


## GERAIZEIRO AGRI-FOOD SYSTEMS AS CLIMATE-RESILIENT AGRICULTURE PRACTICES: A CASE STUDY IN THE TAPERA SETTLEMENT (RIACHO DOS MACHADOS-MG)

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**Gabriel Costa Ribeiro<sup>1</sup>**

### ABSTRACT

This article aims to analyze techniques for the restoration of biodiversity and water supply from traditional agri-food systems in the Geraizeiro settlement of Tapera, in Riacho dos Machados-MG. It is justified due to the fact that spatial analysis studies have indicated a high degree of floristic recomposition of cerrado massifs previously degraded by eucalyptus monoculture, a phenomenon caused, in hypothesis, by experiences of resistance and agroextractivist production. Bringing it to the current context of climate change, the case study will seek to discuss how a group of families from Tapera have presented traditional agri-food alternatives through climate-resilient agriculture practices, and what are the challenges observed to consolidate and perpetuate this work in the community context.

**Keywords:** Climate Change. Traditional Environmental Systems. Scrubland.

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<sup>1</sup> Bachelor's degree in Socio-Environmental Sciences (UFMG); Master in Society, Environment and Territory (UFMG/Unimontes); PhD student in Social Development (Unimontes – CAPES Scholarship); Researcher at the Interdisciplinary Center for Socio-Environmental Research (NIISA/Unimontes).

E-mail: gabrielcostaribeiro@gmail.com

ORCID: <https://orcid.org/0009-0006-1952-9141>

## INTRODUCTION

Territorial and social transformations caused by developmental projects demand from researchers who are attentive to the dynamics of regulation, use and appropriation of spaces and nature, efforts and large investments for the exercise of a critical reflection on real situations of our place and our time, on which, not infrequently, reparations are impossible and where all types of violence have still been practiced and legitimized.

In the north of Minas Gerais, systematic research on the so-called *territorial environmental conflicts*<sup>2</sup> with traditional communities has gained strength in some research centers in recent years. It is important to highlight the common connection between these groups: the search for constructive dialogues with their research interlocutors, favoring the collective creation of action strategies and networks for the defense of citizenship.

Of particular note are the research and extension activities carried out by centers such as the Interdisciplinary Center for Socio-Environmental Research (NIISA-Unimontes), the Study and Research Group on Traditional Communities on the São Francisco River (Opará Mutum-Unimontes), the Center for Regional and Agrarian Studies and Research (NEPRA-Unimontes), the Research Group for a Decolonial PluriEthnoPopular Education (GDECO/ETNOPO-Unimontes), the Study Group on Environmental Themes (GESTA-UFMG) and the Center for Agroecology and Peasantry (NAC-UFVJM), which has carried out important work within the field of environmental conflicts in traditional communities in the region.

Aware that all knowledge production is delineated by a tangle of social relations from the perspective of a few actors, that is, it has a specific position, these researchers have dedicated themselves to considering and interpreting power relations. To understand scientific practice through the prism of social and political phenomena is to touch deeply on the debate on issues in vogue in society, such as social inequalities, gender, work and income issues, environmental degradation and social injustices as effects of the capitalist appropriation of spaces. It is to transpose the discourses and perceive oneself as a subject in the struggle for equity.

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<sup>2</sup> I use the concept of *territorial environmental conflict* along the lines of Zhouiri & Laschefski (2010), defined by situations in which there are overlapping claims between activities that generate environmental degradation and social groups, bearers of different identities and cultural logics, on the same spatial cut.

My academic career began and was developed in research and extension activities with the theme of environmental conflicts with traditional communities. Since graduating in Socio-Environmental Sciences, from 2011, I have a relationship with this public as a scholarship holder with the Center for Studies on Human Work - NESTH/UFMG (2011-2012) and, later, at GESTA-UFMG (2013-2018). In a master's dissertation defended in 2018 within the scope of the Graduate Program in Society, Environment and Territory (UFMG/Unimontes), I analyze how the struggle of the *geraizeiro* movement of Vale das Cancelas (Grão Mogol/MG) for the legal recognition of its traditional territory is strengthened in the process of confronting mining.

Between 2019-2022 I worked professionally as Executive Secretary at the Center for Alternative Agriculture of Northern Minas (CAA-NM), during which time I provided technical advisory services to social movements, organizations and representative segments of traditional peoples and communities throughout the cerrado biome. In other words, my academic and professional trajectory has been guided by continuous dialogue, made possible between advisors and life experiences with a network of contacts participating in the struggle for the recognition of their collective and territorial rights, in a political-scientific engagement once advocated by Velho (1978):

The idea is insisted on that in order to know certain areas or dimensions of a society, it is necessary to have contact, to experience it over a reasonably long period of time, because there are aspects of a culture and a society that are not made explicit, that do not appear on the surface and that require a greater, more detailed and in-depth effort of observation and empathy (VELHO, 1978 pgs. 36-37).

