

DIMENSIONS OF DEVELOPMENT AND CAPACITY BUILDING IN AGENDA SETTING FOR FAMILY FARMING





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Ficha catalográfica elaborada pela Seção de Catalogação e Classificação da Biblioteca Central da Universidade Federal de Viçosa

F383d
2023

Ferreira, Marco Aurélio Marques, 1976-
Dimensions of development and capacity building in agenda setting for family farming [recurso eletrônico] / Marco Aurélio Marques Ferreira, Juliana Maria de Araújo ; Marcelo José Braga, coordenador -- Viçosa, MG : UFV, IPPDS, 2023.
1 livro eletrônico (62 p.) : il. color.

Texto em inglês.
Disponível em: <https://aksaam.ufv.br/publicacoes>
Bibliografia : p. 54-59.
ISBN 978-85-60601-22-6

1. Agricultura familiar. 2. Desenvolvimento rural. 3. Desenvolvimento sustentável. I. Araújo, Juliana Maria de, 1991-. II. Braga, Marcelo José, 1969-. III. Fundo Internacional de Desenvolvimento Agrícola. IV. Fundação Arthur Bernardes. V. Universidade Federal de Viçosa. Instituto de Políticas Públicas e Desenvolvimento Sustentável. Projeto Adaptando Conhecimento para a Agricultura Sustentável e o Acesso a Mercados. VI. Título.

CDD 22. ed. 338.1

Bibliotecária responsável: Bruna Silva CRB6/2552

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Revisão Linguística:

Layout, diagramação e capa: Adriana Freitas e Letícia Ribeiro Ianhez

Tradução:

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PREFACE

The history of family farming cannot be distinguished from the history of the formation of the national territory and, therefore, is directly related to the process of social, economic and environmental development of our nation.

Since the beginning of the process of occupation of the Brazilian territory, family farming has not been duly considered by the State in formulating the country's development model.

In fact, it took a long time for family farming to become relevant on the federal government's decision-making agenda, as it did not meet the development model advocated by the dominant political elite in periods of growth or modernization of agriculture.

Family farming was and still is misunderstood by many sectors as subsistence farming and, in this regard, remained for a long time on the sidelines of State public policies, with residual actions of agricultural policies as a whole¹.

This negligence and lack of prestige in formulating the political agenda fueled a cycle of inequalities and regional disparities that demand short- and long-term structural actions to be interrupted. Facing this problem becomes necessary for the country to be able to advance in levels of development compatible with the desired standard.

These discussions between development, capacity building and agenda setting will underpin this document. We hope that this text provokes concerns and reflections in social actors capable of influencing the trajectory of Brazilian family farming. We wish that it supports parliamentary actions and government plans by secretariats and ministries, and that it encourages joint efforts by national and international bodies and agencies committed to family farming and the collective benefits it generates for our planet. In addition, this document can encourage actions and greater engagement by the private sector and philanthropic institutions, towards the development and strengthening of family farming.

The authors

a new agenda setting for family farming

Even suffering, with historical exceptions, with the neglect of the political agenda setting of different governments, from the colony to redemocratization, researchers and policy makers are in consensus on the importance of family farming in regional development. For this reason, it is the main object of attention and promotion of multiple national and international actors, such as the UN, and, in particular, the International Fund for Agricultural Development (IFAD). IFAD operates in Brazil since the 1980s, with the aim of increasing the production and income of family farmers by facilitating their access to essential services, strengthening their organizations and connecting them to markets².

This is due to the role that family farming plays in overcoming poverty, in better income distribution, in retaining the rural population in the countryside, in nutrition and food security, in the productive occupation of land, in maintaining economic activity in rural areas, in preserving the environment, among many other contributions to global sustainability.

Such contributions go far beyond economic accounting, as in the case of the preservation of historical and cultural heritage and the preservation of traditions

in planting, cultivation and management in different regions of the country, passed on through many generations.

A fact that inserts family farming into political development discussions, but which, depending on the prevailing ideology among rulers and dominant political groups, is disqualified in the guidelines for the execution and implementation of public policies and, especially, in the composition of the budget plan and in the appropriation of a share from the public budget.

Promoting inclusive and sustainable rural development by supporting family farmers is a topic as old as the country itself. Before the occupation of the national territory, natives already had extensive knowledge of soil management and subsistence cultivation. Historical credit must be given to indigenous peoples for their role in the conservation and sustainable management of natural resources. Their deep, varied and locally rooted knowledge can help the world adapt and mitigate the consequences of climate change while maintaining productive and sustainable agriculture^{3,4}.

Most of our daily consumption foods have their origin and name derived from the cultivation traditions and culinary

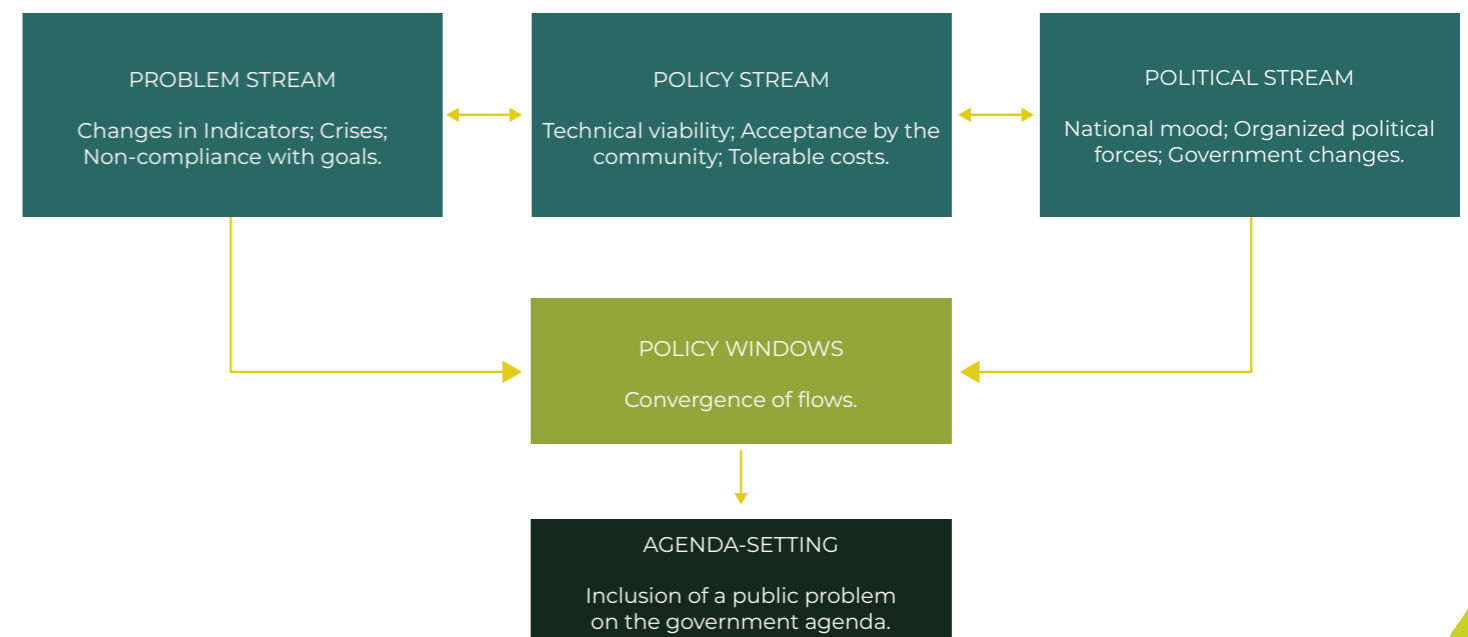
knowledge of indigenous peoples. Some examples are: Pineapple, Açaí, Aipim, Baiacu Jerimum, Cassava, Pitanga, Porridge, Moqueca, Paçoca, Popcorn, Pirarucu, Urucum among many others.⁵ Furthermore, indigenous peoples have unique food systems, anchored in sustainable subsistence practices, which are adapted to the specific ecosystems of their territories⁴. However, the loss of biodiversity in the food system, combined with the increase in the consumption of industrialized foods by indigenous peoples, lead to an increase in their levels of malnutrition, especially among women⁶.

It must be noted that many indigenous peoples have developed sophisticated production systems that range from mastering agricultural calendars based on astrology, to selection systems, soil management and crop diversification⁷.

Between this remote origin and the intensified regional disparities in the context of contemporary family farming, there were a few windows of opportunity for prioritizing family farming on the national public policy agenda, as an important instrument in the development process.

The moment we are experiencing is one of those rare opportunities that brings together all the elements necessary for the progress required to introduce an agenda for change. As well described in the multiple streams model⁸, a window of opportunity arises through the streams of problems, solutions and political context, as outlined in Figure 1.

Figure 1. Multiple Streams Model.



Source: Based in Kingdon

We clearly identified a series of problems experienced or intensified by the setback of the priority agenda for family farming, as well as by the weakening or dismantling of some of the main public policies for the sector. On the other hand, there is experience and accumulated knowledge that allows the development of projects, actions and public policies with a multisectoral approach, between public and private actors in the short and long term.

At this point, we have observed the sharing of responsibilities between different social actors, from the local to the international scope, for the implementation of technically viable and financially sustainable actions.

In favor of this, there are leaders who are committed to the topic, which have the legitimacy and support to implement a public policy agenda aligned with the SDG-17. As examples, we cite the fight against hunger and rural poverty, the promotion of health and well-being, quality education and gender equality, among other topics of direct or transversal interest to family farming.

The combination of these factors, as illustrated in the model above, opens a window to a new agricultural development agenda that highlights family farming and a solid articulation with rural movements as one of its central pillars. In this context, with strategic focus and regionalized priorities,

aligned with the country's territorial reality. Among these priorities are the North and Northeast regions, which lack better programmatic guidance and synergy between the different sectoral public policies. That is, it is not just about family farming, but also a set of dimensions and capabilities that dialogue directly with it, based on regional experiences and the network of actors in local communities.

In retrospect, the failure of some of the previous regional development programs may be attributed to the fact that the experience accumulated by the local communities themselves was not considered. Nor were local and traditional knowledge duly valued.

The case of the indigenous peoples from the Amazon, as highlighted in specialized studies, illustrates this context very well. Before colonization, the coexistence of indigenous peoples with the ecosystem occurred in a sustainable way, thus maintaining different peoples in very well-preserved ecosystems for ages^{7,9}. In addition to the contribution of indigenous peoples to environmental preservation, one can stress the contribution of traditional knowledge, socio-biodiversity and indigenous food systems to the provision of food and healthy diets⁴.

This historical wealth diverges from the agricultural nature of many regions in

the North and Northeast, exposing the institutional fragility of the State. Especially regarding the duty to preserve the culture, physical integrity and quality of life of the original peoples, as portrayed in the tragedy experienced by the Yanomami people in recent years and made public in early 2023.

Considering that the birthplace of sustainable practices in Brazilian family farming is the scene of a humanitarian tragedy that generates malnutrition, hunger, and the contamination of rivers and soils by illegal mining activities, there is an opportunity to rethink the political and executive agenda of makeover, support and promotion of family farming initiatives. In particular, in the Amazon and Caatinga biomes, predominant in the North and Northeast regions of Brazil that suffer from severe discrepancies in terms of development, when compared to other regions of the country.

The design of a new agenda must start from these differences to propose means and actions, not lodging in them as a stereotyped vision of competitive patterns of models for national agriculture.

As stated by Hurtienne¹⁰ the perception of the Amazonian agriculture as being itinerant, unproductive, harmful to the environment and condemned by the advance of large properties, for example, is challenged by the evidence and consolidation trends of

family farming based on complex production systems. Such ecosystems include permanent cultures and small livestock, and are able to coexist in harmony with the existing fauna and flora and, in this way, contribute to development in its multiple economic, social and environmental dimensions.

The main objective of this document is to propose reflections like this one and induce concrete actions in favor of family farming, based on secondary data from two sources: official information and statistics, and studies on the subject published by different authors.

In addition to this introductory section, this document consists of four other sections. In the second section, we explore the differences in the level of development by Brazilian macro-regions, emphasizing the most vulnerable elements in the North and Northeast regions and their relationship with family farming. In the third section, we present some of the central topics for setting up an agenda for family farming and regional development. For the last two sections, we use the global agenda on sustainable development goals (SDG-17) as a guiding reference, with emphasis on the objectives most relevant to the purpose of this document.



Dimensions of development and agriculture

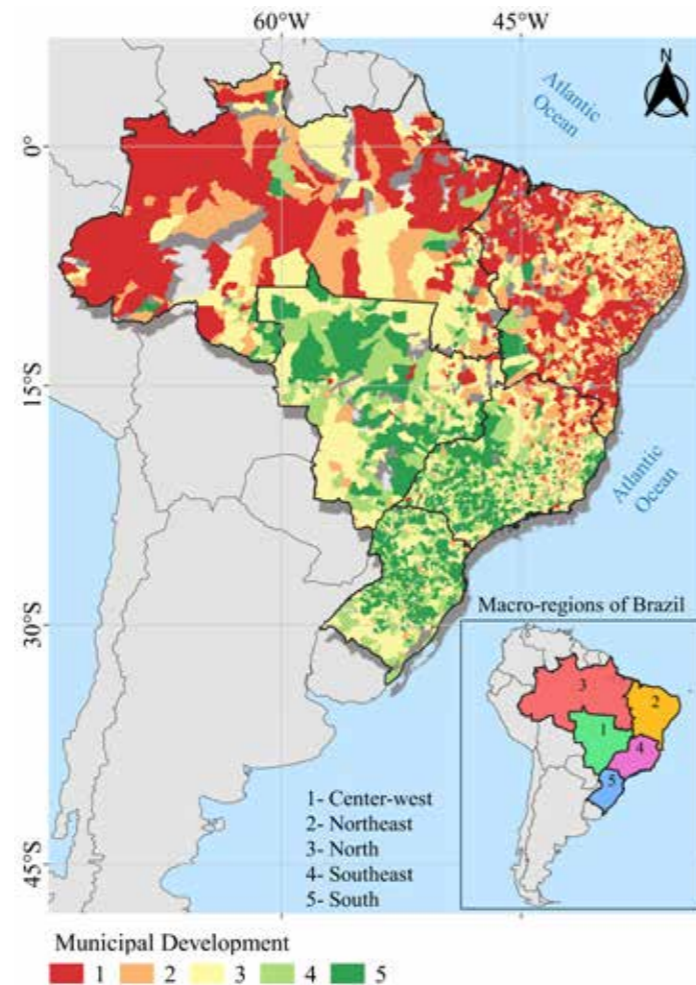
In Brazil, the development process was not only greatly influenced by the direct role of the State in agriculture, but also, indirectly, by the development of structuring capacities. After several decades of diverse intervention models, the differences in Brazilian regional development are evident, enabling the observance of characteristic traits between macro-regions and biomes (Figure 2). Obviously, the balance of regional disparities is not credited exclusively to the agricultural policy account, although it has always played a relevant part in this process.

