



## FOOD AND PRODUCTION: A CASE STUDY OF RURAL SETTLEMENT IN SANTO AMARO DAS BROTAS/SE

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**Abstract:** This study aims to characterize the production and diet of family farmers in the Celso Furtado Settlement Project, located in the municipality of Santo Amaro das Brotas, Sergipe. Quantitative nature, the research was conducted based on primary data collected through a semi-structured questionnaire, which was then systematized in Excel and analyzed using descriptive statistics. The variables analyzed include agricultural and livestock production, the composition of the settlers' diet according to agricultural and livestock products and those purchased outside the establishment, and the number of daily meals. The results showed high production diversification and food diversity in the settlement. However, it was found that production on the farms does not fully meet the food needs of the settled families, who still depend on purchasing food outside the settlement. In addition, it was found that internal production is mainly intended for self-consumption, with a small surplus for sale, contributing to the food and nutritional security of the settlers. Finally, it is concluded that productive diversification in the settlement contributes to the food security of families.

**Keywords:** Self-consumption; agrarian reform; diversification; food regimes.

## ALIMENTAÇÃO E PRODUÇÃO: ESTUDO DE CASO DE UM ASSENTAMENTO RURAL EM SANTO AMARO DAS BROTAS/SE

**Resumo:** *O presente estudo tem como objetivo caracterizar a produção e alimentação dos agricultores familiares do Projeto de Assentamento Celso Furtado, localizado no município de Santo Amaro das Brotas/SE. De natureza quantitativa, a pesquisa foi realizada a partir da coleta de dados primários por meio de questionário semiestruturado, que foram posteriormente sistematizados na plataforma Excel e analisados por meio de estatística descritiva. As variáveis analisadas englobam a produção agrícola e pecuária, composição da alimentação dos assentados de acordo com os produtos agrícolas e pecuários e àqueles adquiridos fora do estabelecimento, e o número de refeições diárias. Como resultados, constatou-se a alta diversificação produtiva e diversidade alimentar no assentamento. Contudo, verificou-se que a produção nos estabelecimentos não supre integralmente as necessidades alimentares das famílias assentadas, que ainda dependem da aquisição de alimentos fora do estabelecimento. Ademais, aufere-se que a produção interna é designada sobretudo ao autoconsumo, com pequeno excedente destinado à venda, contribuindo para o cenário de Segurança Alimentar e Nutricional dos assentados. Por fim, conclui-se que a diversificação produtiva no assentamento contribui com a Segurança Alimentar das famílias.*

**Palavras-chave:** *Autoconsumo; reforma agrária; diversificação; regimes alimentares.*

### 1 Introduction

Reflections on food systems in rural areas have gained prominence amid global calls for the eradication of hunger. Their implications reveal that extensive agro-industrial chains, the

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foundation of food systems, result in a disconnect between the stages of production, processing, and consumption, generating multiple consequences (Grisa *et al.*, 2021). Thus, it is necessary to progressively expand studies on agri-food regimes and systems, especially regarding family farming and its production methods.

This article examines the production and dietary patterns of land reform settlers; however, it employs the concept of family farming, as both categories fall within the regulatory scope of Law No. 11,326, dated July 24, 2006. Family farming is defined by Wanderley (2009, p. 156) as “that in which the family, while owning the means of production, also performs the labor on the farm”. Thus, family farming can be considered a generic category with a great capacity to adapt to historical contexts in economic, social, cultural, and environmental terms, with family farmers as protagonists of the social processes they experience, especially regarding the resistance and innovations resulting in transformations in agriculture and the rural environment (Wanderley, 2009). Considering this, Wanderley (1996) highlights that peasantry is one of the forms that family farming takes, constituting a particular way of producing and being part of society in which farmers are the owners of the means of production.

Thus, family farming presents itself as a production model that stands in contrast to the corporate model of agriculture, capable of “increasing the economic, ecological, and social resilience of rural communities” (Ploeg, 2014, p. 11), and is therefore of great importance in food production. In this sense, considering everyone’s right to quality food, in sufficient quantity and culturally appropriate (Brazil, 2006), family farming contributes to ensuring Food Security and Nutrition (FSN) in rural areas, which constitutes one of the pillars of food sovereignty (Belik, 2003).

The contribution of family farming to FSN in rural areas occurs through self-consumption, which is nothing more than production carried out by the family for its own domestic consumption (Grisa, 2007), meeting its food and nutritional needs. In rural areas, the promotion of production for self-consumption is driven by social movements that oppose the corporate model of agriculture and champion food sovereignty as their primary cause (Desmarais, 2007; Custódio *et al.*, 2011; Ribeiro, 2013).

In this context, the subjects of this study are the family farmers of the Celso Furtado Settlement Project, located in the municipality of Santo Amaro das Brotas, in the state of Sergipe, established by the Sergipe Agrarian Reform Program of the Institute of Colonization and Agrarian Reform (INCRA). This settlement was chosen for the research because the researchers already had a close relationship with the settlers, due to previous projects carried out in partnership with the community. Additionally, the researchers were curious to investigate the impact of productive diversification and self-consumption, given certain characteristics intrinsic to the settlement



identified in the field, such as: (1) the large number of elderly people; (2) limited access to grocery stores, supermarkets, and open-air markets, due to the distance of these shopping venues from the settlement; and (3) the high rate of participation in public programs such as the Bolsa Família Program and retirement benefits.

Considering this, the focus of this study is the production and diet of farming families settled through agrarian reform, with the aim of understanding their diversification of production, particularly in terms of agricultural crops, and the dietary patterns of this population. Therefore, it is essential to characterize consumption and production together, clarifying the relationship between them. Thus, the objective of this study is to characterize the production and diet of family farmers in the Celso Furtado Settlement Project, Santo Amaro das Brotas, Sergipe.

