Referência

ANDRADE, Liza Maria Souza de et al. (org.). **Residency in science, technology and society (CTS) habitat, agroecology, solidarity economy and eco-systemic health**: integrating postgraduate and extension. Brasília: LASUS FAU: Editora Universidade de Brasília, 2023. 328 p., il. Disponível em: https://livros.unb.br/index.php/portal/catalog/book/501. Acesso em: 13 nov. 2023.

ISBN: 978-65-84854-07-9

Andrade . Neder . Tostes . Wiesinieski . Aureliano . Pazos (Orgs.)

RESIDENCY IN SCIENCE, TECHNOLOGY AND SOCIETY (CTS)
HABITAT, AGROECOLOGY, SOLIDARITY ECONOMY AND ECO-SYSTEMIC HEALTH: INTEGRATING POSTGRADUATE AND EXTENSION

RESIDENCY IN SCIENCE, TECHNOLOGY AND SOCIETY (CTS)
HABITAT, AGROECOLOGY, SOLIDARITY ECONOMY AND ECO-SYSTEMIC HEALTH: INTEGRATING POSTGRADUATE AND EXTENSION

Brasília, 2023

Liza Maria Souza de Andrade | Ricardo Toledo Neder
Simone Parrela Tostes | Livia Barros Wiesinieski
Ana Luiza Aureliano | Valmor Cerqueira Pazos (Orgs.)

RESIDENCY IN SCIENCE, TECHNOLOGY AND SOCIETY (CTS)

HABITAT, AGROECOLOGY, SOLIDARITY ECONOMY AND ECO-SYSTEMIC HEALTH: INTEGRATING POSTGRADUATE AND EXTENSION

Dados Internacionais de Catalogação na Publicação (CIP)
(Câmara Brasileira do Livro, SP, Brasil)

Residency in science, technology and society (CTS) habitat, agroecology, solidarity economy and eco-systemic health [livro eletrônico] : integrating postgraduate and extension / organização Liza Maria Souza de Andrade...[et al.] ; tradução Eduarda Morena Roma Buzar, Abner Luis Calixter, Erika Stella Silva Menezes. -- Brasília, DF : LaSUS FAU : Editora Universidade de Brasília, 2023.
PDF

Vários autores.
Outros organizadores:-serif"> Ricardo Toledo Neder, Simone Parrela Tostes, Livia Barros Wiesinieski, Ana Luiza Aureliano, Valmor Cerqueira Pazos.
Bibliografia.
ISBN 978-65-84854-20-8

1. Agroecologia 2. Artigos - Coletâneas 3. Arquitetura 4. Economia solidária 5. Interdisciplinaridade 6. Meio ambiente 7. Saúde I. Andrade, Liza Maria Souza de. II. Neder, Ricardo Toledo. III. Tostes, Simone Parrela. IV. Wiesinieski, Livia Barros. V. Aureliano, Ana Luiza. VI. Pazos, Valmor Cerqueira.

23-175764 CDD-303.483

Índices para catálogo sistemático:

1. Tecnologia e sociedade : Sociologia 303.483

Eliane de Freitas Leite - Bibliotecária - CRB 8/8415

This book is sponsored by:

CAU/BR
Conselho de Arquitetura e Urbanismo do Brasil

Achievement:

Support:

Research groups and cores of UnB involved:

External Partners to UnB:

RESIDENCY IN SCIENCE, TECHNOLOGY AND SOCIETY (CTS)

HABITAT, AGROECOLOGY, SOLIDARITY ECONOMY AND ECO-SYSTEMIC HEALTH: INTEGRATING POSTGRADUATE AND EXTENSION

Liza Maria Souza de Andrade | Ricardo Toledo Neder
Simone Parrela Tostes | Livia Barros Wiesinieski
Ana Luiza Aureliano | Valmor Cerqueira Pazos (Orgs.)

BRASÍLIA-DF
2023

PRESENTATION

This book aims to present the fundamentals and the basis of the multi professional course in CTS - Science, Technology, and Society in residency (Lato Sensu Graduation + Extension), characterized by a pedagogical practice and educational planning type PEX - research associated with teaching and integrated with extension. The proposal socially and territorially articulates three interdisciplinary themes: Habitat (Housing, Architecture, Urbanism, and Environment in the Countryside and the City); Agroecology (Food Sovereignty, Family Farm, Field, and City Integration); Health (Epidemiological Surveillance, Collective Health, Family Health, Sanitation, Ecosanitation, and Ecological Infrastructure) and a fourth transdisciplinary theme: Associated Work (Solidarity Economy, Training and Education, Occupation, Income, and Solidarity Technology).

The contents of the chapters were developed in the discipline of Special Studies in Technology, Environment, and Sustainability of the Graduate Program of the Faculty of Architecture and Urbanism of the University of Brasília (PPG-FAU/UnB), offered in 2021, integrated into the Extension Course Fundamentals in Science Technology and Society (CTS) – Habitat, Agroecology, Solidarity Economics, and Ecosystem Health, a partnership of the Science Policy Center, Technology and Society (NPCTS/CEAM/UnB) and professors of the Faculty of Architecture and Urbanism (PPG-FAU), the Faculty of Planaltina (FUP), the Faculty of Agriculture and Veterinary Medicine (FAV) and CDS/UnB, the Collective Health course of the Faculty of Ceilândia (FCE), the Faculty of Education (FE) and the Institute of Humanities (IH).

Thus, the process of construction of the Multiprofessional Residency CTS was initiated to form a transdisciplinary epistemological base in Solidarity Technoscience, inserting the University Extension in graduation studies, integrating 15 master's and doctoral students to more than 50 people from social movements, collectives, professional entities, government technicians, researchers and professors from other institutions as well as undergraduate students. The students were organized into working groups in the online meetings by the Teams platform, through which the following themes were discussed: i) solidarity technology, sociotechnical adequacy, and solidarity economy; ii) Freirean education and work; iii) territorial connections, social struggles and networks of solidarity; iv) sociotechnical adequacy for habitat production: spatial patterns in the field and the city; v) sociotechnical adequacy for agroecology and urban agriculture; and vi) ecosystem

health, sanitation, and governance, which make up the contents of the chapters of this book.

In the introductory chapter, it is detailed how the methodological process of structuring the course took place, divided into two parts: 1) theoretical-methodological foundations based on Solidarity Technoscience, forms of Technical Assistance, and the University Extension; and 2) political-pedagogical proposal of the course, including the themes, the territories surrounding the Distrito Federal that will be worked on the course, the curriculum matrix and the general functioning.Then Finally, the expected results and the developments already in progress are discussed.

The essence of the Residency consists in uniting Graduation And Extension in a trans-multi-interdisciplinary character with the vision of university public policy (opposite that of private or official philanthropy) offering vacancies for 35 trans-multi-disciplinary technical agents (managers, urban architects, lawyers, economists, sociologists, social workers, technicians, and engineers, community health agents), of which 28 will receive scholarships, and 14 territorial agents (2 agents from each of the 7 territories of the Distrito Federal and surrounding areas) able to act as multipliers of community initiatives, to provide sociotechnical advice to local entities and to articulate resources, people, entities, tools, and territorial tactics in seven territories surrounding the Distrito Federal in favor of the protagonism of subjects and groups in their daily territories.

The Lato Sensu Course and the Multiprofessional Residency Extension Program CTS – Habitat, Agroecology, Ecosystem Health, and Solidarity Health (linked to PPG-FAU/UnB and the Extension Decanery – DEX/UnB) are being sponsored by the 2021 ATHIS Notice of the Council of Architecture and Urbanism of Brazil (CAU/BR[1]) and with the parliamentary amendment of Mrs. Erika Kokay, directed to the payment of scholarships.

It also has the support of research and extensionist practices carried out by the Research and Peripheral Extension Group, emerging works within the matter of the project "Habitat production in the territory of DF and surroundings: urban and rural ecosystems and sociotechnical advice", coordinated by Professor Liza Andrade, with drone images produced by engineer Valmor Pazos Filho, as well as with project "Digital Platform Cooperativism (prototype for seven territories of the Distrito Federal), mapping of actors, agencies and sociotechnical adequacy in rural and urban territories of production of the popular circuits of the economy – a CTS approach", coordinated by Professor Ricardo Neder. Both projects are funded by the Distrito Federal Research Support Fund (FAP-DF).

Support was received from research and experiences of the Agroecology Center of UnB, coordinated by Professor Flaviane Canavesi, of the Ecoplanetary project, coordinated by Professor Aldira Dominguez, and the Life and Water project in ARIS, coordinated by Professor Perci Coelho.

The list of modules below has the respective module: professors-coordinators and doctoral tutors of ppg/FAU/UnB of the Fundamentals extension course in science, technology and society (CTS) – Habitat, Agroecology, Solidarity Economy and Ecosystem Health.

- **Solidarity technology, sociotechnical adequacy and solidarity economy** - Professor Dr. Ricardo Toledo Neder - FUP/UnB; Tutor - Lívia Cristina Barros da Silva Wiesinieski;

- **Freirean education and work** - Professor Dr. Raquel de Almeida Moraes - FE/UnB; Tutor - Ana Luiza Aureliano Silva;

- **Territorial connections, social struggles and solidarity networks** - Professor Dr. Perci Coelho de Souza - IH/UnB; Tutor - Letícia Miguel Teixeira;

- **Sociotechnical adequacy for habitat production: spatial patterns in the countryside and in the city** - Professor Dr. Liza Maria Souza de Andrade - FAU/UnB; Tutor - Juliette Anna Fanny Lenoir;

- **Sociotechnical adequacy for agroecology and urban agriculture - Professor Dr. Flaviane Canavesi** - FAV/UnB; Tutor - Natalia da Silva Lemos;

- **Ecosystem health, sanitation and governance - Professor Dr. Aldira Guimarães Duarte Dominguez** - FCE/UnB; Tutor - Diogo Isao Santos Sakai; and

- **Technical Support** - Valmor Cerqueira Pazos - FAU/UnB - master's account FE/UnB.

