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# Social Technologies and food production in municipalities in Southwest Bahia. Achievements and challenges in guaranteeing peasant food sovereignty.

# Tecnologías sociales y producción de alimentos en municipios del suroeste de Bahía. Logros y desafíos en la garantía de la soberanía alimentaria campesina.

# Tecnologias Sociais e produção de alimentos em municípios do Sudoeste Baiano. Conquistas e desafios na garantia da soberania alimentar camponesa.

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**Abstract**

This article aims to analyze how food production is carried out by peasant families in Southwest Bahia, based on the use and appropriation of water structures in the "For One Land and Two Waters" Program (P1+2). Therefore, the study was delimited in four municipalities Anagé, Bom Jesus da Serra, Cândido Sales and Poções. The methodology adopted includes literature review, documentary research, survey of primary and secondary data, and semi-structured interviews, carried out remotely because of the pandemic. The results obtained show that the P1+2 social technologies play a substantial role in the cultivation of foods that make up the diet of peasant families.
**Keywords:** Peasantry; P1+2; Coexistence with the Semiarid Region.

**Resumen**

Este artículo tiene como objetivo analizar cómo la producción de alimentos es realizada por las familias campesinas en el suroeste de Bahía, a partir del uso y apropiación de estructuras de agua en el Programa "Por una tierra y dos aguas" (P1 + 2). Por tanto, el estudio se delimitó en cuatro municipios Anagé, Bom Jesus da Serra, Cândido Sales y Poções. La metodología adoptada incluye revisión de literatura, investigación documental, relevamiento de datos primarios y secundarios y entrevistas semiestructuradas, realizadas de forma remota a causa de la pandemia. Los resultados obtenidos muestran que las tecnologías sociales P1 + 2 juegan un papel sustancial en el cultivo de

alimentos que integran la dieta de las familias campesinas. Sin embargo, el período seco todavía se presenta como un desafío para la producción continua.

**Palabras llave:** Campesinato; Convivencia com el semiárido; P1+2.

**Resumo**

Este artigo objetiva analisar como se dá a produção de alimentos pelas famílias camponesas no Sudoeste Baiano, a partir do uso e apropriação das estruturas hídricas do Programa "Por Uma Terra e Duas Águas" (P1+2). Para tanto, delimitou-se o estudo em quatro municípios: Anagé, Bom Jesus da Serra, Cândido Sales e Poções. A metodologia adotada inclui a revisão de literatura, a pesquisa documental, o levantamento de dados primários e secundários, e entrevistas semiestruturadas, realizadas remotamente por conta da pandemia. Os resultados obtidos evidenciam que as tecnologias sociais do P1+2 exercem papel substancial para o cultivo de alimentos que compunham a dieta alimentar das famílias camponesas. No entanto, o período de estiagem ainda se apresenta como desafio para uma produção contínua.

**Palavras-chave**: Campesinato; Convivência com o Semiárido; P1+2.

## Introduction

The Brazilian Semiarid region comprises 1,262 cities distributed in ten federal states, nine of which are located in the Northeast Region, a space that was occupied and explored since the times of colonization in Brazil, and, in order to understand it, so as not to limit it to positivists and determinist perspectives, it is necessary to make a critical socio-economic reading of its configuration, in time-space, linked to a totality. (OLIVEIRA, 1977; ANDRADE, 1984; PRADO JUNIOR, 2004)

The homogenizing movement carried out by the State, since the second half of the 20th century, with the production, circulation, distribution and consumption of products, for the generation and accumulation of wealth, has suppressed the natural, social and economic potential of this space of multiple existences, as well as it has hindered the expansion of actions based on the principles of Agroecology, the living with the semiarid and the sustainability. (CASTRO, 1996, 1986; SILVA, 2006; BARBOSA, 2012, 2014; BATISTA E CAMPOS, 2014)

However, in the universe of issues that involve the being and living of the country person, food production is one of the most relevant to be worked on. And it

is in this perspective that the Brazilian Semiarid Articulation (SAA) provided in the semiarid region of the Northeast, specifically in the beginning of the 21st century, a movement that mobilized and articulated public policies which guaranteed peasant families the right to have access to water for the maintenance of their existence, and, in this existential universe, the guarantee of water for food production. The program "One Land and Two Waters" (P1+2) was then created by SAA along with the State. (VALE; SANTOS, 2020)

Started in 2007, P1+2 is part of a set of structuring and training actions for the policy of living with the semiarid region, which promoted the continuity of the democratization of water, initiated with the Program called "One Million Rural Cisterns" (P1MC). Its implementation "prioritizes food security and sovereignty through agroecological food production, [...]" (BARBOSA, 2009, s/n), and through social technologies such as sidewalk and flood cisterns, trench barrier, dam underground, stone tank/cauldron and popular water pump, among others. If the P1MC made the democratization of access to safe drinkable water possible for drinking and cooking, P1+2 "completed it" by supplying the productive needs of peasant families, in the dimension of guaranteeing their existence, especially, but also in the possibility of income generation with the sale of production surplus. (ASACOM, 2019)

Although it has been implemented in the northeast semiarid since 2007, P1+2 began to be implemented in Southwest Bahia Identity Territory only in 2012, under the execution of CEDASB - Territorial Management Unit (TMU) of SAA. 1,149 social technologies were built through federal government funding, specifically in the first term of President Dilma Rousseff (PT); 989 were financed by PETROBRAS and Banco do Brasil Foundation (BBF); and 792 through resources from the Bahia state government, specifically during the government of Jaques Wagner (PT).

