



COMMUNITY TIES AND INSTITUTIONS: SOCIAL CAPITAL, PUBLIC POLICIES,
AND FOOD SECURITY IN THE AGROFORESTRY SETTLEMENTS OF RIO
BRANCO, ACRE, BRAZIL

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Abstract: Agroforestry settlements constitute a public policy initiative aimed at supporting the permanence and social reproduction of farming families in the peri-urban areas of Rio Branco, Acre, Brazil. This study analyzes how different dimensions of social capital, expressed through community ties and forms of collective action, are associated with the food security conditions of families living in the Custódio Freire and Wilson Pinheiro agroforestry settlements, while also considering the productive, economic, and institutional factors that shape this relationship. This exploratory and descriptive comparative case study employs both quantitative and qualitative approaches. The purposive sample consisted of 25 families, nine residing in the Custódio Freire settlement and sixteen in the Wilson Pinheiro settlement. Data were collected using an adapted version of the Integrated Questionnaire for the Measurement of Social Capital (SC-IQ), the Brazilian Food Insecurity Scale (EBIA), and semi-structured interviews. The results indicate the coexistence of solidarity practices and willingness to cooperate with low institutional trust, intermittent participation in local associations, and difficulties in collective organization. Food security was also found to be associated with a broader set of conditions, including income, food production for household consumption, productive diversity, infrastructure, technical assistance, and access to public policies. The study concludes that social capital constitutes a relevant resource for building collective capacities, but its mobilization depends on material and institutional conditions capable of transforming community ties into lasting strategies for local development and addressing food-related vulnerabilities.

Keywords: Social Capital. Food Security. Family Farming. Local Development. Public Policies.

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LAÇOS COMUNITÁRIOS E INSTITUIÇÕES: CAPITAL SOCIAL, POLÍTICAS PÚBLICAS E SEGURANÇA ALIMENTAR NOS POLOS AGROFLORESTAIS DE RIO BRANCO, ACRE

Resumo: Os polos agroflorestais constituem uma experiência de política pública voltada à permanência e à reprodução social de famílias agricultoras no entorno urbano de Rio Branco, Acre. Este estudo analisa como diferentes dimensões do capital, expressas nos laços comunitários e nas formas de ação coletiva, social se articulam às condições de segurança alimentar das famílias residentes nos polos Custódio Freire e Wilson Pinheiro, considerando também fatores produtivos, econômicos e institucionais que condicionam essa relação. Trata-se de estudo de caso comparativo, de caráter exploratório e descritivo, com abordagem quantitativa e qualitativa. A amostra intencional foi composta por 25 famílias, sendo nove residentes no Polo Custódio Freire e dezesseis no Polo Wilson Pinheiro. Foram utilizados uma versão adaptada do Questionário Integrado para Medir Capital Social (QI-MCS), a Escala Brasileira de Insegurança Alimentar (EBIA) e entrevistas semiestruturadas. Os resultados indicam a coexistência de práticas de solidariedade e disposição para cooperação com baixa confiança institucional, participação associativa descontínua e dificuldades de organização coletiva. Verificou-se, ainda, que a segurança alimentar está associada a um conjunto mais amplo de condições, envolvendo renda, autoconsumo, diversidade produtiva, infraestrutura, assistência técnica e acesso a políticas públicas. Conclui-se que o capital social constitui recurso relevante para a construção de capacidades coletivas, mas sua mobilização depende de condições materiais e institucionais capazes de transformar vínculos comunitários em estratégias duradouras de desenvolvimento local e enfrentamento das vulnerabilidades alimentares.

Palavras-chave: Capital Social. Segurança Alimentar. Agricultura Familiar. Desenvolvimento Local. Políticas Públicas.

1 Introduction

The establishment of the agroforestry settlements in Rio Branco is associated with the economic and territorial transformations experienced in Acre following the decline of the rubber economy. The reduction in extractive activities, changes in the land tenure structure, and the migration of part of the rural population toward the state capital contributed to an accelerated process of urbanization and to the expansion of economic and social vulnerability. In this context, during the 1990s, the municipal government of Rio Branco established agroforestry settlements as a strategy for resettling families with rural backgrounds and creating productive opportunities for them (Pontes, 2015; Toni, 2006).

The settlements were conceived as areas intended for family farming, combining the objectives of income generation, food production for household consumption, and enabling families to remain in the territory. This configuration requires an analysis that extends beyond the strictly productive dimension, since families' ability to ensure adequate access to food depends not only on agricultural income but also on access to productive resources, public policies, infrastructure, and forms of social organization.

The trajectory of the agroforestry settlements also provides a basis for understanding the relationship between resources developed within communities and government action. Networks of solidarity, trust, and cooperation can help address everyday difficulties and support the organization of families. However, some of the conditions necessary for production and social reproduction, such as access to water, infrastructure, technical assistance, and marketing policies, depend on state action. Analyzing this relationship makes it possible to assess the extent to which



community ties contribute to addressing vulnerabilities and to identify which demands remain dependent on the capacity of public institutions to respond.

Food security, in this context, must be understood as a multidimensional phenomenon. Although income is essential for access to food, particularly in societies where food is predominantly obtained through market transactions, the food security conditions of rural families may also be influenced by their capacity to produce food for household consumption, diversify crops, access markets, share resources, and mobilize family, community, and institutional networks. From this perspective, analyzing families' food security conditions requires the simultaneous consideration of economic, productive, and relational factors.

In this context, community ties are also part of families' social reproduction strategies. Neighborly relations, solidarity practices, support networks, and experiences of cooperation can be mobilized in response to productive, economic, and food related difficulties. These ties do not replace material resources or public policies, but they can expand families' capacity for action and foster collective responses to shared problems.

In the agroforestry settlements, agricultural production is part of families' social reproduction strategies, combining income generation, food production for household consumption, and opportunities to participate in different marketing channels. Its contribution to food security, however, does not occur in isolation, as it also depends on productive conditions, the composition of household income, available infrastructure, and access to public policies.

Among the relational resources that can influence communities' capacity for action is social capital. Although the concept encompasses different theoretical traditions, there is convergence regarding the relevance of social networks, trust, reciprocity, and forms of cooperation as resources that can be mobilized by individuals and groups. For Bourdieu (1986), social capital derives from resources associated with participation in relatively durable networks; Coleman (1988) emphasizes its function within the structure of social relations; Putnam (1993) highlights trust, civic networks, and norms of reciprocity; and Fukuyama (1995) stresses the importance of shared values and norms for cooperation.