Starting from Abramovay's perspective¹¹ that rural development cannot be conceived as a simple expansion of agricultural activities, we will explore other dimensions associated with development and quality of life. In particular, those that will support the achievement of sustainable development goals, with special attention to topics of interest to family farming.

There is a huge variety of factors that lead to different levels of development. In most cases, the North and Northeast regions of Brazil are at a clear disadvantage. Such regions have a higher concentration of smallholdings. It is important to note that the lowest levels of development (in red

in Figure 2) are mainly concentrated in the northern and northeastern Brazil and in the regions with predominance of the Amazon, Caatinga and upper part of the Cerrado and Atlantic Forest biomes.

Figure 2. Level of municipal development by macro-region.



Source: Research indicators, according to the methodological note.

The lower level of development in the North and Northeast regions is directly related to the development process of national agriculture. Family farming was left out of the agricultural modernization processes implemented in the 1960s and 1970s, which introduced a model that favored capitalized sectors, focused on commodities, which could contribute to the trade balance^{1,12}.

This factor contributes, in part, to the understanding of similarities between agricultural models and levels of socioeconomic development. In fact, the adopted

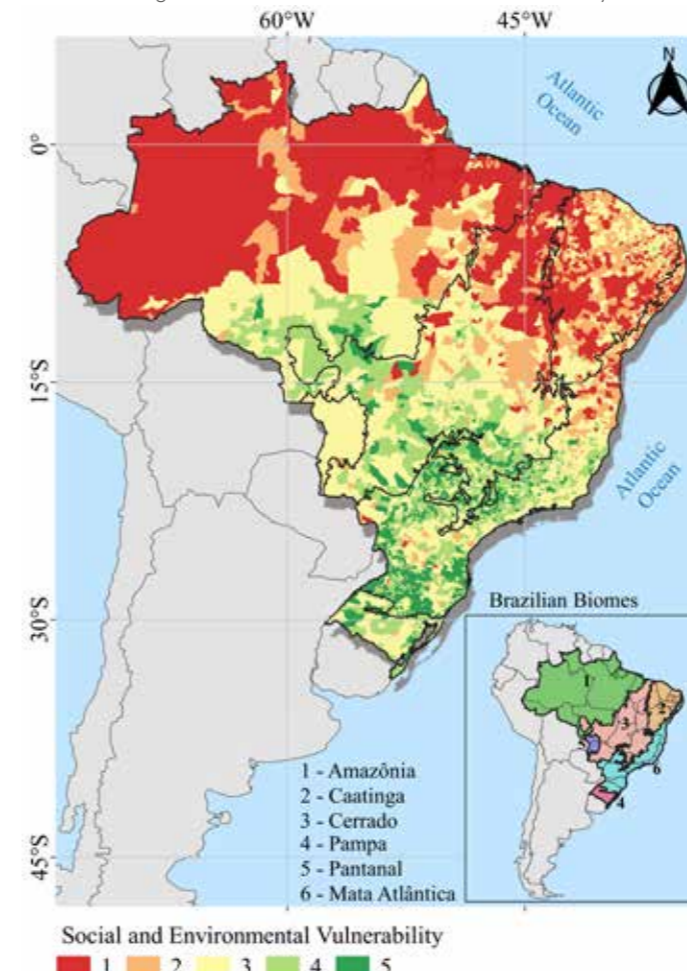
model prioritized the concentration of land, the exploitation of labor and the consequent degradation of the central foundations of human development^{1,12}.

As a consequence, modernization contributed to greater social exclusion and the expansion of regional inequalities since family farming was left out of this process. Among the numerous factors that expanded inequality, it is worth noting that access to new technologies was oriented towards those who had agriculture as an economic activity, making it impossible for small holders to have access to new productive technologies¹³.

Therefore, the current relationship between agriculture and regional development is also the result of the State's inefficiency and its low capacity to develop agendas and propose actions adapted to the different regional realities. This is due to the hegemonic model of public policy design, in which the budgetary concentration for agricultural policies is the responsibility of the federal government, which does not always elect its priorities in direct response to these needs. Such facts have direct consequences on the persistence of regional inequalities and on the indiscriminate exploitation of indigenous lands and forests, in addition to the direct benefit of specific groups, capable of exerting political pressure.¹⁴

With this, the formulation of policies at the national level takes place through a top-down implementation. Some of them captured by interest groups and historical patrimonialism and, therefore, little adaptable to regional and local needs. As a consequence of low levels of development, there is greater exposure to conditions of socio-environmental vulnerability in some specific regions (Figure 3).

Figure 3. Social and Environmental Vulnerability.

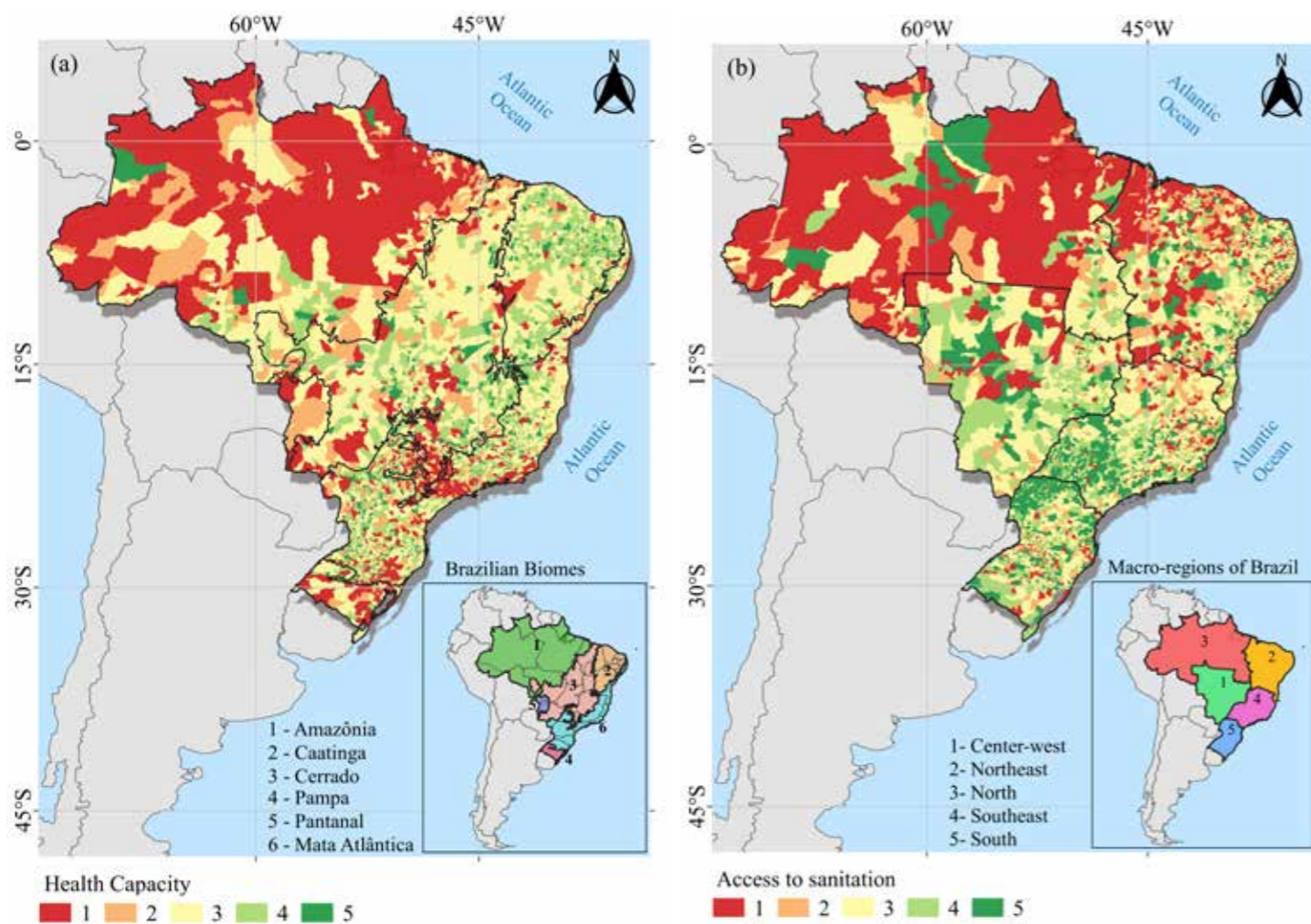


Source: Research indicators, according to methodological note.

From these two dimensions, it is possible to infer the clear spatial relationship between some key variables in this process of development and vulnerability, namely: the biome, the macro-region and the concentration of family farming establishments. The lowest development levels are observed, predominantly, in the Caatinga and Amazon biomes and in the states of the North and Northeast regions, with ramifications in the Atlantic Forest and Cerrado biomes. Precisely in regions where there is a strong presence and concentration of family farming.

Nessa abordagem de análise, fica claro que os agricultores familiares não se diferenciam apenas em relação à disponibilidade de recursos e às limitações de geração de renda e riqueza. In this analytical approach, it is evident that family farmers do not differ only in terms of the availability of resources and limitations in generating income and wealth. They also differ in terms of potentialities and restrictions on the use of acquired learning, such as environmental and socioeconomic insertion, influenced, among other factors, by the location and particular features of the environment in which they are inserted¹⁵. Essential conditions for human development, given the lack of policies integrated with agriculture and the rural environment, such as health and basic sanitation capacities (Figure 4).

Figure 4. Health Capacity (a) and Access to sanitation (b).



Source: Research indicators, according to methodological note.

Note that the North and Northeast regions have, on average, worse conditions in terms of access to sanitation and health capacities. Factors that, as will be detailed below, interact directly with the priority agenda for family farming.

It is, therefore, a holistic view in which agriculture conditions and is conditioned by important dimensions of sustainable development. In this perspective, as Brazil is a federal state with immense biodiversity, it is opportune to analyze the development perspectives, based on these sections of biomes and regions, in different dimensions, as a way of outlining the geopolitical, economic, social and environmental context for the formation of family farming agenda.

It is intended to describe how these regions and biomes behave for different dimensions of development, making it possible to extend the concept of development beyond the material aspect of family farming.

It is also an approach consistent with the elaboration of public agendas, since the federative entities with political, managerial, administrative and self-government capacities are the municipalities, the states, the federal district and the Union. Of these, it is in the municipalities, as the smallest administrative unit, that the variables that make up the outlined dimensions are collected.

These dimensions are summarized as:

- Municipal Development
- Social and Environmental Vulnerability
- Child and Nutritional Vulnerability
- Health Capacity
- Public Investment Capacity
- Operational Capacity in Agriculture
- Technical Assistance in Agriculture
- Women's Engagement Potential
- Educational Potential
- Access to Sanitation
- Environment and Sustainability

Among the possibilities for correcting the asymmetries related to agricultural development, there is the access to technical assistance and agricultural technology (Figure 5). The dimension of technical assistance and technology in agriculture shows that this is a general limitation for all regions, although the worst indicators are observed for the North and Northeast regions. Among the biomes, in addition to the Amazon and the Caatinga, the upper part of the Atlantic Forest and the Cerrado are regions that require greater attention from policy makers.

With regard to emancipatory and essential capacities for the development of quality of life, disparities are also noted at the regional level, in a clear overlapping of vulnerability in areas of concentration of family farming in the North and Northeast regions of Brazil. Among these dimensions, education, and child and nutritional vulnerability (Figure 6) are symbolic, as they particularly affect children and young people who, as will be shown below, form capacities for the intergenerational eradication of poverty and the improvement of the succession process in family farming.