With the discontinuation of the policy of living with the semiarid region, there was no longer a significant advance in P1+2 Program, which is presented as a

weakening factor for the peasantry in the regional and territorial dimension, as it hinders the possibility of minimally improving the food security of families.

Social technologies represent the living with the semiarid, which, in turn, presents itself as one of the ways for the organization of a society committed to the principles of Agroecology, in regards to the way of life, both in the sense of production, but above all, in terms of their sociability and relationship with nature. STs are strategies endowed with a technique that can be reapplied, with low implementation cost, and decentralizing, being the participation of subjects in the construction of knowledge a condition that characterizes them. They need to be committed to "solving concrete social demands, experienced and identified by the population", as ratified by the Social Technology Institute (STI, 2004, p. 28). They are one of the ways to overcome the concentration of water in the northeastern countryside.

Thus, the reality of peasant families covered by P1+2 social technologies in the cities of Anagé, Bom Jesus da Serra, Cândido Sales and Poções, in the Southwest Territory of Bahia, was adopted for the analysis of the research. The choices of the cities, communities and families were performed at random, guided by contracts/agreements executed by CEDASB. From the universe of social technologies, priority was given to sidewalk cisterns, flood cisterns and trench barriers.

The sample consisted of 24 peasant families, organized into three groups composed of eight families, each group corresponding to a social technology. This methodological and procedural arrangement allowed the analysis of variance on family production from the social technology implemented on their land, such as diversity and production continuity, as well as the management of stored water.

The research has exploratory and explanatory, qualitative and quantitative characteristics, as it is dedicated to the analysis of an event/action, from the point of view of the elements that contribute to its occurrence. The methodological procedures adopted include the bibliographic survey, in order to search for the state of the art of the intended approaches in this work; the documentary research, which

allowed the interpretive analysis of primary sources of information and data (GIL, 2002; LAKATOS and MARCONI, 2003), that was made available by CEDASB, the entity responsible for implementing P1+2 program in the selected locations. The institutional documentation was made available after a duly justified formal request. Research was carried out on institutional and governmental websites, such as the National Water Agency (NWA), the National Institute of Meteorology and Weather, in order to ascertain the incidence of droughts in the cities involved.

In order to understand the nuances of food production by peasant families, semi-structured interviews were adopted as a data collection technique, whose main characteristic is the possibility of flexibilization of its base script (COLOGNESE; MÉLO, 1998). The interviews took place virtually, via Google meet platform, by video calls (WhatsApp), and by phone call, due to the pandemic context still in force. A bibliographical research was also carried out, specifically case studies, that could favor a comparison of the reality in different territories, on the universe of the subject of this work. The collected data were treated through analytical and comparative reading, systematized and organized for the elaboration of graphics, charts, tables and text.

Therefore, with this methodological apparatus, this work aims to understand how the dynamics of food production by peasant families takes place, through the use and appropriation of social technologies of P1+2, as well as to apprehend the advances and challenges found in this process.

**Social technology of living with the semiarid. Adaptation strategy to climate change.**

Over the last 40 years, the course of the planet has been discussed regarding the modus operandi of the world society, especially concerning its relationship with nature. However, it was in the 1990s that the issue was treated with a more

operational perspective, in the sense of collective resolution and co-responsibility among countries around the world.

The Kyoto Protocol, signed in 1997 and in force since 2005, is considered a milestone in environmental discussions, as it sets out concrete goals for the reduction of greenhouse gases in the planet's atmosphere. The countries would need to rethink the development paradigm that was adopted, but what actually happened was the adoption of strategies to "escape" responsibility, as translated into the logic of carbon credit between countries, an unequal relationship between the richest and polluters, holders of high standard technologies, with the localities supplying air filtration sources, usually countries in another level of "development". (VENTURA, et al, 2012)

The theme of climate change, in a serious and deliberative way, is on the margins of the capitalist countries' agendas, while nature already shows the impacts of anthropic action on its course and balance. The world scientific community continues to signal the need to adopt social, economic and environmental practices that are more sustainable, so as not to collapse the planet.

In this scenario, studies indicate that semiarid and arid regions will be the locations that will suffer most from environmental impacts. The Brazilian semiarid region, for example, has had its area modified a few times in the last 30 years, as shown in the records in Table 1. It is in this context, and of its overcoming, that there is a need to implement strategies which promote a more sustainable relationship from society with the natural resources made available by nature.

The observation of the data in table 1, makes it possible to identify the progression of the number of cities inserted as semiarid, since 1989, when the first delimitation of the Brazilian Semiarid Region was carried out by the Superintendence for the Development of the Northeast (SUDENE). This socio-spatial aggregation of cities followed some guiding and classifying criteria such as the rainfall index, considering the "annual average equal to or less than 800mm of precipitation" (BRASIL, 1989). Thus, there was an area formed by 1031 cities.