In rural contexts, such resources may acquire particular relevance because some of families' social reproduction strategies depend on territorial relations, exchanges, reciprocity, community organizations, and engagement with public institutions. A territorial approach therefore makes it possible to understand social capital not as an isolated individual attribute, but as a resource produced through relationships among actors and shaped by the social, economic, and institutional characteristics of the territory (Sabourin, 2002).

Although income, production, and access to food are recurring dimensions in studies of food security in family farming, it remains important to understand how relational resources and



collective capacities interact with material and institutional conditions in specific rural territories. This issue is particularly relevant in communities where production, food production for household consumption, neighborly relations, local organizations, and access to public policies simultaneously constitute families' social reproduction strategies. The study of agroforestry settlements makes it possible to examine these dimensions in two contexts with distinct productive, territorial, and institutional characteristics.

Based on these considerations, the study is guided by the following research question: How do the different dimensions of social capital relate to the food security conditions of families in the Custódio Freire and Wilson Pinheiro agroforestry settlements, and which social, productive, and institutional factors shape this relationship? The study is based on the proposition that social capital can strengthen family and collective capacities to address food related vulnerabilities through support networks, reciprocity, information flows, and collective action. Its mobilization, however, depends on the material, productive, and institutional conditions present in the territory.

The objective of this study is therefore to analyze how social capital, expressed through community ties and forms of collective action, relates to the food security conditions of families in the Custódio Freire and Wilson Pinheiro agroforestry settlements, considering the interaction among social networks, strategies of food production for household consumption, productive conditions, and institutional action.

2 Social capital, food security, and local development

From Bourdieu's (1986) perspective, social capital refers to the set of actual or potential resources associated with participation in relatively durable networks of relationships. This approach suggests that social ties do not automatically generate benefits, since their capacity to produce resources depends on the position of actors within networks and on the conditions under which these resources can be mobilized. Coleman (1988), in turn, emphasizes the role of social relations in facilitating certain actions, highlighting elements such as trust, reciprocal obligations, and the circulation of information. Putnam (1993) relates the concept more closely to institutional functioning and the capacity for collective cooperation, emphasizing civic networks, trust, and norms of reciprocity.

The application of this concept to rural development, however, requires caution. The existence of community ties does not eliminate material constraints or replace public policies. Social capital can facilitate resource sharing, the circulation of information, productive cooperation, and the capacity to articulate demands, but its mobilization also depends on access to infrastructure, markets, technical assistance, credit, and institutions capable of responding to collective demands. Social networks, organizational capacities, and material resources should



therefore be understood as interdependent dimensions of family farming and public policy implementation (Santos; Ferreira; Almeida, 2016; Santos et al., 2020).

This perspective is particularly relevant to the analysis of food security. In rural territories, families may combine food purchases in the market, production for household consumption, exchanges among neighbors, social benefits, and agricultural and nonagricultural income. Networks of trust and reciprocity can increase temporary access to food, equipment, information, and marketing opportunities, while collective organizations can facilitate engagement with the state and access to public policies.

The relationship between social capital and food security should therefore be understood as relational and conditional. Social capital can strengthen the capacity to address vulnerabilities, but its effectiveness depends on the available productive, economic, and institutional conditions. This approach avoids interpretations that place exclusive responsibility on communities themselves for difficulties resulting from inadequate infrastructure, technical assistance, or public policies.

For the purposes of this study, social capital is understood through four dimensions operationalized by the Integrated Questionnaire for the Measurement of Social Capital: groups and networks; trust and solidarity; collective action; and cooperation. These dimensions are analyzed in relation to food security indicators, household food production strategies, income, and the structural conditions of the two agroforestry settlements investigated.

Based on these analytical dimensions, community ties are empirically examined through relationships of trust among residents, practices of mutual assistance and solidarity, willingness to cooperate, participation in local organizations, and experiences of collective mobilization. The analysis seeks to identify not only the existence of these ties but also the conditions under which they are mobilized in response to shared problems.

3 Materials and Methods

This research is characterized as a comparative case study of an exploratory and descriptive nature, combining quantitative and qualitative approaches. The case study design was selected to examine the relationships among social capital, food security, and territorial conditions in two specific contexts, without seeking statistical generalization to family farming as a whole in Rio Branco. The comparison between the two agroforestry settlements made it possible to identify similarities and differences in social organization, productive conditions, and household food security strategies.

The selected cases were the Custódio Freire and Wilson Pinheiro agroforestry settlements, located in different areas of the municipality of Rio Branco. The Custódio Freire settlement is



located along the BR-364 highway, at kilometer 8, while the Wilson Pinheiro settlement is located along the AC-90 highway, at kilometer 18. The selection of these two cases was also justified by their institutional and productive differences. Custódio Freire is under municipal administration, has plots of approximately 2.5 hectares, and is characterized predominantly by horticultural production. Wilson Pinheiro, under state administration, has plots ranging from 5 to 8 hectares and a greater presence of fruit crops. These differences make it possible to examine how distinct territorial and productive conditions interact with forms of social organization and food security strategies.

Participants were selected through purposive sampling, consistent with the exploratory nature and case study design of the research. During fieldwork, families were contacted at their homes and invited to participate in the study. The sample consisted of families who were present at their homes at the time of the visits, were available, and voluntarily agreed to participate. The study included family farmers over 18 years of age who were directly involved in the productive and household dynamics of the units investigated. A total of 25 families participated, nine from the Custódio Freire settlement and sixteen from the Wilson Pinheiro settlement. The sample was not intended to statistically represent all families living in the settlements. The findings are therefore limited to the cases investigated and allow for analytical and contextual generalization.

Social capital was investigated using an adapted version of the Integrated Questionnaire for the Measurement of Social Capital (SC-IQ), developed by the World Bank (Grootaert et al., 2003). Considering the objectives of the study and the characteristics of the agroforestry settlements, the analysis focused on four dimensions: groups and networks; trust and solidarity; collective action; and cooperation.

These dimensions were selected to prioritize aspects related to farmers' capacity for organization, interaction, and collective mobilization. During data collection, the questions were read aloud by the researcher and participants' responses were recorded directly in the instrument, following a standardized procedure for all participants.