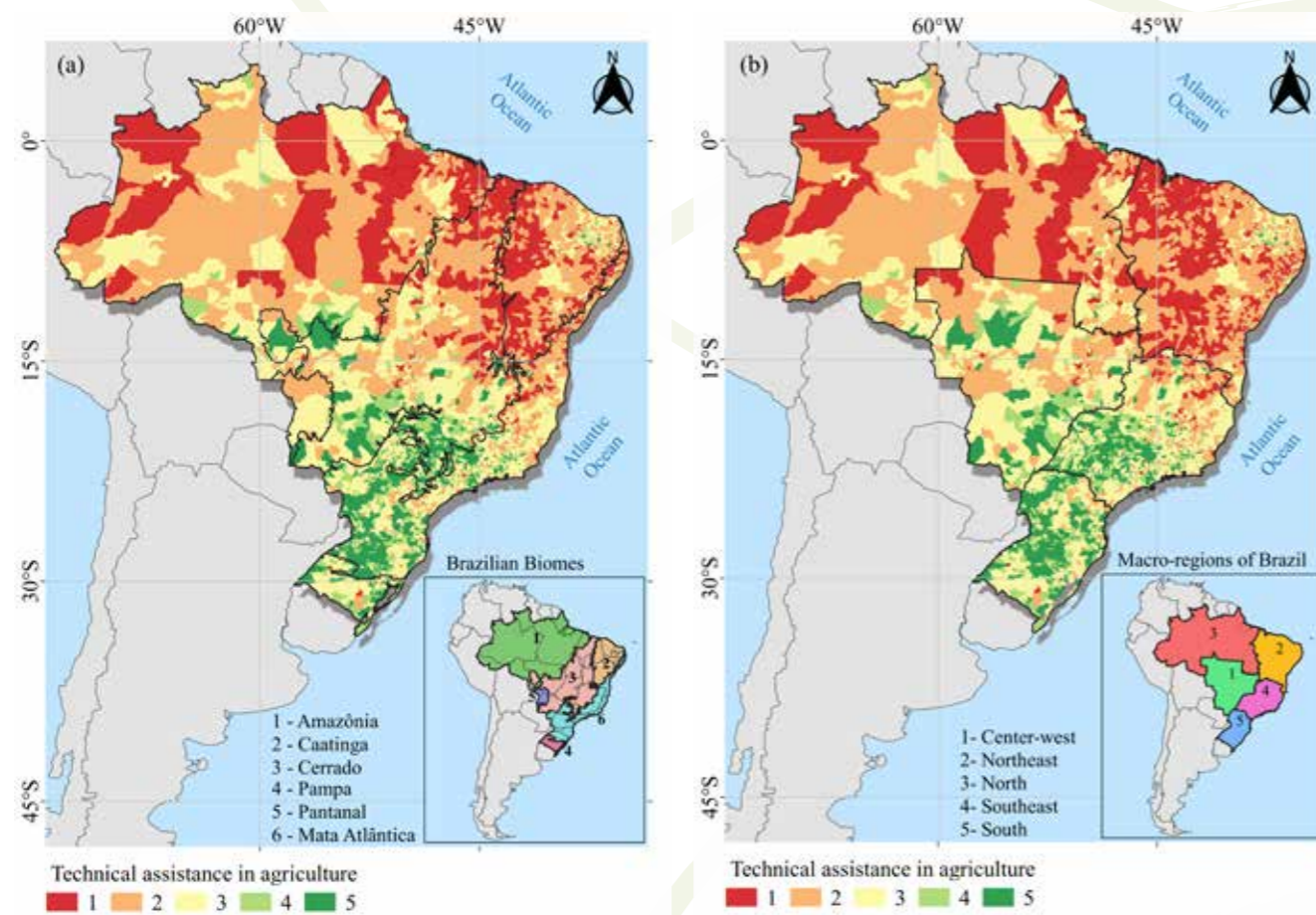


Figure 5. Technical assistance in agriculture by Biome (a) and Macro-region (b).

Source: Research indicators, according to the methodological note

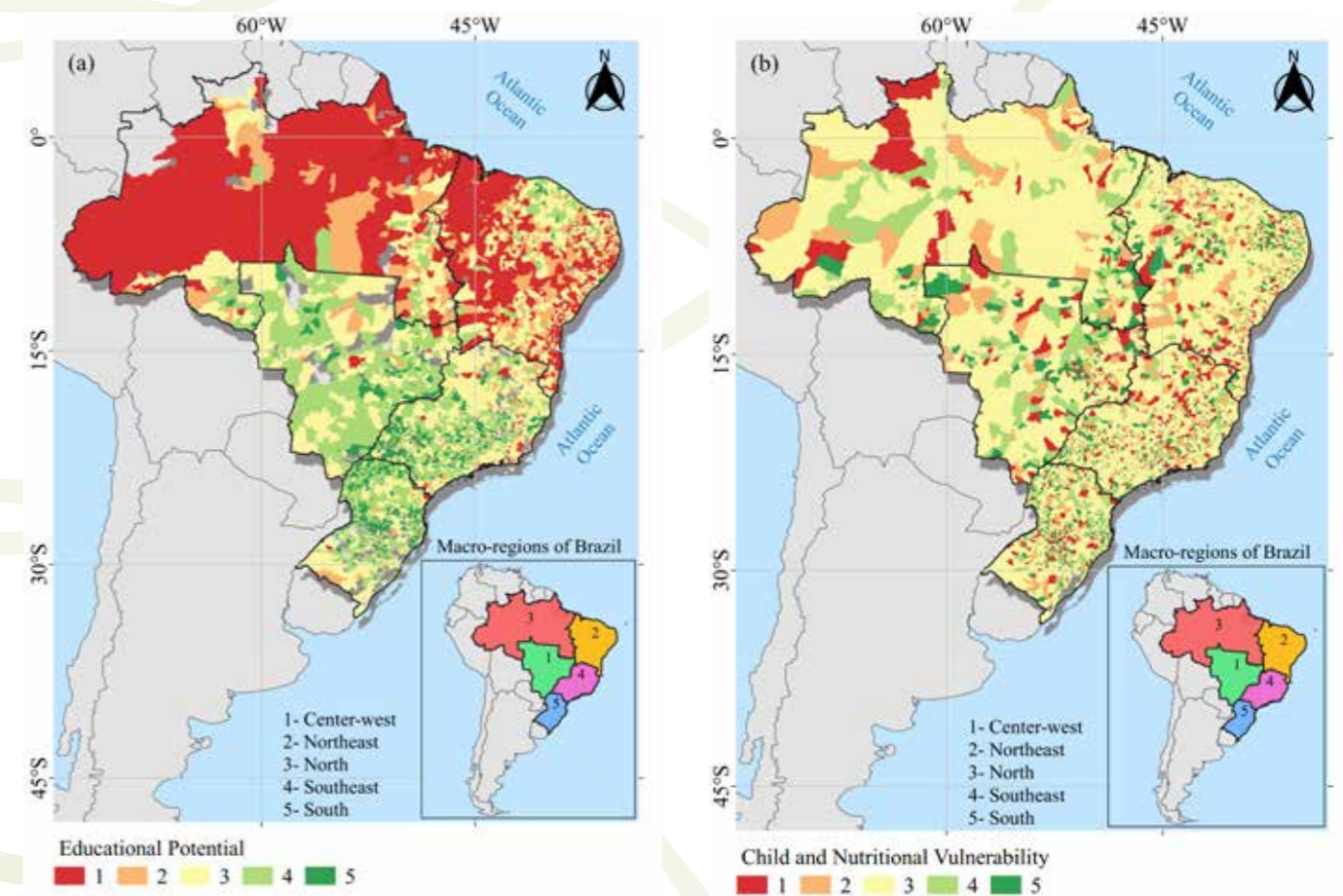


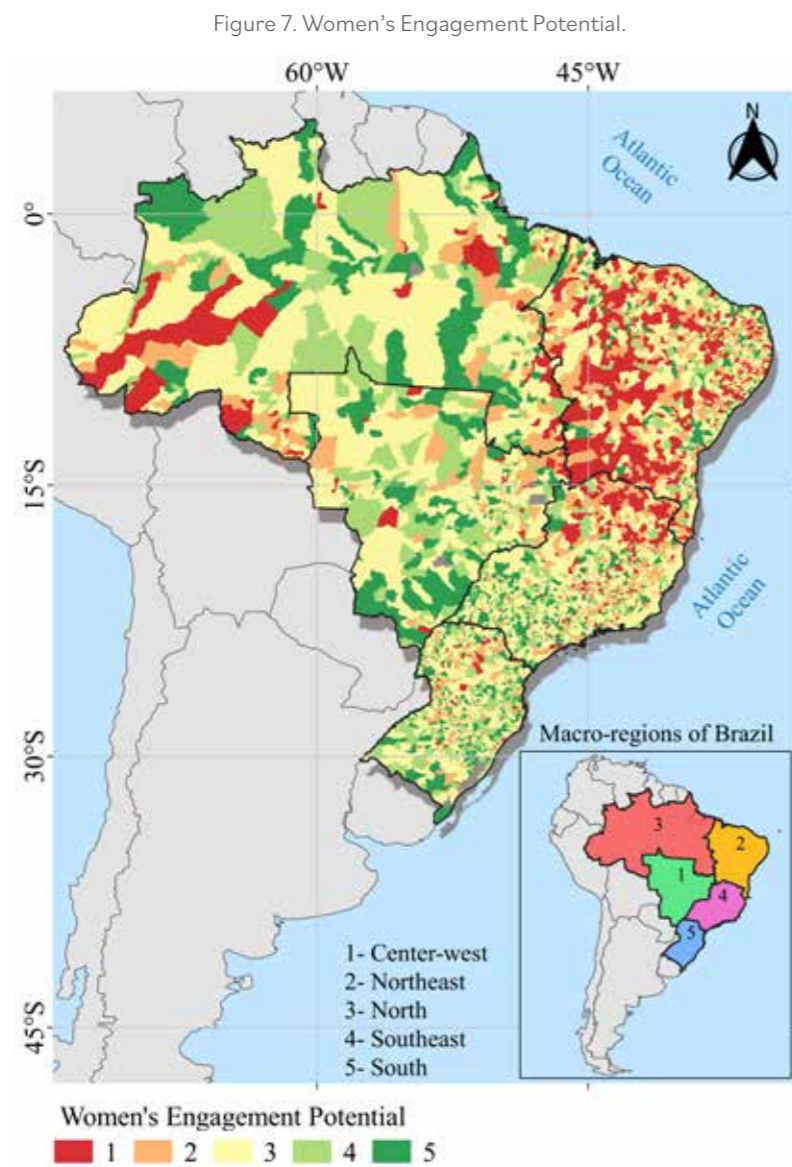
Figure 6. Educational Potential (a) and Child and Nutritional Vulnerability (b)..

Source: Research indicators, according to the methodological note.

These dimensions are also essential to support other cross-cutting agendas that we will discuss later, such as the introduction of technologies, the improvement of the means of production, the active participation of young people, as well as the promotion of actions for gender equality.

When it comes to development, the aspect of inclusion and women's empowerment is necessary to guide any policy aimed at family farming. This requires the existence of capacities to enhance this dimension.

However, it is observed that in the Northeast region, with emphasis on the Caatinga biome, the upper part of the Cerrado and the Atlantic Forest, there are greater contextual limitations for the development of women's engagement potential (Figure 7). Among the elements that contribute to this reality are cultural factors, gender-based division of labor and the historical difficulty women face in becoming protagonists in work activities, especially with regard to family farming. This is not an exclusive limitation of these regions, but it stands out in comparison to the others.



Source: Research indicators, according to the methodological note.

In other aspects directly related to agriculture, some dimensions deserve attention. Among them, the public investment capacity at the local level and the operational capacity of agriculture (Figure 8) reveal great asymmetries, disfavoring the North, Northeast and part of the Brazilian Southeast regions.

The total number of existing tractors, implements and machines per 100 agricultural establishments measured the operational capacity of agriculture. Used as a proxy for agricultural mechanization, it highlights, on the one hand, the intensity of capital and technology as important elements for expanding the productive potential of family farming.

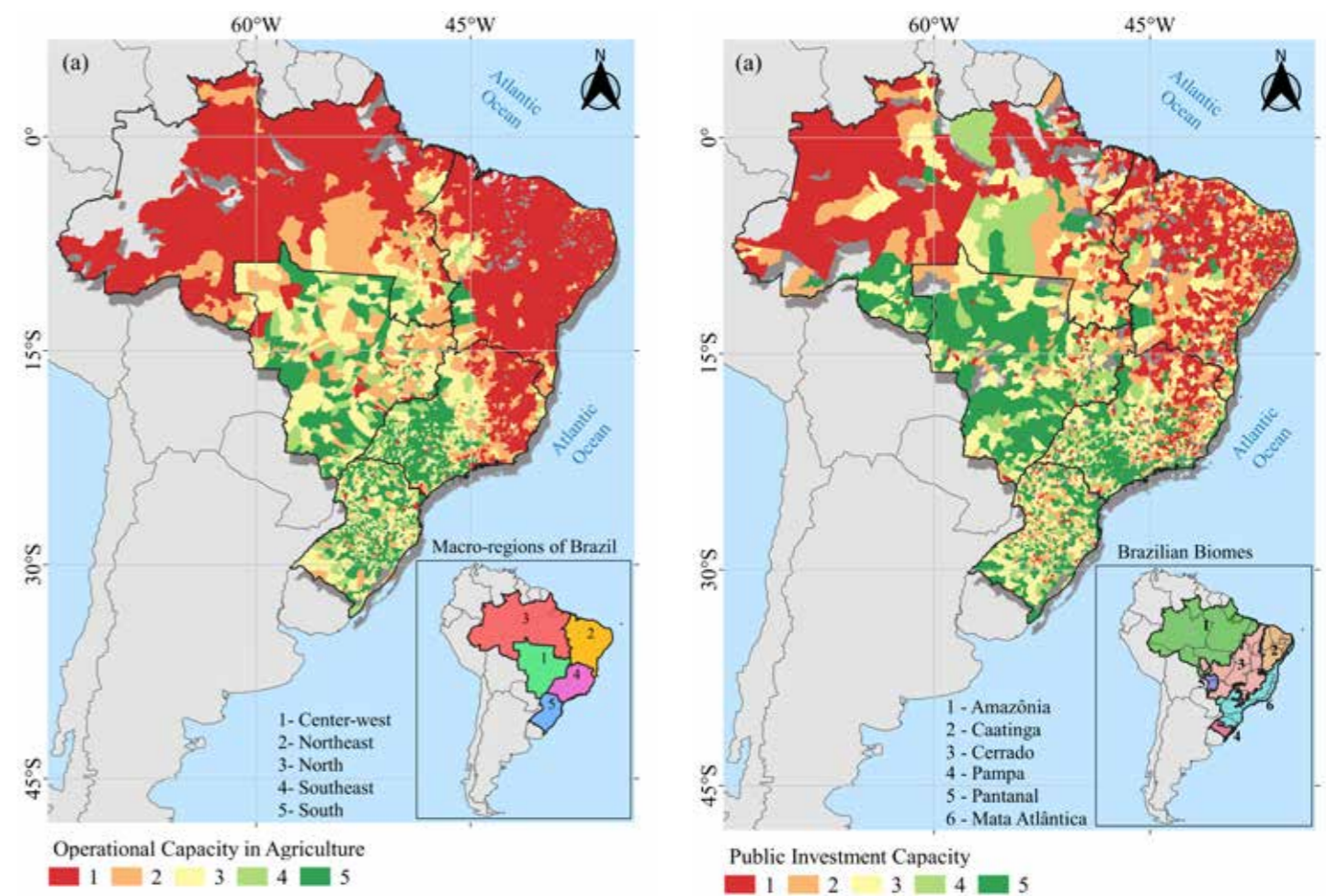


Figure 8. Operational Capacity in Agriculture (a) and Public Investment Capacity (b)..

