organization, types of marketing channels, and market structure directly influence fish farmers' decision-making power.

4.5 Stages of Processing/Value-Addition/Industrialization

Processing and adding value to fish products are fundamental strategies to increase profitability and market reach, as highlighted by Mora (2005). The research revealed significant differences in the approaches adopted by the associations regarding fish processing and value addition, highlighting both opportunities and challenges in this aspect.

In the Bom Peixe association, 37% of fish farmers sell fish in natura, without any type of processing. This practice reflects the simplicity of operations in some cases but also limits the product's potential for added value. However, the majority (63%) of respondents indicated that the fish undergoes classification, washing, and packaging before sale. These procedures, although basic, represent efforts to add value to the product and better meet consumer expectations.

A relevant aspect identified is that these processes are generally carried out at the time of sale, especially at local fairs, which constitute the main marketing channel for this association. At these fairs, practices such as gutting and cutting the fish are performed on-site, demonstrating care in offering a product more suitable to the

final customer's preferences. This practice, in addition to adding value, can improve the perception of freshness and quality, crucial factors in the fish market.

Although these procedures represent an advance compared to selling fish in natura, the absence of industrialization limits the potential for product diversification and access to larger markets, such as supermarkets or even export markets. Thus, the current practices of Association Bom Peixe can be seen as an intermediate step between raw commercialization and a more structured processing system. Nevertheless, fish farmers show interest in improving the infrastructure on their properties to boost sales.

The analysis of fish processing and marketing in the studied associations revealed significant differences in practices. In the Brejinho de Nazaré association, 50% of the products are sold in natura, while 20% undergo classification, washing, and packaging processes, and 30% are subjected to other unspecified types of processing. These data indicate the presence of differentiated local practices, even if not aligned with traditional processing models, which may reflect initial efforts to diversify and add value to fish products.

In the Peixe do Segredo Association, selling fish in natura is also predominant, encompassing 75% of production, without records of basic steps such as classification, washing, or packaging. Nevertheless, 25% of the fish undergo some type of processing, such as being sold as fillets. This preference for in natura sales aligns with consumer behavior, as studies by Pedroza Filho et al. (2020) show that consumers demonstrate greater interest in fresh fish, consumed regularly, at least once a week.

However, the level of fish processing and value addition remains limited across the three associations, with the commercialization of whole (fresh) fish predominating, alongside occasional basic processing activities. It is also observed that the absence of more consolidated industrial processing infrastructure restricts product diversification and limits access to more demanding markets.

4.6 Main Source Of Income For Fish Farmers And The Relevance Of Fish Farming

The data analysis revealed that the Peixe do Segredo Association shows considerable dependence on fish farming as the main source of income. According to the results obtained, 78% of members indicated that fish sales represent their families' sole income, highlighting the central role of this activity in sustaining the producers. This predominance reinforces the importance of fish farming for income generation and the economic stability of the associated families.

Fish farming is the predominant economic base for producers in this locality. Similarly, in the Bom Peixe Association, 70% of fish farmers stated that fish farming is their primary source of income, indicating that this activity is also central to family sustenance. However, Bom Peixe members show slightly greater diversification of income sources compared to those in the Peixe do Segredo Association. Both associations rely primarily on the proximity market as their main marketing channel, which provides greater autonomy to producers and often adds value to products, allowing better price control and greater interaction with the final consumer (Schneider, 2016).

In contrast, the Brejinho de Nazaré Association presents a more diversified economic profile, with 79% of members reporting other sources of income in addition to fish farming. This lower dependence on fish sales reflects an economic balancing strategy, in which fish farming functions as a secondary

source of income. The main marketing channel in this locality is sales to a regional processing plant, indicating a focus on conventional markets. Similarly, a study conducted in the Northwest region of Rio Grande do Sul, covering 216 municipalities, found that fish farming is not the primary source of income for producers but plays an important role as a complementary activity, contributing to the diversification of rural properties and economic security (Schreiber et al., 2021).