In this sense, this article derives from discussions and field immersions carried out within the scope of the research project entitled "Biodiversity and Water: Traditional Communities, Territorial Reconversion and Sustainable Use Units in the Semi-arid Region of Minas Gerais", carried out since 2023 by members of NIISA-Unimontes<sup>3</sup>. Its objective is to analyze techniques for restoring biodiversity and water supply from traditional agri-food systems in the *Geraizeiro* settlement of Tapera, in Riacho dos Machados, in the Upper Rio Pardo region, northern Minas Gerais. The methodological procedures consist of a bibliographic review through the disciplinary fields of Agrarian Geography, Rural Sociology,

<sup>3</sup> NIISA-Unimontes, linked to the Graduate Program in Social Development (PPGDS-Unimontes) and registered in the Directory of Research Groups of the Lattes/CNPq Platform, has been developing since 2008 research, teaching and extension dedicated to understanding the conflicts inherent to the different rationalities, logics and processes of appropriation of the territory existing in the North of Minas.

Anthropology of Territorialities and Political Ecology, as well as records generated by direct observation in the socio-territorial contexts of the *geraizeiros* in the aforementioned settlement.

## **METHODOLOGICAL PROCEDURES**

For the present article, the methodological procedures used consisted of bibliographic research and direct observation, systematized as follows:

*Bibliographic research:* the bibliographic research was organized in the format of an interdisciplinary narrative review, in order to establish a theoretical framework that dialogues with the objective and problems presented.

The 'narrative review' does not use explicit and systematic criteria for the search and critical analysis of the literature. The search for studies does not need to exhaust the sources of information. It does not apply sophisticated and exhaustive search strategies. The selection of studies and the interpretation of information may be subject to the subjectivity of the authors. It is suitable for the theoretical foundation of articles, dissertations, theses, course completion works (USP, *undated*).

*Direct observation:* it was based on the qualitative methodology, seeking to understand a collectivity through the narratives from phenomenological sources. This methodology has as its main characteristic the distinction of empirical phenomena, seeking to identify the singularity of human experiences situated in a given social, cultural and political context. Its assumption is to apprehend the practices of a given group inserted in structures of a collective nature, with the help of theoretical approaches, with their hypotheses, objectives and methods in dialogue with the enrolled actors.

The concentration of the researcher's interest in certain problems, the perspective in which he places himself to formulate them, the choice of instruments for collecting and analyzing the material are never fortuitous; every scholar is always engaged in the issues that attracted his attention, he is always engaged, in a deep and often unconscious way, in what he performs (QUEIROZ, 1999:13).

The qualitative methodology, in its attributions, is based on the apprehension of situations of interest, through the in-depth study of the actions of the researched groups. To this end, it is necessary to examine the various data collected, since in this type of methodology their apprehension occurs through various resources, such as interviews, observation, field notes, coexistence, that is, the subjectivity of the researcher in contact with the observed social reality (GIL, 2010).

## THEORETICAL FOUNDATION

Peasant, family farmer, farmer, *geraizeiro*, *chapadeiro*, generalist, *curraleiro*, native, *catrumano*, settler, distinct facets of a single social subject, resident in the countryside, unionized, *caboclo*, environmentalist, guardian of agrobiodiversity and master of techniques that guarantee climate-resilient agriculture practices, increasingly recognized by development institutions and international cooperation. Each terminology used has the ability to evoke a certain epistemology, whether it is disciplined or comes from popular knowledge, endogenous or exogenous, orthodox or heterodox.

In other words, all the effort employed in the discussions about the characterization of these social subjects should also, in theory, seek to overcome universalizing, unilateral and homogeneous definitions in order to better consider their multifaceted nature, and in order to obtain greater analytical depth. It can be seen that, among so many possibilities, the prevalence of three distinct perspectives. The first and second are influenced by technical discussions of agrarian, environmental and agronomic sciences, while the third comes from the conceptual discussion about ethnic rights, in a clear junction between tradition, law, anthropology and public policies: *peasants*, *family farmers* and *traditional peoples and communities*.

When one analyzes the emergence, consolidation and institutionalization of the *Geraizeira* ethnicity in the context of the North of Minas, it is possible to perceive that the vast majority of the traditional *Geraizeira* communities have peasant origins with a cradle in the struggle for land, in the strict sense of the use of family farming. In this context, subjects are gestated by processes, accumulating histories of resistance, bringing with them a long trajectory of social struggles in the countryside. In view of the above, the following lines will seek to bring to light the relevance of definitions such as peasant and family farmer in the constitution of the *geraizeiro*, referring to a bibliography interested in the Brazilian agrarian dynamics related to the rural universe.