**Table 1- Quantitative settings of the boundaries of the Brazilian semiarid region, by state, in the years 1989, 2005 and 2017.**

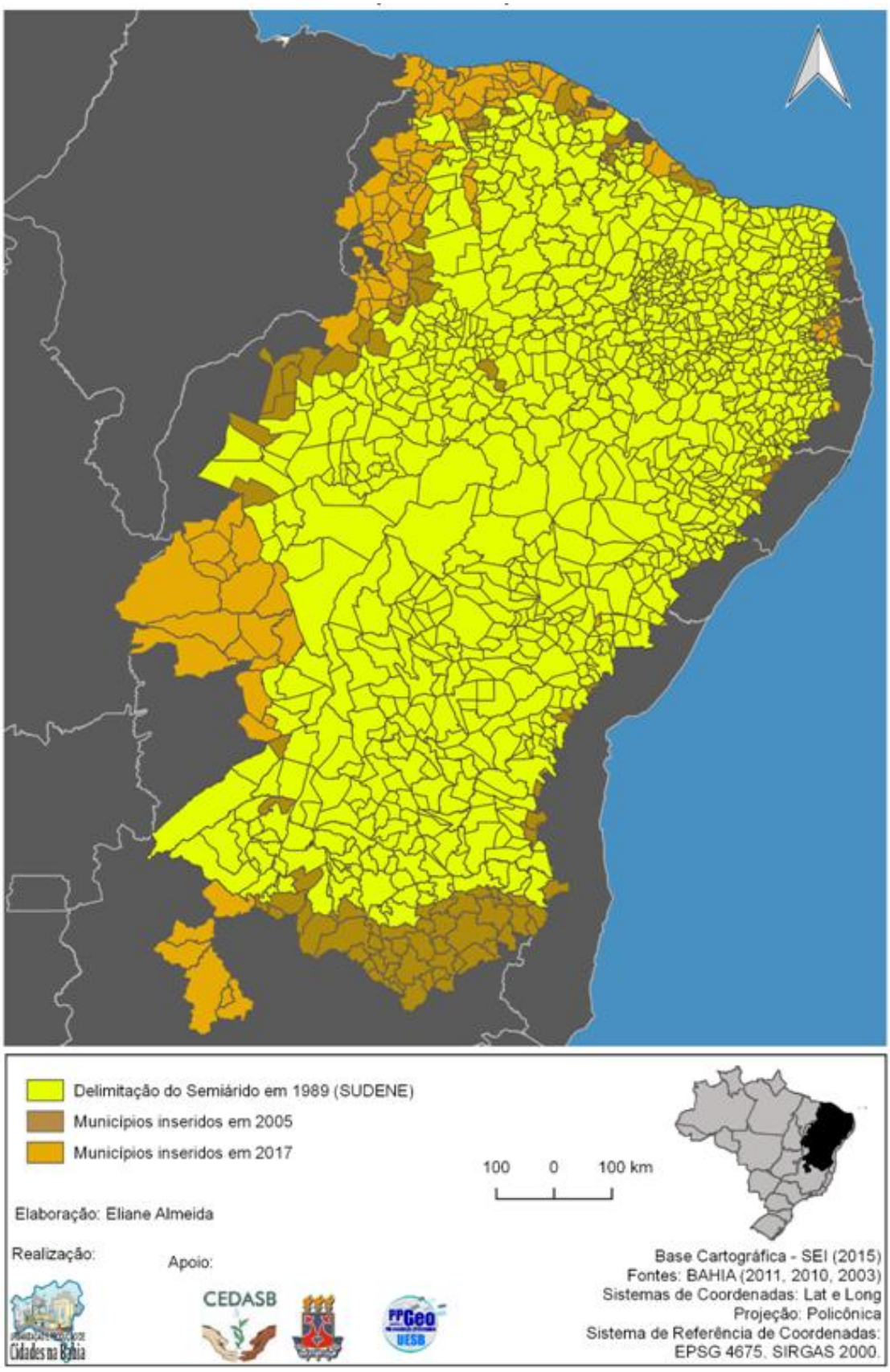
| State | Qty of cities in the FU* | Qty of cities in brazilian semiarid | | |
|---|---|---|---|---|
| | | 1989 | 2005 | 2017 |
| Alagoas | 102 | 35 | 38 | 38 |
| Bahia | 417 | 257 | 265 | 278 |
| Ceará | 184 | 134 | 150 | 175 |
| Minas Gerais | 853 | 40 | 85 | 91 |
| Maranhão | 217 | 0 | 0 | 2 |
| Paraíba | 223 | 170 | 170 | 194 |
| Pernambuco | 185 | 118 | 122 | 123 |
| Piauí | 224 | 109 | 127 | 185 |
| Rio Grande do Norte | 167 | 140 | 147 | 147 |
| Sergipe | 75 | 28 | 29 | 29 |
| | **Total** | **1.031** | **1.133** | **1.262** |

Source: BRASIL (1989, 2005, 2017); IBGE (2019)
Elaborated by: Eliane Almeida (2019).
* Federal Unit

In 2005, in addition to the annual average criterion, the aridity index of up to 0.5, recorded between 1961 and 1990, and the risk of drought greater than 60% based on the period between 1970 and 1990 were also considered (BRASIL, 2005). This change in criteria raised to 1133 the number of semiarid cities in Brazil, and an increase of 8.66% in its territorial extension, which was 892,309.4 km² and is now rated at 969,589.4 km². Furthermore, in 2017, the Brazilian semiarid region would represent 1,128,697 km² of the national territory, with 1,232 cities. This time, the added classification criterion was the daily percentage of water deficit equal to or greater than 60%. (Map 1)

Although there are cross-cutting issues in the delimitation of the territorial boundaries in semiarid region, which we do not intend to list in this work, it is essential that the process of expanding semiarid conditions in cities is related to anthropic practices that culminate in the destruction of nature and the subtraction of its natural resources, including water.

Map 1- Territorial delimitation of the semiarid region in Brazil (1989-2017)




Source: Elaborated by Almeida (2018)

This imbalance structured by societies regarding the appropriation of natural resources to provide their needs, makes it urgent to develop strategies that can enable the existence and integral reproduction of the population of the Brazilian semiarid, and, in a peculiar way, of the peasant populations.