[1]https://www.caubr.gov.br/athis-edital/

The course has the partnership of the Nucleation of Residency AU+E UFBA/UnB, the BrCidades Network, the Housing-Advisory Network, the MST, MTST, Fiocruz, Oca do Sol and the following associations in the territories:

- Association of Powerful Women of Santa Luzia - Estrutural City/DF;
- Association of Residents of Santa Luzia - Estrutural City/ DF;
- Association of Residents, Fighters and Supporters of Dorothy Stang Residential - ARIS Dorothy Stang - Sobradinho / DF;
- Nature House in the Sol Nacente- ARIS Sol Nascente - Ceilândia/DF;
- ASPRAFES - Association of Farmers and Farmers FA - Small Rural Settlement William - MST - Planaltina/DF;
- APRACOA - Association of Rural and Artisanal Producers of The Oziel III Settlement - Pipiripau - Planaltina/DF;
- COOPERCARAJÁS - Carajás Agroecological Production and Marketing Cooperative - Brasília/DF;
- Quilombo Mesquita Renovating Association - Quilombo Mesquita - Western City/GO;
- Preserves Serrinha - REDE Association of Preservation and Sustainable Development of Serrinha do Paranoá - Paranoá/ DF; and
- National Coordination of MTST (working in Nova Planaltina - DF) and Coletivo Negro Raiz

SUMMARY

INTRODUCTION[1]

Liza Maria Souza de Andrade, Ricardo Toledo Neder,
Simone Parrela Tostes, Lívia Cristina Barros da Silva Wiesinieksi

The expansion of higher education observed in Brazil in the first decades of the 21st century takes place in a contradictory socioeconomic situation, inseparable from the characteristics of the country's insertion in the capitalist world system. As in other peripheral countries, the selective and unequal presence of modernizing vectors from the country and abroad is at the basis of the enormous socioeconomic and spatial disparities that characterize Brazilian society (and which are proper to capitalist social formation).

Thus, on the one hand, we see a high degree of development of private and state business productive forms and their technoscientific foundation, concomitant with the growth of poverty. Hence, in this second decade of the 21st century, we have the exclusion of 110 million Brazilians from the workforce employed in the formal sectors.

This exclusion is translated into the organization of the territory, which develops in close connection with the dynamics of capital in its various reconfigurations. The urbanization process is emblematic of this link and has been a determinant in the spatialization of socioeconomic inequalities in the country. This situation makes solutions based on the expansion of these same productive forms (labor-intensive and labor-saving capital) in their economic and socio-spatial dimensions unviable.

The solutions are in double concertation. The university will participate as it has been since the 1930s, in training staff to guide state investments and resources to overcome the delay and recover, even partially, the levels of employment and salary for the skilled unemployed contingents (in 2021, there were 15 million in an economically active population of 30 million). On the other front, the university's technoscientific production does not leverage solutions for the 110 million people who boost the popular circuits of the economy – "U berized (autonomous drivers)", self-employed, women in family domestic work, domestic workers, traditional and indigenous populations.

Between these two dynamic layers of the labor force in Brazil, we are compared the systole-diastole movement of a considerable part of 15 to 20 million Brazilians in a situation of pauperism and accelerated impoverishment (FOLHA DE SÃO PAULO, 2022); a segment that was before 2016 assisted by the tripod Bolsa-Família / Network SUS / Family Health / Public Education. These distributive income policies have been replaced today by Emergency Assistance under neoliberal management guidance.

This scenario directly questions the Brazilian university and directs centrality and urgency to debates and initiatives that allow it to critically reorient its role and contribution towards a fairer and egalitarian society.

The proposal of Multiprofessional Residency in CTS (Science, Technology, and Society – Habitat, Agroecology, Solidarity Economy and Health) is a joint initiative of the Graduation Program of the Faculty of Architecture and Urbanism of the University of Brasília (PPG-FAU/UnB) and the Center for Advanced Multidisciplinary Studies of the same institution.

The residence aims to simultaneously train technical agents and territorial agents able to act as multipliers of initiatives Distrito Federal led by subjects, groups and communities of seven territories surrounding the DF in the formulation of microprojects and local programs. It is a proposal that unites lato sensu post-graduation and extension and relates to areas of social demands for sociotechnical and technological advice, articulating resources, people, entities, tools and territorial tactics.

In the environments of the circuits of the popular economy, there is no traditional legal, fiscal, financial and banking certainty; however, the work and the provision of services and exchanges take place frankly, and even credit is shared by bonds of neighborhood, custom and habit of loaning and friendship. This orientation is shared by the Brazilian experiences of creating microprojects demanded by groups and neighbors community in ordinary neighborhoods to access currency and social resources through community development banks.

In popular territories, the right to the city and the right to housing is equivalent to the creation of the right to social technology understood as a domain of self-managed forms of production through the associated work of communities. In the city, under the historical characteristics of the so-called self-construction and its organizational forms, this domain of the productive cycle over the sociotechnical conditions of organization of leaders, social and popular movements, can be promoted by semi-structured projects of teaching-research-extension in the format of Multiprofessional Residence.

One of the main guidelines that guide the political-pedagogical project of the residence refers to the inclusion of other knowledge and tactics to contribute to the construction of collective and solidary knowledge. This inclusion allows the development of methods, processes, and techniques that contribute to the equating of social problems and mediating social and environmental conflicts in the struggle for the essential rights

[1]Adapted text. Original text published in the Proceedings of the VII ENANPARQ, Axis 7: 'Extensionist Practices,' titled: Residence in Science, Technology, and Society - CTS - Habitat, Agroecology, Solidarity Economy, and Ecosystemic Health: Why Integrate Graduate Studies into Extension?"

of populations excluded from the process of planning the territory, which by resistance practices configure new typologies of urban and rural occupations to be incorporated in the shared construction of local intervention projects.

THEORETICAL AND METHODOLOGICAL FOUNDATIONS

Solidarity Technoscience

Latin American Thought in Science, Technology and Society (PLACTS) criticizes the conception of technology as applied and neutral science and promotes popular participation with other knowledge. It is based on a certain transdisciplinary conceptualization of internal and external epistemological and extra scientific convergences to the major areas of science (NEDER; MORAIS, 2017). In Ibero-American countries, this contemporary trend of review on the social constructivism of technology is known as the Science Technology and Society (CTS) movement.

Observing the ineffectiveness of social and political solutions established to combat inequality and discrimination, sociologist Boaventura de Sousa Santos (2020) advocates a policy capable of escaping the determinations of technosciencetechnosciences defined by scientific and technological agendas from central countries in the Northern Hemisphere (basically the United States of America, England, France, and Germany), which include, at the same time, the definition of labor requirements, project development, technical codes and expertise to be employed by business networks and technology chains consolidated in the central countries (BAGATOLLI and BRANDÃO, 2021).

This model tends to benefit only the professional layers best situated in the structure of income and distribution of wealth, with more opportunities for technological, managerial and formal employment training. This structure favors only marginally or subordinately the broader social segments of Brazilian society, which make up 2/3 of the workforce and which are precisely those that most need this policy.

In the view of authors working with CTS studies and PLACTS, social technology emerged in 2004/2016 to expand the mobilization of social movements, unions, public companies and the media in general (NEDER, 2016). Considering the high interdependence between technology and conditions of socioeconomic life and political organization today, if the previous definitions in the technological project do not provide for the forms of social inclusion of people, groups and social classes, technology generates conditions of exclusion (NEDER; MORAES, 2017).

Unlike conventional technology, developed for or by companies in the capitalist logic of satisfying demands previously identified with a view to profit, social technology is carried out by people, groups, cooperatives, associations, and community collectives not contemplated by conventional technology or inby situations that involve or propitiate its conception (DAGNINO, 2014).

In questioning the neutrality of science and technological determinism, Dagnino (2019) advanced with the understanding of the concepts of Social Technology and Solidarity Economy and elaborated the concept of Solidarity Technoscience to designate the action of a collective of producers that organizes itself to carry out a work process in which socioeconomic context engenders solutions directed to the collective ownership of the means of production. These forms of resistance come from a social agreement (which legitimizes work with collaborations), which influences the productive environment, either aiming at a control (self-management), or under a cooperation (of participatory voluntary type). This process causes a change in the generated product, which the material gain may be appropriate according to the decision of the collective of a solidarity enterprise (DAGNINO, 2019).

The Forms of Assistance/Technical Advice in the Residency Project

According to the Rio de Janeiro Charter "All worlds, one world, Architecture-City 21", of the 27th World Congress of Architects (UIA2021RIO), assistance and technical advice for housing of social interest "should be considered as a public service, permanent and accessible to all society, valuing the possibilities of intersectoral articulation and integral action on the various aspects of reality". It also emphasizes that "the technical knowledge of architects and urban planners must dialogue and share with the popular knowledge of the various agents working in the territory", taking into account the reduction of poverty and the strengthening of democratic, shared, and participatory management.

Generally, the forms of assistance/technical advice are based on a very short project preparation time (one to two years maximum). Both for researchers and for community agents and social actors, the traditional annual notices of "projects" financed, with a short time horizon, generally annualized in the contents, are not enough.

It is also worth remembering that, even with participatory proposals, technical assistance commonly acquires a one-way character (one-way), revealing itself to be centralized in the official issuing institutions (university, Sesi, Senar, Senac, Federal C&T Institutes, schools, municipal and state departments, government programs and private companies). For popular groups (receivers) of urban peripheries and rural areas, in general, technicians, scientists, and researchers who act in this way prioritize a technological and pedagogical approach totally inadequate to the needs of communities (MOLINA et al., 2014).

Therefore, the CTS Residency adopts the Modality of Decentralized Participatory Technical Assistance (ATPD), which has a heuristic approach: we can only advance if researchers who are late will integrate with the holders of technical solutions. Hence, we have to elaborate critical paths (specific heuristics) that take into account popular reactions through methods of listening to local knowledge and practices of resistance (creators of counter-hegemonic power/knowledge). Its decentralized (extensionist) character lies in the fact that the participatory knowledge generated predicts, as a strategic component, that knowledge will be decentralized back with the enriching sociotechnical elements for the communities involved.

This decentralized turning back or returning path of knowledge, in the case of ATPD methods, can only be operationalized by the relevant community-based groups or transversal movements that will work the feedback as part of the individualization of popular groups (taking into account their characteristics such as history, culture, language, myths and facts of local identity).

In addition, new practices under the ATPD modality that assume links and roots with the territory have highlighted the role of training and practices of "relevant groups" to be integrated into a residency process. These groups can be masons and masters of works, artisan workers , agroecological producers, freelancers specialized in transport and change; electricians, mechanics, internet network technicians, etc.

They bear the sociotechnical demands of the community. Its interventions in the territory introduce ways of coping with cognitive power in technological devices generally used by private and state-owned companies against communities. A relevant group, when it becomes subject to resistance and self-management practices in the issues of habitat, community economy, food and agriculture, or also in health as an environment, integrates with networks in the territory and generates learning practices related to education and work, housing, food and production, body and health.

Law No. 11,888 of December 24th, 2008, foresees providing low-income families with free public technical assistance sincethe design and construction of housing for social interest. However, the demands of the population from 0 to 3 minimum wages, the target audience of that law, focuses not only on the qualification of housing but also on the provision and qualification of a series of collective equipment and free spaces that will bring improvements to the place of life of these populations, having a more systemic effect on these territories, besides being spaces that catalyze opportunities for professionalization, generation of culture, employment, and income, with a view to community emancipation.