The peasant way of life is historically characterized by elements oriented from the relationship between land, work and family. This combination occurs in a very different way, especially due to the needs of the domestic group, but also valuing the organizational autonomy of the local collectivity. The peasant's effort to improve his production is described by Mendras (1978) as art, by which the labor force is guided by use value, and not by exchange value, and land is not treated as capital or profit-generating commodity,

but as a means of life. The author also identifies five characteristic features of peasant societies: the relative autonomy from global society; the structural importance of domestic groups; the society of interknowledge; the economic system of relative autarky; and the decisive role of mediators between local and global society (MENDRAS, 1978). For example: it is the need to work to nourish oneself that permeates the conception of the peasant family as a family labor force that relates to the land, in a conception of economy that is not necessarily monetary. In a society of self-consumption, what is required of the land stems from family needs. Woortmann (1990) adds that:

In peasant cultures, one does not think of the land without thinking of the family and work, just as one does not think of the land and the family. On the other hand, these categories are closely linked to central organizational values and principles, such as honor and hierarchy (WOORTMANN 1990).

Peasant cultures can only be understood from their particular manifestations, the rationalities that modulate these processes and the practices of social, cultural, material and productive appropriation and organization. Referring to the *geraizeiro* context, it is possible to observe it in the forms of management of existing natural resources for the creation and improvement of agri-food systems based on animal husbandry, and collection/processing of native fruits for food complement and medicinal uses, in the same way as what Wanderley (1996) has conventionally defined as a "polyculture-livestock" system:

The traditional system of peasant production, called "polyculture-livestock" and considered "a wise combination of different techniques", was perfected over time, until it reached a balance in a specific relationship between a large number of agricultural activities and animal husbandry. In fact, studies on traditional peasant societies show that their evolution can be perceived through the effort to improve this diversity, either by introducing new crops, to the limit of suppressing fallow areas, or by deepening the relationship between the crops and the livestock activities carried out in the establishment (WANDERLEY, 1996 pg.3).

There are authors who approach the peasantry as a moral order, as an expression of morality, of a peasant ethic, or even, from an evaluative and symbolic point of view, starting from the subjective meaning of land (DELBOS, 1982; WOORTMAN, 1983; WOORTMAN, 1990). Such aspects are based on the evaluative order of the symbolic in order to achieve significant connections for these subjects, in the construction of a shared ethics. From this perspective, the *Geraizeiro* way of life reveals itself as an important ally in

the conservation of the *gerais* and the *cerrado*, as they form productive landscapes that provide the continuity of the environmental services provided by the biome, such as the maintenance of biodiversity, hydrological cycles and carbon stocks. When they receive the nickname 'Guardians of the Cerrado', they bring with them the peasant ethic of rational use of natural resources. It is these values that guide the interactions and market relations with their surroundings and condition their subsistence practices, productive and food autonomy, also determining the use value and including, in their formulation, symbolic aspects, principles of solidarity and family production.

My aim is not to treat the peasant as a small producer, the object of an objective analysis of his objectivity, but to attempt a subjective interpretation – for that is my perspective – of his subjectivity. On this level, for example, the concept of use-value gains another value: that of use as value (WOORTMAN, 1990 pg. 12).

From a philosophical perspective, the peasantry is constituted as a moral and ethical form of *family farming*. Conversely, family farming is the technical dimension of the peasantry, in such a way that it also reflects the conscious transition from a society of inter-knowledge to an enveloping society, opening up to transformations and innovations, on the one hand, and at the same time reacting, in its own way, in an attempt to preserve its originality (WANDERLEY, 1996). Inscribed in this scenario, the political appropriation of the concept starts to play a strategic role in terms of the visibility and recognition of unconventional agricultural practices, and collaborative actions capable of presenting solutions to the daily challenges of the peasant way of life. In this sense, understood politically, it has also provided the debate on themes concerning other ways of conceiving and applying agriculture, bringing themes such as the safeguarding of native seeds, genetic heritage, the use and management of agroecosystems and the recognition of traditional agricultural systems (SAT's), unconventional strategies for food sovereignty in the context of climate change.

Some institutional definitions of *family farming*: The Food and Agriculture Organization of the United Nations (FAO-UN) and the National Institute of Colonization and Agrarian Reform (INCRA) point out that family farming considers the management of rural property as a family attribute in terms of work performed and production factors. For the Ministry of Agrarian Development (MDA), it is a process that depends on the strengthening and appreciation of several factors that need to be implemented and articulated. The Brazilian Agricultural Company (EMBRAPA) defines it as a form of production in which the



core of decisions, management, labor and capital are controlled solely and exclusively by the family.

Bringing it to the context of the North of Minas, the set of attributes observed in the conceptual definitions of *peasant* and *family farmer* dialogue with the ways of life of certain groups and communities that carry knowledge, knowledge and practices whose specificities differentiate them in terms of ethnicity, historicity, territoriality, identity, productive arrangements and political organization. It is in this context that the definition of *geraizeiro* as inhabitants of the generals, their ways of life and their forms of political advocacy begins to gain political robustness. The general are areas of plateaus, slopes and valleys of the cerrado regions existing in the surroundings of the Serra Geral, the Alto Rio Pardo and the Planalto Sanfranciscano (VIANA, 2017).