Household food security was assessed using the Brazilian Food Insecurity Scale (EBIA), an instrument based on household perceptions of experiences related to restricted access to food. The shortened eight-item version was used, covering food-related experiences during the three months preceding the interview. Affirmative responses were summed according to the instrument's classification criteria, allowing the participating families to be classified according to their food security or food insecurity status (Segall-Corrêa; Marin-Leon, 2009; Panigassi et al., 2008).

The use of the EBIA added a standardized measure of the experience of food insecurity to the analysis. Its results, however, were interpreted together with data on food production for household



consumption, income, and productive conditions, recognizing that the scale alone does not encompass all the social, nutritional, and productive dimensions of food security.

In addition to the structured instruments, interviews were conducted using a guide containing questions on community organization, trust, cooperation, experiences of collective mobilization, productive difficulties, relationships with local organizations, and government action. The qualitative component was used to contextualize the patterns observed in the questionnaires and to understand the meanings farmers attributed to community relations and the difficulties experienced in the settlements.

3.1 Data Processing and Analysis

Quantitative data obtained from the SC-IQ and EBIA were organized according to settlement and analyzed using descriptive statistics. Absolute and relative frequencies, means, and measures of dispersion were used when applicable. Given the sample size and the exploratory nature of the study, no inferential statistical tests or estimates of causal association were performed.

The comparison between the settlements had an analytical purpose and sought to identify differences and similarities in patterns of trust, participation, cooperation, household food production, income, and food security. Qualitative data were used as a complementary source to interpret and contextualize the quantitative findings based on participants' accounts. The two sets of data were integrated during the interpretation of the results to identify convergences, divergences, and mechanisms related to the mobilization of social capital in the two contexts.

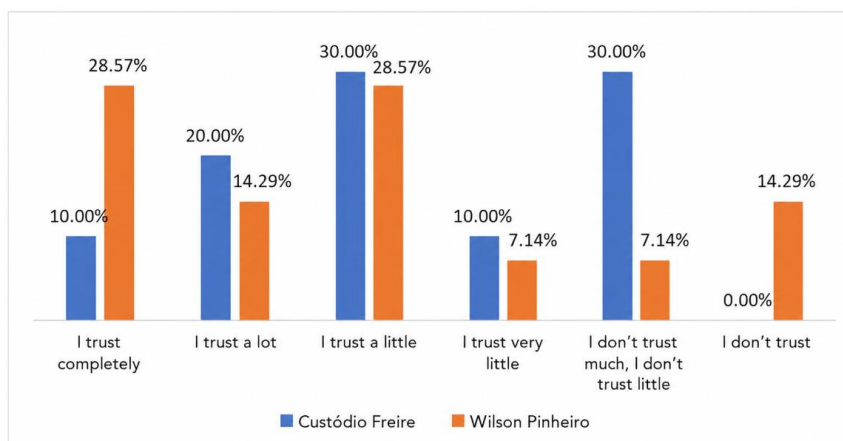
4 Results and Discussion

4.1 Trust, networks, and institutional relations

Trust is widely recognized as a central element in social capital theory because, in communities where trust is shared among members, opportunities for the formation and strengthening of cooperative networks and collective action increase. Mutual trust creates an environment conducive to reciprocity, information exchange, and engagement in common goals, reducing transaction costs and increasing the efficiency of social and economic interactions.

The data indicate low or moderate levels of trust across different social and institutional relationships, although the intensity of this pattern varies between the two settlements and according to the actor considered. Important differences emerge when examining the various spheres, including neighbors, local government, and central government. Figure 1 presents respondents' perceptions of trust in their neighbors.

Figure 1. How much do you trust your neighbors?



Source: Prepared by the authors, 2025.

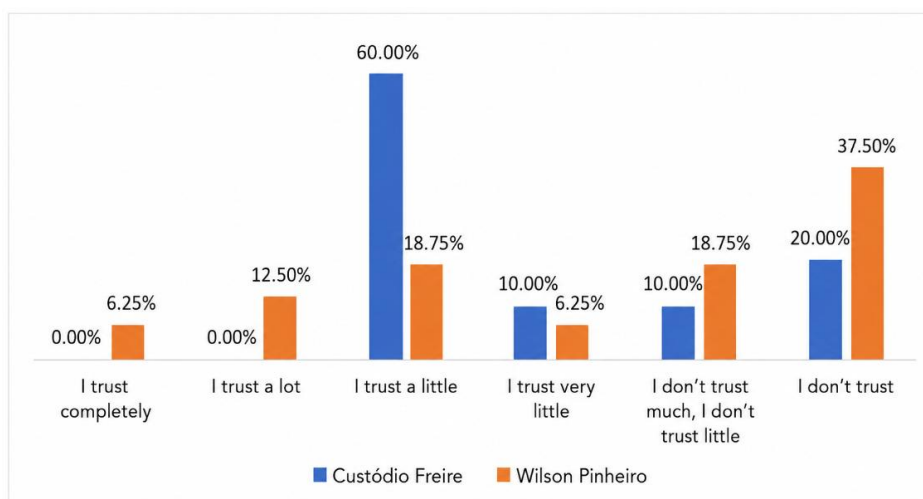
In the Custódio Freire settlement, 30.00% of participants selected the category “neither much nor little,” indicating an intermediate assessment of trust in neighbors. In the Wilson Pinheiro settlement, this response was recorded for 7.14% of participants, with responses showing greater dispersion across the scale categories.

Explicit distrust, although less frequent, is also noteworthy. In Wilson Pinheiro, 6.67% of respondents stated that they did not trust their neighbors, whereas this response was not recorded in Custódio Freire. Despite this context of partial or limited trust, most respondents believed that their neighbors would be willing to help them in times of need, indicating the presence of occasional solidarity even in contexts of low trust.

Some respondents described their neighbors as very reserved. One respondent involved in the management of the Wilson Pinheiro cooperative reported difficulties in dialogue because many residents have difficulty accepting changes, including changes in production and marketing practices. Respondents also reported limited interest in establishing closer relationships with neighbors, which may be related to a culture of social distance or to limited opportunities for community interaction.

This lack of trust is not limited to relationships among neighbors. When asked whether people in general can be trusted, 90.00% of residents in Custódio Freire and 73.33% in Wilson Pinheiro stated that “one can never be too careful.” These findings suggest that caution in interpersonal relationships extends beyond immediate neighborhood relations and may be relevant to understanding the difficulties in collective organization and mobilization observed in the cases studied.