Thus, the technical assistance/advice in housing for social interest to be addressed in the course also includes processes and methodologies of design and intervention in actions in the territory through the articulation of a range of interrelated aspects, according to the experiences of the extension research groups, namely:

> i) the development of research in technical assistance on themes still peripheral and marginalized within the academic system related to the production of space in the field and in the city (Urban and Agrarian Reform) from a multiprofessional dialogue and collaboration; and
>
> ii) new processes and methodologies of design and intervention, integrating them in the form of action research (THIOLLENT, 2011) through active methodologies and social mobilization with a transdisciplinary and trans-proportional vision based on Environmental Sustainability, Social Technology and the participation and autonomy of subjects, covering territories and groups linked to popular movements, urban and periurban communities, communities on the outskirts, residents' associations, environmental entities, as well as peasant communities and traditional communities.

The University's Extension

The political-pedagogical project of the residence is based on two central points linked to the demands of higher teaching:

In the foreground, extension is key; but without continuity, there is no transformation. A key component is anchored in the extension policy resolution of the National Council of Education no. 07 of December 18, 2018, which states that:

> the extension in Brazilian Higher-Education is the activity that integrates with the curriculum matrix and the organization of research, constituting an interdisciplinary, political educational, cultural, scientific, technological process, which promotes the transformative interaction between higher education institutions and other sectors of society, through the production and application of knowledge, in permanent articulation with teaching and research.

In the scope of residence, the University's Extension integrated into academic research represents a possibility of reconstruction of scientific knowledge from the transposition of the university walls with the inclusion of other knowledge that is revealed to be power/knowledge (potential) to influence the resolution of problems. The response time of extension researchers, community agents, and social actors in the territory, however, is qualitatively different. Extensionists sensitize and seek to integrate agents and social actors, but they cannot follow these transformations over a long time.

Then, the residence finds a safe haven in the territory through the extension. The second fundamental component of this political-pedagogical project seeks to carry out the extension as n in-residence program. To adopt a response to the new forms of multi-professional residence, the residence has transcended its provenance in the oldest field of medicine to express itself as the training of residents or professionals living in the territories. With this, there is a potential increase in the capacity of the university to generate forms of technical advice (under modus operandi itself in Architecture and Urbanism, Agrarian Sciences/Agroecology, Anthropology and Sociology, Public Management, Social Psychology, and Law). These hybrid modalities of Extension+Residence are conducive to the creation of a dialogical field influenced by popular social movements and their own civil society organizations (associations, cooperatives), having as reference the new Regulatory Framework of Civil Society Organizations (MROSC) (BRASIL, 2016). Through the Regulatory Framework, forms of cooperation between the State and community entities were based on extension and residence practices, in which the Decentralized Participatory Technical Assistance (ATPD) and the Technical Assistance in Housing of Social Interest (BRASIL, 2008) assume a relevant role.

It is also worth mentioning that residency responds to the need for training of professionals in themes of urban pedagogy, in which the improvement of participatory processes of listening, social learning, and the strengthening of community autonomy is relevant.

Integration and transversality of knowledge for sustainable development

The integrative and multi-trans-interdisciplinary nature of the residency proposal is based on collective and collaborative work and on the integrated and transversal approach of various fields of knowledge in interaction with popular knowledge from the perspective of Social Technology, contributing to the expansion of the contexts of professional activity and to the enhancement of the social and civic citizen responsibility of the university.

The course also aligns with the UN document (2020) "Shared Responsibility, Global Solidarity: Responding to the Socio-Economic Impacts of COVID-19", which recognizes the need to seize the opportunity of this crisis to strengthen countries' commitment to implement the 2030 Agenda and the 17 Sustainable Development Goals (SDGs) to achieve a more inclusive and sustainable future.

The family's loss of income in the circumstances of the pandemic will aggravate the vulnerability of various segments of society, leading them to the poverty line. All inhabitants must have access to livelihoods and a place to live with dignity, according to Articles 5 and 6 of the Federal Constitution of Brazil (BRASIL, 1988), which includes housing among the basic vital needs that must be met by the minimum wage.

In this context, we need the 17 SDDs, more and better health systems, fewer people living in extreme poverty, less gender inequality, a healthier natural environment, and more resilient societies. The residency course directly addresses the following sustainable development objectives:

SDGs 1 (poverty reduction) and SDGs 10 (reducing inequalities)

Through professional training and territorial agents in the theme "associated work" (solidarity economy/training and education/occupation/ income and solidarity technology); in the vulnerable territories or in the environments of the circuits of the popular economy there is no traditional legal, fiscal, financial and banking security, but the work and the provision of services and exchanges take takes place frankly, and even credit is shared by bonds of neighborhood, custom, and habit of loan partnership and friendship, as already evidenced earlier.

This orientation is shared by the Brazilian experiences of creating micro-projects demanded by groups and communities of neighbors in ordinary neighborhoods to access currency and social resources through community development banks. In already advanced experiences (in the last 15 years), and under pre-incubation environments in microcredit, legal, commercial, and economic assistance, as well as experiences of community creation of Rotary Solidarity Funds (such as popular self-financing schemes), this tool empowers local groups to demand cash to support the density of local programs.

Solidarity credit allows guiding local inversions to improve the conditions of social and economic survival in the midst of adverse labor market conditions under the financialization of capital. This financialization does not have practical solutions for 2/3 of the real community and popular economy, due to technology increasingly intensely incorporated into products and production processes, since this results in the dismissal of growing contingents of salaried workers. In addition to these aspects, the course provides for affirmative actions that are expressed through the direct participation and in all stages of 14 territorial agents whose activities will take place in the 7 territories surrounding the Distrito Federal: **1) Planaltina - Pequeno William Settlement / New Settlement Petrópolis; 2) Planaltina - Settlement Oziel III; 3) Sobradinho - ARIS Dorothy Stang, 4) Paranoá/Serrinha do Paranoá 5) Ceilândia - ARIS Sol Nascente, 6) Cidade Estrutural/Ocupação Santa Luzia; 7) Surroundings of Brasilia - Quilombo Mesquita borders DF /GO-Western City** of extreme income vulnerability, poor housing, infrastructure, health, etc.

The integration between professionals and community agents forms a set of interventions aimed at improving the built environment, sanitation solutions, housing and construction improvements, and training in occupation, work, and income (OTR), addressed from the perspective of the leading role of individuals and groups of residents in the consolidation and valorization of their daily territories. The collective and shared construction of local intervention projects based on participatory and solidarity techniques, methods, and processes contributes to addressing social problems and mediating social and environmental conflicts common to populations excluded from conventional land planning processes. This set of actions seeks to contribute to the realization of the right to housing and the right to the city of the communities surrounding the Distrito Federal, seeking to contribute to the commitment to reduce inequalities and promote the rights of vulnerable populations.

SDGs 3 (good health and well-being)

The Ottawa Letter of 1986 for "Healthy Cities" (BRASIL, 2002, p. 19) emphasizes the systemic function of health, which cannot be dissociated from other public policies, and should be conquered with social participation and preservation of the environment.

The positive concept of health makes it the responsibility of other areas at the global level and goes beyond the health sector: the basic prerequisites for ecosystem health are peace, housing, education, food, income, a stable ecosystem, sustainable resources, social justice, and equity. Those who live in informal settlements, densely populated slums, and other precarious territories, without access to adequate housing, basic sanitation services, employment, and income, and, consequently, in situations of food insecurity and social vulnerability, have also compromised the conditions of good health.

Thus, actions that promote improvement in the general conditions of the built environment focus directly and positively on good health, which allows us to affirm that the matter of this proposal, as detailed in the specific objectives, includes SDS 3.

SDGs 5 (gender equality)

The residence has as its proposal to be a decentralized participatory type of assistance, which has popular and community participation through methods of listening to local knowledge and practices of resistance (creators of counter-hegemonic power/knowledge with regard to issues of gender, ethnicity, and culture) that, by welcoming groups and non-majority communities, simultaneously encourages their participation and enhances the understanding and fulfillment of their specific demands. Its gender equality character lies in the fact that the participatory knowledge generated predicts as a strategic component the valorization and organization of local knowledge and initiatives, and that these will be valued with the enriching sociotechnical elements for the communities involved.

Team experiences, such as the work "The inhabiting of powerful women: sustainable and supportive community", in the Santa Luzia sector of the Estrutural City, in DF, is an example of the participatory approach and gender equality in the project processes, in compliance with SDG5.

SDGs 6 (clean water and sanitation)

"Ensure the availability and sustainable management of water and sanitation for anyone and everyone." The course directly and specifically addresses the training in projects focused on water and sanitation from the perspective of Water Sensitive Cities, in which the Peripheral group has been working on socio-technical sociotechnical assistance projects for ecological sanitation.

An area devoid of water infrastructure, such as informal settlements, when compared to a city with its traditional gray infrastructure, has a greater potential to become faster and directly environmentally sustainable and sensitive to water in a process called "leapfrogging", which means the possibility of implementing a given stage without the process going through all the previous stages of development.

In this case, the ecological infrastructure of drainage, sanitation, and reuse of water from nature-based solutions (SbN), ecologically more appropriate and advanced than the traditional gray structure, has greater potential to be implemented, reducing the problems suffered by the territories."

SDGs 11 (sustainable cities and communities)

"Making cities and human settlements inclusive, safe, resilient and sustainable." SDS 11 is attentive to inclusive and sustainable urbanization; the planning and management capabilities of participatory, integrated, and sustainable human settlements, as well as efforts to protect and safeguard natural heritage; reduction of negative environmental impacts per capita of cities in particular to municipal waste management.

This SDG is aligned with the general guidelines of the City Statute (article 20(I) to guarantee the right to sustainable cities, such as the right to urban land, housing, environmental sanitation, urban infrastructure, transportation and public services, work, and leisure, for present and future generations. In its XIV item, the City Statute deals with land regularization and urbanization of

> areas occupied by the low-income population through the establishment of special standards of urbanization, land use, and occupation and building, considering the socioeconomic situation of the population and environmental standards.

The S011 is aligned with the goals of the New Urban Agenda, agreed in October 2016, during the III United Nations Conference on Housing and Sustainable Urban Development, including ensuring access for all to safe, adequate, and affordable housing, as well as basic services and slum urbanization. The project of the residence intends to contribute to the process of land regularization in the formal territories of the Distrito Federal and surrounding areas, thus attending to SO 11."