The *geraizeiros* are social groups with specific relationships with the cerrado biome, providing knowledge and forms of organization linked to the environment. They have land tenure logics historically guided by the presence of regimes of possession and family distribution, marked by the use of rationalities of domain and common use, where the presence of customary rights often formed different modes of regulation of access to and control of land (THOMPSON, 1998).

Geraizeiros, as culturally and contrastively so named, are the inhabitants of the generals. They developed the ability to cultivate on the banks of small watercourses a diversity of crops such as cassava, sugarcane, peanuts, various beans, corn and rice. In addition to the birds, cattle and even pigs were raised free, until in a very recent period, in the areas of plateaus, tablelands and meadows of communal use. And it is in these areas, generically called general, that they seek the supplement to guarantee their subsistence: game, various fruits, medicinal plants, wood for various purposes, wild honey, etc. The products they bring to the market – cassava flour, gum, brown sugar, brandy, native fruits, medicinal plants, handicrafts – reflect the environment, the way of life, the possibilities and potentialities of the agroecosystems where they live (DAYRELL, 1998 p.74).

Surveys already carried out indicate the existence of approximately 290 traditional Geraizeira communities dispersed over an area of 29,900 km<sup>2</sup>, representing 2,900,000 hectares, covering claimed, self-demarcated and/or regularized territories dispersed along the general (CPT, 2014; DAYRELL, 2019 pg.224). It turns out that, unlike the process of demarcation of indigenous and quilombola lands, traditional communities were not contemplated with a specific legal framework capable of better clarifying how the process of recognition, delimitation and regularization of their traditional territories would take place. In view of the above, since the 1990s, the *geraizeiros* have activated agrarian reform



mechanisms in search of the regularization of conventional settlements or those endowed with special regimes, and such strategies have had more effective practical effects than the search for formal titling of traditionally occupied territories.

To better understand these strategies, it is necessary to go back to the 1970s, a period in which the North of Minas Gerais was targeted by a development model driven by agricultural activities, which constituted a new hegemonic understanding of market agriculture: the Green Revolution was a watershed both for the Brazilian rural environment and for global capitalist expansion (NAVARRO, 2001). It is from the expropriatory coexistence with the monocultures of eucalyptus plantations in the plateaus, in the face of an epistemic conflict between what was conventionally constituted these territories, whether they were vacant lands or lands of common use, that the *geraizeiros* began to organize themselves, from the 1990s onwards, into collectivities mobilized around the implementation of a larger project of *agroextractivist reconversion*. And for this they used strategic actions.

The context in which the constitutive initiatives of the *geraizeiro* movements emerge are directly related to the historicity of *native insurgencies* (DAYRELL, 2019), for which land conflicts in the region have never occurred without the explicitness of resistance by local populations. The driving force of the initiatives are the local communities or groups of these communities that have taken the lead in the processes of identity self-recognition and in the struggles for the protection of the place where they live.

I conceptualize as native insurgents, characters who make history by positioning themselves in defense of the people of the place, who figure in the memory and social imaginary of the communities, who confronted local powers, the police force and the institutionalities of the State in the struggle for the right to land, in particular those who were suffering expropriation processes in different social and economic contexts (...) In short, native insurgents as individuals who come out in defense of their ethnicity, in a struggle for their permanence or that of the collectivity with which they identify and with a place of belonging, constructed as territory and anchored in the historicity of their people in the confrontation they make with State agencies, farmers or capitalist companies against the expropriation of lands and their resources (DAYRELL, 2019, p.411).

Over these thirty years, there have been many threats, criminalizations, lawsuits and land grabbing, but there have also been victories and territories retaken, ensuring notorious rescues and adaptations of ways of life based on unique ways of planting, harvesting and living. In general, the settlements of Tapera (Riacho dos Machados), Americana (Grão

Mogol) and Veredas Vivas (Rio Pardo de Minas) are the main *repossessions* formally recognized by state agencies.

Currently, *geraizeiros* are social groups whose livelihoods and food security depend largely on the use of natural resources and land-based productive activities. They have contributed to the conservation of their living habitats, but their traditional forest management and land use systems, livelihoods and cultural survival are increasingly threatened. External and internal pressures are eroding their ability to adapt and increasing their vulnerability. The expansion of the agricultural frontier and the adverse impacts of climate change have contributed to the decrease in the adaptive capacity of their ways of life. Consequently, the benefits for environmental conservation and adaptation to climate change in their territories are increasingly threatened.

We know that a good part of these communities are still invisible, silenced by economic and land pressures, discriminatory processes and politically and socially excluded. We also know that a large part of the socio-environmental conflicts in Minas Gerais result from the invasion of their traditional territories and the direct or indirect impact on such communities (COSTA FILHO, 2010 pg.3).