## 2 Theoretical frameworks

This study takes “food regimes<sup>5</sup>” as its framework, with the aim of contextualizing the current agri-food landscape. This concept was first described by Harriet Friedmann in 1987; however, the seminal study that is currently used in food research was authored by Harriet Friedmann and Philip McMichael in the same year. McMichael (2021, p. 2) describes food regimes as a “methodological initiative that sought to specify the relationships between the world order and agri-food trade”. Similarly, Schneider, Schubert, and Escher (2016) emphasize that food regimes cannot be explained as something concrete, but rather as a method that evaluates agri-food pillars based on “periods, cycles, or trends” that are currently driven by the concentration of capital and information technology.

In light of the changing landscape of food regimes shaped by a global perspective, Niederle and Wesz Junior (2018) refine this concept by introducing the definition of food orders. Food orders are “arrangements of rules, habits, values, identities, meanings, and artifacts associated with specific ways of producing, distributing, selling, buying, preparing, and eating” (Niederle; Wesz Junior, p. 360, 2018). With this, the authors classify six food orders present in Brazilian society: Industrial, Commercial, Domestic, Aesthetic, Civic, and Financial.

In this study, we will employ the concept of the Domestic Order, as it is defined as a social form that refers to “subsistence agriculture”, from its crisis to its resilience (Niederle; Wesz-Junior, 2018; Escher, 2019). Subsistence production is constantly relegated to the realm of oblivion, given that, in the face of the ongoing modernization of agriculture, it was believed that this practice would inevitably disappear (Grisa, 2008). Although research on subsistence agriculture has

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<sup>5</sup> The concept of food regime stems from other studies on post-World War II food systems (McMichael, 2009, p. 140).



focused on production for self-consumption, Grisa (2007a), Niederle and Wesz Junior (2018) emphasize that subsistence production is a broader concept, involving not only household consumption but also the sale of surpluses to the market to acquire goods not produced within the household. In other words, production for self-consumption is part of subsistence production. However, while subsistence production is associated with the possibility of establishing exchange relationships and physical reproduction, production for self-consumption has non-monetary relevance, contributing to the fight against poverty and ensuring food security and nutrition (Grisa, 2008, p. 483–485).

The right of family farmers to produce their own food and the need to improve the quality of life in rural areas, which take precedence over capitalist concerns, are recurring themes in social movements. This is because, according to Chonchol (2005), there is a trend toward the concentration of production and income in the hands of large-scale farmers, marginalizing family farming. Thus, it is a challenge for social movements to shift the perspective that “business opportunities” are more important than the health and nutrition of the population (Belik, p. 11, 2024). Furthermore, the development and consolidation of policies and proposals to combat hunger have materialized through the mobilization of social movements, which are essential for the participatory consolidation of the Food Security and Nutrition Policy (Menezes, 2010; Takagi, 2010).

In Brazil, concern for food is one of the main agendas of rural social movements, most of which are national branches of Via Campesina (such as the Landless Rural Workers’ Movement – MST), one of the leading contemporary peasant movements fighting against the corporatist model of agriculture (Desmarais, 2007; Ribeiro, 2013). According to Custódio *et al.* (2011), food sovereignty is characterized as a common agenda among rural social movements linked to Agrarian Reform, with Food Security and Nutrition (FSN) as one of its pillars (Belik, 2024).

Food Security and Nutrition is a concept that originated in the post-World War II period, when many countries were unable to produce their own food (Belik, 2003). According to the Organic Law on Food Security and Nutrition (Law No. 11,346, of July 15, 2006), FSN can be defined as “the realization of everyone’s right to regular and permanent access to food of sufficient quality and quantity, without compromising access to other essential needs” (Brazil, 2006), in a manner that respects cultural diversity and is sustainable in environmental, economic, and cultural terms.

In rural areas, food security and nutrition can be ensured through production for household consumption, serving as the foundation for social reproduction while fostering the diversification of rural families’ strategies (Gazolla; Schneider, 2007). Grisa (2011) echoes this idea when he states that food is one of the foundations of the social reproduction of rural families, contributing



to the improvement of their quality of life, even though production for self-consumption does not alter structural issues. However, the process of outsourcing agricultural activities contributes to the decline of production for self-consumption, making families vulnerable and directly dependent on the market (Grisa, 2007b). Furthermore, diversified production systems, especially for subsistence, can contribute to the autonomy of rural families, as there is less dependence on the market for food purchases (Duval; Ferrante; Bergamasco, 2012; Schneider, 2012). Therefore, it is of utmost importance to emphasize the significance of production for self-consumption as a means of ensuring food security and nutrition in rural areas.

### 3 Methodology

This study is characterized as exploratory quantitative research, as it aims to provide a comprehensive view of a specific phenomenon (Gil, 2008). Furthermore, the research was conducted using primary data to understand the characteristics of family farmers, their farms, and their productive activities, as well as their food-related issues. Accordingly, the variables were selected based on their scope, encompassing their unique features and considering the specific context of the phenomena, in order to understand them in depth (Gil, 2002; 2008).

The study involved the collection of primary data, which was obtained through interviews conducted using a semi-structured questionnaire. Data collection took place in October 2024 in the agricultural village of the Celso Furtado Settlement Project, located in the municipality of Santo Amaro das Brotas, Sergipe (Figure 1). When conducting the interviews, the intention was to use the “snowball” sampling method until saturation was reached; however, given the small number of officially settled families and the varying patterns observed in the responses, the questionnaire was administered to all plots in the settlement, without requiring farmers to refer others, provided they agreed to participate in the study. Thus, the questionnaires were administered in 22 of the settlement’s 30 households, with diverse production and dietary contexts. It should be noted that the interviews were conducted in the settlement’s agrovillage<sup>6</sup>, where the small plots are located, intended for the construction of houses and productive gardens.