Different degrees of dependence are identified. While the Peixe do Segredo and Bom Peixe associations show a higher centrality of fish farming as a source of livelihood, Brejinho de Nazaré presents a more diversified profile, in which aquaculture plays a complementary role. These findings indicate that the economic importance of the activity is directly related to the type of market accessed and the degree of producer autonomy, reflecting different strategies of socio-economic reproduction in rural areas.

5.0 Conclusions

The collective organization of fish farmers into associations plays a significant role in structuring production and expanding market access, contributing to the reduction of individual marketing barriers and strengthening the family fish farming value chain. However, the results also indicate that, despite this collective arrangement, many marketing strategies remain predominantly individual, revealing a persistent tension between formal associative organization and everyday market practices. This analytical dimension warrants further investigation, as it suggests that associations do not necessarily translate into fully collective economic action.

The heterogeneity of market configurations and of the strategies adopted by each association also highlights the specificities and challenges faced in the context of family fish farming. Across the three associations, most production is marketed in natura, with low levels of value addition. In Bom Peixe, fish filleting is carried out only at the point of sale, whereas in the other associations processing activities are minimal or absent. No sales of processed fish products were identified, largely due to the absence of collective processing infrastructure and sanitary inspection certification, both essential requirements for accessing formal and higher-value markets. This situation is further exacerbated by the high perishability of fish, which requires adequate storage and transportation conditions that are not available in the studied associations.

Fish farming constitutes the main source of income for producers in the Bom Peixe and Peixe do Segredo associations, where proximity and territorial markets are prioritized, based on trust-based relationships with consumers. In contrast, in Brejinho de Nazaré, fish farming plays a complementary role, reflecting greater diversification of income sources and different economic strategies. This divergence highlights distinct patterns of dependence on aquaculture activity and varying degrees of market integration.

Although the associations demonstrate resilience by fostering collaborative environments, the limited effectiveness of public policies and the inadequacy of infrastructure significantly constrain their development potential. Existing policies do not adequately reach fish farmers, which undermines their practical implementation. This scenario underscores the need for more targeted and effective public policies capable of ensuring not only formal access to programs but also their operationalization at the territorial level, including investments in production, processing, and commercialization infrastructure.

Finally, it is important to emphasize that this study is based on 26 interviews with fish farmers from three associations in the state of Tocantins. Thus, while the findings are relevant for understanding local dynamics, the analysis is empirically grounded in the investigated universe, reinforcing its regional scope and the need for further studies to broaden comparative and systemic interpretations.

Acknowledgments

We gratefully acknowledge the financial support provided by the Tocantins State Research Support Foundation (FAPT) and the National Council for Scientific and Technological Development (CNPq).

References

- Appadurai, A. (2013). *The future as a cultural fact: Essays on the global condition*. Verso.
- Belik, W., & Fornazier, A. (2016). Políticas públicas e a construção de novos mercados para a agricultura familiar: analisando o caso da alimentação escolar no município de São Paulo [Public policies and the construction of new markets for family farming: analyzing the case of school meals in the municipality of São Paulo]. *Raízes: Revista de Ciências Sociais e Econômicas*, 36(2), 70–83. <https://doi.org/10.37370/raizes.2016.v36.460>
- Câmara, S. B., Andreatta, T., Azevedo, J., Christofari, L. F., & Casarin, M. A. B. (2020). Análise econômica comparativa de diferentes canais de comercialização utilizados pela agricultura familiar [Comparative economic analysis of different marketing channels used by family farming]. *Revista IDEAS*, 14(1), e020004. https://revistaideas.ufrj.br/ojs/index.php/ideas/pt_BR/article/view/249
- Cassol, A., & Schneider, S. (2022). A imersão social da economia em mercados alimentares brasileiros: Uma abordagem institucionalista [The social embeddedness of the economy in Brazilian food markets: An institutionalist approach]. *Revista de Economia e Sociologia Rural*, 60(2). <https://doi.org/10.1590/1806-9479.2021.233766>
- Cassol, A., Deggerone, Z. A., & Schneider, S. (2024). Sociologia dos mercados alimentares: Revisão e contribuições teóricas e metodológicas recentes [Sociology of food markets: Review and recent theoretical and methodological contributions]. *Redes*, 29(1). <https://doi.org/10.17058/redes.v29i1.19288>
- Costa, A. C., & Sousa, D. N. (2025). A câmara setorial da piscicultura como ferramenta de inclusão produtiva de piscicultores [The fish farming sectoral chamber as a tool for the productive inclusion of fish farmers]. *DRd – Desenvolvimento Regional em Debate*, 15, 20–38. <https://doi.org/10.24302/drd.v15.5145>
- Deggerone, Z. A., & Schneider, S. (2022). Os canais de comercialização utilizados pelos agricultores familiares em Aratiba–RS [Marketing channels used by family farmers in Aratiba, RS]. *Organizações Rurais & Agroindustriais*, 24(1), e1892. <https://www.revista.dae.ufla.br/index.php/ora/article/view/1892>