THE PROPOSAL OF THE RESIDENCY COURSE

Background: the discipline of Graduation Studies and the Extension Course

The discipline "Fundamentals in Science, Technology, and Society (CTS) – Habitat, Agroecology, Solidarity Economy and Ecosystem Health", offered from March to June 2021, was created to form a transdisciplinary epistemological base in Solidarity Technoscience to include university extension in graduation studies through a multi-professional multiprofessional residency project CTS/UnB, a partnership of the Science Policy Center, Technology and Society (NPCTS/CEAM/UnB) and professors from the Faculty of Architecture and Urbanism/PPG-FAU, the Faculty of Planaltina/FUP, the Faculty of Agriculture and Veterinary Medicine/FAV and CDS/UnB, the Collective Health course of the Faculty of Ceilândia - FCE, the Faculty of Education/FE and the Institute of Humanities/IH.

We chose to integrate the participants of the extension course with the students of the Graduation Program in work groups and online meetings through by the Teams platform, where the following themes were discussed: i) solidarity technology, sociotechnical adequacy, and solidarity economy; ii) Freirean education and work; iii) territorial connections, social struggles and networks of solidarity; iv) sociotechnical adequacy for habitat production: spatial patterns in the field and in the city; v) sociotechnical adequacy for agroecology and urban agriculture; and vi) ecosystem health, sanitation, and governance. Meetings of the working groups of each of the themes were organized.

Initially, 40 vacancies were offered by the registration systems (students and external community) of UnB, matriculaweb, and SiGAA, respectively. Due to the great demand, it was necessary to expand the offer of vacancies, and the course began on March 3, 2021, with 55 registered. On June 2, 2021, meetings with 53 concluded, representing the Southeast, Midwest, and Northeast macroregions, closed.

From the exchanges made in the working groups and in the classes taught by the teachers, 6 chapters were systematized for this book from the structuring axis of the course. The first chapter, called "Fundamentals in Solidarity Technoscience, sociotechnical adequacy and solidarity economy", aimed to reflect on the solidarity economy from the theoretical framework and the history of public policies aimed at the promotion and inclusion of informal workers. This group of workers had its socioeconomic context strongly affected by the covid-19 pandemic and by the lack of support and efficient public policies of the Federal Government.

This chapter was organized into the following sections: introduction;

comprehensive framework of public policy for solidarity economy in Brazil (period 2004-2016); the framework of the solidarity economy movement in Brazil (1990-2017); analytical view on the relations between solidarity technoscience and solidarity economy: structuring issues – presenting a proposal for analytical consolidation of understanding about how solidarity economy operates in relation to the methodology of research-extension and teaching for sociotechnical adequacy in the context of the popular economy in Brazil and its subordination relations to the State and the formal sector of capitalist companies; a glossary of practical terms and concepts, which will facilitate the teaching and learning process of the CTS Residency; and bibliographic sections, with references such as "Small library of self-management, solidarity economy, and solidarity technology".

The format adopted in this chapter differs from the other ones by occupying the role of leading and integrating knowledge. Thus, for the following sections, another structure was adopted, capable of reflecting the dialogues and presenting the good practices known and/or experienced by the members of the groups.

Table 1 presents the synthesis of the content collectively produced by the other thematic notebooks/axis from local and academic knowledge.

Thematic axes / Contributions	Fundamentals	Procedures	Good practices
Freirean education and work culture	Education as a practice of freedom Vs Banking education (FREIRE, 1987); Educator who "thinks right" (FREIRE, 1996, p.30); Partnership between university and society (DAGNINO, 2020); and Solidarity economy as a tool for awareness and empowerment (DAGNINO, 2014).	For the organization and structuring of the chapter, we used google docs platform, exchanges through social media, online meetings and conversation circles, ensuring "dialogicity" along the route. Bibliographic and documentary research.	(a) Lead Community - Poconé - Mato Grosso; (b) Peripheral Group and urban pedagogy; (c) EJA within the Freiriano principles.
Territorial connections, social struggles, mobilization and solidarity networks	Region concentrated as a space of social relations (SANTOS, 1999); Informational reach and the subjects-networks (SOUZA, 2006); Solidarity technology (DAGNINO, 2019); and Pedagogical and socio-technical interactionism (NEDER, 2013).	Preparation of form and identification of the subjects-networks and their social struggles, which were connected through social networks. Bibliographic and documentary research. Systematization and discussion of the results by the members of the working group.	Practices in ATHIS Araras: Jardim Esperança Association; Collective Territorial Term; Movement around the recovery of Ribeirão Sobradinho; Occupation CCBB Resists; Technical Assistance for Housing of Social Interest; Nzinga Institute of Studies of Capoeira Angola and Banto Educational Traditions.
Socio-technical adequacy for habitat production	Sociotechnical Adequacy AST (DAGNINO, 2019); Solidarity Economy (DAGNINO, 2019); Solidarity technology (DAGNINO, 2019); Freireana Pedagogy (FREIRE, 1970); Space use value (LEFEBVRE, 1968); and Space as a social product (LEFEBVRE, 1968).	Synchronous remote encounters with online lectures from invited teachers. Synchronous remote encounters with group conversation circles to discuss the contents and define the parameters for choosing case studies. Bibliographic and documentary research.	(a) Onze8 Association (Vitória, ES): experiences in ATHIS and the Território do Bem (Territory of Good); (b) Learning in bioconstruction: a case study in the Pequeno William settlement (DF); (c) Application of ATHIS in São Vicente/SP, with a development partnership with CAU/SP; (d) Sociotechnical advice in Santa Luzia, Structural/DF; (e) The Union/SP Building.
Sociotechnical adequacy for agroecology and urban agriculture	Sociotechnical Adequacy AST (DAGNINO, 2019); Sustainable Agriculture (CAPORAL; COSTABEBER, 2004); and Urban and Periurban Agriculture (AUP) (SANTANDREU; LOVO, 2007).	For the organization and structuring of the chapter, we used google docs platform, exchanges through social networks, online meetings and conversation circles, ensuring dialogicity along the route. Bibliographic and documentary research.	(a) The experience of Gramorezinho in Natal/RN: organic agriculture or agroecology?; (b) The experience of Serrinha do Paranoá and its waters that supply the Distrito Federal – agroecology as a practice to emerge waters; (c) The experience of Surveying Areas for Agrourbania - University of Brasilia / College of Planaltina; (d) The experience at the Rancho de Terra in the Pequeno William, Planaltina/DF settlement; (e) The experience in the Urban Indigenous Territory Xucuru in Brasília/DF.
Ecosystem Health, Sanitation and Governance	Solidarity technology (DAGNINO, 2019); Ecosystem health (GOMES; MINAYO, 2006); and Social Determinants of Health (SD) (BUSS and PELLEGRINI apud ÁVILA; DANTAS; DUARTE, 2019).	For the organization and structuring of the chapter, we used google docs platform, exchanges through social networks, online meetings and conversation circles, ensuring dialogicity along the methodological route built from the listening of reports of experiences in the territory. Data collection and bibliographic and documentary research.	(a) Community Safety Council of Tororó CONSEG and the Greater Tororó Region - Distrito Federal; (b) Women's Movement of the Ginga Suburb of Salvador/BA; (c) Environmental/BA multipliers; (d) Child Environmental Agent Ceilândia/DF; (e) Local Community Sanitation Management for Community of Santa Luzia/DF.

Table 1: Synthesis of the chapters produced in the discipline Fundamentals in Science, Technology and Society (CTS) – Habitat, Agroecology, Solidarity Economy and Ecosystem Health. Source: elaborated by the authors (2021).

The 6 chapters developed as a collective product of the extension discipline were incorporated as a collection of the residence and constitute a fundamental support material of the course, being the main bibliographic reference of the disciplines and activities.

THE PEDAGOGICAL PROJECT OF THE COURSE

The proposal socially and territorially articulates three interdisciplinary themes: Habitat (housing, architecture, urbanism, environment); Agroecology (food sovereignty, family farming, field, and city integration); Health (epidemiological surveillance, collective health, family health, sanitation, eco-sanitation and ecological infrastructure) and a fourth transdisciplinary theme: Associated Work (solidarity economy, education and education, occupation, income and solidarity technology).

The work area consists of the territory of the Distrito Federal and its surroundings and is characterized by a very close and complicated city/field relationship, in which both urban and rural spaces appear in their aspects more or less mixed with each other.

Despite the transitions and variations, in the approach of this area, it was decided to structure the typologies initially by their rural (traditional communities and settlements and pre-settlements of the agrarian reform) or urban, in order to contemplate the specific demands arising from the characteristics of regularization of these spaces.

The territories of the Distrito Federal can be divided into: regular areas – consolidated and formally established urban areas; regularized or re-urbanized areas - areas that have undergone re-urbanization, and regularization processes; and, finally, informal areas – those that remain categorized as informal or irregular, spaces often absent from any formal intervention of the State (ANDRADE et al., 2019).

In the Distrito Federal, currently, there are 508 indirect occupations in urban and rural areas that are not on the map of the 2009 Master Plan for Spatial Planning (PDOT), such as ARIS or ARINES. A map with these new areas was presented by the Secretary of State for Urban Development and Housing (SEDUH) at the II Forum of the Metropolitan DF Nucleus of the Brasil Cidades Project, in FAU/UnB university week 2019, in October of that year.

Decree No. 40,254, of November 11, 2019, provides for procedures applicable to urban land regularization (Reurb) processes in the Distrito Federal, pursuant to Federal Law No. 13,465 of July 11, 2017. Art. 2 presents one of reurb's objectives, namely:

> identify informal urban centers that should be regularized, organize them and ensure the provision of public services to their occupants, in order to improve urban and environmental conditions in relation to the situation of previous informal occupation.

In some of these territories, the research groups that lead this proposal are already working linked to UNB extension centers and projects conducted by the ITCP Incubator (UnB/FUP) and the Peripheral Research and Extension Group (UnB/FAU), which direct the Notice 36/2018 CNPQ/MCTIC/MDS Tecnologia Social).

The territories of the Distrito Federal to be worked on in the residence cover the Northern Region (Serrinha do Paranoá/Varjão/Serrinha); Planaltina region for two settlements of agrarian reform (Pequeno William and Oziel III); Southern Region (Estrutural City), ARIS Dorothy Stang, ARIS Sol Nascente, and Quilombolas Territories in the state of Goiás (Quilombo Mesquita), according to Figure 1. Following are shown drone images of all territories.