Figure 1 – Study area.

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<sup>6</sup> Only twenty-two families were interviewed, as the remaining eight either declined to participate in the survey or did not produce anything; they simply lived on the plot.



Source: Compiled by the authors (2025).

In addition to the data collection phase, a literature review was conducted to support the discussions and analyses carried out, with consideration given to the nature of the data selected from the questionnaire for this study. The literature review focused particularly on reviewing articles, theses, and dissertations that offer a contemporary perspective on the study's themes, to build a solid theoretical foundation for analysis, taking into account the study's regional context. Furthermore, the perceptions recorded in the field notebook, a necessary tool for the empirical assessment of the settlement's dynamics, were utilized in the discussion.

In addition, a database was created in Excel so that the collected data could be organized and classified into categories. Of these previously defined categories, three will be used: public policies, agricultural production, and food and nutritional security. Based on these, the following variables collected in the field were selected: agricultural production, livestock production, food purchased outside the household, the ratio of self-consumption to sales, food composition, and number of daily meals. To group the agricultural production data, the following main categories were used: fruits, grains, medicinal plants, legumes, tubers, and vegetables, noting that for discussions regarding the relationship between sales and self-consumption, the main categories with the highest frequency in the responses were selected. Finally, descriptive statistics were used to facilitate data analysis.



#### 4 Results and Discussion

The Celso Furtado Settlement is an Agrarian Reform Settlement Project established in 2010 following the expropriation of the Nossa Senhora das Graças Ranch, known as the Aruari Ranch, by the National Institute of Colonization and Agrarian Reform (INCRA) in 2006. It is in the municipality of Santo Amaro das Brotas, approximately 3,6 Km from the SE-240 highway, covering an area of 704 hectares and with the capacity to settle 30 families.

To characterize the population, 22 families were interviewed; the respondents are between 31 and 70 years old, 86% work exclusively on the property in agricultural activities within the plot (which will be explored throughout the discussion), approximately 83% have an educational level equivalent to incomplete elementary school, 64% of the respondents identify as female, and about 73% rely primarily on retirement benefits and funds from the Bolsa Família Program for their income.

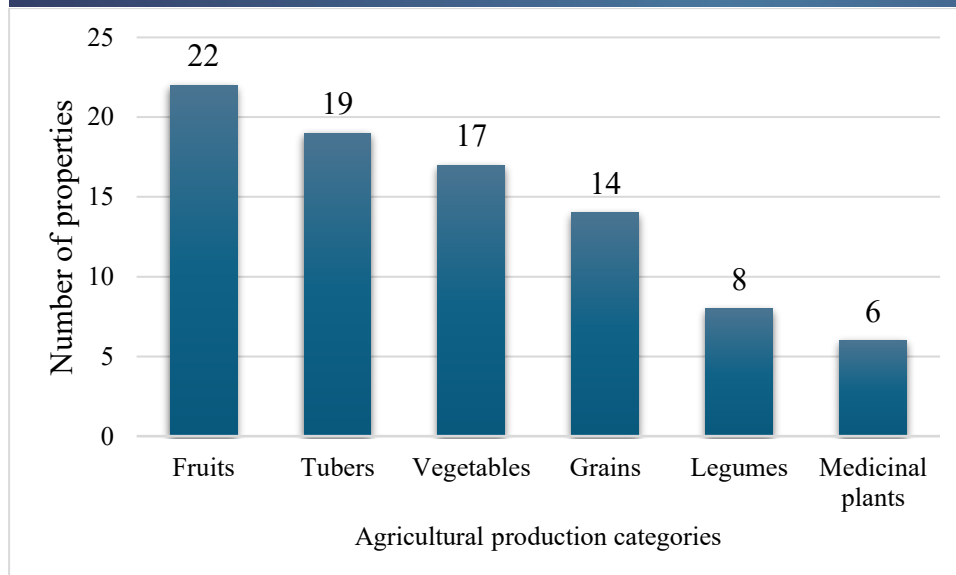
The Celso Furtado Agrarian Reform Project, like most agrarian reform settlements, features a segregated distribution of small and large plots, the former averaging 0,46 hectares and the latter approximately 3,51 hectares<sup>7</sup>. Given this information, it is important to note that most of the families interviewed in this study grow crops exclusively on the small plots, using the large plots for raising a few animals or simply for maintaining pasture.

In this land tenure context, Figure 2 shows the agricultural production of the Celso Furtado settlement. Based on the survey of production in the settlement, it is noted that thirty varieties of fruits, twenty types of vegetables, seven types of medicinal herbs, four types of tubers, four types of legumes, and two types of grains were produced, highlighting the productive diversity found in the local settlement under study. Thus, considering the large number of species produced, especially fruits and vegetables, we chose to characterize production based on the number of plots producing them.

Figure 2 – Agricultural production at the Celso Furtado Settlement during the 2024 agricultural year.

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<sup>7</sup> Although these values are expressed in hectares, the settlement uses the “tarefa de terra” as its unit of area. The “tarefa de terra” is a unit of area measurement widely used in Brazilian agriculture, driven by cultural factors (Vizolli; Mendes, 2016). In Sergipe, one tarefa de terra is equivalent to 0,3053 hectares (MDA, 2025).



Source: Compiled by the authors (2025).

Figure 2 shows that twenty-two plots produce fruits, nineteen plots produce tubers, seventeen produce vegetables, fourteen produce grains, and, less frequently, legumes and medicinal plants, which are present in eight and six plots, respectively.