Figure 2. How much do you trust members of the local government?

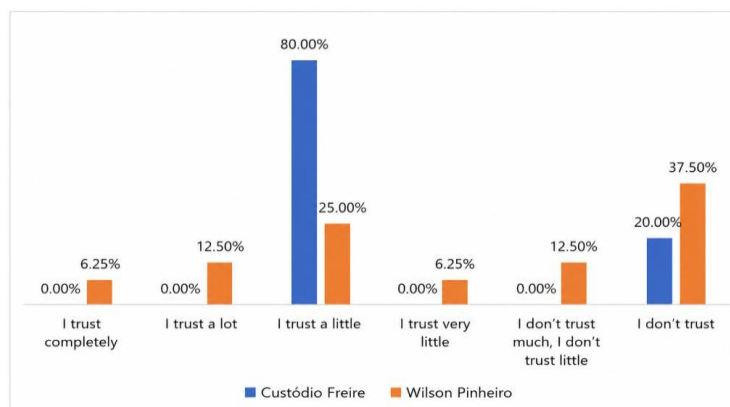


Source: Prepared by the authors, 2025.

The level of rejection of the local government is comparable to the level of distrust among neighbors, suggesting that local public institutions face a degree of distrust similar to that observed in interpersonal relationships. This perception may be related to unfulfilled commitments by public authorities, including the commitment to maintain local access roads following residents' protests in 2023. The municipal government provided only leftover asphalt material, which residents themselves spread along the access road.

The lack of technical assistance is another source of dissatisfaction among residents. One resident reported that, several years ago, the municipal department of agriculture committed to providing technical visits twice a week, but this commitment was not fulfilled. This situation adversely affects producers because, when crops are affected by pests, farmers face difficulties in preventing the spread of plant diseases. Figure 3 shows that trust in members of the central government is even more limited.

Figure 3. How much do you trust members of the central government?



Source: Prepared by the authors, 2025

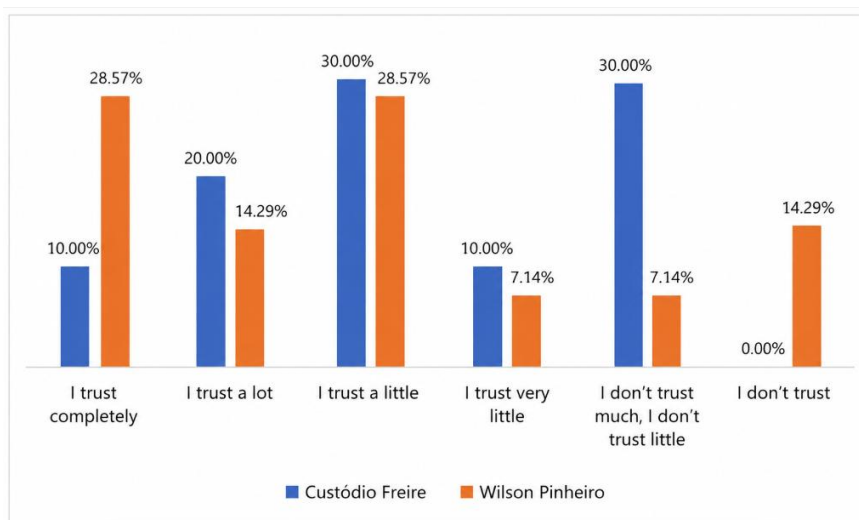
In the Custódio Freire settlement, 80.00% of respondents reported having little trust, while 20.00% reported no trust at all. In the Wilson Pinheiro settlement, 37.5% also reported no trust, indicating a similarly negative perception. These findings suggest that although the central government is physically more distant from residents' everyday realities, it is not perceived as more trustworthy than neighbors and, in some cases, is viewed even more negatively.

The data show that none of the social or institutional spheres examined enjoys a high level of trust. In Wilson Pinheiro, however, neighbors are perceived as slightly more trustworthy, particularly given that a substantial proportion of respondents believe their neighbors would provide assistance in times of need.

In Custódio Freire, the local government presents a higher percentage of "little trust" responses, at 60.00%, than the level of explicit distrust reported toward neighbors. This may indicate a form of resigned, yet still existing, trust in institutional action.

The low levels of trust in government institutions should be interpreted alongside participants' reports of difficulties in accessing public policies, technical assistance, infrastructure, and institutional marketing channels. The data do not allow a causal relationship to be established between these experiences and levels of trust, but they indicate that perceptions of state action constitute a relevant dimension of the context under analysis. The study also examined levels of trust in producers' associations, as shown in Figure 4.

Figure 4. How much do you trust the producers' association?



Source: Prepared by the authors, 2025.

The analysis of trust in the producers' association is particularly relevant because, together with churches, it is one of the few social groups to which most respondents reported belonging. In Wilson Pinheiro, 14.29% of residents stated that they did not trust the producers'



association. It is important to note that this response option was not included in the original questionnaire but was incorporated because it repeatedly emerged spontaneously among participants.

According to one local producer, the first association ceased operating because of previous financing agreements entered into by some farmers with the association acting as guarantor. Defaults on some of these agreements resulted in financial and legal restrictions on the association, preventing it from participating in support programs such as institutional food procurement. The reported experience with the former association and the relatively recent establishment of the new organization provide relevant contextual elements for interpreting the observed levels of trust, although the data do not allow a causal relationship to be established between these experiences and participants' responses.

In Custódio Freire, residents showed a relatively neutral position regarding trust in the producers' association, with 33.24% reporting that they "neither trust nor distrust" it. One producer reported rarely attending meetings because notices are sent through messaging applications. Since he accesses the internet infrequently, he often learns about institutional decisions only after they have already been made. This communication problem limits members' participation in meetings and, particularly, in the association's decision making processes. The association recently underwent a leadership change with the appointment of a new president. However, the questionnaire could not be administered to the current representative because he does not live in the settlement, which may limit his engagement with local producers.

The analysis presented in Table 1 shows that residents of the Custódio Freire settlement expressed a greater willingness to contribute to collective initiatives, even when they would not benefit directly.



Table 1. If a community project does not benefit you directly but benefits other people in the neighborhood or community, would you contribute your time or money?