Strategies with an effective and efficient local impact are understood as Social Technologies. The STs for living with the semiarid are, for example, for Civil Society Organizations (CSOs), instruments for the dissemination, consolidation and construction of knowledge, which arises from the experiences accumulated by peasant families. It refers to the praxis that has the principles of Agroecology in the technique undertaken in a contextualized way.

> A set of techniques, transforming methodologies, developed and/or applied in the interaction with the population and appropriated by it, which represent solutions for social inclusion and improvement of living conditions. (IST, 2004, p. 26)

This definition by the Institute of Social Technology (IST) is consistent with the way in which social organizations understand and develop STs, in the case highlighted here, organizations that work on living with the semiarid region, based on the actions of the SAA. Giving visibility to what constitutes social technology is of paramount importance to contribute to possible advances in public policies and/or autonomous actions through applied socio-technical practices, which are configured as effective solutions for certain realities. Otherwise, not apprehending them would mean leaving them invisible, which would not make it possible to recognize their transforming potential. (IST, 2004)

The term "contextualized technologies" is also used to address to the set of techniques, practices, knowledge and methodology developed in the semiarid region, from the perspective of "Living with the semiarid".

> [...] contextualized technologies must combine these two aspects: the recovery and enhancement of the knowledges and the motivations of

> the rural population and technological practices and instruments appropriate to that reality. The main objective should be to generate innovative production forms, based on appropriate management practices and use of natural resources, prioritizing technologies adjusted to the ecological conditions of semiarid conditions, providing improvements in the living conditions of the local population and increasing the productivity of the countryside economy. (SILVA, 2006, p. 190)

It is important to emphasize that although there is still no consensus on the definition of social technology, the approach brought by Silva (2006) warns that, for the semiarid region, the social technology that serves is the one contextually inserted in the rural reality, a technology that subjects can actively participate in the process of its implementation, which has a tangible management, and that its structure enables management autonomy and independence.

It is in this perspective defended by Silva (2006) that the social technologies of living with the semiarid fit in, which are the know-how of the organizations of the Brazilian Semiarid Articulation (SAA). This expertise is related to its primary objective, which is to ensure that peasant families in the semiarid region have access to quality water, so they can exist with more dignity.

The consolidation of the SAA took place in contexts of popular demonstrations against the State's inertia towards the intensified scourges due to long periods of drought; the ineffectiveness of public policies adopted to mitigate the impacts of droughts in the northeastern territory; and the rejection of the discourse of "fighting droughts" as a bias that promotes structural solutions for the region. (VALE; SANTOS, 2020)

In 2002, SAA was constituted as a legal personality, and inserted itself in the propositional sphere of public policies of living with the semiarid northeast, along with the State, as well as, in the social mobilization for the diffusion of a differentiated paradigm in dealing with climate issues, specifically regarding the access to water in the countryside, through social technologies (Idem). It has already

implemented 626,791 thousand cisterns in the Brazilian semiarid region to store 16 thousand liters of water for the consumption of peasant families; 6,848 cisterns in rural schools with the capacity to store 52 thousand liters of water; 103,528 social technologies to finance small-scale agricultural production; and 793 community seed houses. (ASABRASIL, 2021)

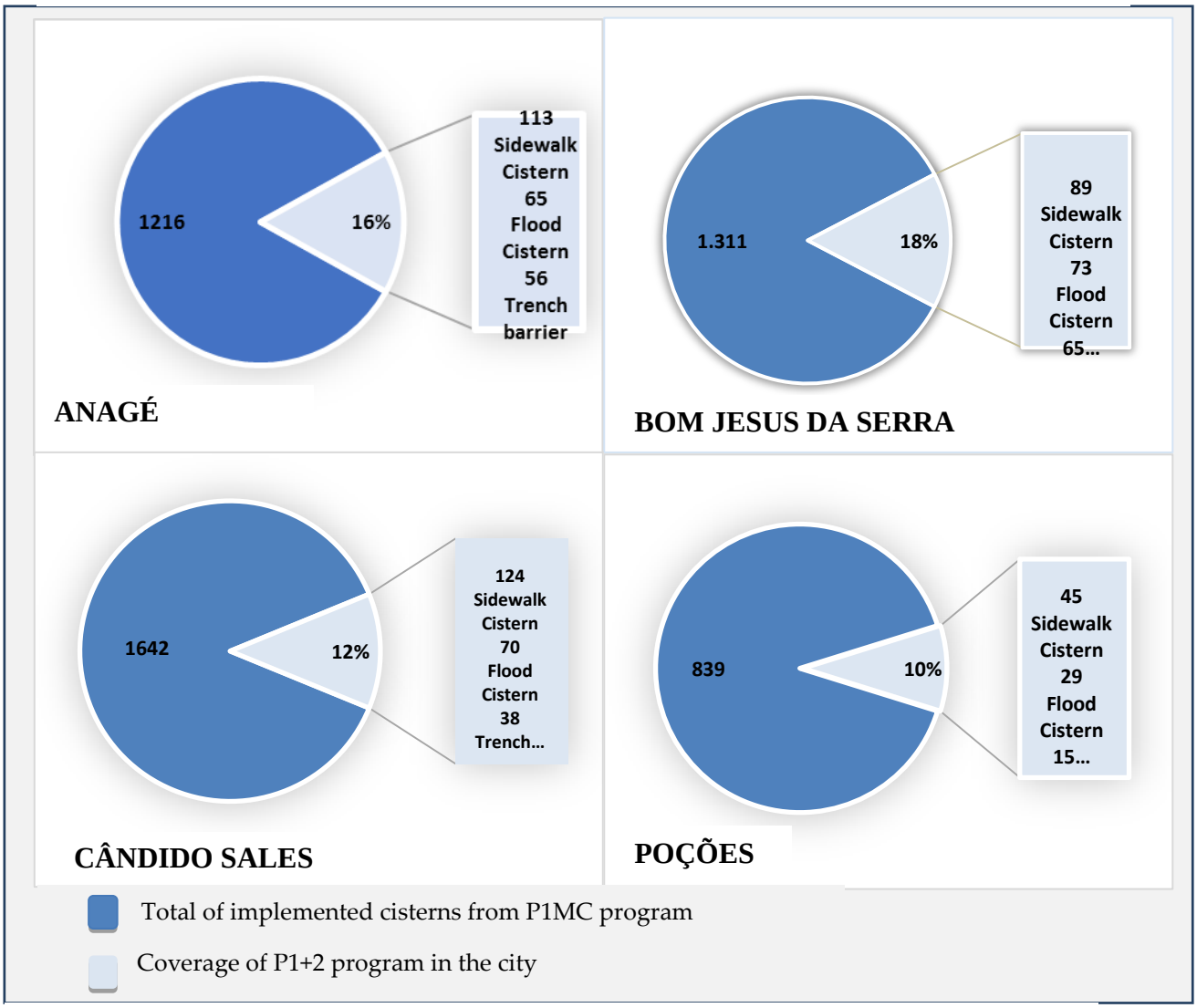
This socio-technical framework, in synergy with rural realities, became an opposition to state public policies that are not consistent with the logic and capillarity of projects for living with the semiarid region. The low budget cost of its social technologies, the easy applicability, appropriation and handling, the efficiency and harmonious aggregation to the agro-ecosystem of family production units (FPU), are characteristics that confirm that STs are part of a consistent strengthening project of the peasantry of the semiarid northeast.