- Debus, D.; Ribeiro Filho, G. V. & Bertolini, G. R. F. (2016). Analysis of studies conducted on financial management in family-run fish farming. *Custos e @gronegocio on line*, 12, 215–230. <http://www.custoseagronegocioonline.com.br/especialv12/OK%2010%20familiar%20english.pdf>
- Flexor, G. G., Kato, K. Y. M., & Leite, S. P. (2023). Transformações na agricultura brasileira e os desafios para a segurança alimentar e nutricional no século XXI. In G. Noronha, Maluf, R., Castro, L., Noronha, J., Delgado, N. & Gadelha, P. (Eds.), *Alimentação e nutrição no Brasil: Perspectivas na segurança e soberania alimentar* (pp. 111–165). Edições Livres/Fiocruz.
- Fligstein, N., & Calder, R. (2015). Architecture of markets. In R. A. Scott, & S. M. Kosslyn (Eds.), *Emerging trends in the social and behavioral sciences* (pp. 1–14). Wiley. <https://doi.org/10.1002/9781118900772.etrds0014>
- Fligstein, N., & Dauter, L. (2012). A sociologia dos mercados [The sociology of markets]. *Caderno CRH*, 25, 481–504. <https://doi.org/10.1590/S0103-49792012000300007>
- Food and Agriculture Organization of the United Nations. (2020). *The state of world fisheries and aquaculture*. FAO. <https://www.fao.org/state-of-fisheries-aquaculture>
- Garcia-Parpet, M. F. (2021). Mercados e praças de mercado: Karl Polanyi e o capitalismo contemporâneo [Markets and marketplaces: Karl Polanyi and contemporary capitalism]. *Sociologia & Antropologia*, 11, 123–147. <https://doi.org/10.1590/2238-38752021v1115>
- Gazolla, M., & Rufino de Aquino, J. (2021). Reinvenção dos mercados da agricultura familiar no Brasil: a novidade dos sites e plataformas digitais de comercialização em tempos de Covid-19. [Reinventing family farming markets in Brazil: the emergence of websites and digital sales platforms during the Covid-19 era]. *Estudos Sociedade e Agricultura*, 29, 427–260. <https://orcid.org/0000-0003-0772-7141>
- Giddens, A. (2013). *A constituição da sociedade: Bases para a teoria da estruturação* [The constitution of society: Outline of the Theory of Structuration]. Martins Fontes.
- Grisa, C. (2010). As políticas públicas para a agricultura familiar no Brasil: Um ensaio a partir da abordagem cognitiva [Public policies for family farming in Brazil: An essay based on the cognitive approach]. *Desenvolvimento em Debate*, 1(2), 83–109. <https://revistas.ufrrj.br/index.php/dd/article/view/31915>
- Grisa, C. (2018). Mudanças nas políticas públicas para a agricultura familiar no Brasil: Novos mediadores para velhos referenciais [Changes in public policies for family farming in Brazil: New mediators for old frameworks]. *Raízes: Revista de Ciências Sociais e Econômicas*, 38(1), 36–50. <https://raizes.revistas.ufcg.edu.br/index.php/raizes/article/view/37>
- Instituto Brasileiro de Geografia e Estatística. (2022). *Cidades: Tocantins* [Cities: Tocantins]. <https://www.ibge.gov.br/cidades-e-estados/to.html>
- Lima, A. F. (2020). Sistemas de produção de peixes [Fish production systems]. In A. P. O. Rodrigues (Ed.), *Piscicultura de água doce: Multiplicando conhecimentos* [Freshwater fish farming: Multiplying knowledge] (pp. 97–108). Embrapa.