Response	Custódio Freire (n = 10)	Wilson Pinheiro (n = 16)
Money	7 (70.0%)	5 (31.3%)
Time	7 (70.0%)	7 (43.8%)
Work	10 (100.0%)	11 (68.8%)
Equipment	2 (20.0%)	4 (25.0%)
Non-contribution	0 (0.0%)	4 (25.0%)

Source: Prepared by the authors, 2025.

All respondents in Custódio Freire stated that they would contribute labor, while 70.00% indicated that they would be willing to contribute money or time. This pattern suggests a stronger sense of solidarity and belonging to the local community. In comparison, contribution rates were noticeably lower in Wilson Pinheiro, particularly for financial contributions, with only 31.25% willing to contribute money. Contributions of labor were reported by 68.75%, while 43.75% indicated that they would contribute their time. The limited willingness to contribute equipment in both settlements, 20% in Custódio Freire and 25% in Wilson Pinheiro, may be explained by the material constraints faced by the families. Many farmers reported owning little equipment and therefore being unable to lend it, as illustrated by one respondent's statement: "If I had it, I would lend it."

Another relevant finding is the proportion of respondents in the Wilson Pinheiro settlement who stated that they would not contribute in any way, 25%, compared with none in the Custódio Freire settlement. This result indicates a lower stated willingness to contribute collectively among participants in Wilson Pinheiro, particularly when compared with respondents from Custódio Freire.

This tendency toward greater social engagement among residents of Custódio Freire is also evident when participation in collective action over the previous 12 months is considered. In Custódio Freire, 30.00% of respondents reported having participated in such activities, compared with only 23.53% in Wilson Pinheiro. Taken together, these indicators suggest a greater stated willingness to engage in certain forms of cooperation among participants from Custódio Freire. This difference, however, should be interpreted in light of the purposive nature

and small size of the sample.

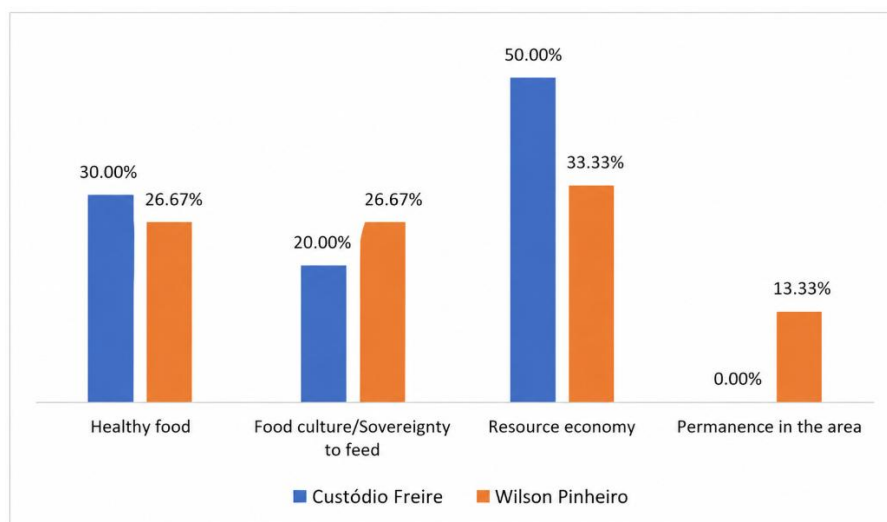
4.2 Food Production for Household Consumption: Perceptions and Limitations

Food production for household consumption constitutes an important strategy for the social reproduction of family farming, as it can reduce household expenditure on food, increase the availability of food within the household, and partially reduce dependence on market fluctuations. In rural contexts, this practice may also be associated with strategies for productive diversification and enabling families to remain in the territory.

In the agroforestry settlements, food production for household consumption is constrained by several factors, including the small size of the plots. In the Custódio Freire settlement, for example, plots average 2.5 hectares, and in some cases not all of the land is suitable for agricultural use because of steep slopes and low soil fertility. These physical constraints limit productive potential, hinder crop diversification, and reduce families' capacity to meet their own food needs.

The study sought to identify what producing food for household consumption means to families from the respondents' perspective, as illustrated in Figure 5. Food production for household consumption is perceived differently by residents of the Custódio Freire and Wilson Pinheiro settlements, reflecting both structural differences between the plots and differences in cultural practices and subsistence strategies.

Figure 5. What does producing food for household consumption mean to your family?



Source: Prepared by the authors, 2025.

For 50% of participants in Custódio Freire, saving money was the meaning most frequently associated with food production for household consumption, highlighting the economic

importance attributed to this practice. This finding does not exclude other cultural, social, or identity related dimensions that may coexist with its role in reducing food expenditure. In Wilson Pinheiro, although this aspect was also relevant (33.33%), respondents attributed a wider range of meanings to this practice, particularly healthy eating (26.67%) and food sovereignty (26.67%). Only in Wilson Pinheiro was food production for household consumption associated with remaining in the territory (13.33%), indicating that some participants in this settlement also perceive this practice as connected to their ability to remain in the territory.

This difference in perceptions may be partly explained by the structural characteristics of the plots. In Custódio Freire, plots are smaller, with only 2.5 hectares, compared with plots ranging from 5 to 8 hectares in Wilson Pinheiro. As a result, the variety of crops is more limited. This is one of the conditions that may restrict productive diversification and opportunities for household food production. When asked how much of the family's food came from production on their own property, 90.00% of residents in Custódio Freire responded that only a portion, less than half, came from their own property, compared with 62.5% in Wilson Pinheiro, indicating greater capacity for household food provision in the latter settlement.

The diversity of foods produced for household consumption also reflects this difference in scale. Chart 1 presents all the foods mentioned by respondents when asked about production for household consumption. While residents of Custódio Freire reported approximately 26 types of food products, more than 45 items were identified in Wilson Pinheiro, including vegetables, fruits, roots, grains, animal protein, and fish.

Chart 1. Foods produced on the property for household consumption

Category	Custódio Freire	Wilson Pinheiro
Vegetables	Kale, green herbs	Kale, lettuce, arugula, scallions, green herbs, cucumber, chicory, cilantro, tomato, sweet pepper
Fruits	Banana, passion fruit, tangerine, orange, lemon, cupuaçu, soursop, acerola, mango, coconut, cajá, jackfruit, avocado	Banana, mango, soursop, cupuaçu, acerola, açaí, guava, coconut, ponkan tangerine, orange, jambo, cacao, sweet lime, jabuticaba, cashew, papaya, jackfruit, biribá, plantain
Animal proteins	Eggs, chicken, pork	Pork, chicken, eggs, fish
Grains, roots, and condiments	Cassava, sugarcane	Cassava, beans, corn, cassava flour, tapioca starch, annatto



Source: Prepared by the authors, 2025.