The fruit category is the only one present in all twenty-two plots, highlighting that all families engage in fruit production to some extent. Although considered agricultural production, it should be noted that most of the fruit trees present on the productive plots were not planted by the settlers; they were already part of the flora of the Aruari Farm, consisting mostly of coconut, mango, and banana trees. Nevertheless, it is worth noting that management and maintenance are carried out by the family, which allows these plants to continue producing food diversity for the household, also characterizing them as non-monetary income, as they are used for the families' consumption and/or subsistence (Ramos; Borges, 2021; Bellentani, 2010).

Root vegetables are the second most common category in the plots, especially in productive backyards, represented by the production of cassava, yams, sweet potatoes, and ginger, the latter being present in only one of the nineteen plots where root vegetables were grown. Tuber production in the state of Sergipe is carried out primarily by family farms (IBGE, 2025), and these crops are characterized as traditional foods within the local food culture, as they tend to revive and recreate knowledge and practices that are often lost in the agricultural landscape due to large estates and agribusiness (Fabrini, 2017). The production of cassava, yams, and sweet potatoes also appears more frequently on smallholdings because these foods are present daily in family meals and, furthermore, are part of the productive profile of the Northeast region (IBGE, 2025).

According to the IBGE (2025), the main crops grown in the municipality of Santo Amaro das Brotas are sugarcane, coconut, cassava, bananas, and sweet potatoes. This characteristic reflects the landscape of Eastern Sergipe, the mesoregion to which the municipality belongs, which



is known for its production of fruits, sugarcane, and cassava (IBGE, 2025). Thus, the production of fruits and tubers in the settlement is linked to regional factors, given that conditions are favorable for such production and that these foods constitute the staple diet of the settlement's families. Corroborating this idea, it is important to note that production aimed at self-consumption tends to reduce the food vulnerability of settled families, as it provides food for households independent of market relations (Grigol *et al.*, 2022), so much so that, in addition to the crops mentioned, vegetables constitute the third-largest production per plot, being present in seventeen of the twenty-two that were visited. That is, their consumption is linked to production for self-consumption, mainly due to the difficulties in obtaining food in urban markets, considering financial constraints and the perishability of these items (Grigol *et al.*, 2022). The authors state that the varieties present generally complement the "rice, beans, and meat" staple.

The grain category is present in fourteen plots. It is important to note that the grain production shown in Figure 2 is associated with the exclusive cultivation of grain corn in the fourteen plots, and one of them also produces coffee. This is because, unlike other regions of the state, corn cultivation in the Celso Furtado is linked to livestock farming, being used primarily to feed the chickens raised on the small plot. Furthermore, according to the field notebook entries, corn is also intended for family consumption on important festive dates in the state, such as São João and São Pedro; however, in this case, green corn is consumed rather than grain corn. What is observed here is production in harmony with socio-environmental conditions, reinforcing the concept of sustainability in both social and environmental spheres (Vivas, 2017).

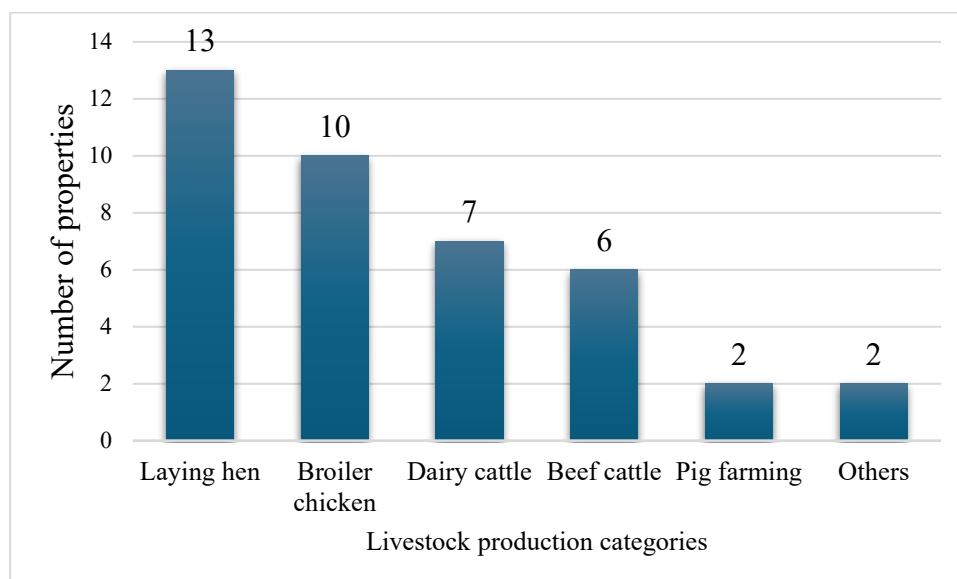
Legume cultivation is present on only eight plots, despite beans being a staple food in the Brazilian diet. However, according to field observations and collected data, all interviewed families consume beans, which they purchase from open-air markets, grocery stores, and supermarkets. Furthermore, agronomic factors contribute to the lower production of carioca beans, fava beans, and string beans, as the settlement's soil suffers from two extremes: very dry during periods of water scarcity and very waterlogged during the rainy season. In addition, during the rainy season, floodplains form, reducing the farm's usable agricultural area.

Less frequently, medicinal plants are found on six plots. The cultivation of medicinal herbs is primarily associated with traditional knowledge related to healing and treating illnesses (Freitas *et al.*, 2023), that is, they play a secondary role in family nutrition but are important for preserving traditional knowledge and preparing foods based on local culture.

Livestock production is also present on the plot, as it plays an important role in feeding the farming families living in the settlement. Livestock farming stands out due to factors such as production security compared to crop farming, low costs, guaranteed income, as well as the difficulties surrounding land preparation and marketing for agricultural products (Ramos; Borges,

2021). Thus, Figure 3 shows the classification of livestock farming types according to the number of plots.