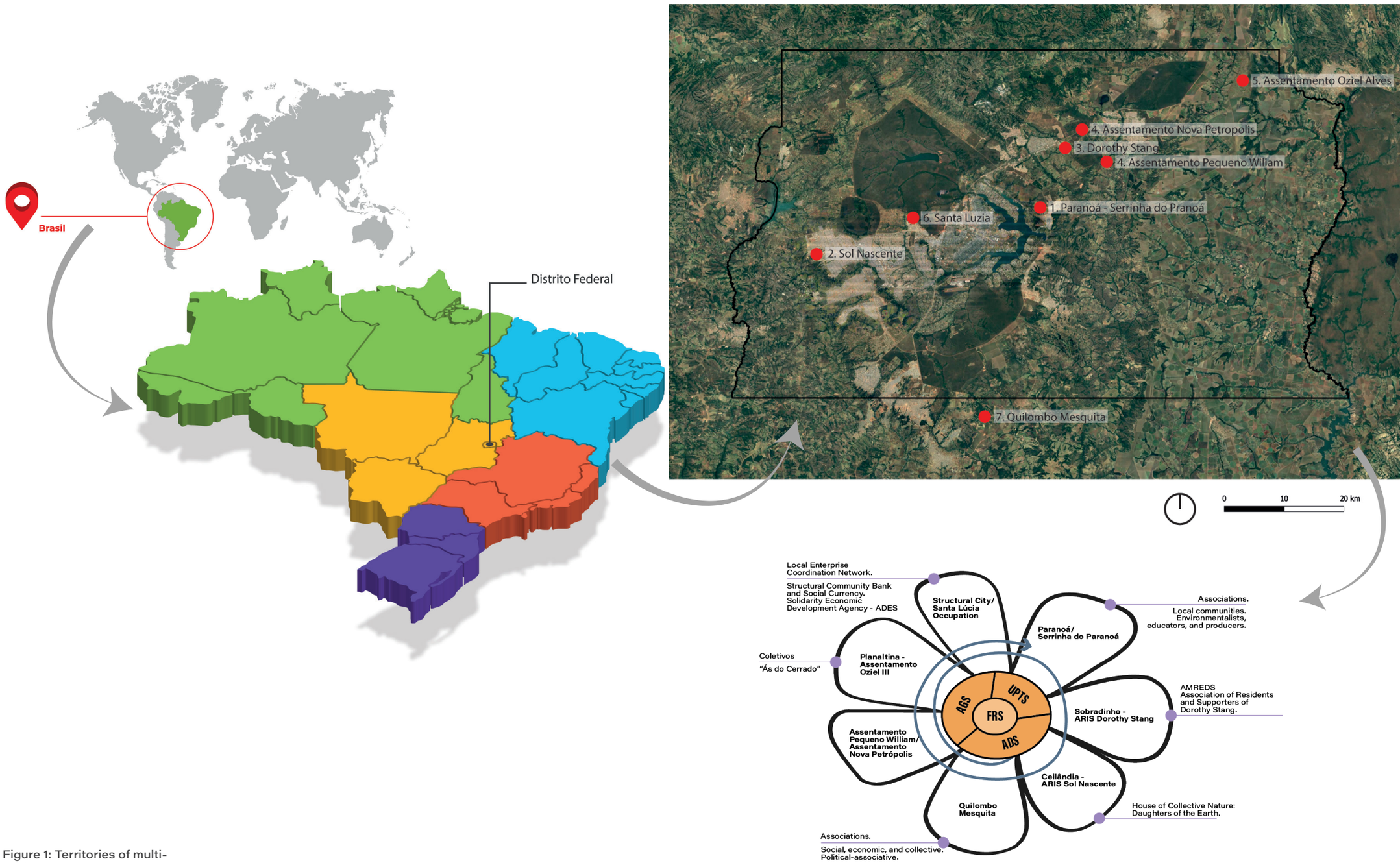


Figure 1: Territories of multi-professional residence CTS.
Source: CTS Residence, 2022.

Paranoá/ Serrinha do Paranoá

Photo: Valmor Pazos Filho

Ceilândia - ARIS Sol Nascente

Photo: Valmor Pazos Filho

INFRAESTRUTURA SOCIOECOLÓGICA E OCUPAÇÕES INFORMAIS NA MICROBACIA DO RIO MELCHIOR:

UMA PROPOSTA DE DESENHO URBANO SENSÍVEL À ÁGUA PARA O SOL NASCENTE.

ALUNO:
FELIPE SOUZA LIMA

ORIENTADORA:
LIZA MARIA SOUZA DE ANDRADE

Sobradinho - ARIS Dorothy Stang

Photo: Valmor Pazos Filho

Planaltina - Assentamento Pequeno William

Photo: Valmor Pazos Filho

Planaltina - Assentamento Oziel III

Photo: Valmor Pazos Filho

CÉU NA TERRA:

CONSTRUINDO CENÁRIOS SUSTENTÁVEIS NO

ASSENTAMENTO OZIEL ALVES III

Cidade Estrutural - Ocupação Santa Luzia

Photo: Valmor Pazos Filho


Quilombo Mesquita
Photo: Valmor Pazos Filho
QUILOMBO MESQUITA
20
22
CALENDÁRIO
JANEIRO
A ORIGEM DO QUILOMBO MESQUITA E A HERANÇA DAS ESCRAVAS ALFORRIADAS

The essence of residence consists in uniting graduation and extension in a trans-multi-interdisciplinary character with the vision of university public policy (opposite that of private or official philanthropy) in the training of 35 trans-multi-disciplinary technical agents (managers, urban architects, lawyers, economists, sociologists, social workers, technicians, and engineers, community health agents), of which 28 will receive scholarships, and 14 territorial agents (2 agents from each of the 7 territories around the Distrito Federal described below) able to act as multipliers of community initiatives, to provide sociotechnical advice to local entities and to articulate resources, people, entities, tools, and territorial tactics in seven territories surrounding the Distrito Federal in favor of the leading character of subjects and groups in their daily territories.

Part of the project is being funded by the 2021 ATHIS notice of CAU/BR and also has a parliamentary amendment appeal by Mrs Erika Kokay (PT/DF) to pay scholarships to 28 students at the specialization level and 14 scholarships for territorial agents over 18 months.

Within the internal scope of UnB, the MULTIPROFESSIONAL RESIDENCY CTS is being organized by members of the Peripheral Research and Extension Group, emerging works, the Technological Incubator of Popular Cooperatives (which is an extension program operating under the theoretical basis of CTS and PLACTS Studies) and the Science, Technology and Society Policy Center (NPCTS/CEAM). It has a partnership with the Nucleation of the Residency AU+E UFBA/UnB, the BrCidades Network, the Housing-Advisory Network, the MST, Fiocruz and CAU/BR.

The course will involve training and education to promote sociotechnical advice on social management plans for habitat production, agroecology, labor generation, and solidarity economy, ecosystem health, and sanitation.

The course has a total workload of 480h and a duration of 18 months (3 semesters). It is structured into 08 modules, of which 07 are bimonthly (Introductory Module, 05 Thematic Modules and Module Research / Preparation of Final Work) and 01 is annual (Module Experiences in the Territory). The Introductory Module and the 05 Thematic Modules have a workload of 60 hours and are intended for classes, lectures, orientations and round tables; The Research Module has a workload of 30 hours and is intended for the orientation and preparation of the course completion work; the Experiences in the Territory Module has a workload of 90 hours and is intended for experiences in the territories from field classes, visits and workshops. The summary table (Table 2) presents the organization of these activities.

SEMESTER I	Two-month period 1 60 hours	**Module Foundation in CTS and Freireana Education [WL= 60h]**
		Introductory concepts and knowledge knowledges: Connections of knowledge; Sociotechnical adequacy; Solidarity technoscience; Freireana Education, Social Design and Labor Culture (art, education and popular culture, solidarity trade); Territorial Connections; Habitat production in the countryside and in the city; Agroecology; Ecosystem Health.
	Two-month period 2 90 hours	**Thematic Module 1: Connection of Knowledge and Solidarity Technology [WL= 60h]**
		Sociotechnical adequacy; Economy and solidarity finances; rotary solidarity funds, associative and cooperative , cooperation and associated work; generation of work and income, banks and social currencies; organization and studies of labor cultures.
		Experience in the Territory Module [WL= 30h]
		Subject-network, perspectives in the territory, social struggles, devices of political directivity, practices in ATHIS.
SEMESTER II	Two-month period 3 75 hours	**Thematic Module 2: Territorial Connections [WL= 60h]**
		Subject-network, perspectives in the territory, social struggles, devices of political directivity, practices in ATHIS.
		Experience in the Territory Module [WL= 15h]
		Practical classes/field visits/workshops in an urban context: Ceilândia/ARIS Sol Nascente and Cidade Estrutural/Santa Luzia.
	Two-month period 4 75 hours	**Thematic Module 3: Habitat Production in the countryside and in the city [WL= 60h]**
		Participatory spatial planning, right to the city, social housing project in the countryside and in the city. Demands, vocations and analysis of the problem. Local identity, existing knowledge, spatial patterns and events. Dimensions of sustainability (social, cultural and emotional, economic and environmental). Code generation, language establishment. Community participation.
		Experience in the Territory Module [WL= 15h]
		Practical classes/field visits/workshops in urban context (ARIS Dorothy Stang) and rural context (Quilombo Mesquita).
SEMESTER III	Two-month period 5 75 hours	**Thematic Module 4: Agroecology, Urban Agriculture [WL= 60h]**
		Urban agriculture planning and citizenship. Organic/fresh food, family participation and food sovereignty.
		Experience in the Territory Module [WL= 15h]
		Practical classes/field visits/workshops in rural context: Pequeno William Settlement and Varjão/Serrinha.
	Two-month period 6 75 hours	**Thematic Module 5: Ecosystem Health [WL= 60h]**
		Epidemiological surveillance practices, collective health and family health, eco-sanitation , and ecological infrastructure.
		Experience in the Territory Module [WL= 15h]
		Practical classes/field visits/workshops in urban context (Santa Luzia) and rural context (Oziel Alves III Settlement).
SEMESTER IV	Two-month period 7 30 hours	**Module 6: Search [WL= 30h]**
		Introduction to the methodology of scientific research applied to microprojects of local action, aiming to assist the student in the realization of the Course Completion Work, an academic document indispensable for approval in the CTS Residency.
	Completion of the Course	**Conclusion Final Works and Defense Banking**
		Course completion activity: Presentation seminar/defense stands.

Table 2: Synthesis of the organization of the Residency Course - CTS (Postgraduation + Extension) - Habitat, Agroecology, Solidarity Economy and Ecosystem Health. Source: elaborated by the authors (2022).

FINAL CONSIDERATIONS:

The structure and operation of the proposal of a Lato Sensu postgraduate course of Multiprofessional Residency CTS – Science, Technology and Society that socially and territorially articulates three interdisciplinary themes: Habitat (housing, architecture, urbanism, environment); Agroecology (food sovereignty, family farming, field and city integration); Health (epidemiological surveillance, collective health, family health, sanitation, eco-sanitation and ecological infrastructure) articulated across a fourth transdisciplinary theme: Associated Work (solidarity economy, training and education, occupation, income and solidarity technoscience, generation of associations and popular cooperatives).