Source: Research indicators, according to methodological note.

The means of provision with public resources are: local public policy, which demands municipal financial capacity; and budget transfer. The latter, resulting from public policies or budget amendments, especially parliamentary ones. In both, there is a clear disadvantage for the regions of predominance of the Amazon and Caatinga biomes and the upper part of the Atlantic Forest and the Cerrado.

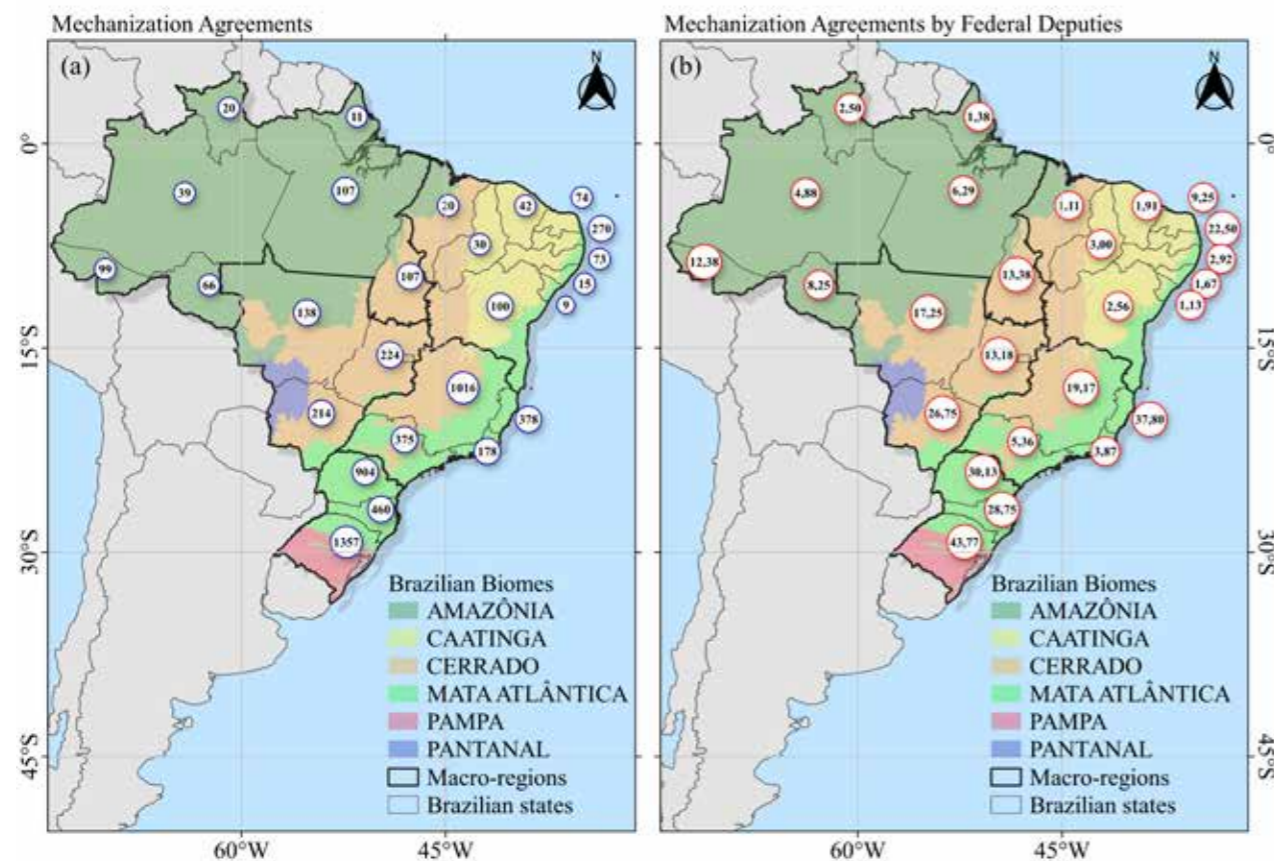
Precisely in those biomes and regions that have lower levels of assistance, the State has limitations in providing and training technical capacities. This can be evidenced by the little success of these regions in signing agreements for agricultural mechanization through budget amendments in the last legislature (2019-2022), as shown in Figure 9.

The least contemplated regions are the North and Northeast, where there is a greater

concentration of family farming establishments, in contrast to the South and Southeast regions. As a relevant part of these demands comes from Federal Deputies and legislative groups, the second part of Figure 9 shows the ratio of agreements to the number of Federal Deputies in each state. It is not surprising that the states of the South, Southeast and Center-west, with few exceptions, were more contemplated.

Considering the idea that amendments are a budgetary resource also aimed at correcting asymmetry and building capacities, a great institutional weakness of this instrument is observed. To illustrate, there are differences in the performance of states such as Rio Grande do Sul, with approximately 44 allocations per federal deputy, and Maranhão, where approximately 1 allocation is observed, on average, for the entire legislature (2019-2022).

Figure 9. Mechanization Agreements (a) and Mechanization Agreements by Federal Deputies (b).



Source: Research indicators, according to the methodological note.

Differences in the recommended and promoted models of agriculture are largely responsible for these disparities. It is evident that the Brazilian agricultural panorama presents strong contradictions, since, in the same territory, two very different models cohabit.

On the one hand, we have high-productivity agribusiness, focused especially on monoculture and exports. On the other hand, there is family farming, which, due to regional disparities and different levels of development, reflects old social problems such as land concentration, lack of infrastructure and poverty in the countryside¹².

Agribusiness and agroecology, based on the sustainable use of natural resources, are antagonistic forms of agricultural activity in terms of their relationship with the environment, established work relationships and the destination of production¹⁶. Encouraged by the state for economic reasons and the media for ideological reasons, the hegemony of agribusiness exacerbates violence against vulnerable traditional communities, such as quilombolas, indigenous peoples and peasants¹⁷. Large corporations involved in agribusiness hold financial resources and develop biotechnology, extending the capitalist model to the agricultural sector, accumulating wealth, promoting environmental degradation, imposing monocultures and encouraging the concentration of land^{16,17}. Practices that are little suited to the environmental conditions of the North and Northeast and to the conditions of family farmers in these localities.

As explained above, it is not just about access to land, but fundamentally about a set of public policies, capacities and potentialities that require the joint efforts of the most different actors committed to the promotion of family farming.

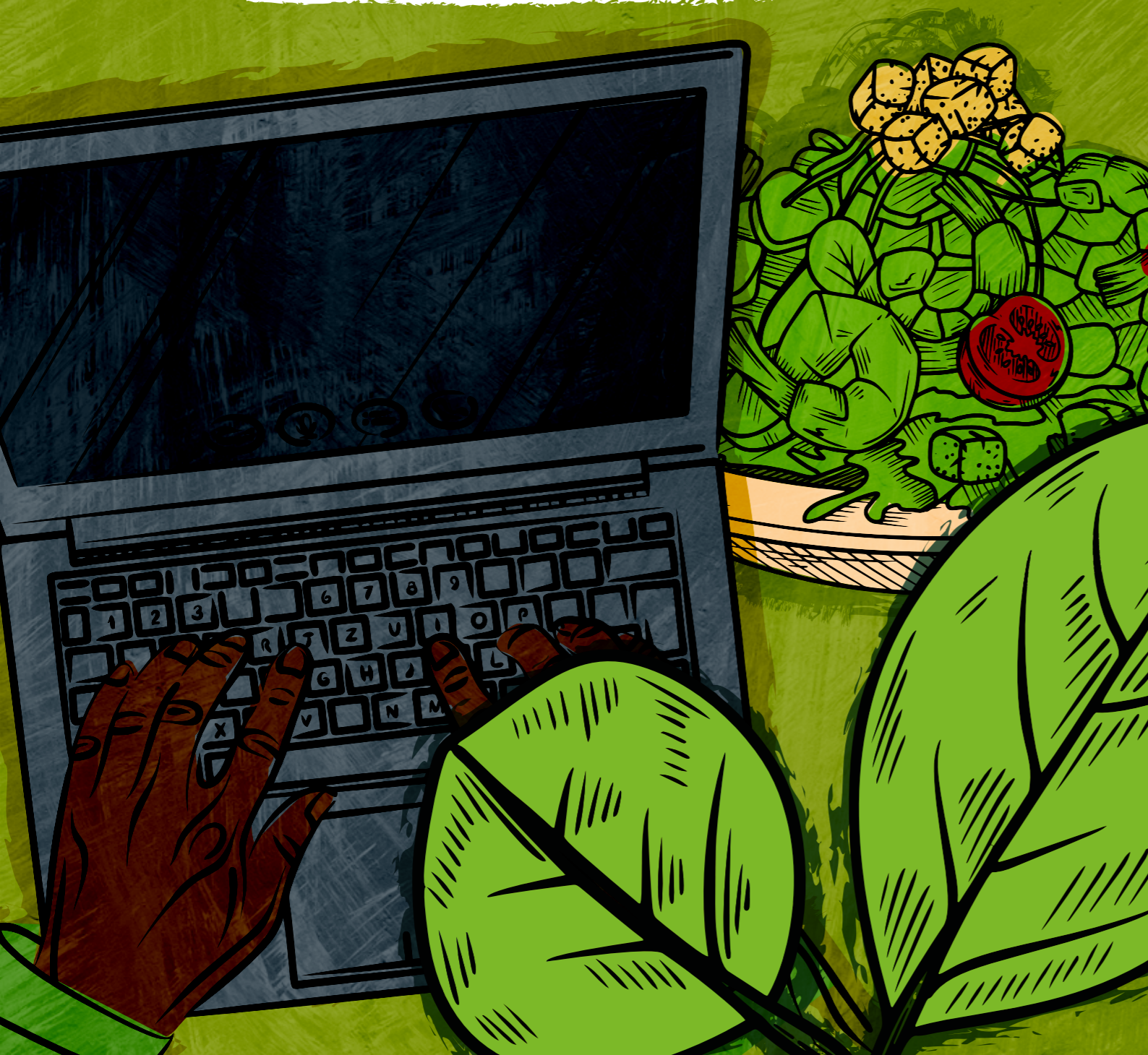
Access to land is one of the necessary, but not sufficient, basic conditions for changing this scenario. It only makes sense if accompanied by access to a set of conditions that alter the local and regional institutional environment, which allow the revelation of the potentials with which each territory can participate in the development process¹¹.

Therefore, in order to achieve the 2030 Agenda and its Sustainable Development Goals, especially those related to the main topic of this document (such as SDG 1 – Eradication of poverty; SDG 2 – Zero Hunger and Sustainable Agriculture and SDG 15 – Terrestrial Life, Terrestrial Ecosystems and Biodiversity), family farming needs to be duly considered in public policy agendas at municipal, state and, fundamentally, federal levels. It is important to highlight that other SDGs are also relevant for family farming, such as gender equality (SDG 5), clean water and sanitation (SDG 6), reduction of inequalities (SDG 10) and action against global climate change - in the case of low-carbon agriculture (SDG 13).

Family farming must drive instead of tow this development process. Therefore, it needs to be well represented in the composition of the first levels of government and in the legislative branch, to participate actively in the budget elaboration, with priority programs and projects for the sector. This obviously requires technical expertise and support from civil society. These questions are favored by the historical moment.

Aiming to contribute to this aspect, the third section of this work discusses some of the central topics for the development of a new public policy agenda for family farming.

THE AGENDA SETTING



The 1990s were remarkable for the formulation of an Agenda for Family Farming (AFF), in particular, with the establishment of state and institutional capacities for the implementation of public policies for the sector.

This became possible in two ways: i) first, through recognition of family farming as a social and political category by the State¹⁸; ii) second, the introduction of important public policies for the sector, such as the National Program for Strengthening Family Agriculture (PRONAF) in 1996.

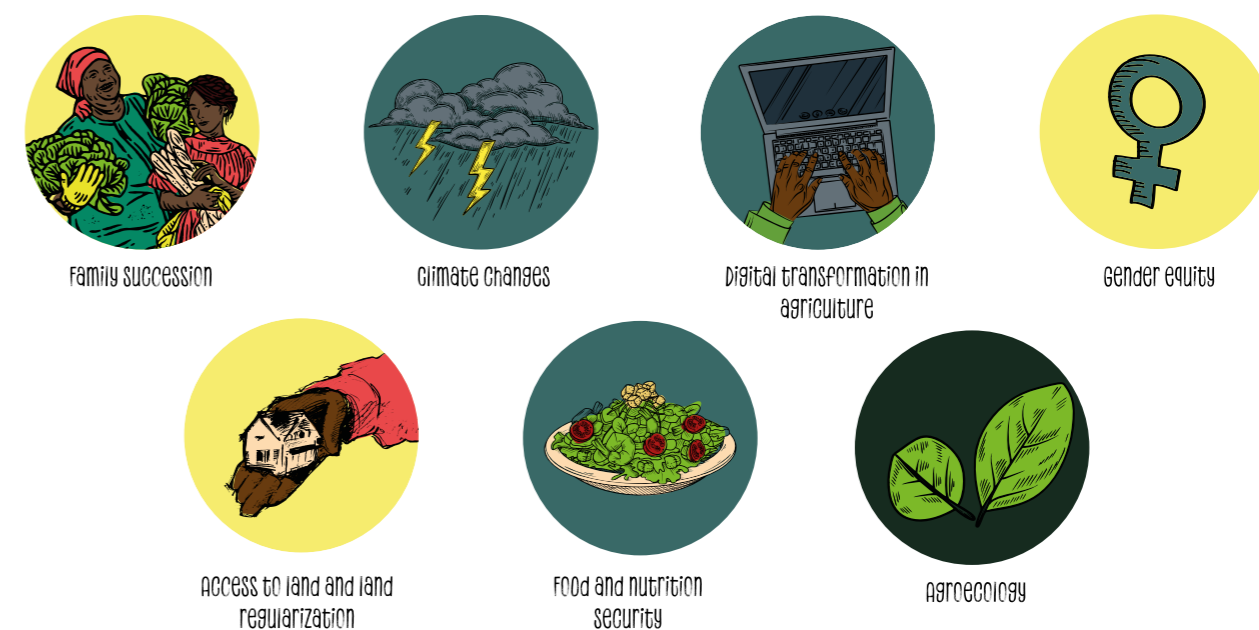
Therefore, from the mid-1990s onwards, Family Farming became relevant in the public policy agenda aimed at agriculture, although this agenda varied according to the current government plan and the governor in office.