Figure 3 – Livestock production at the Celso Furtado Settlement during the 2024 agricultural year.



Source: Compiled by the authors (2025).

According to Figure 3, chicken farming is the predominant activity in the settlement. Laying hen farming is present on thirteen plots, followed by broiler chicken farming, which is present on ten plots. In addition, there are large animals, specifically cattle, with dairy cattle farming present on seven productive plots. Furthermore, beef cattle are present on six plots, and the categories “Pigs” and “Others” are each present on two productive plots.

The first general observation that stands out when looking at Figure 3 is that, unlike agricultural crops, no type of livestock was identified on all plots. Furthermore, it is evident that, although we do not present quantitative production figures, field observations, corroborating the data presented above, indicate that livestock farming is conducted on a smaller scale compared to crop farming, with small animals, such as laying hens and broiler chickens, being the primary types raised.

Egg production is the settlement’s primary livestock activity, carried out in productive backyard gardens. The suitability of the backyard environment and ease of management are unique features that may explain the settlers’ preference for continuing this type of farming. According to De Sá, De Sá, and Simões (2021, p. 7), the presence of chickens in most rural productive backyards is justified by the possibility of raising them in small areas, in addition to the fact that they are animals that can withstand adverse environmental conditions. Among the adverse environmental conditions found in the settlement are, primarily, irregular rainfall; furthermore, the dry season is characterized by very high temperatures.

Although cattle raising is an activity that is less vulnerable to weather conditions, especially



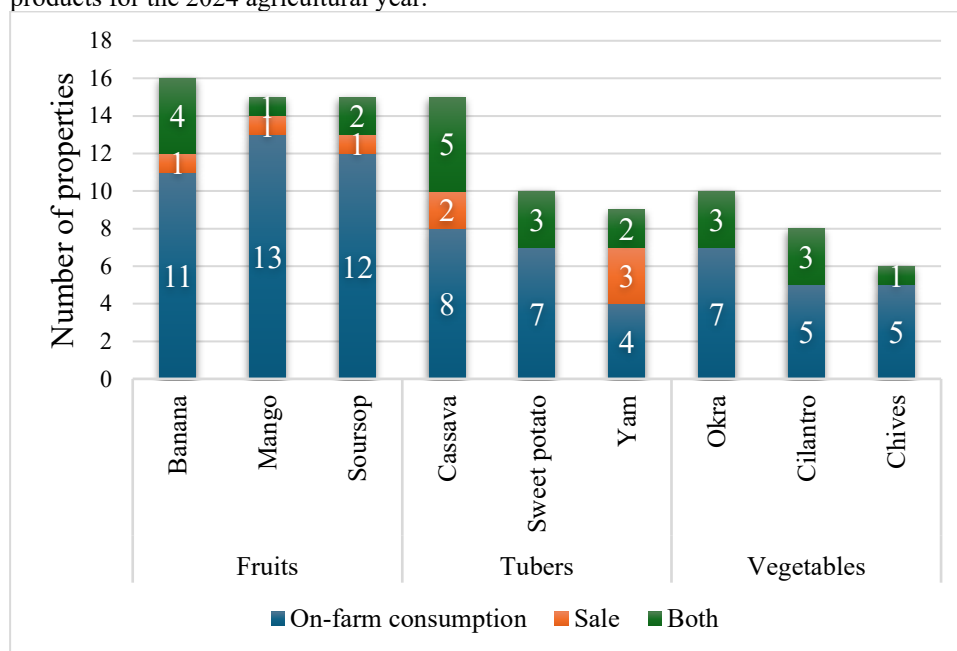
drought (Alves; Villwock; Fossá, 2023), milk and meat production in the settlement lags behind most agricultural crops and poultry farming. This is due to very specific issues associated with the settlement's unique characteristics, such as the distance between small and large plots and the difficulty of access (unmaintained roads) to these areas, combined with the advanced age of most settlers, who are predominantly elderly, contributing to smaller-scale cattle raising. It is worth noting that beef cattle raising is carried out differently from dairy cattle raising, since the latter is generally conducted on small plots, with a very small number of animals (one or two, at most). Beef cattle farming, on the other hand, is market-oriented, as most farms raise cattle for sale and keep their herds on large plots, where natural pasture is available.

Furthermore, according to the notes in the field notebook, pig farming on the small plot is hampered by the proximity of the productive backyards, leaving insufficient distance to prevent the smell from the pigsty from bothering the neighbors. Furthermore, the two plots categorized as "Others" produce honey, sheep, and goats, which are raised out of personal convictions and determination, serving as alternatives for social reproduction linked to the dynamics of these families. It is worth noting that honey production has a commercial focus, unlike the others, which are primarily produced for family subsistence. Thus, it is affirmed that small- to medium-scale livestock farming prevails in the settlement. Grigol *et al.* (2022) emphasize that this production, when intended for self-consumption, is of great relevance for access to animal protein, and consequently for the food and nutritional security of the settlers. Furthermore, the development of productive practices related to livestock farming ensures the reproduction of the family unit, as it builds a diversity of knowledge based on lived experiences (Ramos; Borges, 2021).

The integrated production of crops and small-scale animal husbandry, primarily for household consumption, is a common feature of backyard farming. Productive backyards, in addition to being spaces of diversity, contribute to household food and nutritional security (Gomes; Duarte, 2017). In line with this, Nobre *et al.* (2021) states that productive backyards provide families with sufficient quantities of quality food, in accordance with the principles of food and nutritional security.

Based on the survey of agricultural production, it was possible to determine the dietary composition of the settlers and the ratio of sales to self-consumption for the most produced products among families. Accordingly, Figure 4 presents the breakdown of agricultural products categorized by destination, including: (1) self-consumption, products intended solely for family consumption; (2) sale and self-consumption, which are products intended for family consumption and the sale of surplus; and (3) sale, which are products intended solely for sale.