In summary of the data previously presented, the course will involve training and education from the perspective of social technology (immediate perception) and solidarity technology (sociotechnical adequacy associating popular basis and scientific epistemological essence), it is expected to work from three guidelines:

i) work technical codes and standards in the proposition of Microprojects and Local Action Programs (MPAL) through sociotechnical advice focused on decentralized participatory processes with social groups initially belonging to seven territories around the Distrito Federal;

ii) implement a methodology that takes into account new languages to express the cognitive policy (popular, community and identity) of community leaders and social movements, in order to broaden the understanding, reflection, appropriation and shared development of solutions in the face of sociocultural barriers; and

iii) community and self-managed associative forms of an open socioeconomic system, based on the values of cooperation and solidarity, called solidarity economy.

To update methodologies in social technology and innovative systems, the 1st National Meeting on Extension in Graduation Studies and Technical Advisory for The Production of Habitat healthier, resilient and supportive in the countryside and in the city was held, on August 17, 18 and 19, 2022. The meeting aimed to bring together academic residencies, specialization courses and research and extension groups that deal with the complexity of habitat production and technical advice/assistance in a debate on the extent of graduation school.

TEACHERS PARTNERS:

ADRIANA MATTOS CLEN MACEDO
ALDIRA GUIMARAES DUARTE DOMINGUEZ
ALEXANDRE BERNARDINO COSTA
ANA LUIZA AURELIANO SILVA
ANELISE RIZZOLO DE OLIVEIRA
ANTÔNIA SHEILA GOMES LIMA
ANTONIO DE ALMEIDA NOBRE JUNIOR
ARIUSKA KARLA BARBOSA AMORIM
BENNY SCHVARSBERG
CAIO FREDERICO E SILVA
CARLA PINTAS MARQUES
CARLOS HENRIQUE MAGALHAES DE LIMA
CRISTIANE GOMES BARRETO
CRISTIANE GUINANCIO
DANIEL RICHARD SANT ANA
DEMETRIOS CHRISTOFIDIS
ERLANDO RESES
EVERALDO BATISTA DA COSTA
FABRICIO MONTEIRO NEVES
FERNANDO LUIZ ARAUJO SOBRINHO
FLAVIANA BARRETO LIRA
FLAVIANE DE CARVALHO CANAVESI
FLAVIO MURILO PEREIRA DA COSTA
FRANCO DE MATOS DOUTORADO
HELIANA FARIA METTIG ROCHA
ION DE ANDRADE
IRACEMA FERREIRA DE MOURA
JAIR RECK DOUTORADO
JOAO DA COSTA PANTOJA
JOSÉ CARLOS MOTA
JOSENAIDE ENGRACIA DOS SANTOS
JULIETTE ANNA FANNY LENOIR
LEANDRO DE SOUSA CRUZ
LIVIA CRISTINA BARROS DA SILVA WIESINIESKI
LIZA MARIA SOUZA DE ANDRADE
LUIS ALEJANDRO PEREZ PENA
LUIS ANTONIO PASQUETTI

TEACHERS PARTNERS:

LUIZ CARLOS SPILLER PENA
MANOEL BARBOSA NERES MESTRADO
MARCIO ALBUQUERQUE BUSON
MARCIO AUGUSTO ROMA BUZAR
MARCIO FLORENTINO PEREIRA
MARCIO HENRIQUE BERTAZI
MARIA CONCEIÇÃO FREITAS
MARIA LIDIA BUENO FERNANDES
MARIA LUIZA PINHO PEREIRA
MARIBEL DEL CARMEN ALIAGA FUENTES
MARIO FABRICIO FLEURY ROSA
NATÁLIA DA SILVA LEMOS
NINA LARANJEIRA
PATRICIA SILVA GOMES
PAULO DIMAS ROCHA DE MENEZES
PAULO GABRIEL FRANCO DOS SANTOS
PERCI COELHO DE SOUZA
PRISCILA ALMEIDA ANDRADE
RAQUEL DE ALMEIDA MORAES
REGINA COELLY FERNANDES SARAIVA
RENAN DO NASCIMENTO BALZANI
RENATO DAGNINO
RENATO PEIXOTO DAGNINO
RICARDO TEZINI MINOTI
RICARDO TOLEDO NEDER
ROGERIO BEZERRA DA SILVA
ROGERIO FERREIRA
SERGIO KOIDE
SILVIA RIBEIRO DE SOUZA
TANIA CRISTINA DA SILVA CRUZ
THIAGO APARECIDO TRINDADE
THIAGO GEHRE GALVAO
VANDA ALICE GARCIA ZANONI
VANIA RAQUEL TELES LOUREIRO
WAGNER DE JESUS MARTINS
ZARÉ AUGUSTO BRUM SOARES

REFERENCES

ANDRADE, Liza M. S.; LEMOS, Natalia da S.; LOUREIRO, Vânia R. T.; LENOIR, Juliette A. F. «Extension and Solidarity Technology: Peripheral in DF and surroundings». Cadernos de Arquitetura e Urbanismo, Belo Horizonte: Pontifícia Catholic University of Minas Gerais, v. 26, n. 38, p. 189-234.

BAGATTOLLI, Carolina; BRANDÃO, Tiago. "Contesting the Mainstream Narrative? A Conceptual Discussion on the Politics of Science, Technology, and Innovation from the Periphery". Journal of Scientometric, Res. 2021; 10(1s): p p. 5-20.

BRAZIL, ATHIS – Law No. 11,888 of December 24, 2008. It provides low-income families with free and public technical assistance for the design and construction of housing of social interest.

BRAZIL, MROSC – Law No. 13,019 of July 31, 2014. Regulatory Framework of Civil Society Organizations: Secretariat of Government of the Presidency of the Republic; Brasilia: Presidency of the Republic, 2016.

DAGNINO, Renato. «Social Technology and Solidarity Economy: building the bridge». In: Social Technology: conceptual and methodological contributions [online]. Campina Grande: EDUEPB, 2014, p. 207-265.

DAGNINO, Renato. Solidarity Technology: a strategic manual. Marília: Anticapital Fights, 2019.

FOLHA DE SÃO PAULO. «Poverty reaches a record of almost 20 million in Brazilian metropolises.» São Paulo, 2022. Available in: https://www1.folha.uol.com.br/mercado/2022/08/pobreza-chega-a-recorde-de-quase-20-milhoes-nas-metropoles-brasileiras.shtml. Access: 05 Sep. 2019.

MOLINA, M.C.; SANTOS, Clarice A.; MICHELOTTI, F; SOUSA, Romier da p. Counter-hegemonic practices in the training of professionals of agrarian sciences (reflections on agroecology and field education in Pronera courses). Brasilia. MDA. NEAD Debate Series 22, 2014.

NEDER, Ricardo Toledo. «Sociotechnical interactionism and culture of resistance in incubation policies of popular cooperatives: seven strategic dimensions in ETCP as an agency, as evaluation indicators». Northeastern Meeting of Incubators of Solidarity Economy. In: Democracy and solidarity economy: impasses and opportunities. Juazeiro do Norte - Federal University of Cariri, 2016.

NEDER, Ricardo Toledo; MORAES, Raquel de Almeida. «Where does the university go in the face of science & technology policy in Brazil.» Observatory of the Movement for Social Technology in America. Uberlândia: Browsing publications, 2017.

UNITED NATIONS - United Nations. Shared responsibility, Global solidarity: Responding to the socio-economic impacts of COVID-19. 2020. Available in: https://www.un.org/sites/un2.un.org/files/sg_report_socio-economic_impact_of_covid19.pdf. Access: 3 Dec. 2021.

SANTOS, Boaventura de Sousa. The end of the Cognitive Empire: The affirmation of southern epistemologies. Authentic Publishing House, Belo Horizonte, 2019.

SANTOS, Milton. «Money and territory.» In: Geographia - Journal of the Graduate Program in Geography at UFF. Year 1, No. 1. 1999.

_____. The divided space: the two circuits of the urban economy of underdeveloped countries. São Paulo: EDUSP, 1979.

THIOLLENT, Michel. Action research methodology. São Paulo: Cortez, 2011

UIA 2021. Letter from Rio. «All worlds, one world, architecture-city 21.» In: 27 WORLD CONGRESS OF ARCHITECTS. Available in https://www.uia2021rio.archi/carta-de-rio-de-janeiro-propuestas-de-uia2021rio-para-la-ciudad-21/. Access: 3 Dec. 2021.

Sociotechnical Adequacy and Solidary Economy

Chapter 01

Authors:

Ricardo Toledo Neder | Lívia Cristina Barros da Silva Wiesinieksi | Emilene Eustachio
Iasmin de Sousa Jaime | Simone Parrela Tostes | Rafael Reis

SOCIOTECHNICAL ADEQUACY AND SOLIDARY ECONOMY

Ricardo Toledo Neder[1]
Lívia Cristina Barros da Silva Wiesinieksi[2]
Emilene Eustachio[3]
Iasmin de Sousa Jaime[4]
Simone Parrela Tostes[5]
Rafael Reis[6]

SUMMARY: This chapter aims to reflect on the solidarity economy from the theoretical fundamentals and the history of public policies aimed at the promotion and inclusion of informal workers. This group of workers had their socioeconomic context affected by the covid-19 pandemic and by the lack of support and efficient public policies of the Federal Government. This chapter is organized as follows: Introduction; section 1 presents a comprehensive picture of public policy for the solidarity economy in Brazil (period 2004-2016), and section 2 presents the picture of the movement for solidarity economy in Brazil (1990-2017). Section 3, called "Analytical vision on the relations between solidarity technoscience and solidarity economy: structuring issues", presents a proposal for analytical consolidation of understanding of how solidarity economy operates in relation to the methodology of research-extension and teaching for sociotechnical adequacy in the context of the popular economy in Brazil and its subordination relations to the State and the formal sector of capitalist companies. Section 4 presents a glossary of practical terms and concepts, useful for teaching and learning in the CTS Residence. In the end, there are two bibliographic sections, one of the references used in this work, and the other, entitled "Small library of self-management, solidarity economy, and solidarity technoscience".

[1]UnB; rtneder@unb.br/ [2]UnB; liviabsw@gmail.com/[3]emilene.fe@gmail.com/ [4]UnB; iasmin.arch@gmail.com/ [5]IFMG; simone.tostes@ifmg.edu.br/ [6]UnB; projetos@nosetor.com.br

SOLIDARITY TECHNOLOGY: FOR WHOM AND FOR WHAT?

Ricardo T. Neder

Nothing is so simple and linear when it comes to the production of knowledge in the face of the cultural and anthropological, linguistic, political, and economic-sociological heterogeneity of Latin America. Given that science and technology are already associated with the technoscience of capitalist corporations, we are faced with a finding and provocation by invoking the solidarity dimension of technoscience for our Latin American countries.