- Martins, L. C., Pereira, A. S., Pires, C. R. F., Santos, V. F., Sousa, D. N., & Kato, H. C. A. (2021). Ações de educação alimentar e nutricional do pescado: O uso de atividades lúdicas para a promoção da aprendizagem [Initiatives for fish-related food and nutrition education: Using playful activities to promote learning]. *Revista Ciências & Ideias*, 12, 191.
- Matzembacher, D. E., & Meira, F. B. (2020). Mercantilização e contramovimento: Agricultura sustentada pela comunidade (CSA) [Commodification and counter-movement: Community-supported Agriculture (CSA)]. *Organizações & Sociedade*, 27(94), 396–430. <https://doi.org/10.1590/1984-9270942>
- Meante, R. E. X., & Dória, C. R. C. (2017). Caracterização da cadeia produtiva da piscicultura no estado de Rondônia [Characterization of the fish farming production chain in the state of Rondônia]. *Revista de Administração e Negócios da Amazônia*, 9(4), 164–181. <https://periodicos.unir.br/index.php/rara/article/view/2617>
- Ministério da Agricultura, Pecuária e Abastecimento. (2024). *Painel Aquicultura em Águas da União* [Aquaculture in Federal Waters Dashboard]. <https://www.gov.br/agricultura>
- Mora, J. A. (2005). Rendimiento de la canal em cachama blanca (*Piaractus brachypomus*) y el híbrido *Colossoma macropomum* × *Piaractus brachypomus* [Channel yield in white cachama (*Piaractus brachypomus*) and the hybrid *Colossoma macropomum* × *Piaractus brachypomus*]. *Bioagro*, 17(3), 161–169. https://ve.scielo.org/scielo.php?script=sci_arttext&pid=S1316-33612005000300006
- Pedroza Filho, M. X., Flores, R. M. V., Rocha, H. S., Silva, H. J. T., Sonoda, D. Y., Carvalho, V. B., Oliveira, L., & Rodrigues, F. L. M. (2020). *O mercado de peixes da piscicultura no Brasil: Estudo do segmento de supermercados* (Boletim de Pesquisa e Desenvolvimento, nº 38) [The farmed fish market in Brazil: A study of the supermarket segment (Research and Development Bulletin, No. 38)]. Embrapa Pesca e Aquicultura.
- Polanyi, K. (2000). *A grande transformação: As origens da nossa época* (2ª ed.) [The Great Transformation: The Origins of Our Time]. Campus.
- Rover, O. J., & Darolt, M. R. (2021). Circuitos curtos de comercialização como inovação social [Short marketing channels as social innovation]. In M. R. Darolt, & O. J. Rover (Eds.), *Circuitos curtos de comercialização, agroecologia e inovação social* [Short marketing chains, agroecology, and social innovation] (pp. 19–43). Estúdio Semprelo. <https://repositorio.ufsc.br/handle/123456789/229738>
- Ruraltins. (2020). *Censo da piscicultura no Tocantins* [Fish farming census in Tocantins]. Instituto de Desenvolvimento Rural do Estado do Tocantins. <https://central3.to.gov.br/arquivo/508166>
- Sabourin, E. (2015). Gestão territorial e economia social e solidária: uma análise pela reciprocidade [Territorial management and the social and solidarity economy]. *Guaju: Revista Brasileira de Desenvolvimento Territorial Sustentável*, 1, 3–26. <https://doi.org/10.5380/guaju.v1i1.43406>
- Schneider, S. (2016). Mercados e agricultura familiar [Markets and family farming]. In F. C. Marques, M. A. Conterato, & S. Schneider (Eds.), *Construção de mercados e agricultura familiar* [Market development and family farming] (pp. 93–135). UFRGS.