Figure 4 – Breakdown of on-farm consumption, sales, and combined on-farm consumption and sales of agricultural products for the 2024 agricultural year.



Source: Compiled by the authors (2025).

To select the products, those that appeared most frequently in the respondent's answers were identified. Based on this, three categories were chosen (since they appeared most frequently in the interviewed groups), and from these, three products were selected: banana (sixteen groups), mango (fifteen groups), and soursop (fifteen groups) among the fruits; cassava (fifteen groups), yam (nine groups), and sweet potato (ten groups) among the tubers; okra (ten groups), cilantro (eight groups), and chives (six groups) among the vegetables, which already provides us with indications of the main products produced and consumed by farmers and their families.

Figure 4 shows a strong trend toward production exclusively for personal consumption; however, some agricultural crops are still sold due to surpluses, albeit on a smaller scale. When sales do occur, they take place at open-air markets located in the central region of the municipality of Santo Amaro das Brotas, as well as along the SE-240 highway, grocery stores, and small shops in the region. Additionally, one of the interviewed families participates in the Food Acquisition Program (PAA), to which it supplies vegetables and tubers. Thus, it is understood that the settlement's production is not solely for self-consumption (although this is the predominant practice), but rather constitutes subsistence production, given that the surplus is sold (Grisa, 2007a).

The category with the highest number of plots produced for self-consumption is fruit. The choice of bananas as one of the fruits also intended for sale may be related to the fact that this is the most widespread crop in the region (IBGE, 2025). Furthermore, mangoes and soursops are seasonal crops, and their sales may be linked to high production volumes at certain times of the year.

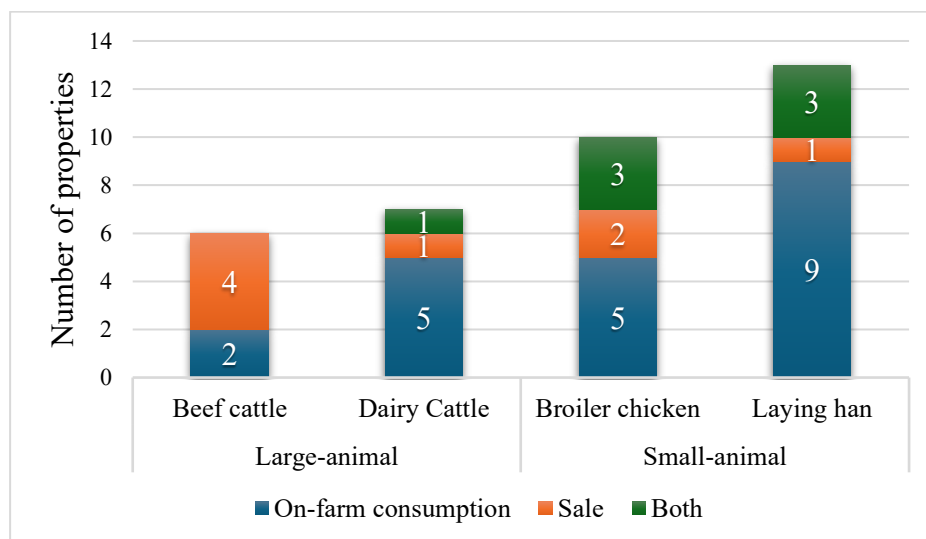
Next, it is observed that tubers make up the largest portion of the settler’s diet. Cassava remains a crop grown on a larger proportion of plots, standing out both for subsistence consumption and for sale. This may be related to the crop’s hardiness, which requires less in terms of climatic conditions and soil fertility (Souza *et al.*, 2014) compared to the other crops mentioned above. Furthermore, cassava production is highly valued because there is demand for this product at the Olga Benário Settlement Project (located next to the Celso Furtado Settlement), which is supplied to the agroindustry producing tapioca starch and its derivatives. These are traditional products of the Northeast region, produced and consumed on a large scale (Álvarez; Souza, 2017).

Furthermore, sweet potato and yam production constitute the agricultural output of the municipality of Santo Amaro das Brotas (IBGE, 2025); however, as these are regional products, it is difficult to define household consumption habits and practices (Manos; Galvão; Almeida, 2015) to explain these results quantitatively.

Finally, vegetable production, a category represented by okra, cilantro, and chives, varies across plots and is determined primarily by the family’s needs. According to the families, vegetable cultivation depends on consumption habits, and when they do sell produce, it is what they identify as most profitable at the time. However, it is essential to note that these crops, in addition to being harder, can also be produced year-round in the Northeast region, where they are widely accepted in the diet (EMBRAPA, 2010).

In addition to characterizing the agriculture-based diet, this article also aims to assess the composition of the livestock-based diet (Figure 5), bringing together the four main types of livestock raised on the settlement, as previously described in the discussion.

Figure 5 – Breakdown of on-farm consumption, sales, and combined on-farm consumption and sales of livestock products for the 2024 agricultural year.



Source: Compiled by the authors (2025).