These data require further qualification because productive diversity is not present on every property. In the Custódio Freire settlement, for example, two of the families visited reported that foods produced for household consumption were limited to vegetables. In addition, only three properties maintained some form of animal protein production. In the Wilson Pinheiro settlement, staple foods such as beans, cassava flour, and tapioca starch, animal proteins such as pork and fish, and native fruits such as açaí, biribá, cashew, cacao, jambo, and jabuticaba were each mentioned only once. In both settlements, some of the products listed are not grown exclusively for household consumption and are also marketed commercially.

When asked about the difficulties involved in expanding food production for household consumption, producers identified several factors, including water scarcity, the need to maintain ponds, low soil fertility, lack of technical assistance, small plot size, pests, and limitations related to farmers' age and health. Two of these obstacles are particularly noteworthy. The first is water scarcity, which residents frequently described as an urgent and recurring problem. According to their accounts, the municipal water supply network runs approximately 1 km from the settlement. Extending this network to the settlement could solve, or at least alleviate, the irrigation problems faced by producers.

Although some properties have ponds, inadequate maintenance combined with prolonged dry periods compromises water storage. During droughts, water is supplied by municipal water trucks. This support, however, is insufficient to meet both household and productive needs. Families without ponds often depend on the solidarity of their neighbors to obtain water in critical situations.

Assistance among neighbors during periods of water scarcity illustrates one of the concrete forms that community ties take within the settlements. In these situations, relationships of proximity and solidarity are mobilized to address a difficulty affecting both production and families' daily social reproduction. The capacity of these ties is nevertheless limited when problems require structural solutions. Sharing water may temporarily mitigate the effects of scarcity, but it cannot replace investment in water infrastructure. This case therefore illustrates the relationship between community ties and state action that runs throughout the study's findings.

Another relevant factor is low soil fertility. Some farmers reported that when they begin cultivating certain crops, such as bananas, only the first harvest produces satisfactory results, followed by a substantial decline in productivity in subsequent harvests. In Wilson Pinheiro, in addition to the difficulties already mentioned, other problems include shortages of labor and equipment and insufficient municipal investment. Although labor shortages were not initially emphasized, they affect both settlements. Production is generally carried out by the household



heads as couples, who tend to be older, with many already receiving rural retirement benefits.

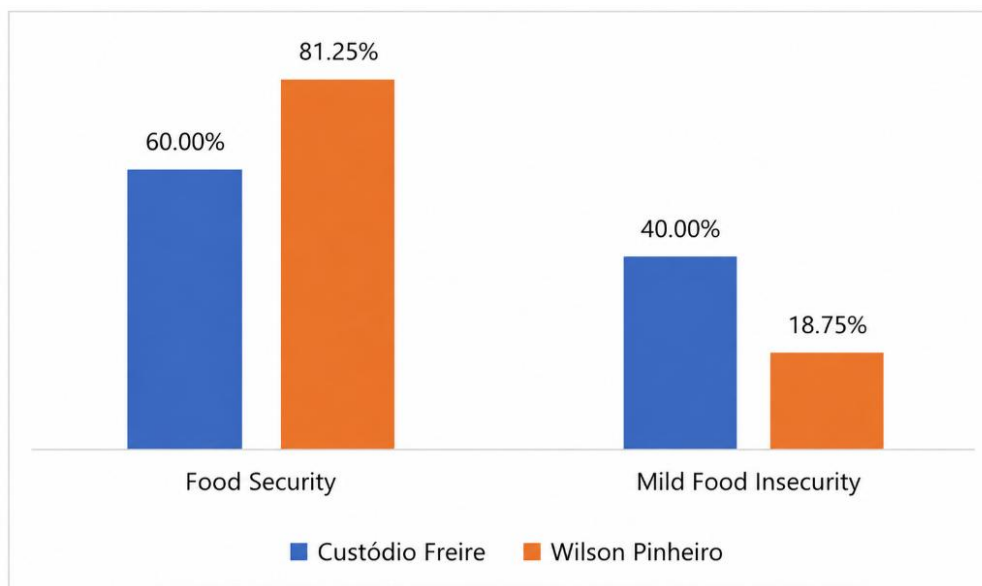
The shortage of equipment and insufficient municipal investment are interconnected problems. For many producers, the acquisition of equipment and inputs needed for production should be facilitated through public policies and government investment. Their accounts indicate considerable expectations regarding government action in providing equipment, inputs, and productive infrastructure. This finding should be understood in light of the fact that some of these demands involve high cost resources or institutional responsibilities that could hardly be met through community organization alone.

4.3 Food Security and Household Income Composition

The food security and food insecurity status of families living in the settlements was assessed using the Brazilian Food Insecurity Scale (EBIA). The Brazilian Institute of Geography and Statistics (IBGE) began using the EBIA in 2004 as part of that year's National Household Sample Survey (PNAD). The methodology is designed to capture families' perceptions of their food conditions, allowing different levels of food security and food insecurity to be classified.

Although the EBIA is widely used, some authors have identified limitations in this methodology. An analysis of the questions included in the scale shows that the instrument is primarily designed to measure food security in terms of access to food. Its recurring emphasis on insufficient financial resources to purchase food reflects the Brazilian context, where access to food occurs predominantly through market purchases. However, the scale does not adequately capture nutritional quality or sustainable production conditions (Jesus and Hoffmann, 2024). Despite this criticism, the authors reaffirm the importance of income as a fundamental, although not exclusive, determinant of food insecurity in Brazil. Figure 6 presents the levels of food insecurity observed in the agroforestry settlements, as measured by the EBIA.

Figure 6. Results of the Brazilian Food Insecurity Scale (EBIA), in percentage term



Source: Prepared by the authors, 2025.

The interpretation of these results requires consideration of the fact that the EBIA measures household experiences related to food access and perceptions of food restrictions rather than directly measuring nutritional quality or dietary diversity. The classification obtained through the scale should therefore be analyzed together with information on food production for household consumption, income, productive diversity, and families' social reproduction conditions.