**Analysis of food production by peasant families through P1+2 Program.**

Before going into the specifics about food production by peasant families, it is important to understand how the policy of living with the semiarid region is configured, in particular, P1MC and P1+2 Programs. Concerning P1+2, specifically, it is noticed that it represents a spatiality of coverage that is still incipient in the Southwest of Bahia (Figure 1), as well as in the semiarid Northeast region, since it still accounts for just over 103,000 water structures of rainwater collection to supply for the agricultural production implemented so far. (SAA, 2021)

As previously mentioned, the STs of living with the semiarid region have as their main focus the storage of rainwater to supply the needs of rural families. In this

Infographic 1 – Comparison of the percentages and quantities of social technologies in P1MC and P1+2 Programs, implemented by CEDASB, in the cities of the research, until 2021.



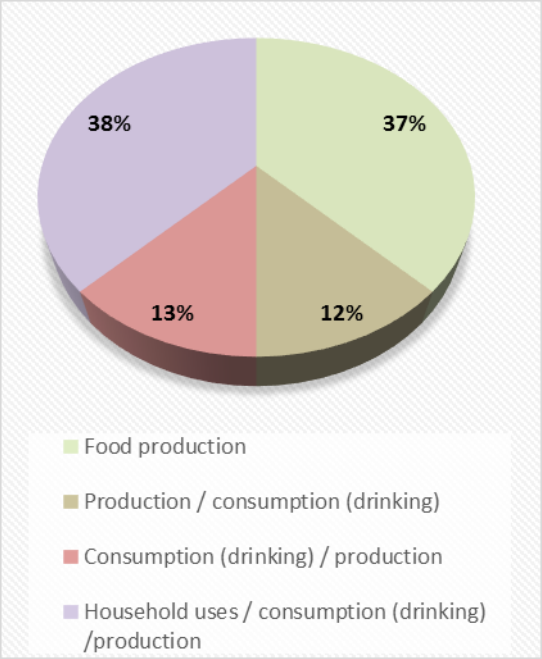

Source: Documentary Research, CEDASB (2021)
Sistematization and elaboration: Eliane Almeida.

work, the analysis of "One land Two waters" program was carried out, specifically, the sidewalk cistern, flood cistern and trench barrier.

The systematization of the information from the interviewed groups, organized by social technology, enabled the identification of specificities of being and living in a semiarid region, in the specific case of this work, concerning its

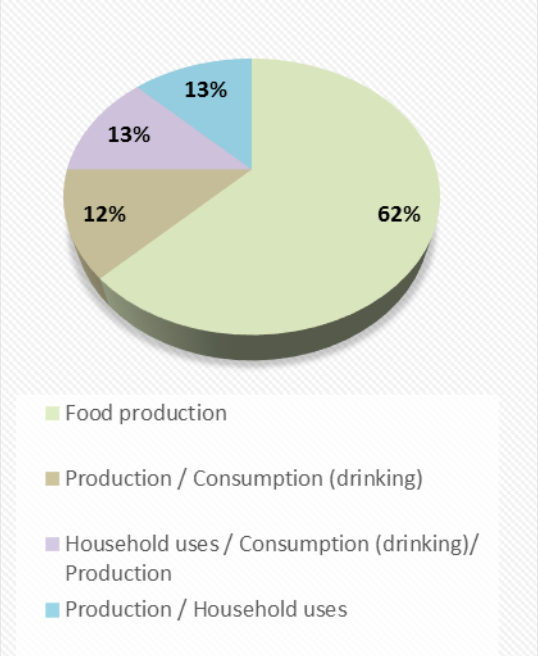
production character. The analysis of the reality demonstrated in the first place that the families develop water management following the logic of the latent need of the moment, in order of priority (Graphs 1 and 2).