This finding requires an interpretation of the area of studies and research gathered in a vast specialized literature that goes by the name of "socio-constructivist" view of science and technology in contemporary societies (Western and Eastern)". It opposes the interpretation model of science(s) and technology(s) as phenomena enclosed in centers of economic power, and its laboratories, research centers, universities and other places where there is a predominance of graduated staff, masters, and doctors who act as ideologues in the act through the mastery of technique.

In its place, in the last 40 years, another view has thrived about the way of doing scientific-technological as a result of complex processes that cross the societies from start to finish uniting reason (of the scientific and technological areas) and experiences[7] under pressure from societal and humanistic, ecological and social and cultural sustainability demands.

Known as The Social Studies of Science and Technology (ESCT), this vision was fundamental to uncover unusual or unsuspected relationships between scientific production, scientists and technologists, and the veiled interests that permeate their daily practices in society. We, therefore, need a critical theory of technology capable of putting into motion another democratic rationalization[8].

Provocation, on the other hand, because talking about solidarity technoscience is to seek to overcome its company corporate character as a set of sciences and technologies committed exclusively to the new forms of profit extraction from nature and societies.

[7]See, by the way, FEENBERG, Andrew (2009) Between reason and experience – Essays on technology and modernity. Preface Brian Wayne - Postscript Michel Callon - Translation, essays and additional notes Eduardo Beira with Cristiano Cruz and Ricardo Neder. Lisbon: inovatec / MIT-Portugal. (363 p.m.).

[8]See, by the way, NEDER. R. T. (org) [2013] – Andrew Feenberg's Critical Theory. Democratic rationalization, power and technology. Brasilia. OBMTS/CAPES.

The notion of solidarity technoscience – developed by the Latin American researcher Renato Dagnino[9] – is used here as one of the theoretical foundations of the research and extension project in graduation studies called Residency CTS – habitat, agroecology, work and ecosystem health. Solidarity technoscience is formally defined as the cognitive result of the action of a collective of producers who act on their work process.

A key point is that by acting like this, this collective is seeking to change the unfavorable socioeconomic context that surrounds it. The main (but not the only) unfavorable condition is that this collective seeks access to the factors of production (material inputs, credit, machinery and equipment, knowledge of markets, promotion, etc.).

The collective also presents a desire to form a social agreement that legitimizes its collaboration partnership or cooperativism. By gradually performing the above conditions, it alters the productive environment that surrounds it; it is guided by two vectors: voluntary and participatory cooperation, and by the conditions of self-management control (of those who do what, for how long, earning x or y).

The sum of these two vectors causes the change in the generated product "which the material gain can be (thus) appropriate according to the decision of the collective (solidarity enterprise)"[10] . This is an intellectual provocation by thousands of researchers in Latin America to support cognitive solutions specific to our societies; solutions that are expressed through the technoscientific base, capable of enabling social policies for large-proportion socio-productive inclusion.

This is a movement for scientific and technological policy in Latin America based on the formulation of CTS studies involving the notion of solidarity technoscience. The results will be important to promote transdisciplinary methodological connections in the matter of technical advice of the future multi-professional residence, in the process of construction.

[9]DAGNINO, Renato. (2019) Solidarity Technology – a strategic manual. Marília/SP: Ed. Lutas Anticapital.

[10]P. cit. DAGNINO, 2019, p. 18.

INTRODUCTION

The popular sectors of the economy under capitalism in Brazil

Figure 2 – Man with work permit certificate card in hand. Source: Citizenship Action (2021).

Everyone shares a certain critical perception, even intuitive, about the fact that we have in Brazil large contingents of the working classes (about 80 to 90 million people, valid by the data on those who were forced to resort to aid during part of the pandemic, from 2020 to 2021) without being able to be hired (with a signed License to Work or not) by the typically capitalist segments of the economy or by the public sector.

Many, in common sense, realize this fact, but do not understand this scenario; how can an economy, so-called capitalist, work with large companies and mega organizations , with a well-structured state, subsist with such chronic economic and social inequality that affects the lives of millions of people of working age through denial of decent work over most of their lives?

When it comes to sociotechnical projects and programs that work towards these popular segments of the economy, we deal with groups, individuals, organizations and entities that live in the midst of these structural uncertainties.

By relating to these segments in interdisciplinary partnership with colleagues from various areas – Architecture and Urbanism, Popular Technological Education, Agroecology, Natural Sciences, Environmental Management and Public Policy Management of Science and Technology, health, housing, sanitation, food, education among others – there is no way to leave the issue of occupational structure, employment and wage regime aside. The two dimensions (that of interdisciplinary projects and that of the structure of unemployment) end up articulating.

Therefore, it is necessary to identify how it is possible to articulate their demands for employment, occupation and income solutions that fall on the university and public administration, often under hostility from the private business sector.

To understand the above paradox, it is a question of overcoming misunderstandings of common sense and resistance to overcome mistrust of the private sector (and public managers that would use the purchasing power of the State only with companies in the formal sector).

It is essential to insist on the fact that social and solidarity enterprises (EES) are incubation environments for future cooperatives and associations that can enrich the economic fabric as a whole.

Actions on microcredit, sociotechnical assistance, technological, legal, commercial and economic advice, as well as experiences of community creation of Revolving Solidarity Funds, involve strong schemes of popular self-financing, donations and promotion of public entities as well as appropriations of public funds.

Who are we talking about? Following , in Chart 3, we present a classification of the profile of the workforce in Brazil that is in the condition of members of the popular sectors of the economy.

TABLE 3 - Profiles of The Busy and Underoccupied People's Economy in Brazil

1. Typical groups of self-employed segments	1.1. **Self-employed workers** - Correspond to indirect economic production units by self-employed without establishment, and with diverse experience of qualification and schooling (autonomous street vendors, service providers in 480 popular occupations; (a substantial part is something around 70%) of this segment are not individual microentrepreneurs (MEI)[11]. 1.2. **Self-employed and micro-enterprises subordinated to medium and large enterprises** – They correspond to formal or informal production units with workers with or without employment contracts in micro or small enterprises with strong dependency ties to medium and large industrial, commercial, and service enterprises ("outsourced" and subcontracted). According to the research, Brazil had 51.7 million employees in 2015, of which 9.8 million were outsourced. Before the outsourcing law was approved and sanctioned in 2016, what was worth in Brazil was the jurisprudence of the TSE (Superior Labor Court), which prohibited outsourcing the end-activity of the company (a bank, for example, could not outsource the attendants of the cashier. Now, this has become legalized practice. The new legislation allows unrestricted outsourcing. The regions with the highest incidence of this type of labor relationship were the Northeast and North, with 22.7% and 22.4%, respectively. The south of the country was the region with the lowest number of outsourced, proportionally: 16%[12]. 1.3. **Self-employed, professionals with autonomy and "liberal" professionals** - Formal/Informal production units with self-employed with and without establishment, benefited from legislation as "self-employed professionals" (in general all regulated professionals in the field of health care and medicine, engineering, advocacy, specialized technical services; autonomous work is all activities performed by professionals in a said manner "liberal"), but provides services to companies or people for a specific time, without employment. They are benefited from tax cases and the ease of getting jobs in the digital market. It is a segment regulated by the Internal Revenue Service in Brazil. Workers who are under the previous modalities, are officially classified as MEI – individual micro-entrepreneurs with CNPJ (Brazilian National Registry of Legal Entities). The micro-entrepreneur can only be a legal entity. Must have a maximum of nine employees (trade and services) or 19 employees (industry and construction); the income of the micro-entrepreneur should be limited to R$ 240,000.00 annually; tax system: he must pay IRPJ, ICMS, COFINS, PIS, CSLL, IPI, etc. and other taxes related to his activities, the declaration of his income and commitments to social security (his and the employees); can pay much of these taxes in a simplified way opting for the National Simple.[13].
2. Groups linked to units of family producers	**2.1 Units with family workers giving assistance in care** - formal productive activities organized by individual workers under cooperative family work directed to the production of their own consumption for the reproduction of the labor force (wife, husband, children, households treated in the official IBGE data as auxiliary family workers, "those people who work in aid of a resident of the household or the relative, without receiving payment" cf.[14]. **2.2. Worker/Domestic** – are basic family economic units that employ workers with or without a contract to provide domestic services. It is data contained by all statistics that this is a segment in which the historical permanence of domestic work is associated with female and black employment. This data is illustrated by the indicators of gender and race participation in the category. In 2018, there were 6.23 million people employed in the country, according to data from PNAD[15]. Of this total, only 457,000 were men and 5.77 million were women, that is, women corresponded to 92.7% of the category. Of the total number of workers, 3.75 million were black and 2.018 million were non-black. Black women, therefore, represented 65.0% of the number of domestic women in the country[16].
3. Groups with relative autonomy of competition between capitalist enterprises	**3.1. Production Niche** – Formal/informal units with workers with or without establishments linked to market circuits through production units in economic spaces not exploited by the large company, and with a relative degree of independence of competition between capitalist companies, although it is converted by them into a source of profits after proven their viability of production at a great proportion (craft breweries, organic food production, information, and communication technology micro-enterprises). **3.2. New activities enhanced with evolution 4.0.** – Part of a cluster of new activities called "creative economy", which already existed before the microelectronics revolution 4.0 involving Architecture, Visual Arts, Cinema, Television, Advertising, and other media; Design, Games, Publishing, Music, Fashion, Communication. With the microelectronics revolution, this segment becomes a large breeding barn for workers in general[17].

Table 3 – Profiles of The Busy and Underoccupied People's Economy in Brazil. Source: Systematized by the team.

[11]Available in: https://www.sebrae.com.br/sites/PortalSebrae/ufs/ac/artigos/atividades-que-o-mei-pode-exercer,eaa753fa67b2d610VgnVCM1000004c00210aRCRD. Access: 1st Dec. 2021.

[12]Aspects of labor relations and unionization / IBGE, Coordination of Work and Income. - Rio de Janeiro : IBGE, 2017. Available in: https://biblioteca.ibge.gov.br/visualizacao/livros/liv100322.pdf. Access: 1st Dec. 2021.

[13]Available in: https://www.contabilizei.com.br/contabilidade-online/trabalho-autonomo/. Access: 04 Dec. 2021.

[14]Available in: https://agenciadenoticias.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/25066-pesquisa-revela-retrato-inedito-do-mercado-de-trabalho-do-interior-do-pais. Access: 2 Dec. 2021.

[15]Available in: https://www.ibge.gov.br/estatisticas/multidominio/condicoes-de-vida-desigualdade-e-pobreza/17270-pnad-continua.html?=&t=series-historicas. Access: 04 Dec. 2021.

[16]Available in: https://www.dieese.org.br/estudosepesquisas/2020/estPesq96covidTrabalhoDomestico.pdf. Access: 04 Dec. 2021.