Income is one of the main variables influencing the food security and food insecurity status of families in both urban and rural areas. Chart 2 presents the different types of income received by farmers in 2024, together with the respective standard deviations.

Chart 2. Annual income received by families and respective standard deviation

Income type	Custódio Freire	Wilson Pinheiro
Gross income	521.748,00	444.948,00
Average gross income	57.972,00	27.809,25
Standard deviation	33.341,27	27.248,22
Non-agricultural work	13.250,00	67.632,00
Family allowance	31.200,00	39.000,00
Pension/Retirement	145.728,00	327.888,00

Source: Prepared by the authors, 2025.

The economic situation of the Wilson Pinheiro settlement, which has the lower average agricultural income, contrasts with the infrastructure available there. The settlement has access roads in better condition and a favorable location, approximately 13 km from Ceasa. It is also the only settlement with a state public school and public transportation. In some cases, its plots are twice the size of those in the Custódio Freire settlement.

The interpretation of these values should take into account that gross agricultural income does not deduct production costs such as inputs, transportation, electricity, and fuel. The values presented therefore do not necessarily correspond to the net income effectively available for household consumption. An individual analysis of the data from the questionnaires completed by producers reveals substantial differences in income across families. In this regard, the Wilson Pinheiro settlement has a lower standard deviation, suggesting greater homogeneity in household income among producers, with individual family incomes tending to be similar or relatively close. In contrast, the standard deviation for Custódio Freire indicates greater variation in the income received by producers.

Chart 3. Relationship between average monthly agricultural income and food security status

Income per month	Monthly Income (R\$)	
	Custódio Freire	Wilson Pinheiro
Average income	2.107,66	2.413,75
Standard deviation	2.852,29	3.052,15

Source: Prepared by the authors, 2025.

In this case, respondents experiencing mild food insecurity have a higher average agricultural income than those classified as food secure. This finding contrasts with the predominant theoretical and empirical expectation that higher levels of agricultural income tend to be associated with better food security conditions, since higher income implies greater capacity to access food in adequate quantity and quality.

Several hypotheses may help explain this apparent paradox. The fact that some families with higher agricultural income experience mild food insecurity suggests that the relationship between income generation and food security is not necessarily linear. Agricultural income is only one component of household economic reproduction and may be associated with production

costs, marketing expenses, and different uses of the resources obtained. In addition, retirement benefits, income transfer programs, nonagricultural work, and food production for household consumption are also part of families' economic strategies. These findings therefore reinforce the need to analyze food security in relation to the composition of income sources and the conditions of social reproduction rather than solely in terms of the value of agricultural production.

In the Wilson Pinheiro settlement, participants classified as food secure had a higher average agricultural income than those classified as experiencing mild food insecurity. Given the exploratory nature of the study and the small number of observations, this result should be interpreted descriptively, without inferring a statistical association between the variables.

Regarding the receipt of social benefits, these programs contribute to increasing or supplementing household income. Chart 4 presents the distribution of retirement benefits and Bolsa Família according to participants' food security status.

Chart 4. Relationship between social benefits and food security status

Social Benefit	Wilson Pinheiro (Mild Food Insecurity)	Wilson Pinheiro (Food Security)	Custódio Freire (Mild Food Insecurity)	Custódio Freire (Food Security)
Retirement Pension	100%	56.25%	100%	66.67%
Family Allowance	33.33%	31.25%	50%	28.57%

Source: Prepared by the authors, 2025.

The observed distribution shows that social benefits are received both by food secure families and by those experiencing mild food insecurity. Given the exploratory nature of the study and the sample size, these findings should be interpreted descriptively, without inferring an association between receipt of these benefits and food security status.

4.4 Social Capital, Collective Capacities, and Local Development

The results show that community ties take different forms and vary in intensity across the settlements studied. Neighborly relations, solidarity, willingness to cooperate, and experiences of collective mobilization coexist with low levels of trust in certain relationships, intermittent



participation in local associations, and difficulties in collective organization. The central issue, therefore, is not the absence of relational resources, but the conditions that facilitate or hinder their conversion into more enduring forms of collective action.

According to Bourdieu (1986), social capital is realized through the capacity of groups to mobilize their ties in pursuit of shared interests. This experience illustrates the occasional mobilization of community ties around a shared demand, demonstrating that relational resources can be activated in response to concrete collective problems. However, the fact that these actions were reported as isolated events rather than recurring practices suggests that the available social capital has not yet developed into a permanent social structure.

Another participant mentioned the “request for paving the access road” as an example of collective action, further indicating that residents identify local problems and, on certain occasions, attempt to address them through joint action. For Putnam (1993), the institutional performance of a community is directly related to the density of its civic networks. Although the reported actions indicate some capacity for coordination, their sporadic nature and the lack of institutionalized channels for participation reveal weaknesses in the structures that should sustain cooperation over the medium and long term.

The response “a community festival to raise money for building materials for the church” provides an example of solidarity associated with faith, a form of mobilization common in rural contexts where religious institutions continue to function as community centers. Fukuyama (2001) argues that informal norms, such as those established around religion, can become social capital when they foster cooperation toward common goals. In this case, the church serves as both a symbolic and practical mediator of collective action. However, engagement limited to religious causes may also restrict the scope of cooperation to devotional contexts rather than contribute to the development of lasting mechanisms of civic or political participation.

The absence of continuous collective action is reinforced by another response, “a long time ago,” given by a participant when asked about the last time residents had mobilized to address problems in the community. This time gap indicates an erosion of collective practices and is consistent with Putnam’s (2000) assessment of the weakening of intermediary institutions and civic culture. The time between one mobilization and another is an indicator of the distance between the perception of a problem and the community’s capacity to respond. When asked whether residents could engage collectively in production and marketing activities, many respondents answered, “Yes, with support from the municipal government.”

The recurring reference to municipal government support should not be interpreted solely as an indication of community dependence. It also shows that collective action takes place in a context in which certain solutions depend on resources, infrastructure, and institutional capacities



that exceed individual or community capacities. Problems such as water supply, access road maintenance, transportation, and technical assistance require state action to varying degrees. The limited capacity to mobilize social capital therefore results both from internal organizational weaknesses and from limitations in the institutional structure available within the territory.