**Graph 1 – Family management of water from the Sidewalk Cisterns, 2021.**




Source: Field Research, 2021.
Sistematization and elaboration: Eliane Almeida.

**Gráfico 2 – Family management of water from the Flood Cisterns, 2021.**




Source: Field Research, 2021.
Sistematization and elaboration: Eliane Almeida.

In Graph 1, when observing the priority order, it is possible to apprehend the multiple use and destination of water resources in the routine of peasant families, also to make up for an existing water deficit for family consumption. It is important to emphasize that for a family to receive a ST of P1+2, it must necessarily have been contemplated with P1MC. By prioritizing this aspect, two possibilities were inferred for this emerging issue: the first is that the use of water from the sidewalk cistern for family consumption (drinking) is related to the inefficient water management by the families of the 16,000 cistern liters, whose primary functionality is the destination for the consumption of the family and the preparation of their food, and the second is

that, in the face of such intense and prolonged periods of drought, the families developed, as an alternative, an under-management within the management of water resources .

Listening to the subjects allowed us to confirm that, despite the fact that there is a certain "indiscipline" in the management of "drinking water", which is also used for household chores, it is the prolonged dry period that reconditions the administration of available water resources. Currently, there is the emptying of community watersheds; the reduction and/or suspension of emergency actions performed by the army in the cities with "Water Truck Operation"; and the financial difficulty of buying water to drink (R$120.00 to R$150.00 to hire a water truck with 8 thousand liters of water). This whole situation makes families manage social technologies in ways that often contradict the definition and functionality that SAA diffuses itself. However, reality is more complex than theories, concepts and definitions.

The dialogue built, through interviews, with agencies directly or indirectly linked to the distribution of water in rural communities, such as the Department of Agriculture and Civil Defense, allowed us to visualize another variable that adds to the theme of access to water in the cities contemplated by the research, and how this reverberates in the locus of peasants.

This is the emergency supply of families during periods of prolonged drought, mainly through the so-called "Water Truck" Operation, carried out by the Army and the city government. This situation is as follows: Anagé, with 25,516 inhabitants, of which 20,592 are rural residents, currently has 25 water trucks; Bom Jesus da Serra, with 10,113 inhabitants, of which 7,345 are rural residents, had only 5 water trucks; Candido Sales, with 27,918 inhabitants, considering that 8,632 live in the countryside, has only 3 water trucks available, and, finally, Poções, with 44,701 inhabitants, of these 10,042 are rural residents, has 22 water trucks available (IBGE, 2010; PESQUISA DE CAMPO, 2021)

It is important to point out that the families that correspond to 37% illustrated in Graph 1, and that use water only to produce food, emphasized that this prioritization will be given even when they have the opportunity to meet domestic demands in other watersheds, and while the cistern of 16 thousand liters does not dry out, every water reservoir that can support the family will be used. It was noticed, therefore, that food production appears at different priority levels as it presents itself in different social dynamics of availability of water resources.

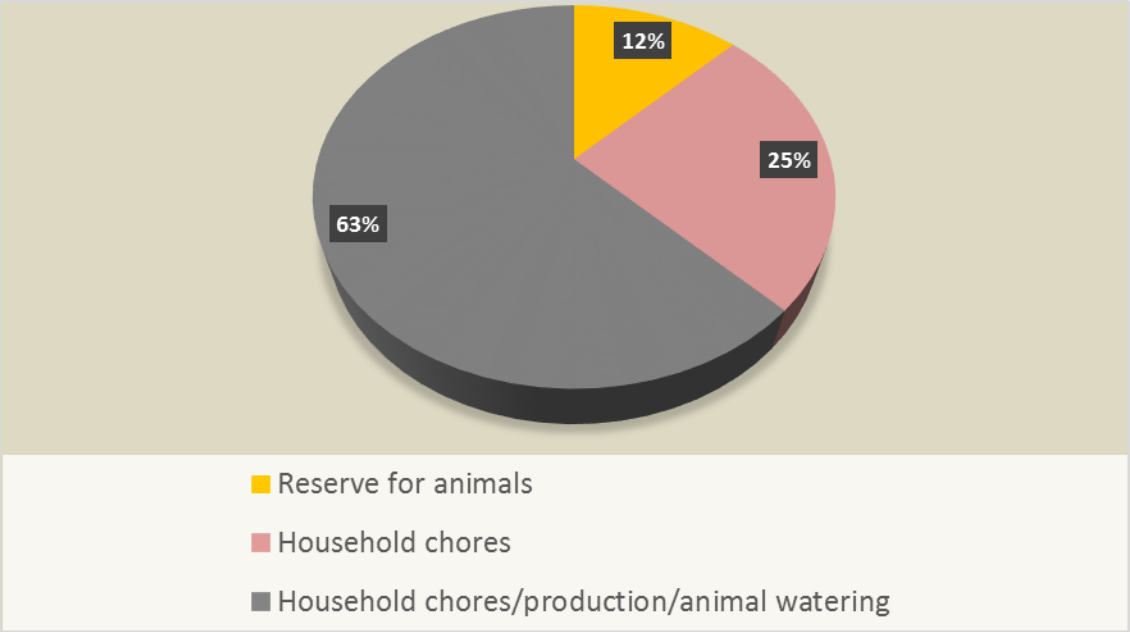
Another reality that conforms to this discussion is that of families that have the sidewalk cistern, which in a context like the one mentioned above, end up supplying water to the neighborhood, which are mainly composed of family members, so that they have water to drink and cook, especially, when they are deprived of water in their "first water" cisterns. We found, for example, a family composed of 8 people, who share the water from their waterfront cistern with two other equally large families.