Among the most important topics on this agenda, we have chosen the ones that we consider to be decisive for the elaboration of public policies. Among the inclusion criteria are:

- i) the strong presence of these themes in technical discussions and specialized texts in the area;*
- ii) the potential effects on the development of family farming and on the quality of life of rural communities; and*
- iii) the possibility of concrete partnership actions between the public and private sectors, and international and national agencies and organizations.*

O resultante dessa seleção aponta para sete temas prioritários na formação da AAF ao longo dos próximos anos, como esboçado na Figure 10:

Figure 10. Agenda for family farming
Source: elaborated by the authors.



According to the literature consulted, there is evidence that family farming contributes to the improvement of economic, social and environmental sustainability conditions via collaborative strategic action within each of these topics.

Family farming features place it as a central asset in the execution of public policies on topics such as development, environment, sustainability and mitigation of climate change effects. Therefore, it is up to public policy makers, in partnership with the private sector and the third sector, to introduce integrated projects and programs within each of these topics, in addition to structuring transversal actions.

FAMILY SUCCESSION



In formulating the public policy agenda for family farming, generational succession is a problem to be addressed.

This topic is directly related to social issues that the State must face, such as infrastructure, access to quality education and internet, consumption of cultural goods, gender equity and the expansion of economic opportunities and human development for young people who live in rural areas. All of these elements affect, directly or indirectly, the youth's interest in remaining in rural areas and in maintaining and expanding the family's agricultural enterprise.

Recent studies on Brazilian rural development emphasize the intense migration of rural youth who leave the countryside in search of better study

opportunities, decent work conditions and income, with a fixed salary and social security, which implies a trend of rural emptying in the next years¹⁹.

The widespread abandonment from family farming youth, in any region, represents a collapse in the local productive system and the maintenance of the productive and cultural heritage accumulated in the region.

According to the results of the 2017 Agricultural Census, the youngest, aged between 25 and 35, make up 9.48% of the population in rural areas. This number is far below the 13.56% of the previous census. On the other hand, in the 55 to 65 age group, there was an increase from 20% to 24%. This reinforces a weakening pattern of agricultural labor and affects the process of rural succession.

“This requires that policy makers interconnect policies for family farming with other policies aimed at quality of life, gender equity, human development and the inclusion of young people in the daily decision-making of rural enterprises, rejuvenating family farming in the middle and long term”

[Family Succession]

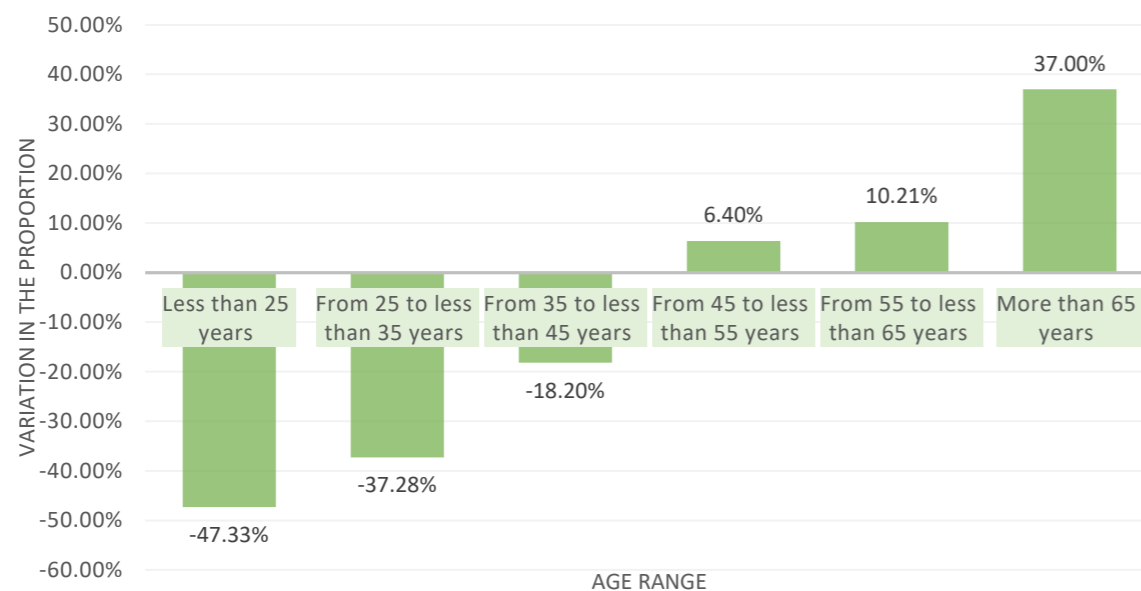
Specifically regarding the northeastern semi-arid region, the comparison between the 2006 and 2017 Agricultural Censuses reinforces the decrease in the proportion of heads of establishments aged up to 45 years, while in the upper age strata, there was an increase in this percentage. This reflects the decrease in the percentage of young heads of agricultural establishments, generating uncertainties about the generational renewal of these establishments (Figure 11).

The absence of successors in family farming tends to generate uncertainties related not only to the continuity of families and productive activities, but also of rural communities, which gradually lose their population and begin to feel the consequences of this change on their social dynamics.

Studies demonstrate some of the main limiting factors or barriers in the succession process in family farming:

- *lack of encouragement from parents*
- *low autonomy in the production process*
- *low level of access to information*
- *low economic revenue*
- *search for study and professional expectations in urban areas*
- *comparison between urban and rural spaces*
- *unfavorable socioeconomic context*
- *gender inequality*
- *difficulty in obtaining, regularizing or expanding land*
- *lack of involvement in the decision-making process*
- *hardship of agricultural activities*

Figure 11: Variation in the proportion of family farming establishments in the northeastern semi-arid region in each age group (of the head of establishment) between the 2006 and 2017 agricultural censuses.



Source: Fortini²⁰.

Social and economic factors considerably influence young people's decision to leave family farming in search of better living conditions in urban centers. In many cases, the low income generated in rural establishments acts as a pressure factor for choosing urban work, even in precarious conditions, as highlighted by several authors²⁷⁻³⁰.

In many cases, rural exodus is not an option, but a need for survival and, sometimes, for family support. For this reason, the option for young people to stay on the rural

property or leave it is not simple, as the social context interferes in this decision-making process²⁵.

This requires policy makers to interconnect policies aimed at family farming with other policies aimed at quality of life, gender equity, human development and the inclusion of young people in the daily decision-making of rural enterprises, rejuvenating family farming in the medium and long term.

DIGITAL TRANSFORMATION IN AGRICULTURE



Information and communication technologies (ICTs) are a set of integrated technological resources that provide, through hardware, software and telecommunications functions, interactions between people, business, research, and teaching and learning processes¹⁹.

It is known that digital technologies play an important role in agriculture as a whole and, in a special way, in family farming. The selection of suppliers, including joint purchasing, training and commercialization, has been significantly modified in the last two decades with the revolution experienced in the field of ICTs.

Farmers purchase products via joint purchase platforms, learn about improving planting, harvesting and processing techniques with online courses, and sell their products through websites, sales platforms or marketplaces, technologies that were intensified during the period of coping with the Covid-19 pandemic.

Currently, family farmers have the opportunity to participate in higher value-added distribution chains and even in international markets with the use of ICTs.

However, due to different access conditions, the use of technologies is still not commonplace in Family Farming. In large-scale agricultural production, the use of ICTs and precision agriculture, on the rise with the implementation of 5G technology in Brazil, establishes another stage of

modernization of agriculture, placing it in correspondence with the most modern in the world. At the other extreme are those who are excluded from this process of advancing ICTs. The gap between those who still lack basic infrastructure, such as access to the Internet, and those who have taken advantage of this process increases in many regions.

Many family farmers, especially those linked to associations and cooperatives, or benefited from development projects by NGOs or international agencies, are able to participate in this process through collective actions.

It is necessary to point out a series of elements that limit the advancement of ICTs among family farmers, several of which were mapped in studies^{31, 32} among which we highlight:

- *Cultural aspects;*
- *Low involvement and participation of farmers ;*
- *Low level of education of farmers;*
- *High costs;*
- *Lack of adequate infrastructure, including quality internet access and*
- *Resistance or distrust;*
- *Lack of adaptation of technologies to the local context.*

Digital inclusion goes through the process of appropriation and adherence to ICTs by family farmers as a strategy to expand their own capabilities, as well as to develop new skills, which requires overcoming the highlighted limitations. It is not just about acquiring technological resources for interaction and communication, nor about bringing the internet access to family farmers. This is a necessary but not sufficient condition for inclusion. It is important to introduce these technologies in the scope of education and training contextualized to different local realities.

Digital inclusion in the countryside requires investment in infrastructure, availability of fixed internet, access to smartphones and quality internet, in addition to encouraging the private sector and partnerships to expand connectivity in the countryside³³.

In the context of Covid-19, numerous

potentialities have emerged in terms of digital inclusion in rural areas. Elements such as access to the radio, one of the main means of communication used in the field, remote assistance to farmers, as well as the use of messaging applications, enabled the continuity of technical assistance, carried out remotely, conveying timely and quality information to farmers³⁴.

In addition to ICTs, technology in rural areas is also related to access to electricity. In the case of the state of Maranhão, for example, most family farms still did not have access to electricity. Although the Agricultural Census indicates that, in general, there was an increase in access to this type of service, more than 16% of Brazilian family farmers did not have electricity in 2018, with greater concentration in the North and Northeast regions.

“For the greater reach of ICTs among farmers, government and civil society must propose a quick and effective modernization agenda in this area. This is an agenda for digital inclusion and technological adherence that will require a synergistic composition of different sectors of society”.

[TRANSFORMAÇÃO DIGITAL]

Thus, for the greater reach of ICTs among farmers, government and civil society must propose a quick and effective modernization agenda in this area. This agenda for digital inclusion and technological adherence will require a synergistic composition of different sectors of society, with the effective participation of different agencies and public bodies.

It is also about adapting to new consumption patterns, in line with sustainability and good production practices. Elements that are currently managed by traceability, certification of origin and other attributes that, in the ICT environment, add value to family farming.

Therefore, the intention is to move from a pattern of digital exclusion to a pattern of synergistic use of ICTs in a sustainable way for social, economic and environmental benefit.

Locations with higher poverty rates, notably more distant from the technological frontier, have more opportunities for growth and value generation when they manage to access investments for innovation and the improvement of the means of production. Access to these resources and the presence

of institutions facilitating this process strongly contribute to local development³⁵.

Some projects, such as AKSAAM, the result of a partnership between IFAD and the Federal University of Viçosa - UFV, demonstrate that achievements in this area are possible, and that it requires the engagement of other public and private bodies to enhance coverage and effects.

There is a strong connection between technology and family succession agendas, since ICTs directly influence keeping young people in the countryside, expanding horizons of well-being, learning and work. Conditions that are the basis for quality of life and human development.

The sociability of rural youth in interaction with different users, mediated by the digital connection, promotes in their imagination a relationship of autonomy regarding their decisions. That is, the expansion of social and interactive spaces promotes social legitimacy in the face of the territory¹⁹.

ACCESS TO LAND AND LAND REGULARIZATION



Access to land is a human right necessary for the full realization of a series of other rights. Therefore, it is a human right that unifies and enables other basic constitutional precepts, such as life and human dignity³⁶.

In this way, democratic access to land is a central topic on the policy agenda for family farming, either by unlocking the farmers' own capacities to carry out their activities, or by enabling them to envision perspectives for growth and improvement in the quality of their livelihoods. These perspectives are nourished by the appropriation of economic residues derived from the individual or collective productive use of the land.

However, access to land goes far beyond having a piece of land for planting, since property has an even greater value of conquest and achievement in the imagination of farmers. For

“the resurgence of the debate on the redemocratization of access to land, as an inducer of quality of life, social development and human dignity, must be understood as one of the major inflection points in public policy between the current government and the one that preceded it”

[Access to land and land regularization]

traditional peoples and communities, land has a sacred value and their right to the land they traditionally occupy is constitutionally guaranteed. Therefore, it is more than a simple legal or economic formality of property rights. It is a matter of self-fulfillment by making the property the breadwinner of the family. For this reason, the Brazilian Federal Constitution assures indigenous peoples and quilombola communities (art. 68 and 231) the precedence and prevalence of tenure³⁶. Land tenure, as a fundamental right, goes beyond physical aspects and determines a range of social, economic and environmental possibilities aligned with the concept of development and sustainability in its multiple aspects.

For this reason, the issue of demand for land and existing agrarian conflicts will require the reformulation of the main policies associated with the agrarian issue, stimulating multisectoral proposals for the qualified resumption of Agrarian Reform in the AFF.

In this area, the resurgence of the debate on the redemocratization of access to land as an inducer of quality of life, social development and human dignity must be understood as one of the major inflection points in current public policy, since, in recent years, there were no significant advances in this agenda.

Historically, Brazil has a low percentage of regularized properties and little integration between public policies for access and productive use of land, especially for small properties. This is why agrarian reform and land tenure regularization demand central space on the public policy agenda of the three spheres of government.