Climate change is expected to have acute harmful effects on the general and the Cerrado. The costs of climate change in Brazil until 2050 were estimated, according to the different scenarios predicted by the Stern Review and the Intergovernmental Panel on Climate Change (IPCC), as losses in the order of 0.5 to 2.3% of the country's GDP. These impacts will: (i) hit the poorest and least developed areas of the country hardest; (ii) have a greater effect on the agricultural sector and rural areas; and (iii) increase regional inequalities and have a major effect on social groups whose livelihoods depend on subsistence agriculture. Due to its acute vulnerability to the effects of climate change, the Cerrado biome will face the highest costs, with losses totaling 4.5 percent of GDP in 2050 (IPCC, 2021).

In terms of academic publications on the traditional *Geraizeira* communities in the North of Minas, there is a vast number of studies published since the 1990s, which have also contributed to the formulation of a social thought on traditional Brazilian peoples and communities (DAYRELL, 1998; D'ÁNGELIS FILHO, 2005; NOGUEIRA, 2009; BRITO, 2013, among others). In view of so many works already produced in relation to the description of the *Geraizeiro* way of life and how their struggles for access to territories are

operationalized, it is clear that there are no texts that portray the social dynamics after the territorial struggle has been concretized. After all, how do life and work relations take place among the settlers in this context? Is it possible to analyze how the *geraizeiros* are living after the resumptions?

The struggle of the *geraizeiros* is made in a complex web whose strategies are diverse, but which are read as a collectivity that uses similar methods (NOGUEIRA, 2009). The *locus* of these actions is varied, but the struggle takes place through strategies such as 'empates', joint efforts, resumptions, encampments, judicializations and agroextractivist reconversions. In this sense, the *geraizeiros* have produced and reconquered territories, and also experiencing new challenges, opportunities, dilemmas and contradictions little known or studied. In view of the above, the next section of this article will present preliminary results of research carried out within the scope of NIISA-Unimontes actions in the PA Tapera, in Riacho dos Machados, Alto Rio Pardo region, North of Minas Gerais.

## DEVELOPMENT OF THE THEME

To better understand the process of formation of the PA Tapera, it is important to bring to the discussion some historical elements. According to Bibiano (2009), "the area currently occupied by the settlement is approximately 3,800 hectares, which were previously part of the 20,000 ha of the farm owned by Mr. Alcebino dos Santos – the 'Major' and which was sold to SICAFE" (pg.7). The 'Major', a local cattle ranching leader, can be considered the main culprit for the expropriation of land from the squatting peasants who had already lived in the vicinity since ancient times, which would become their private property, using local influence and legal maneuvers to obtain the formal right to property.

Since that time, squatters and aggregates have lived on the Tapera Farm. The households had a more constant link with the farm and with the work carried out there, care for the cattle and other animals, in addition to the plantations. The squatters, on the other hand, worked only in the face of sporadic demands, such as cutting wood, building firebreaks, beating pastures and, when authorized by the farmer, they cultivated small swiddens on the banks of the streams in the region (MACÊDO, 2009 pg.31).

In this sense, in a broader context in the Brazilian historical scenario, the farm can be taken as one of the main elements that produce rural exodus (MOURA, 1988). Thus, since the processes of expropriation are widely worked out in the literature of the Brazilian peasantry, Moura (1988) also suggests that:

To orient the analysis in such a way as to ethnograph the issues from the side of the aggregate, the farmer and the squatter means to admit that the farm will always be the complementary face, the opposite pole that perpetuates its domination through relations with different peasant fractions. The farm aims to intensify the planting of pasture, the exclusivity of cattle ranching, real estate speculation, clearing the land of men who occupy it with the garden, the house and the expense and thus give it meaning and substance (MOURA, 1988 pg. 7).

The white domination in the region was also perpetuated through the housing system and the concession of land for planting in the middle – in which the farmer gives a piece of land and the seeds for planting – and in the third – in which the farmer grants only the land. With the passage of time, these occupations became small possessions within the dairy farm, peasant nuclei that came to compose the *geraizeira* community of Tapera.

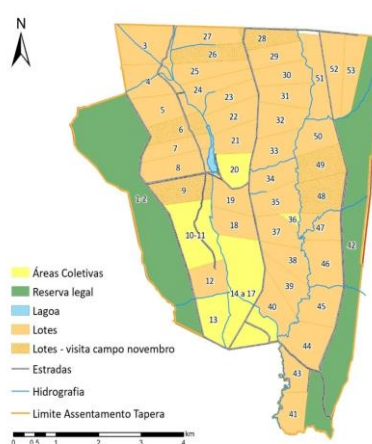
Created in 1972, *SICAFÉ Produtos Siderúrgicos Ltda* is a company dedicated to the commercial cultivation of monocultures of eucalyptus of the clone species, which came to compose in the region of Serra Geral and Alto Rio Pardo an agro-industrial mosaic by which the cerrado forests present in the chapadas dos gerais ended up suffering intense disturbances regarding their biogeochemical cycles at the plant level, people, animals and ecosystems. Local residents ended up trapped in small fragments of grotas, while the chapadas, which were used as collective areas for collecting fruits from the cerrado and raising animals 'on the loose', ended up devastated.