In previous discussions, the low level of livestock production in the settlement (compared



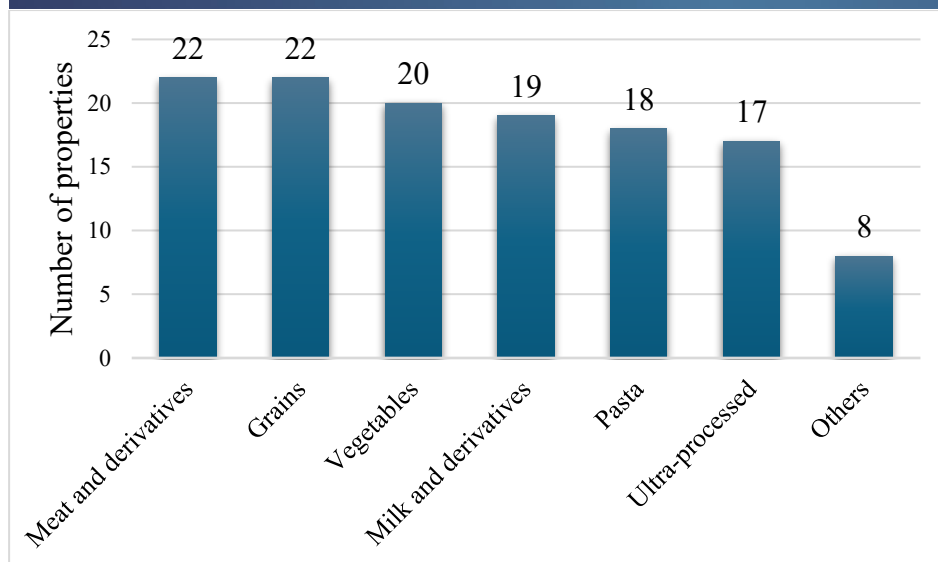
to crop farming) was noted, as it is characterized by a small number of herds, in terms of the number of animals, concentrated on a few plots. Due to characteristics intrinsic to the settlement's spatial logic, small-animal husbandry is favored, while large-animal husbandry is conditioned by factors such as access to large plots and the availability of family labor on the plot. This latter factor is decisive in beef cattle production at Celso Furtado, given that 83% of these beef cattle-producing plots have more than one person under the age of forty working on the farm.

Dairy cattle raising differs from beef cattle raising due to the way it is carried out. Unlike beef production, dairy production is carried out on a smaller scale within productive backyards, allowing families to raise one or two cows on the small plot, moving them to the large plot only when fattening is needed or when the forage produced on the small plot is insufficient to meet the animals' daily feed requirements. Thus, dairy production is primarily designed to meet the family's food needs rather than following a market-driven logic, as is the case with beef cattle.

The primary purpose of raising chickens is for family consumption. This is due to the ease of management, particularly regarding feed and space, as well as the dietary habits of the settlement. Egg production is prioritized because it allows for maintaining a fixed number of animals over a long period without the need to purchase new animals monthly. Furthermore, since broiler chicken production is limited, and it is still necessary to buy meat and meat products, this favors the raising of laying hens.

Grisa (2008, p. 486) points out that there are foods that are indispensable for the family but cannot be produced by them, even if production for self-consumption meets most of their dietary needs. Thus, although the plot's production is diversified, the settlers still need to acquire food outside the settlement (through barter relationships with neighbors) and even outside the settlement (in supermarkets, grocery stores, and open-air markets), as shown in Figure 6.

Figure 6 – Food purchased outside the household during the 2024 agricultural year.



Source: Compiled by the authors (2025).

Meat products, along with grains, are the foods most frequently purchased outside the study areas, although the other products listed are present in similar quantities across the study areas, indicating that purchasing decisions consider all aspects of the diet.

The food categories that the largest number of families purchased outside the study areas were: meat and meat products and grains, which were present in all twenty-two study areas analyzed. This result was expected because, as indicated in the previous figures, livestock production is carried out on only a few plots, primarily for the production of eggs and milk; that is, what is produced on the plot is not sufficient to meet the family's needs, necessitating the purchase of other sources of animal protein for family consumption. As for grain production on the farm, it is limited to the cultivation of grain corn to feed the chickens raised in the productive backyard; therefore, the settlers purchase staple grains for daily consumption, such as rice, beans, and coffee, from outside the farm.

Furthermore, horticultural products are purchased from outside the farm in nearly all of the plots analyzed and are present in twenty production plots. Despite the wide variety of crops, there are some agricultural species that cannot withstand the region's soil and climate conditions, in addition to requiring management far beyond what farmers can provide (especially nutritional management), as is the case with tomatoes, garlic, and onions (Dusi *et al.*, 1993; Menezes Sobrinho *et al.*, 1993; Costa, 2010). These foods are an important part of the diet, present in the daily lives of the Brazilian population, and farmers acquire them from outside their farms. In addition to environmental and management conditions, many families choose to buy specific "vegetables and legumes"; that is, it is the dynamics of the plot that dictate these particularities.

In third place are milk and dairy products, which are purchased outside the settlement in nineteen lots. The absence of dairy processing plants, along with the small number of farmers



raising dairy cattle, contributes to the practice of purchasing dairy products outside the settlement. In addition to milk itself, families purchase cheese, butter, and yogurt, which make up a significant portion of their daily diet. By comparing the number of plots that produce milk with the number of plots that purchase milk and dairy products outside the settlement, it is possible to observe an indication that even those plots that produce milk may be purchasing these products through other channels, suggesting that milk production does not meet the family's demand, leading them to purchase them elsewhere.

Considering the observations recorded in the field notebook, another factor contributing to this scenario of widespread purchasing of products outside the household is the small size of the plots, which acts as a limiting factor in producing enough of all the food necessary to sustain families, which generally consist of more than three people. Furthermore, since families do not use large plots to grow agricultural products, their productive capacity is limited.