This situation reveals a dependence on external institutional mediation for local economic cooperation to become effective. According to Coleman (1990), social capital needs to be reinforced by institutions that help ensure trust and commitment among actors. The absence of an autonomous structure of mutual support makes the community vulnerable to fluctuations in public policies and to the presence or absence of the state. This indicates that although there is a positive perception of the possibility of organization, the internal institutional framework needed to transform this possibility into concrete action remains insufficient.

Another response indicated that residents could organize themselves to produce and market their products “if they had their own vehicle.” This statement highlights a material constraint that prevents the activation of social capital in its economic dimension. For Bourdieu (1997), social capital interacts with economic and cultural capital, and its effectiveness depends on the balance among these dimensions. In this case, the lack of infrastructure, specifically transportation, represents an obstacle that goes beyond collective willingness and exposes the community’s structural vulnerability.

Thus, even where there is a willingness to act collectively, the scarcity of concrete resources reduces the potential of social capital as a driver of local development. Responses such as “it is possible through the cooperative” and “yes, through the cooperative” reveal a perception that an institutional space exists in which collective action can take place. This is consistent with Coleman’s (1988) argument that formal structures such as cooperatives can function as repositories and catalysts of social capital. However, the fact that the cooperative appears as an exception rather than the rule indicates that access to this type of productive network is limited to particular groups or segments.

In these terms, social capital remains concentrated, which Bourdieu (1997) considers a form of symbolic monopolization of relational resources that limits equitable access to development opportunities among residents. When farmers were asked whether they believed collective production and marketing activities could be developed, most responded that “it would be good.” The fact that they did not directly affirm the feasibility of collective action indicates a diffuse desire for cooperation, but also a lack of clarity regarding the institutional and organizational pathways through which it could occur. Putnam (2000) argues that in communities with low levels of social capital, expressions of willingness remain fragmented because they lack concrete structures for mobilization.



Agricultural income alone does not guarantee food security. In the Custódio Freire settlement, for example, families with higher agricultural incomes were still experiencing mild food insecurity. The relationship among income, dietary patterns, and EBIA classification should be interpreted with caution. The scale measures household experiences associated with restricted access to food and is not a direct measure of the nutritional quality of the diet. Differences among dietary diversity, food production for household consumption, and food security classification therefore do not necessarily represent inconsistencies, but rather distinct dimensions of the phenomenon under analysis.

Low levels of interpersonal and institutional trust hinder collective action and public policies. Community cooperation exists, but it is occasional and requires institutional strengthening. Food production for household consumption is strategic, but is constrained by factors such as soil fertility in the Custódio Freire settlement, while Wilson Pinheiro has greater productive diversity. Given the difficulties in diversifying production, particularly in Custódio Freire, the creation of a solidarity based production and market system emerges as an alternative for strengthening household food production. Organizing the production of different crops across individual plots and allocating part of this production to food exchanges among neighbors could reduce dependence on market purchases, which absorb part of the agricultural income that could otherwise be invested in improvements to the production process.

Taken together, the results indicate that the dimensions of social capital are related to the strategies used by families to address productive and food related difficulties. Trust, solidarity, and support networks are associated with practices such as assistance among neighbors, information sharing, and mobilization around common problems. However, the limited continuity of collective action and the weakness of some local organizations constrain the capacity to transform these ties into lasting institutional resources.

This relationship does not operate in isolation. Income, food production for household consumption, water availability, soil fertility, infrastructure, technical assistance, and access to public policies simultaneously shape the conditions for families' social reproduction (Graciano et al., 2018; Santos et al., 2023). The results therefore point to an interaction between relational resources and structural conditions, avoiding the attribution of an exclusively causal role to social capital in explaining food security conditions.

The results show that community ties constitute important resources for families in the agroforestry settlements, particularly when everyday difficulties mobilize relationships of mutual assistance, reciprocity, and cooperation. These resources, however, face limitations when the problems encountered depend on infrastructure, technical assistance, investment, or other forms of government action. Solidarity among neighbors can mitigate certain difficulties, but it cannot



replace public policies capable of providing lasting responses to the productive and social needs of these communities. In this sense, social capital and state action are not mutually exclusive alternatives. Families' capacity to address situations of vulnerability can be strengthened when community organization and public policies are coordinated within the territory.

Taken together, the results show that the relationship between social capital and food security in the settlements studied is not linear. Neighborhood networks, solidarity, willingness to cooperate, and experiences of collective mobilization constitute resources that can strengthen families' capacity to address temporary difficulties, as demonstrated by the practices of mutual assistance and resource sharing observed in the study. However, the conversion of these relational resources into more lasting collective capacities is constrained by intermittent participation in local associations, low institutional trust, and difficulties in community coordination.

5 Conclusion

This study analyzed how different dimensions of social capital are related to the food security conditions of families in the Custódio Freire and Wilson Pinheiro agroforestry settlements. The results show that community ties are expressed through neighborly relations, practices of solidarity, willingness to cooperate, and experiences of collective mobilization. These ties, however, coexist with low levels of trust in certain relationships, intermittent participation in local associations, and difficulties in collective organization, which limit their conversion into more lasting collective capacities.

The analysis also showed that food security conditions cannot be explained exclusively by social capital or agricultural income. Food production for household consumption, productive diversity, water availability, soil conditions, infrastructure, technical assistance, social benefits, and other sources of income jointly shape families' social reproduction strategies. In this sense, relational resources can strengthen their capacity to address vulnerabilities, but their effectiveness depends on the material and institutional conditions available within the territory.

The findings have implications for public policies targeting agroforestry settlements. Measures to strengthen community organization, associations, and cooperatives can contribute to expanding collective capacities, particularly when coordinated with policies for technical assistance, productive infrastructure, access to water, marketing, and support for food production for household consumption. Strengthening social capital should therefore be understood as complementary to, rather than a substitute for, state action.

The study has limitations arising from the purposive and small sample, the concentration of the research in two agroforestry settlements, and the cross-sectional nature of the data. These characteristics preclude statistical generalizations and causal inferences regarding the population



of the settlements. Nevertheless, the combination of quantitative instruments and qualitative evidence made it possible to identify mechanisms and relationships relevant to understanding the cases studied.

Future studies could expand the number of families investigated, include other experiences of peri-urban settlements, and adopt longitudinal designs capable of tracking changes in community networks, productive conditions, and food security over time.

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