It was through the technical work carried out throughout the early years of the 1990s, by an articulation entitled by Brito (2013) as *the Social Movement Network of the Geraizeiros*, that political incidences interested in a resumption itself were practiced. At the time of the work, the author presented the actors of this network in their various spheres. At the global level, organizations such as the United Nations Development Program (UNDP), Misereor, Bread for the World and Heks-Eper contributed to issues of financial logistics and to making the struggle visible on the international stage. At the regional level, the Center for Alternative Agriculture of Northern Minas (CAA-NM), the Pastoral Land Commission (CPT), the Rosalino Articulation of Traditional Peoples, the Unimontes research centers, as well as state agencies such as the Chico Mendes Institute for Biodiversity Conservation (ICMBio), and Embrapa. At the local level, the Network was articulated with the Articulated Movement of Rural Workers' Unions of the Upper Rio Pardo Region (MASTRO) and the Rural Workers' Unions (STR's).

The network articulation created in partnership with unions, social pastorals,

development agencies and third sector organizations made it possible in the first case of legal recognition of the Geraizeira identity in the North of Minas Gerais through the expropriation of a portion of the Tapera Farm by squatters in Riacho dos Machados. A certificate of possession was obtained in 1994, and the geraizeiros organized their territory through dialogues with INCRA agents along the lines of a conventional settlement (PA), formalized in 1996, without, however, failing to consider in the legal document issues involving their territoriality and otherness, demarcating family areas with Areas of Common Use and Legal Reserves.

**Figure 1:** Distribution of PA Tapera lots. 2023 (NIISA-Unimontes Collection).



The process of delimiting the agrarian reform settlement demanded the mediation of two distinct perspectives: first, the community perspective, which sees the PA as a portion of its traditional territory in all its signs; and the technical-state perspective, represented by INCRA, which often imposes difficulties and challenges arising from a standardized and rigid conception of planning applied for its formal recognition.

On the one hand, the territory as a space for the family's work, and the patrimony in the sense of the possibility of guaranteeing family survival. The territory as a constituent part of the group's identity, a space for the transmission of traditional knowledge to future generations, and, simultaneously, the form of social reproduction and subsistence (COSTA FILHO, 2016). On the other hand, regional planning, characterized by a set of interventions by the public authorities in spaces through territorial development policies, with the objective of maintaining and reinforcing a certain modernizing project that can adapt, mediate and standardize different interests.

In view of this paradox, some concepts, instrumental definitions must be highlighted in order to understand the variables that involve a settlement. The concept of

*environmental services*, also defined as *ecosystem services*, was outlined by Daily (1997), who understands them as a direct and indirect benefit to the human population arising from the dynamics of a given ecosystem. These services can be classified into four distinct categories: supply service, which offers natural goods to the human population; regulation services, which govern climate, rainfall, waste and the spread of diseases; cultural services, which offer beauty and recreation; and support services, such as soil formation, photosynthesis and nutrient recycling (EUROPEAN UNION, 2009). In this sense, one of the purposes of Legal Reserves would be the maintenance of these ecosystem services.

Another relevant point for the understanding of the interposition of planning logics is the concept of *fiscal module*, defined by INCRA as:

(...) a unit of measurement expressed in hectares, fixed for each municipality, considering the following factors: type of exploitation predominant in the municipality; income obtained from the predominant exploitation; other existing explorations in the municipality that, although not predominant, are significant in function of income or area used (INCRA, *undated*).

Properties with less than four (4) fiscal modules obtained the flexibility to constitute their Legal Reserves, in accordance with the concept of family property, defined by article 3 of the Family Farming Law, No. 11,326/2006. The justification for this distinction would be to offer a differential treatment to family farmers, since it is assumed that their cultivable areas are smaller and have less commercial competitiveness. However, the fiscal modules vary in length according to the municipality, and may reach dimensions incompatible with the elements that characterize family farming.

Almost 30 years after the formalization of the PA Tapera, georeferencing data have indicated a high degree of floristic recomposition of previously degraded cerrado massifs. The project "Biodiversity and Water: Traditional Communities, Territorial Reconversion and Sustainable Use Units in the Semi-arid Region of Minas Gerais", carried out since 2023 by NIISA-Unimontes, seeks to analyze the recomposition of biodiversity and water supply in these areas, considering the hypothesis of the prevalence of native experiences of resistance and geraizeira agroextractivist production in the context of climate change.