By directing the analysis to Graph 2, and comparing it with Graph 1, it is evident that the families which received the flood cistern use the stored water, predominantly, for the production of food. Most of these families had other water sources, such as artesian wells and pools, which supply water to the household chores such as washing dishes, clothes, and cleaning the house in general, and thus do not require as much use of water from the STs .

But for other families, which are a minority within the sample worked in this paper, the stored water is also consumed, as there are no other sources, when the 16 thousand liters cisterns dry up. When reporting the handling of water using social technology, the families explained that the flood cisterns are of great value, but that their maintenance is difficult, as large amounts of sediment enter, usually organic matter and/or leaching from the soil. Even with sediment decantation, the stored water is still muddy in most cisterns. Therefore, it focuses on food production and household chores.

When verifying how this appropriation and management of water took place with the families covered by the trenches, a somewhat different reality was found (Graph 3). As it is a structure with the capacity to store almost 10 times the amount of

**Graph 3 – Family management of water from trench barriers, by priority, 2021.**




Source: Field Research, 2021.
Sistematization and elaboration: Eliane Almeida.

water in the sidewalk and flood cisterns, the trench barrier is a social technology that guarantees families greater convenience in order to meet the daily maintenance demands of domestic activities. However, food production, although it appears in the amount of 63% as a priority destination in the second instance, is carried out with less focus, continuity and diversity.

It was possible to identify that, in two of the eight families that have a trench barrier, donating water to the neighborhood is part of their routine. As there are 500m³ of water, they feel they have a duty to meet the demands of the community, especially in periods of drought where even drinking water is scarce and the 16 thousand liters cisterns are empty. One of the interviewed families emphasized: "I

don't deny water, I give water to everyone who wants to take it. Anyone. [...] I've already donated about seven trucks of water here" (verbal information). The truck that the farmer refers to is the water truck, and the period is the current one, with a record of two years without substantial rain.

In order to facilitate the understanding of the universe of the diversity of the production of the families, the agricultural production of families was systematized from water stored in the three social technologies of living with the semiarid, in the period comprising implementation until the year 2020 (Table 1).

**Table 1 – List of food produced by families, by social technology, from 2010 to 2020.**

| Food | Sidewalk Cistern | Flood Cistern | Trench Barrier |
|---|---|---|---|
| | Qty of Farming Families | Qty of Farming Families | Qty of Farming Families |
| Lettuce, cilantro | 8 | 8 | 5 |
| Cilantro | 8 | 8 | 5 |
| Green onions | 6 | 8 | 5 |
| Kale | 7 | 6 | 4 |
| Cabbage | 2 | 3 | - |
| Tomato | 1 | - | - |
| Beet | 6 | 7 | 4 |
| Parsley | 4 | - | - |
| Rocket | 1 | 1 | - |
| Carrot | 7 | 7 | 4 |
| Pepper | 4 | 1 | - |
| Pumpkin | 3 | 1 | 4 |
| Okra | 2 | 1 | 1 |
| Saffron | 2 | - | - |
| Brazilian Gherkin | 2 | - | 1 |
| Onion | 2 | 3 | 2 |
| Beans (broad/andu) | 2 | 5 | 3 |
| Corn | 1 | 3 | 2 |
| Bell Pepper | - | 1 | 1 |
| Cucumber | - | 1 | 1 |
| Potato | - | 3 | - |
| Garlic | - | 2 | - |
| Annatto | - | 2 | 1 |
| Sweet Potato | - | 1 | 1 |
| Chayote | - | 1 | - |
| Aubergine | - | 1 | - |
| Manioc | - | - | 1 |
| Brazilian Cashish | - | - | 1 |

Source: Field research (jun/jul, 2021)
Sistematization and elabortion: Eliane Almeida

It is observed that the families that received the flood cisterns bring more experiences of production, in terms of diversity, than the families that have the sidewalk cisterns. This fact can be interpreted by the premise that, as the water from the sidewalk cistern is intended for various demands of families, such as drinking and household chores, the production turns out to be less diverse, in order to maintain a balance in meeting all of the demands.

However, in both technologies a nutritious and diverse family food base was perceived, based on the cultivation of vegetables. In the case of trench barriers, the survey found that the experiences of production took place more at the beginning of its implementation, since most families did not have a continuous practice of planting around this ST, and they justified saying that the barriers are distant from their houses and yards, about 300 to 1000 meters.

All interviewees emphasized that the land around the trench is "weak" and "bad". Therefore, its functionality, in the last three years, has been limited to guaranteeing a water reserve for domestic use and for animals (cattle, swine, poultry and horses). Food production is on a scale for family consumption, and with reduced diversity, except for a family that managed to install a hydraulic pump system to take water from the trench to alternative reservoirs located in their backyard, ensuring water for domestic chores and for the production of vegetables, greens and fruits.

Returning to the families' analysis of the types of soil where the barrier is excavated, the hypothesis that arises is that in the absence of a more specialized soil study in identifying these areas, ST ends up not reaching its potential in fulfilling the social functionality to which it was conceived. The soils of the studied locations are classified as Latosols and Acrisols. Latosols are characterized by being, most of them, good retainers of water, although acidic and poor in nutrients, and require a planned and intense management to ensure productivity, quality and food diversity for

families. Acrisols, on the other hand, are soils of low fertility, susceptible to compaction and erosion, they have, in some localities, rocky sediments in their structure, and they also need acidity correction and efficient fertilization management. They present variants throughout the semiarid region of Bahia, which is why soil analysis is an essential measure for any purpose. (CUNHA, et.al., 2010; FILHO, et.al., 2006)

When calling the implementing institution of P1+2 in the locations – CEDASB, to verify its understanding of this issue, informed that it considers the questioned aspect pertinent, to ensure the effectiveness and efficiency of the technology. However, it clarified that there is no soil analysis in the work plan of P1+2 projects. And, in addition to this issue, the short term that the institution has in fulfilling the goals agreed in the contracts, which makes it impossible, for example, the formation of possible partnerships in the promotion of soil analysis necessary for greater safety in the implementation of trench barriers, and for guidance on the management of the area where it will be produced.