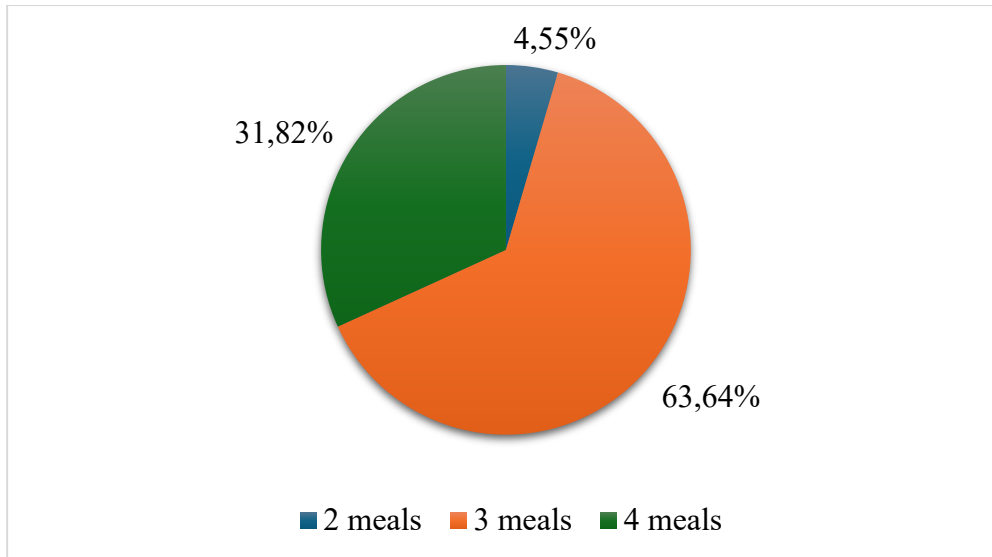
In fourth and fifth place, respectively, are pasta, found in eighteen batches, and ultra-processed foods, found in seventeen batches. These categories include products that families cannot produce themselves and that depend on agro-industrialization, as they encompass foods such as wheat flour, filled cookies, sausages, and pasta, among others (GAPB, 2014). Therefore, there is no alternative but to purchase them at grocery stores and supermarkets. Furthermore, it is noteworthy that although ultra-processed foods appear among the categories shown in Figure 6, it is highly significant that this category ranks second to last, given that excessive consumption of these products contributes to a decline in quality of life through an increase in comorbidities (Bielemann *et al.*, 2015). Based on the observations recorded in the field notes, the consumption of ultra-processed foods is primarily associated with the purchase of cookies, candies, sausages, and wheat flour (for baking cakes); these products are intended for feeding the settled children.

Consequently, the "Others" category includes foods defined as culinary ingredients and processed foods (GAPB, 2014), namely: cooking oil, vinegar, and sugar. Just as with pasta and ultra-processed foods, farmers are unable to produce these items on-site, leading them to purchase them elsewhere.

Consequently, the "Others" category includes foods defined as culinary ingredients and processed foods (GAPB, 2014), namely: cooking oil, vinegar, and sugar. Just as with pasta and ultra-processed foods, farmers are unable to produce these foods on their farms, which leads them to purchase them elsewhere.

Finally, in addition to the products consumed, the frequency of daily meals eaten by the family is also linked to dietary patterns (Figure 7). A preference for products from family farming promotes greater food diversity while ensuring the supply of staple foods and healthy eating habits (Silva *et al.*, 2023).

Figure 7 – Percentage of daily meals consumed by households during the 2024 agricultural year.



Source: Compiled by the authors (2025).

Figure 7 shows that 63,64% of families eat three meals a day (fourteen families), followed by 31,82% who eat four meals a day (seven families), and finally, 4,55% who eat two meals a day (one family). It should be noted that these meals refer to those prepared at home, as indicated by the interviewed families. These results corroborate the studies by Carvalho and Rocha (2011) and Heitor, Rodrigues and Tavares (2013), who found that the adult population in rural areas eats three meals a day, on average. According to the authors, this is an adequate meal frequency, representing the minimum necessary to meet the body's energy demands.

It is worth noting that food insecurity is divided into three levels: mild (when there is concern about food in the near future, but dietary needs are still met), moderate (when there is a reduction in the quantity and variety of food), and severe (when there is a severe reduction in the quantity and variety of food, compromising the number of daily meals) (EBIA, 2023). Based on this, it can be stated that, although one of the families eats only one to two meals a day, none of them reported concerns related to food. Therefore, it is possible to conclude that most families are not subject to food insecurity in the Celso Furtado settlement.

It is worth noting that the diversified production in the settlement may be linked to the families' way of life, which is rooted in the know-how passed down from generation to generation. Furthermore, the strong influence of the principles of the Landless Rural Workers' Movement on the settlement's leadership reinforces the idea that land is the guarantee of families' quality of life, as well as how they can achieve social reproduction.

Another important analysis concerns the relationship between production, diversified production, and food security, as it is evident that in the Celso Furtado Settlement, in addition to a wide diversification of agricultural and livestock products, the settlers have income, mostly



derived from social assistance, to purchase the food that makes up the families' meals and prevent situations of food insecurity within the households of families settled in Celso Furtado.

## 5 Concluding remarks

Based on the results, it can be concluded that the settlement's productive context is directly linked to subsistence farming, following a logic that aligns with market dynamics while being fundamentally tied to the family's needs. Furthermore, it is clear that production is subsistence-oriented, with crops grown for family consumption and any surplus sold, if available.

The most striking feature of the settlement is its productive diversification, evident in the variety of crops and livestock, especially on small plots or "productive backyards." The diversification of the productive portfolio is a strategy employed by families to ensure a better quality of life and food security, given the area's hostile economic, productive, and climatic conditions.

Furthermore, there is still a need to purchase food from outside the farm, even though existing agricultural production is a determining factor in the social reproduction of the settlers. However, it should be emphasized that most of these foods cannot be produced by farmers on their own plots due to soil and climate conditions, labor constraints, and/or processing limitations.

Finally, it can be stated that there is productive diversity in the agricultural and livestock sectors, and food is purchased outside the household, when necessary, primarily using income obtained through government social programs. It is thus concluded that most settler families are in a situation of food security, given the close relationship between production and self-consumption.

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