We used as a pre-field immersion strategy the proposal of meetings at the headquarters of local community associations. This meeting took place in mid-October 2023, where a physical copy of the georeferenced maps of the settlements was presented,



and there, together with the community members, we listed which experiences that, as a whole, could portray the context experienced as a whole.

With the participation of 19 members of the community, the project was presented with the debate of the objectives of the research, with listening to those present about its importance and indications pointed out. The survey referring to landscape changes was socialized with reference to the 1990s and, soon after, a survey of the main economic activities in development by the families was made, identifying different productive dynamics, as well as the evolution of the population present in the different family groups with the identification of some productive specificities.

In addition to the research itself, the project also envisioned providing advisory and political advocacy actions. At the time, the main issues that circumscribed the PA Tapera concerned the regularization of the Rural Environmental Registry (CAR) of the settlers and the definitive titling of the allotments with INCRA.

Regarding the first point, even though the local community association had made the public registration of the families' CAR via electronic portal, the community members remained unable to access public credits, such as the National Program for the Strengthening of Family Agriculture (PRONAF). It was reported that the settlement registry was regularized and updated, however, a preposition of small private property with the settlement has made it unfeasible.

Regarding the definitive titling of the settlers, it would be necessary to draw up a new georeferencing chart, as it only describes the external perimeter georeferenced in the registration, thus missing the real parceling experienced in the current terms due to the need to better understand how the "de facto domain" of the lots has occurred after 30 years of settlement.

The absence of spatially located geographic information has made it difficult to understand territorial management processes, cerrado regeneration and the importance of agri-food systems in these dynamics. In this sense, one of the main mottos of the Project "Biodiversity and Water: Traditional Communities, Territorial Reconversion and Sustainable Use Units in the Semi-arid Region of Minas Gerais" is to provoke a movement to democratize access to this data, so that both the government and the community as a whole can better visualize certain territorialities spatially and establish cause and effect relationships.

After the pre-field immersion described above, we moved on to the second phase of the research. As a member of the project, I am part of an interdisciplinary team, but we have recurrently used the resources of ethnography, relying on the experience of renowned researchers from traditional peoples and communities in the North of Minas Gerais who have deep knowledge about the generals. We were again at PA Tapera applying these resources in mid-November 2023.

I identify similarities in *modus operandi* to those described by Comerford *et al* (2015) when they gathered and analyzed ethnographic studies in Minas Gerais, presented in a workshop proposed by the Graduate Program in Social Anthropology of the National Museum (UFRJ):

Several of the ethnographies in question direct their attention to the ways of *arriving* at and leaving houses. You don't get to a house just like that, nor do you get out of it anyway. These ways of acting are constitutive of the definition of "home", as are the various transits between houses, and also the displacements within them. All this movement is, therefore, usually the object of surveillance, control, knowledge, elaboration, reflection (COMERFORD *et al*, 2015 pg. 16).

After the initial immersion mentioned above, held in mid-October 2023, visits to the following profiles were listed: 1) families that develop traditional Geraizeiro agri-food systems; 2) families that develop extensive livestock activity; 3) families that do not develop any agricultural activity.

For the present article, the analysis will focus specifically on profile 1. In these cases, the prevalence of peasant/geraizeiro management techniques guided by specific relationships is perceived, in order to create forms of productive organization linked to the environment. Polyculture is practiced through a consortium system of gardens, orchards, vegetable gardens and native fruits, while cattle ranching prevails in mango areas for pasture and in the crossing of 'pé duro' cattle with other foreign cattle, such as Nelore, thus forming the 'chapadeira' species, more resistant and productive.

**Figure 2:** Geraizeira cattle farming species 'chapadeira'. 2023 (NIISA-Unimontes Collection).



The *mangoes* are areas intended for cattle feeding, in an intercropping regime that involves the management of shaded areas from selective pruning, keeping the stumps in the soil for fertilization of shoots, planting and maintenance of native pasture, such as *andropogon*. They are also used as fallow areas for the formation of future gardens. In other words, the peasant/geraizeira logic in its use involves a strategy of preservation of the cerrado biome in the *mango areas themselves*, with a view to preserving it.

**Figure 3:** 'Swidden on the stump' culture in a mango area. 2023 (NIISA-Unimontes Collection).



Currently, the Tapera Settlement has 53 demarcated lots, 42 of which have been

occupied by 76 families, totaling approximately 260 inhabitants. 08 lots became collective areas and 03 destined to the Legal Reserve.

In this sense, the families included in profile 1, many of them composed of community members descended from the former squatters of the Tapera Farm, make use of traditional management techniques based on the agroextractivist reconversion strategy, with the aim of regenerating areas deteriorated by the indiscriminate planting of eucalyptus by the company SICAFE. This logic induces the regeneration of the cerrado from the implementation of traditional agri-food systems in a polyculture-livestock system, through which gardens, vegetable gardens, orchards, reserves and mangoes are managed in order to guarantee the production, collection, processing and regeneration of watercourses.