It is no coincidence that in several rural regions of the country, there are permanent conflicts over access to and use of land. Family farmers are among the most vulnerable groups in this regard.

Between 1985 and 2019, Brazil implemented 9,367 settlement projects with the capacity to include 1,076,939 families. That means 78.3 million hectares of land, that is, 9.2% of the national territory. Although relevant, it was not enough to change the highly concentrated land structure³⁷.

The percentage of owned land in Brazil is relatively low, with a disadvantage for the Northeast region where the property does not reach 80% of the total. The highest percentage of concession by land agency is observed in the Center-west region, where the size of the property is above the national average. Among farmers who do not have the definitive title to land

ownership, more than 83% belong to Family Farming³⁸.

Furthermore, there is a large concentration of land in the hands of a few, as demonstrated by the Gini index of the distribution of land tenure in Brazil, which equals 0.73. The 10% largest properties occupy 73% of the area and the 90% smallest properties occupy only 27% of the agricultural area, reinforcing existing disparities. In all Brazilian states, the 10% largest properties hold more than 50% of the area. In six states and in MATOPIBA (Maranhão, Tocantins, Piauí and Bahia) the 10% largest properties are equivalent to more than 70% of the area³⁹.

Precisely in the North and Northeast regions, where there is a significant concentration of smaller family farming establishments, the concession rate is slightly higher than the average, as shown in Figure 12.

The precarious means of access to land are worrying in these regions. In the North and Northeast, occupancy rates are approximately 3.9 and 3.6%. These regions also stand out among settlers and concessionaires, with the state of Maranhão leading with 9.3% of the total, followed by Ceará (8.2%), Bahia (7.8%) and Piauí with 6.5%⁴⁰.

On the other hand, several studies have supported the positive relationship between the number of domain titles (DTs) and the value of production and planted area in the Brazilian states. Therefore, the strengthening of property rights, through development policies, tends to contribute to the economic development of agriculture⁴¹.

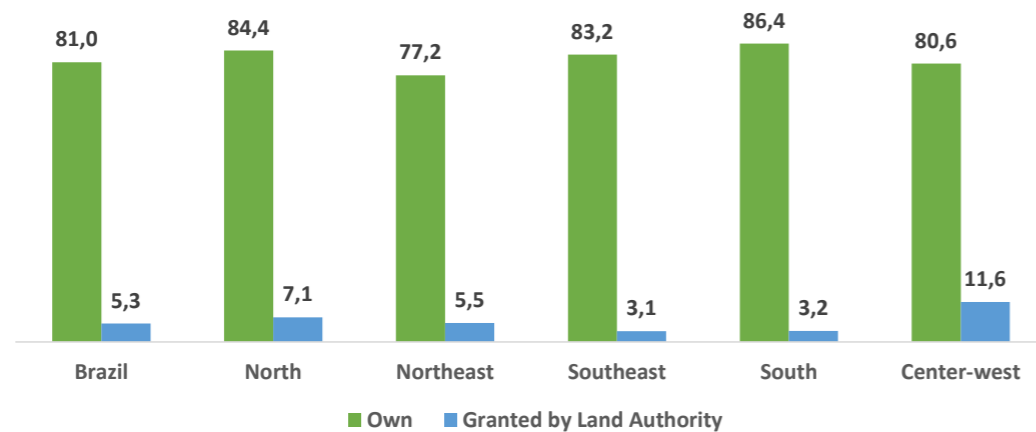
For family farming, the establishment of public policies for land tenure regularization is essential for maintaining conditions for sustainable growth, particularly in the North and Northeast regions. These actions would aim to guarantee legal, social, economic and environmental security for farmers, based on the ownership and productive use of the land.

Several studies reinforce the contributions of land regularization to development. Among these contributions, the following stand out: better execution of environmental inspection, increased productivity, reduced deforestation and a more efficient use of land⁴¹.

The results indicate that some of the recent measures focused on land regularization, such as MP 910/2019, are not linked to data that favor vulnerable and excluded groups in Brazilian agriculture and, therefore, are not considered efficient³⁹.

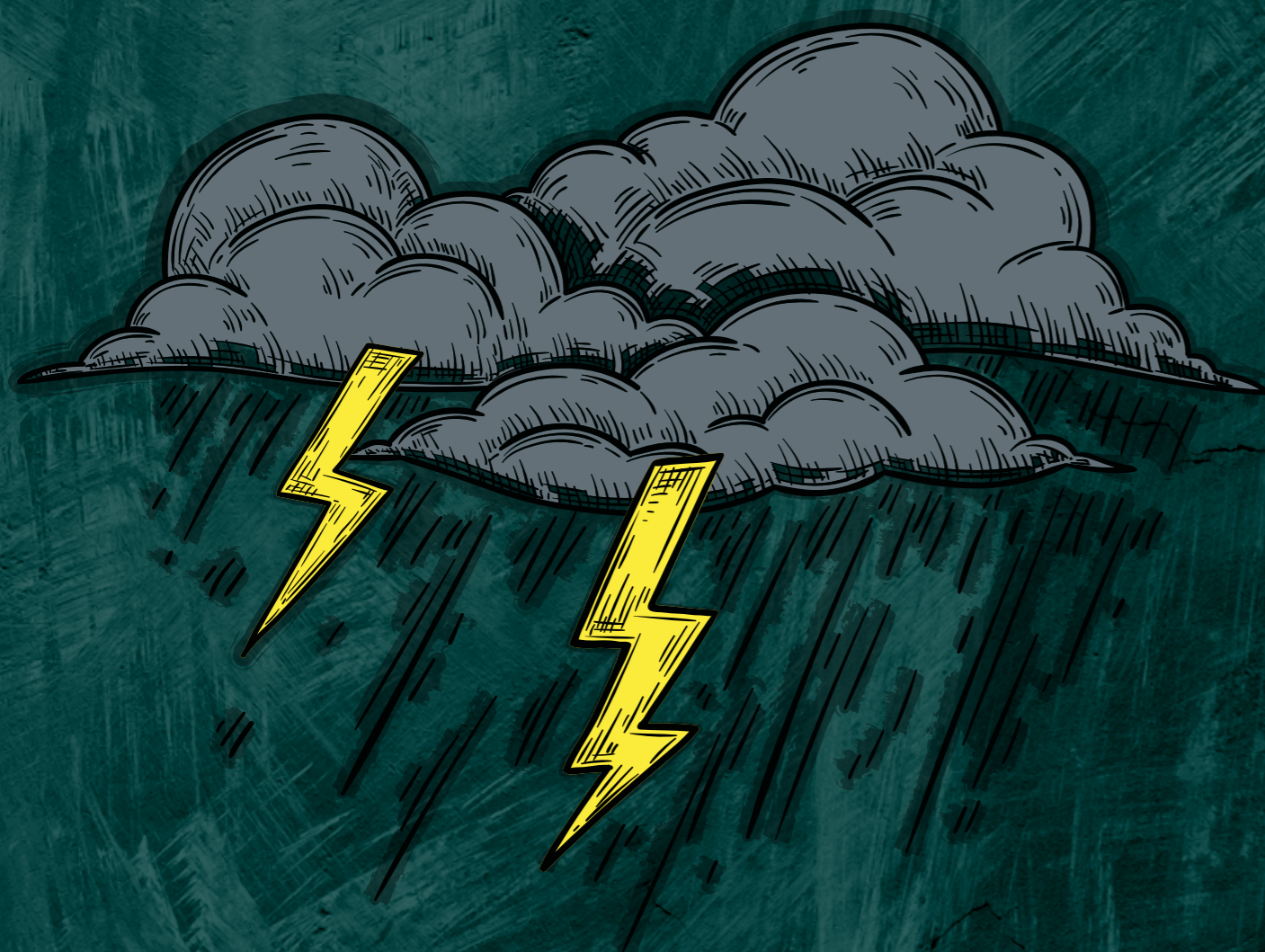
Furthermore, it is not just a matter of land tenure, but also of having access to the means of sustainable production to achieve the desired levels of development and quality of life. There is a need to connect the National Agrarian Reform Program (PNRA) to promotion strategies, such as credit, access to technology, technical assistance and the sale of family farming products. Especially in the search for markets with greater benefit for agricultural production.

Figure 12. Percentage of own establishments and with land concession.



Source: IBGE.

CLIMATE CHANGES



Climate change manifests itself in different ways, among which global warming stands out⁴². The average global temperature in the year 2022 was already more than 1°C higher than the average temperature between 1850 and 1900, and the period 2015-2022, was the hottest on record⁴³.

Behavioral and social theories of well-being explain how people's feelings and functions depend on how they relate to their environment and how they are enabled and limited by their environmental and social impacts⁴⁴.

Despite the uncertainties that still exist in the debate on climate change, they can be considered the biggest global environmental problem today. They cause severe effects on public health, on the availability of water and energy, on the regularity of rainfall, and cause extreme weather events^{45,46}.

These aspects have a direct impact on the living conditions and means of production of family farmers, indigenous peoples and traditional communities. This population is already impaired in terms of access to basic services, such as access to potable water, sewage and solid waste collection.

Recent studies have shown that climate change also has negative effects on conditions of vulnerability, development, food and nutrition security, and well-being⁴⁷⁻⁴⁹. Climate change can aggravate social exclusion and increase competition for scarce natural resources, in addition to forcing migration, increasing violence in the countryside and insecurity in its multiple aspects⁵⁰.

Therefore, the relationship between climate change and food and nutrition security reinforces negative expectations

“There is a need to implement cross-cutting public policy agendas, due to the multidimensional nature of the problem and the fact that climate change is contributing to the advancement of hunger and vulnerability. Among the transversal aspects are poverty, access to technologies and technical assistance, access to land and means of production, in addition to educational and health capacities for building resilience conditions”.

[Climate changes]

for development, especially for developing countries such as Brazil, if short- and long-term public policies are not promptly implemented.

Climate change interferes with the material circumstances in which people live, including the infrastructure and ecosystems through which people access goods and services such as clean air, education, energy, family and friends, food, health, housing, water and work⁴⁴. Therefore, it is not just about production, food and survival in rural areas. It concerns the condition of survival with human quality and dignity. In this regard, it is important to emphasize that Brazil has suffered several episodes of natural disasters in recent years, in which climate change is attributed to one of the catalyst or conditioning elements.

Regions with a lower level of development, such as the North and Northeast of Brazil, are potentially more vulnerable and,

therefore, are more susceptible to the consequences of environmental changes in levels of well-being and quality of life. As highlighted by Alpino and other authors⁴⁷, climate change affects more intensely populations in poverty that face greater social inequality.

As demonstrated in the previous sections, the Brazilian regions with the lowest level of development and the highest level of vulnerability are also those most prone to the negative effects of climate change. Among these effects is the reduction of nutritional and health conditions^{49,51,52}. More specifically, the intensification of water scarcity in biomes more susceptible to droughts and desertification processes, such as the Caatinga, has more potentially harmful effects on food security and social vulnerability.

Among the factors that intensify this vulnerability are the advances in agribusiness and mining activities in some regions, generally associated with deforestation and water contamination. Consequently, the means of production of family farmers, indigenous peoples and

traditional communities are negatively affected. Deficiencies in access to public sanitation policies, such as potable water, sewage and regular garbage collection, aggravate this situation.

These are factors that reinforce the need to implement cross-cutting public policy agendas, due to the multidimensional nature of the problem, and the consideration that climate change is contributing to the advance of hunger and vulnerability in Brazil and in the world⁵³. Among the transversal aspects are poverty, access to technologies and technical assistance, access to land and means of production, in addition to educational and health conditions.

These factors are potentiated by climate change. In this regard, several works present evidence of the inverse relationship between climate change and the level of human development, health conditions and quality of life ^{48,51,52}. There is a clear link between climate change, agricultural and fisheries productivity, as well as negative effects on nutrition, health and food security⁵⁴.

The comparison between data from the 2006 and 2017 Agricultural Census indicates a decrease in the percentage of family farming establishments in the Northeastern Semiarid Region. Among the aspects that may have contributed to this, there is the drought that affected the Northeast between 2012 and 2017, leading many farmers to cease their activities. In addition, most establishments that closed their activities were those with an area of less than 0.1 hectares (ha), revealing the economic vulnerability that affects these farmers.

Thus, family farming is one of the sectors with the greatest urgency in introducing public policies to adapt to climate change. For family farming whose production is labor intensive, there are very pessimistic projections about the impact of climate change, in particular on the capacity and productivity of human labor, with the expectation of imposing new challenges on production and productivity.

It should be noted that agribusiness is closely linked with the degradation and contamination of the environment, directly

reflecting on the health of the population. The expansion of this segment may put biomes such as the Cerrado, Amazon, Caatinga and Atlantic Forest at risk, contributing to the loss of biodiversity and the reduction of native vegetation cover⁵⁸. On the other hand, family farming is a sustainable alternative as it does not degrade the environment and enables a reduction in greenhouse gas emissions.

In this way, the urgency of actions to mitigate the effects of these climate changes on family farming is evident and, through it, for global benefit. The current scenario demands sustainable agricultural strategies through integrated public policies and strategies to increase resilience in vulnerable regions, such as the North and Northeast, mainly. The ability to guarantee food security and nutritional adequacy in the face of climate change will be one of the determining aspects for the future of this century and, therefore, must occupy a central place in the development of public policies and in the formation of state capacities.

GENDER EQUITY



Data from the 2017 Agricultural Census indicate that women headed less than 20% of agricultural establishments in Brazil. The gender ratio was more balanced in establishments with an area of less than 1 hectare (ha), where the ratio was 2 men to 1 woman. However, in the Northeastern Semiarid region, there was an increase of more than 48.5% in the proportion of women heading family farming establishments, revealing female empowerment and the need for their inclusion in the decision-making process inherent in the sector.²⁰

Gender inequality in the leadership of agricultural establishments is noticeable for all age groups, as shown in Figure 13. Still, about 25% of rural women could not read or write⁴⁰. These data reveal that the reality of women in rural areas is still marked by low access to essential public services, such as education, in addition to gaps in their ability to act in a leadership position in establishments.