Returning to the focus on production diversity, the presence of many medicinal plants was noticed, considering the "natural pharmacy" of the families. The stored water made it possible to grow many of these plants year-round. Mint (54%), lemon grass (50%), lemon balm (37,5%), boldo and rosemary (25%), ruta (17%), basil, pennyroyal, spearmint and fennel (12,5%), chicory, "*girama*", holy basil, lavender, corama and wormwood (4%), palm (8%). Among the fruit crops stood out the cultivation of banana, papaya and orange (29%), pomegranate, guava, lemon and watermelon (17%), mango, acerola and avocado (12.5%), pineapple, noni, green coconut, tangerine, jackfruit, soursop and passion fruit (8%), cashew, sugarcane, pine cone and brazilian cherry (4%).

Having all the information gathered through this research, it was possible to observe that the technologies of P1+2 Program are essential instruments for the maintenance of their existence for peasant families. Other studies on this topic also converge with this assertion, such as the work by Santos (2017) that showed the

productive diversity of peasant families in communities in the city of Retirolândia, in the Territory of Sisal, after the implementation of the social technologies of P1+2. The family income of 70% of the families in this research was complemented by the sale of the production surplus, in institutional programs such as PAA and PNAE, as well as in open markets. 35% of these families manage to guarantee at least one minimum wage with this sale.

In this same perspective, the case study carried out by Silva and Teixeira (2015) in the Territory of Sertão do Araripe, in Pernambuco, showed how P1+2 provides the plant variety of an agroecological system, in this case, the backyard family production. About 69 plant species cultivated among swiddens, forages, fruit, vegetables and medicinal plants were mapped, and a timid practice of marketing these foods was identified, prioritizing self-consumption.

The analysis carried out by Alencar (et al., 2018) on the impacts of the program on agricultural diversification in the extreme south of the state of Ceará, using the Propensity Score Matching (PSM) method, also concludes the importance of the social technologies of P1+2 to guarantee a diversified and nutritious food diet for rural families, as production over a longer period is possible.

In these works, the need to expand the program is highlighted, so that a greater number of farming families can have an improvement in their quality of life. They clarify the urgency of complementary or concomitant actions, the structuring actions, stressing out technical assistance and rural extension, so that the agroecological transition can be consolidated more efficiently, and all the knowledge disseminated in the process of implementing the program in the places.

Due to this reason, the reality analyzed in this article also identified that 100% of the families, before P1+2, did not have the habit and the financial conditions of producing vegetables and fruits. Thus, they only consumed this type of food when they could afford it, which was rare. Currently, as described in table 1, even when the weather is not favorable, they are able to guarantee a more complete diet.

In short, SAA's social technologies, duly appropriated by families, provided the families the opportunity to produce and consume their own food, in an agroecological way, and, in some cases, provided the generation of monetary income from the sale of surpluses. In this work, the details that are present in everyday life are brought, a dimension of life capable of disturbing theories, questioning and evaluating sociotechnical models within the scope of the peasantry, and its peculiar conditions of social reproduction.

**Final considerations**

In the last 2 years, the cities of Southwest Bahia have been impacted by the drought, and, as already known, it is in the countryside that these impacts reverberate more, as it directly affects the daily life and productive, social, economic and cultural dynamics of the peasant population.

From July 2019 to July 2021, there was an incidence of severe, moderate and mild droughts in the Southwest of Bahia. Only between the months of October and December 2020, there were no droughts in the region (BRASIL, 2021). This climatic situation, added to the continuous and progressive increase in the destruction of nature, from a systemic perspective, means that in the semiarid region, socioeconomic changes tend to be more specific.

However, in view of so many variables, it is possible to understand, as the research showed, that food production, even with STs, is still closely related to the scarcity of water resources, what justifies the multiple uses of water in the water structures of P1+2 program by the families. Nevertheless, it was possible to identify that, in a priority scale, food production occupies a significant place.

The importance of STs to guarantee the diversity and quality of food consumed by families is undeniable, as it is important for their sovereignty and food security. Nonetheless, cross-cutting issues that impact the use and management of stored water cannot be disregarded, such as periods of intense and long droughts, which have affected the continuity of food diversity, and conditioned part of the families to external purchases, or subtraction of these foods in the family diet. In this

context of drought mentioned, the family strategy is the multi-use of water from cisterns and trenches, in addition to the definitions related to their functionalities.

Another aspect verified in this work is that it is important for SAA organizations to reflect upon the system for collecting water through the flood cistern, which is really questioned by the families, especially due to the amount of sediment that is deposited in its interior and in the decanters, what makes the maintenance of the structure difficult. Likewise, the trench barriers require more detailed soil studies, so that after excavation, the technology can actually be more efficient considering the demands of the families.

In the perspective of contributing to the living with the semiarid region so that its consolidation can be more successful in rural communities, it is suggested that P1+2 Program's action plan include technical follow-up, after or concomitantly with the implementation of STs, in order to contribute to families in the process of handling and managing the subsystems, as this would lead peasants to a more effective and full appropriation.

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