The specificities observed in the families enrolled in profile 1 prove to be effective in the practice of climate-resilient agriculture, since they adapt to the current context of the semi-arid region of Minas Gerais, and at the same time combat environmental degradation. Obtaining income from extractivism is guaranteed by community association, focused on the production of socio-biodiversity products through a partnership with the Grande Sertão Cooperative<sup>4</sup>, located in the municipality of Montes Claros.

In 2023, the production of high-quality pulp became the main source of income in the Tapera Settlement, driven by 17 families enrolled in profile 1. 3,216 kilos were produced and sold, including sour coconut, acerola, tamarind, cajá, native passion fruit, umbú, cajá and ubá mango. In terms of swidden, native species of corn (BR 106 cultivated, bluish, mixed, black, among others) and beans (picker, andú, roxinho, curiango, carioquinha penca, chicken fig) were cultivated, and in this case some families specialized in the reproduction of seeds, which are replicated in other territories in the North of Minas, through the Network of Guardians of Agrobiodiversity<sup>5</sup>. Cheese, cottage cheese and dulce de leche are also produced on a small scale, which have high medicinal potential due to the cattle being raised 'in the wild', feeding on native fruits, medicinal herbs and weeding, as well as gum flour, brown sugar and pequi oil. In the breeding part, there are still pigs,

<sup>4</sup> Created in 2003, the Grande Sertão Cooperative brings together 1200 families in 300 communities in 30 municipalities in the North of Minas, acquiring and processing products from the socio-biodiversity of the cerrado.

<sup>5</sup> The North-Minas Gerais Network Guardians and Guardians of Agrobiodiversity was constituted as an offshoot of work carried out in the 1990s by the CAA-NM for the rescue, evaluation, selection and storage of native seed varieties in the North of Minas, being composed of families of farmers and agrarian reform settlers who assert themselves as traditional peoples and communities. It fights for the recognition of the importance of SATs in maintaining a large genetic stock of species and varieties managed by them in constant coevolution with the rapidly changing environmental and climatic context (DAKI, 2021).



chickens, turkeys, peacocks, goats, horses and bees, for family production and consumption.

**Figure 4:** Criolo corn species cultivated in PA Tapera. 2023 (NIISA-Unimontes Collection).



Two successful examples of rainwater harvesting from the regeneration of plateau areas and runoff via grooves to dams were also observed, ensuring water availability throughout the year. It is these families, members of profile 1, who showed the highest rates of production in the fields and regeneration of the cerrado from the creation of reserves in their lots. It is in this conjunction between traditional practices and family farming in the face of a specific social context that climate-resilient agriculture practices have been implemented.

**Figure 5:** Perennial rainwater collection tank. 2023 (NIISA-Unimontes Collection).



## CONCLUSIONS

Climate change is expected to have acute harmful effects on the Cerrado and the generals. The harshest forecasts for temperature change indicate that most of the cerrado will experience an increase of about 4 degrees (IPCC, 2021).

Traditional peoples and communities are vulnerable social groups, whose livelihoods and food security depend largely on the use of natural resources and land-based productive activities. They have contributed to the conservation of their living habitats – an area that encompasses about 15% of the cerrado biome, but their traditional forest management and land use systems, livelihoods and cultural survival are increasingly threatened.

Consequently, the global benefits for environmental conservation and adaptation to climate change, including carbon sinks, that their territories usually provide, are also impacted. Lately, these drivers of social and economic vulnerability have been further intensified by the adverse effects of Covid-19 and the economic consequences generated by the necessary social distancing as a response to the pandemic.

To continue to deliver the global environmental and climate benefits they use to build the resilience needed to address the adverse impacts of climate change and other man-made threats, they need – in the short to medium term – a greater understanding of climate change and support aimed at promoting sustainable natural resource management and



climate-smart livelihoods that contribute to ensuring their food security, traditional subsistence and social development.

The municipality of Riacho dos Machados, where the PA Tapera is located, is a great cradle of peasants, family farmers and traditional Geraizeiro communities. Faced with a context of influence of climate change on the increase in hunger and conflict over water, there is a notorious pressure on their ways of life, and poverty and food insecurity arise as a consequence.

Of the 76 families residing in the settlement, 17 still cultivate traditional agri-food systems, a low percentage in relation to the whole, but which has guaranteed practical effects of regeneration of the cerrado, its waters and demonstrated alternatives for climate-resilient agriculture. These systems are based on coexistence with local ecosystems and have a greater capacity to maintain themselves in the face of ongoing changes, being able to point out manger practices that are more appropriate to the current context, which minimize losses due to the accentuated climatic irregularities in progress. In this sense, it is urgent to weave strategies and public policies that ensure the recognition and maintenance of these practices, as well as to carry out more densified studies and technical advice to understand the reasons why few families have reproduced the traditional Geraizeiro way of life in the PA Tapera.

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