It is important to emphasize that race and gender discrimination are not exclusive phenomena, highlighting the intersectionality of the theme⁶². This perspective demonstrates that oppression and domination are intertwined aspects in different generations, especially for black

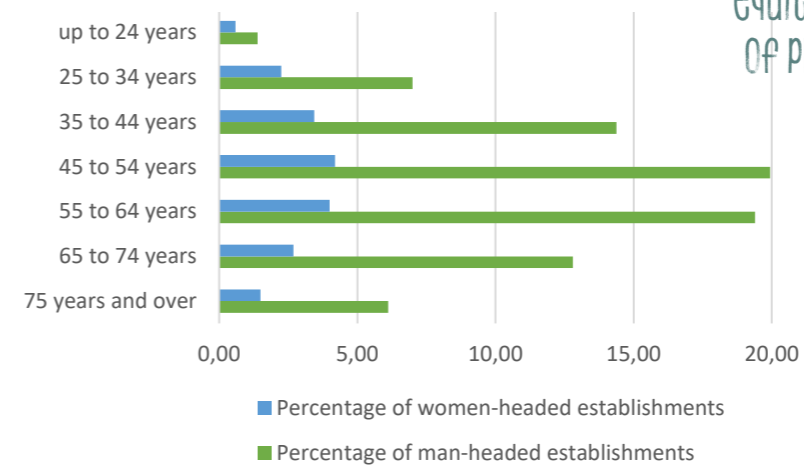
women, quilombolas (afro descendants) and other vulnerable population segments that face oppression in its most diverse ways⁶³. Data from the Violence Map reveal that the black population is the main victim of homicides in Brazil, with an average of 23% more black women being murdered than white women⁶⁴.

Despite the growing debate about women's empowerment in rural areas, this is still an incipient subject that needs attention from managers in the formulation of public policies. On a daily basis, women are responsible for food, clothing and hygiene for the family, in addition to other activities considered less important in daily work, playing a subordinate role and supporting the activities of men, even if their workload is similar. The invisible

“It is necessary to develop cross-cutting capacities in policies, enabling women to play a greater role in the daily activities of family farming, with active participation in aspects such as production, commercialization and investments. In addition to programs that promote equity in access to land, means of production, technology and elements that promote quality of life”

[Gender equity]

Figure 13: Percentage of agricultural establishments by sex and age of producer.



Source: Based on the results of the 2017 Agricultural Census.

work of women in the countryside is still a hindrance to its recognition, despite its undeniable importance for the survival of the family^{65,66}.

Cultural issues related to the daily lives of past generations contribute to the fact that even today women are left in the background, making it impossible for them to be an active agent in changing their reality⁶⁷.

With the modernization of agriculture and the decrease in the workforce, male dominance is reproduced to the extent that men are responsible for investing in new technologies and technical support, managing resources, carrying out sales and contracts, among other important actions in the rural sphere⁶⁸. In this sense, there is an overlap between the positions of father, farmer and head of the rural establishment, with the man being the provider of the family and the holder of the means of production^{66,69}.

Thus, the dynamics of family farming, even with the advances experienced, is still marked by gender differences. Added to this is the lack of expressive data on rural women, where many of the available data are not disaggregated by household status (whether rural or urban). In addition to hampering the creation of targeted public policies, the lack of data contributes to the

invisibility of women in the agricultural sector. Consequently, rural women are still little considered in social and economic development policies⁷⁰. This gender inequality persists even in access to public policies, as is the case with Pronaf⁷¹, proving that the male role in tasks is reinforced and fed by traditional rural values.

The issue of gender in rural areas is also related to migration processes, where the departure of young people (including women) to cities contributes to the masculinization and aging of the rural population, in addition to increasing problems related to the generational succession of agricultural establishments⁶⁹. The greater the division of tasks based on gender and the more segregated women are in carrying out agricultural activities, the lower the chances of them being successors in productive activities. With the decrease in the birth rate, this situation directly affects the continuity of establishments and the success of succession processes.

To change this situation and promote gender equity, some authors highlight, among other strategies, the importance of agroecology insofar as it considers the power dynamics present in food systems and opens up space for effective female participation in production,

commercialization and management of surplus products, in addition to contributing to rural development⁷². Furthermore, it is worth highlighting the growing movement of women's refusal of the production model that reproduces gender inequalities, driven by greater access to information technologies^{73,74}.

Greater female participation in rural credit access programs, enabling improvements in production units without greatly compromising the family budget, in addition to investing in technical training for female farmers and inclusion in other government programs, are also strategies that enable female protagonism in family farming⁷⁵. Equity in access to land, education, leisure and culture are also important for female farmers to remain in rural areas, in addition to generating jobs and income for families⁶⁶.

The collective involvement of women through the creation of associations, participation in social movements and holding debates, enable collective learning and, consequently, can provide important transformations towards women's autonomy and their greater engagement in family farming⁷⁶.

Therefore, it is necessary to develop cross-cutting capacities in policies, aiming to enable women to play a

greater role in the daily activities of family farming, with an active participation in aspects such as access to tangible resources (production, goods, credit, access to markets) and intangible resources (knowledge, new skills). It is also necessary to create programs that promote equity in access to land, means of production, technology and elements that promote quality of life.

Rescuing women's self-esteem and self-confidence, creating associations, encouraging professional qualification and technical training for women, as well as greater access to government programs, are important strategies for promoting gender equity. It is worth mentioning that for successful policies it is also necessary to make available data that really represent production and establishments from a gender perspective, in an effort to make women visible in family farming, enabling the understanding of existing gaps that demand attention..

FOOD AND NUTRITION SECURITY



Initially perceived as an individual issue, based on health aspects, food and nutrition security became a central topic of public policy, considered as an object of struggle against inequality and social vulnerability. Healthy and adequate food is a fundamental right of citizens, directly affecting health, well-being, work and quality of life.

This right goes beyond the act of eating, also involving access to quality food with the necessary nutrients to guarantee good living conditions⁷⁸. In addition, the concept of food security presupposes food free of contaminants, with diversity, high nutritional value and respect for the culture and human rights of citizens.

The consequences of food insecurity and the multiple forms of malnutrition – malnutrition (chronic and acute), overfeeding (overweight and obesity) and the so-called “hidden hunger” (lack of micronutrients), triggered numerous public policies and intersectoral actions in Brazil⁸⁰. As an example, we highlight the creation of the National School Feeding Program (PNAE) and its articulation with

“Policy makers need to be aware that food and nutrition security in family farming is not limited to providing means of access to food, but fundamentally to its production and equitable distribution, in addition to establishing adequate public capacities to meet the needs other dimensions of human development”.

[Food and nutrition security]

family farming and public purchases. The PNAE establishes that at least 30% of the resources for school feeding transferred by the federal government to municipalities and states must be used directly in the acquisition of products from family farming. The program present inducing actions, both for the local agricultural production and for the nutritional quality of food in schools and public organizations. This is true especially because a large part of this production is developed in agroecological systems.

Also noteworthy is the Food Acquisition Program (PAA), which promotes access to healthy and diversified food and the strengthening of family farming. These two programs constitute important means of promoting food and nutritional security, converging towards a society that is more respectful of current and future generations.

In this context, some important actions deserve to be highlighted. First, there is the Catrapovos Brasil, a commission formed by government institutions, indigenous leaders, traditional communities and civil society organizations aimed at promoting adequate nutrition in indigenous and traditional communities. Since its inception in 2016, more than 60 types of traditional foods have been included in school meals, benefiting around 24 cities in the Amazon and nearly 20,000 students⁸³.

Also noteworthy are the actions of the PAA aimed at rescuing and commercializing underutilized or neglected local and regional products, contributing to better nutrition for students. Such actions duly value indigenous peoples and traditional communities, recovering their knowledge and culture, in addition to promoting greater training for them.

There is also the materialization of a series of experiences associated with PANCs – Non-Conventional Food Plants, with the production of materials and booklets by public and private organizations and their adoption in practices to promote food and nutritional security.

Food and nutrition security becomes an important tool to achieve national food sovereignty, favoring family farmers in accessing institutional markets. Therefore, an intrinsic relationship is observed between family farming and food and nutritional security within the scope of Brazilian public policies.

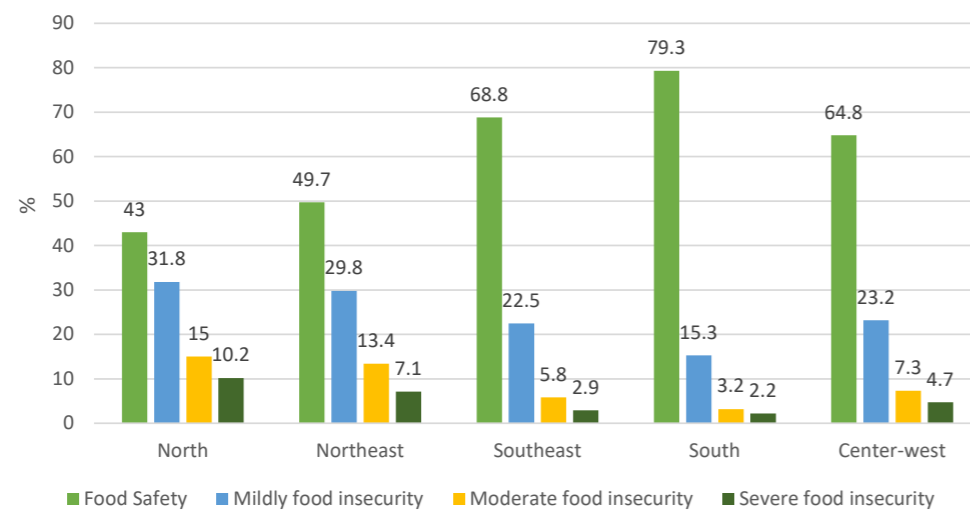
However, population growth and the disproportion between demand and supply of food negatively affect the food security of the population, especially in developing countries. Data from Latin America and the Caribbean in 2020 indicated that 32.2% of men suffered from some degree of food insecurity, while almost 42% of women were affected⁸⁹. In Brazil, relevant social problems such as malnutrition, hunger and difficult access to quality food relate to regional inequalities in social and economic terms,

which compromise access to land and the means for food production. Food price inflation is also a constraint on healthy diets. In 2020 more than 3 billion people did not have the financial resources to buy adequate food, which represents an increase of 112 million individuals compared to the previous year.

Despite the implementation of public policies aimed at promoting food security, the disarticulation of actions and the extinction of important institutions caused a setback in the result of public actions. Between 2013 and 2018 there was an increase of more than 62% in the level of food insecurity in Brazil, with a sharp increase in the most severe degrees.

Data from the 2017-2018 Household Budget Survey revealed that the largest portion of the population experiencing food insecurity resided in the North and Northeast regions. This indicates that less than half of the residents of these locations had full and regular access to food. Figure 14 illustrates the situation of households in terms of food security by geographic region.

Figure 14: Percentage distribution of permanent private households by food security situation



Source: Household Budget Survey (IBGE) 2017-2018.

According to the 2nd National Survey on Food Insecurity in the Context of the Covid-19 Pandemic in Brazil, in 2022, only 4 out of 10 people had full access to food. In rural areas, the situation was worse, so that food insecurity, at some level, reached more than 60% of households, while almost 22% of family farmers were affected by hunger in that year.

The National Child Food and Nutrition Study - ENANI reinforces the need to break the pattern of intergenerational poverty, since 47% of families with children up to five years old experience food insecurity. This percentage exceeds 61% in the North region and reaches around 60%. It is also a multifaceted process that reinforces poverty patterns, since the prevalence of Brazilian children under 5 years of age with some degree of food insecurity was 40.0% among white, 51.2% among brown and 58.3% among black children.

However, as explained in the previous section, this is a multidimensional theme in the aegis of human development conditions. Reinforcing this argument, Silva et al.⁹⁵ stated that food insecurity was associated with lack of access to basic health, low income, women-headed families and households with more than five residents. The lack of access to sanitation services and the difficulty in accessing essential public services such as education, in addition to inadequate eating habits, also contribute to the food insecurity of families.

In this sense, it is noted that environmental and social factors determine the health of individuals. These include food, housing, environment, means of transport, access to leisure, sports practices, public safety, income distribution, among many other elements⁹⁶. All this contributes to the health levels of individuals.

Therefore, policy makers must be aware that food and nutrition security in family farming is not limited to providing means of access to food, but fundamentally to its production and equitable distribution, in addition to establishing adequate public capacities for supply the other dimensions of human development.

It is also about the production of food, involving resources such as land, means of production and monetary resources. In this regard, the importance of family farming for the national economy stands out, as it produces varied and quality food for domestic consumption, in addition to contributing to the creation of jobs in the countryside. Family farmers are also responsible for maintaining agrobiodiversity in the countryside, a common theme in the various social demands that contribute to development based on local cultural and agricultural appreciation.

It is an effort to recover capabilities and reduce the harmful effects arising from regional disparities, since regions such as the North and Northeast concentrate, on average, the lowest socioeconomic and quality of life indicators.

It should be noted that climate change has an inverse effect on the food and nutritional security of family farmers themselves. These, in large part, have scarce resources and have their cultivated areas and production capacity seriously impacted by climate variability.

When analyzing the food insecurity of PNAE family farmers, for example, Trivellato et al.¹⁰⁰ identified the association with indicators such as income, number of residents in the household and presence of children. In this study, income was the most important aspect, but not the only one to impact food security conditions.

Therefore, the formulation of sectorial public policies must contemplate this audience, which historically is dedicated to the production of food for the country's internal supply without, in most cases, having enough income to ensure the necessary conditions for a dignified life.

Food and nutrition security systems stand out for their multisectoral nature. In addition to food safety, they provide protection for the environment; generate jobs and minimize social inequalities, as they allow for a more equitable distribution of added value; respect cultural diversity; incorporate citizen participation and; encourage social cohesion.

For this reason, many authors defend the need to reorganize the dynamics of access to food so that they cease to be based on market interests and become the center of development strategies.