- Schneider, S., & Escher, F. (2011). A contribuição de Karl Polanyi para a sociologia do desenvolvimento rural [Karl Polanyi's contribution to the sociology of rural development]. *Sociologies*, 13(27), 180–219. <https://doi.org/10.1590/S1517-45222011000200008>
- Schreiber, F. H. R., Zucatto, L. C., Schneider, T. L., & Lazzari, R. (2021). Characterization of fish farming in the northwest region of Rio Grande do Sul. *Brazilian Journal of Development*, 7(3), 27257–27275. <https://doi.org/10.34117/bjdv7n3-436>
- Schubert, M. N., & Schneider, S. (2016). Construção social de mercados e as tendências de consumo: o caso do Pavilhão da Agricultura Familiar da Expointer (RS) [Social construction of markets and consumption trends: the case of the Family Farming Pavilion at Expointer (RS)]. *Ciências sociais UNISINOS*, 52(3), 373–382. <https://doi.org/10.4013/csu.2016.52.3.08>
- Schulter, E. P., & Vieira Filho, J. E. R. (2017). *Evolução da piscicultura no Brasil: Diagnóstico e desenvolvimento da cadeia produtiva de tilápia* [Social construction of markets and consumption trends: the case of the Family Farming Pavilion at Expointer (RS)] (Texto para Discussão nº 2328). IPEA.
- Sousa, D. N., Ferreira, P. R., & Farias, S. D. (2026). Demands and challenges of public policies for family Fish Farming: A case study in Brazil. *Naturaleza y Sociedad: Desafíos Medioambientales*, 15, 1–17. <https://doi.org/10.53010/nys.15.12753>
- Souza-Esquerdo, V. F., & Bergamasco, S. M. P. P. (2014). Análise sobre o acesso aos Programas de Políticas Públicas da Agricultura Familiar nos municípios do Circuito das Frutas (SP) [Analysis of access to public policy programs for family farming in the municipalities of the Fruit Circuit (SP)]. *Rev. Econ. Sociol. Rural*, 52(1), S205-S222. <https://doi.org/10.1590/S0103-20032014000600011>
- Tocantins. Secretaria da Pesca e Aquicultura – Sepea. (2024). *Cadeia do Piscicultura no Tocantins: cenário atual dos elos da piscicultura*. [Fish farming value chain in Tocantins: Current scenario of the sector's links] <https://central.to.gov.br/download/375932>
- Van der Ploeg, J. D. (2011). Trajetórias do desenvolvimento rural: Pesquisa comparativa internacional [Rural development trajectories: International comparative research]. *Sociologias*, 13(27), 114–140. <https://seer.ufrgs.br/sociologias/article/view/22439>
- Veiverberg, C. A., Pires, C. B., & Bergamin, G. T. (2021). Comercialização e processamento dos produtos da pesca artesanal [Marketing and processing of artisanal fishery products]. *Extensão Rural*, 28(2), e9. <https://periodicos.ufsm.br/extensaorural/article/view/66498>
- Vidal, M. F. (2016). *Panorama da piscicultura no Nordeste* [Overview of fish farming in the Northeast]. Banco do Nordeste do Brasil.
- Wilkinson, J. (2015). Food security and the global agrifood system. *Global Food Security*, 7, 9–14. <https://doi.org/10.1016/j.gfs.2015.12.001>