Given the factors associated with food and nutrition insecurity, actions must be based on the theme's intersectionality and promote cooperation between the different levels of government, encouraging income generation and improvement in housing and living conditions. In this sense, policies to strengthen family farming, improve health conditions, income and quality of life, in addition to raising awareness of the population about food and nutrition education, constitute important strategies for promoting food security.

AGROECOLOGIA



Conventional agriculture is based on practices such as intensive soil cultivation, monoculture, irrigation and use of inorganic fertilizers, chemical pest control and genetic manipulation of cultivated plants. Such practices, which are the paradigm of contemporary production, disregard the ecological dynamics of agroecosystems.

Agroecology, in turn, concerns the transition from this model of conventional agriculture and development to sustainable styles of rural development and agriculture. This practice is, therefore, in line with important aspects of the sustainable development agenda of global interest, such as SDG- 17.

It refers, to integrated and holistic practices for the conservation and protection of biodiversity and natural resources. Immersed in a favorable political environment, agroecological practices are increasingly adopted by family farmers, peasants, traditional communities and indigenous peoples.

The sustainability of agroecological systems follows the precept that maximizing the production of a particular activity and the consequent maximization of economic results are not the central objective of agriculture.

Agroecological agriculture aims at optimizing the balance of the agroecosystem as a whole, which means the need for greater emphasis on knowledge, analysis and interpretation of the complex relationships that exist between people, crops, soil, water and animals.

It is a system that goes far beyond food production and is based on a set of holistic sustainable dimensions, namely: ecological, economic, social, cultural, political and ethical.

“It is necessary to mobilize state capacities and support public policies so that, in partnership with multilateral agencies, research institutes and local NGOs, it becomes possible to promote agroecological practices adapted to the conditions of each region, respecting the culture and local practices”.

[AGROECOLOGY]

In the semiarid regions, agroecological practices constitute one of the resilience strategies used as concept actions such as “living with the semiarid region” developed by NGOs in the Brazilian northeast. In general, they combine multiple approaches to production and empowerment of local communities, based on their own context. This is not a proposal of passivity in the face of poverty in the region. It is about building skills, means and resources for harmonious coexistence with the semiarid conditions of the region, in a productive and sustainable way. For some authors it is an approach to promote the reconciliation of agriculture with nature.

From this perspective, agroecology works synergistically with inclusion, gender, solidarity economy and adaptation to the effects of climate change actions. For these reasons, the encouragement and promotion of agroecological systems, as one of the central guidelines in family farming, contributes

to advancing the sector’s global agenda, with positive impacts on the level of human development, especially in the regions of greatest interest, as highlighted in the previous section.

As an emerging science, Agroecology carries concepts and methods that strengthen the establishment of dialogue between popular and scientific knowledge, a necessary condition for revitalizing local innovation as a social device for the development of agroecosystems strongly connected to natural ecosystems.

Agroecology constitutes an opportunity for the emergence of integrated and multidimensional solutions. It allows for the convergence of technical and local knowledge, developing new knowledge and enabling farmers to change their reality. Experiences show that the dissemination of agroecological practices by organizations such as IFAD are important moments in the appropriation of technologies for local development, as well as a space for exchanging knowledge and improving social relations among the farmers themselves.

Investing in this agenda means developing public policies that aim to contribute, directly or indirectly, to solving problems that involve training, building infrastructure, and managing the knowledge generated by the area. This strategy develops solutions that include not only agriculture itself, but also encompasses environmental protection, gender equity, social inclusion and the guarantee of food sovereignty for communities.

Santos and other authors highlight some of the difficulties faced by farmers, including: the accounting of production costs and

determination of the final price of products, the lack of specialized technical advice in the area and the unavailability of water in several regions. In addition to these, other elements discussed such as technological inclusion, gender equity, access to land and means of production are extremely important factors.

To this end, it is necessary to mobilize state capacities and support public policies so that, in partnership with multilateral agencies, research institutes and local NGOs, agroecological practices will be encouraged and adapted to the conditions of each region, respecting the culture and local practices.

It is necessary to invest in the conservation of renewable resources, the conscious exploitation of non-renewable resources, and the diversification of plants and animals in coherence with the cultural, social and historical context of each region.

Therefore, it is important to develop regional public policies, with a bottom up approach, in addition to major public policies, with a top down approach, in credit and funding, insurance, acquisitions and institutional purchases, among others proved important for family farming over the last few decades.

The need for an agenda that establishes synergic and complementary foundations with the other agendas is highlighted, especially with food and nutritional security and reduction of the effects of climate change. Several studies have emphasized the positive effects of agroecological production, among them: minimizing the risk of soil and water contamination; the mitigation of erosion and deforestation problems; the conscious use of natural and non-renewable resources

and; therefore, the contribution to the reduction of global warming and the slowdown of climate change.

The preservation of biodiversity is also pointed out, through the interaction of different plants and animals, through the diversity of cultures, as well as the organic matter and microorganisms that act in the soil.

However, complementary efforts are needed, through public policies aimed at processing, distribution, certification and commercialization in higher value-added markets, such as socio-environmental monetization strategies. Likewise, the logistical improvement of the commercialization of short circuits and the expansion of comparative or equitable advantages in the acquisition process in the public procurement market is necessary.

At the local level, the partnership between public and private institutions for the establishment of collective commercialization spaces is enshrined as a successful strategy, especially through fairs of agroecological products and agroecological kiosks. These spaces represent, on the one hand, the possibility of greater added value for producers and, on the other hand, an alternative for the consumption of healthier and more sustainable products, in line with the values of social and environmental responsibility, also in line with the ODS- 17.

Many of these fairs rely on their own visual identity and seals as a way of certifying the origin of the products. However, in most cases, there is no structured policy in this

regard. In general, the initiatives receive local support from NGOs, Development Organizations and public authorities, weakening their economic sustainability in the medium and long term.

There are very successful experiences with shared efforts, although there are also initiatives that survive thanks to civil organization projects and multilateral organizations. The waste of learning is also evident, since successful experiences could be shared and adapted to similar contexts. In this case, a greater effort is required to manage knowledge of experiences and successful practices of agroecological agriculture in regional contexts.

Agroecology research still receives a small investment compared to conventional agriculture, which consists of deep-rooted obstacles for the sector. There are currently many opportunities to change this reality, especially with the establishment of the SDGs, given that agroecology can meet both dietary needs and pressing social and environmental issues.

There is a consensus among several authors that family farming has great potential for expanding the adoption of agroecological systems. Many familiar establishments are strengthening and increasing their income by adopting agroecological principles, with the diversification of products and socially constructed markets. These markets are directly aligned with the social, economic and environmental sustainability principles of this model.

FINAL REMARKS

In light of the information presented, one can see the relevance of family farming and its interconnections with various themes, enabling advances in important aspects such as gender equality, food sovereignty, the minimization of social vulnerabilities, the success of family succession processes in rural establishments, among others. The weaknesses of the sector are also perceived, especially in poorer communities and with worse development rates, in its broad dimensions. Therefore, there is a completely new agenda to be explored, aiming at expanding the benefits and the potential of this segment, with special attention to the North and Northeast regions of Brazil.

The multiple possibilities of using this document to reflect on and catalyze the resources needed to build an agenda for family farming and the capacities to implement it are clear. It is up to public agents, the private sector, the third sector and the society as a whole to articulate actions and public policies capable of transforming critical reflections and analytical dimensions into processes and public policies committed to the progress of family farming. Despite the obstacles to be surpassed, we are aware of the advances made and, even more, of the path that has to be taken to transform these analyzes into plans and plans into sustainable actions..



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appendix i. research methodological note

For the construction of the indicators used within the text, variables or sets of variables that could adequately represent each dimension were selected. Initially, each variable was transformed into an index that varied between 0 and 1. This transformation was carried out according to the following equation (1):

$$Value_1 = \frac{(Value - Value_{min})}{(Value_{max} - Value_{min})} \quad (1)$$

in which $Value_{max}$ e $Value_{min}$ refer, respectively, to the maximum and minimum values observed in the original set of values. The construction of the raw index was based on the average of the values obtained, considering all the variables that make up the indicators. For example, the municipal development indicator is formed by three variables (GDP, General IFDM and IFGF). Each of the variables was transformed, the values for each municipality were added and divided by 3. Finally, equation 1 was used again.

Once the index was built, the values were divided into 5 groups, according to the mean and standard deviation (SD) values. Due to the high values of standard deviation in relation to the mean, for the indicators of Public Investment Capacity and Operational Capacity in Agriculture, $\pm 1/2$ SD and $\pm 1/4$ SD were used instead of ± 1 SD and $\pm 1/2$ SD, respectively.

Table 1 contains the description of each of the indicators and the variables that compose them.

Table 1: description of indicators used in the research

Indicator	Description of variables	Measurement scale	Source	Year
Municipal Development	Gross Domestic Product per capita, at current prices (R\$ 1.00)	R\$	IBGE	2020
	Firjan Municipal Development Index, general category	Index, from 0 to 1	Firjan	2018 (base-year 2016)
	Firjan Tax Management Index	Index, from 0 to 1	Firjan	2019
Socio-environmental Vulnerability	Per capita amounts spent with the Bolsa Família Program	R\$	Ministry of Citizenship	2019
	Families enrolled in the Unified Registry for Social Programs. Percentage of resident families registered in the Unified Registry with per capita family income of up to half the minimum wage over the total number of families registered.	%	MDS/Ministry of Citizenship, obtained through the Sustainable Cities Program	2019
	Percentage of live births whose mothers were 19 years old or younger out of the total live births of resident mothers.	%	Datasus, via the Sustainable Cities Program	2019
	Number of hospitalizations that occurred as a result of diseases related to inadequate sanitation (DRSAI), per 100,000 inhabitants.	100,000 inhabitants	Datasus, via the Sustainable Cities Program	2019

Childhood and Nutritional Vulnerability	Number of children born alive weighing less than 2.5 kg over the total number of live births in the municipality.	%	Datasus, via the Sustainable Cities Program	2019
	Number of malnourished children under 5 years old over the total number of children in this age group.	%	SISVAN, via the Sustainable Cities Program	2020
	Number of deaths of children under one year old over the total number of children born alive to resident mothers, times 1,000.	1,000 live births	Datasus, via the Sustainable Cities Program	2019
Health Capacities	Number of live births whose mothers had 7 or more prenatal consultations out of the total number of live births in the municipality.	%	Datasus, via the Sustainable Cities Program	2019
	Population coverage by family health teams over municipality's population.	%	Datasus, via the Sustainable Cities Program	2020
	Number of public basic health care units, per 1,000 inhabitants.	1,000 inhabitants	Datasus, via the Sustainable Cities Program	2019
Public Investment Capacity	Value of revenues collected in the municipality over the total amount of revenues of the municipality	%	Siconfi, via the Sustainable Cities Program	2019
Operational Capacity in Agriculture	Total number of existing tractors, implements and machinery per 100 rural establishments	Maquinário a cada 100 estabelecimentos	IBGE - Census of Agriculture	2017
Technical Assistance in Agriculture	Number of rural establishments that receive some type of technical assistance over the total number of rural establishments in the municipality	%	IBGE - Census of Agriculture	2017
Female Engagement Potential	Number of female councilors in the City Council over the total number of councilors	%	TSE, via the Sustainable Cities Program	2020
	Number of women-headed rural establishments over the total number of rural establishments	%	IBGE - Census of Agriculture	2017
	Number of women who can read and write over the total number of women who run rural establishments (producer or manager)	%	IBGE - Census of Agriculture	2006
Educational Potential	Number of elementary schools with internet access over the total number of public schools	%	INEP, via the Sustainable Cities Program	2019
	Score of the Basic Education Development Index (IDEB) in the municipal network in the early years of elementary school.	Index	INEP, via the Sustainable Cities Program	2019
	Elementary School Teachers from the Public Education Network with higher education	%	INEP, via the Sustainable Cities Program	2019

Vulnerability in Public Safety	Number of homicide deaths, in the 15 to 29 age group (inclusive) that occurred in the municipality, per 100,000 inhabitants.	100 mil habitantes	Datasus, via the Sustainable Cities Program	2019
	Number of feminicides per 100,000 women.	100 mil mulheres	Datasus, via the Sustainable Cities Program	2019
Access to Sanitation	Total population served with water supply over the total population of the municipality	%	SNIS	2019
Environment and Sustainability	Recovery of selectively collected urban solid waste. Recovery rate of recyclable materials (except organic matter and waste) in relation to the total collected.	%	SNIS, via the Sustainable Cities Program	2019
	Urban population served with selective collection over the total urban population.	%	SNIS, via the Sustainable Cities Program	2019
	Number of risk management and natural disaster prevention strategies adopted over the number of recommended strategies (25)	%	Munic-IBGE, via the Sustainable Cities Program	2020
	Number of existing environmental protection financing instruments in the municipality over the number of available environmental protection financing instruments (6)	%	Munic-IBGE, via the Sustainable Cities Program	2020
Social Control and Accountability	Number of internal control and anti-corruption instruments and policies existing in the municipality over the number of internal control and anti-corruption instruments and policies available (7)	%	Munic-IBGE, via the Sustainable Cities Program	2019
	Number of thematic councils for structuring policies for participation and promotion of human rights in the municipality over the total number of councils available (7)	%	Munic-IBGE, via the Sustainable Cities Program	2019
	Number of instruments and transparency policies existing in the municipality over the number of instruments and transparency policies available (6)	%	Munic-IBGE, via the Sustainable Cities Program	2019
Public Policies for Family Farming	Value of acquisitions from family farming over the amount transferred from FNDE	%	FNDE	2017
	Number of rural establishments with PRONAF-B funding over the total number of rural establishments	%	IBGE - Census of Agriculture	2017
Mechanization Agreements	Mechanization Agreements	Qty.	PLATFORM + BRASIL	2019-2022
	Mechanization Agreements over the number of Federal Deputies	Qty./Deputy	PLATFORM + BRASIL	2019-2022

Source: Made by the authors.