[17]Available in https://www.sebrae.com.br/sites/PortalSebrae/segmentos/economia_criativa/como-o-sebrae-atua-no-segmento-de-economia-criativa,47e0523726a3c510VgnVCM1000004c00210aRCRD and https://unctad.org/system/files/official-document/ditctab20103_pt.pdf. Accessed: 05 Dec. 2021.

From the point of view of the territorial situation, which interests us here more immediately, there are big differences between the popular segments of the economy, if we consider the countryside or the metropolitan regions.

Let's consider the notion of the labor force in the formality (which means having an employment contract, or temporary contracting regime governed by labor laws) and in the informality (without any benefits) used by the Brazilian Institute of Geography and Statistics (IBGE).

Of the universe of people who work in informality, 62.4% are in the countryside, that is, 20.8 million workers without a signed license (private sector employees and domestic workers), without CNPJ and without contribution to official pension (employers and self-employed) or without remuneration (give assistance in family work).

In Brazil, 36% of the employed population is in one of these informal conditions. Informality in the countryside is more present than in metropolitan regions; this just does not happen in the states of São Paulo and Santa Catarina. As for the proportion of this population, the country has 13 states with at least half of its inland workers in informal conditions.

All these locations are in the North and Northeast, and the countryside of Amazonas has the highest percentage, with 71.7% of informal work . The countryside of Santa Catarina has the lowest rate, with 19.4% of its employees in informality.

The Amazonas is also the state with the largest difference of indirect workers in the comparison between countryside and metropolitan regions , followed by Sergipe, Ceará, Piauí, Bahia, and Paraíba.

In addition to unemployment and informality in the countryside, the microdata of Continuous PNAD shows the average income of these sites in the first quarter of 2021. According to the survey, the monthly income of those employed in the countryside is less than half that was received by workers in the capitals of eight states. The average of the country is R$ 2,291.

In Espírito Santo, for example, while a worker from the countryside received R$ 1,725, one of the capital earned R$ 4,653, and the largest difference found, was RS 2,928. Rondônia had the smallest difference, of R$ 514, where the average income of the countryside was R$ 1,736, against R$ 2,250 in Porto Velho.

The lowest monthly gains were concentrated in the countryside of the North and Northeast regions, being the lowest in the Amazonas, with an average income of R$ 1,016. The countryside regions with the highest yields are in the states of São Paulo, Santa Catarina, Paraná, Rio Grande do Sul, Mato Grosso and Mato Grosso do Sul, all above R$ 2,000.

The Brazilian State has historically acted against the possibility of autonomous organizations emerging in low-income communities, especially in the countryside regions, in order to achieve the resolution of their economic exchanges as part of community relations.

This resistance must be quickly situated in order to understand what this has to do with the composition of the labor force in so-called market economic relations between capitalist agents and non-formal or pre-capitalist sectors in Brazilian social formation.

We know from the records of economic history that the arising of the classes holding the factors of production in capitalism since the end of the eighteenth century gave way to the protagonists of fundamental conflicts (between capitalists, and between them and the modern working classes) that to this day persist in several countries of the hegemonic center and the semiperipheries and peripheries in the Americas.

During the formation of the capitalist "system-world" (Wallerstein et al., 1997/1998), the emerging economic sectors of the bourgeois market and industrial classes fought among themselves for state control to ensure better advantages in economic relations with foreign markets (access to commodity markets, labor, foreign exchange, customs advantages, exemptions, tolerance for the exploitation of the slave labor force in the past and low-income or casual workers today).

They simultaneously began to engage in relations with the popular struggles of peasants and workers. In Brazil, this picture, although chronologically more recent than what occurred in the capitalist center, is very similar.

Both there and here, however, there is the same process of formation of the center-periphery relations between sectors and economic groups in the country, holders of access to the richest markets (external, in general, as opposed to the internal market).

In Brazil, since the 1930s, there have been important achievements of public legislation on the protection and regulation of hours worked, salaries, absence leave, and prohibition of the work of children and adolescents. They have obtained thanks to the constant pressures of organizations of the urban and rural working classes in the sectors, these rights have been consolidated in a contradictory way – first, in the richest segments of the economic system.

As shown by the data above IBGE (and historically concentrated from the conservative modernization of the post-1964 and decades of expansion of urbanization without urban reforms between the years 1970-2000), a considerable part of the contingents workers with contractual labor relations concentrated in regions close to the municipalities of the capitals (metropolitan areas).

Although the countryside workers of the economy are very distant from the labor relations formalized by the legislation, they present an advantage which is the fact that they are still very close to the community and family relations of the (self)organization regulated by the principles of relations of exchange and reciprocity of the popular sectors of the economy.

It has acquired strength among theorists and political actors in the last three decades in Brazil the view that it is possible to identify networks of cooperation and organization in civil associations, either as planned resistance or as spontaneous social protection to improve the life quality of the poor populations.

These processes occur both in metropolitan and inland regions (the majority, in the meantime, because, roughly, of the 5,800 Brazilian municipalities, 91% are inland, and only 8% are metropolitan).

A recent survey covering the period 2018-2022 in 22 metropolitan regions (Manaus, Belém, Macapá, Grande São Luís, Fortaleza, Natal, João Pessoa, Recife, Maceió, Aracaju, Salvador, Belo Horizonte, Grande Vitória, Rio de Janeiro, São Paulo, Curitiba, Florianópolis, Porto Alegre, Cuiabá River Valley, and Goiânia; in addition to the Distrito Federal and the Integrated Administrative Region of Development of Grande Teresina), used, among other measures, the Gini coefficient (measures the degree of income distribution among individuals in a population, ranging from zero to one).

The study was based only on measuring income inequality at work, whether formal or informal, captured three stratifications of social inequalities: the poorest 40%, the richest 10%, and 50% that are considered intermediate levels.

According to the study, the poorest 40% lost 32.1% of their income, the 50% intermediate lost 5.6%, and the richest 10% lost 3.2%. All metropolitan regions recorded a loss of income for the poorest stratum, with the highest losses in Salvador (-57.4%), João Pessoa (-50.6%), and Rio de Janeiro (-47.6%). The smallest were recorded in Natal (-8.6%), Curitiba (-9.8%), and Florianópolis (-14.4%). The metropolitan region of Porto Alegre, compared to the other regions of the country, is at the intermediate level[18] .

Since the 1990s, social and popular movements, under pressure against the forms of immobilism, now repression of state actors, began to support the communities to organize themselves. This promotion was decisive for them to develop in social and economic terms (CUNHA, 2012).

Studies on the theoretical and historical scenario in which cases of state intervention are included in partnership with organized sectors of civil society reveal that it is essential to stimulate the collective organization of the poorest and least organized portions of the population, in order to promote its development.

Among these popular segments of the economy, the exchanges are not only economic and go beyond this economic connotation of the employer-employee labor relationship. In general, they are permeated with economic subjectivity because they involve reciprocity (gender, neighborhood, age, experiences, types of commerce, and services based on family relationships) and build up almost an extension of the family, collectively.

These exchanges require different forms of sociotechnical assistance to overcome the barriers and the big personal, family, collective and community sacrifices that the popular segments of the economy face. In their struggle to self-organize, these segments (most of the working classes in the countryside and in the cities) do not have access to the credit and technical promotion that the typically capitalist private sector exclusively dominates.

In order to make an exercise on how to overcome these obstacles of sociotechnical advice (in different chains of goods and services maintained by labor and work of approximately 100 million men and women who make up the popular circuits of the economy), we start from the following assumption: to achieve a high proportion (quantitative) and (geographical) coverage of the size of this IAP (working age population or from 14 to 68 years), we must break the limits and possibilities of a public policy to stimulate cooperativism.

The cooperativism applied to various segments and fractions of the working classes in the popular circuits of the economy (here understood as the positive face of the definition by the exclusion of the informal or non-formal type) is a strategy for the development of sociotechnical advice.

It is based on two main approaches: on the one hand, there is the field of welfare entities that act through incentives to the participation of citizens and their organization with the support of private associations in the field of religious or secular social assistance; since the 1990s, this segment has been renovated by the attempt to professionalize the staff involved in the management of these resources. It is also called new assistance of the foundations and business institutes, in which operates a type of promotion technically identified with standards, results, measures, and indicators of effectiveness and efficacy is known as "third sector methodology" (the main interlocutor of this segment is constituted by an association called GIFE – Group of Foundations and Companies Institutes, which brings

[18]Available in: https://www.brasildefato.com.br/2020/10/24/desigualdade-nas-regioes-metropolitanas-do-pais-cresce-durante-a-pandemia. Accessed: 20 Jan. 2022.

together social investors with private corporate funds from Brazil, institutes, foundations or companies).

The new assistance is structured around non-profit organizations fueled by private social investment. This profile contrasts with the welfare entities of the religious and secular fields in the country, identified with subsistence practices and help for charity. Both feed the view that the problem of poverty must be the subject of actions to relieve people of the effects of structural situations of extreme poverty and poverty (absolute or relative), but without leading to a transformation or total overcoming of the conditions from which extreme poverty and poverty arise.

From the 1990s/2000s, in opposition to the dialogical representation between the new and the old assistance, sociopolitical construction in the field of public policies directed to the "solidarity economy" has emerged, in which the collective experiences of an economic organization have come to represent a horizon of possibilities for groups and collectivities of people to associate in order to produce and reproduce livelihoods according to relations of reciprocity, equality, and democracy (CUNHA, 2012).

Lechat (2002) addresses the origins of the solidarity economy; according to academic research, its roots can be traced back to the 19th century, in the process of reaction of workers to successive capitalist crises (economic disputes between large sectors protected by respective European national states throughout the nineteenth century).

Three moments marked this story: the post-Independence phase of 1822, when there were changes in the process of regulating work, in which the protective mantle of craft and arts corporations (community corporations also within an international scope) that maintained control of the most qualified segments of artisans and masters of crafts to the determinations on employment, was completely broken, occupations, qualifications regulated as a corporate power of producers and their workers.

In the 19th century, it is worth remembering, this corporate-community power based on the pact between producers and workers was undermined by the imposition of a competitive pattern. Workers reacted and created a mutual relief society, food counters and production cooperatives.

On the other hand, a second moment stands out from 1873 to 1895, due to the modernization crisis and investments in agriculture and natural resources. Agricultural cooperatives, savings cooperatives, associations, etc. arise. After The Second World War, so-called "Keynesian" recovery proposals were presented, in which the formulation of development policies for generation was employment and increased economic productivity through state intervention; hence, on the other hand, consumer and housing cooperatives

emerged.

It is worth noticing that in the European scenario, the regulated existence of a sector of the economy generally formed by cooperatives and non-profit associations called "economie sociale" (France/Belgium/Netherlands, Italy) is still common in several countries; Gemmenich Oekonomie, or Community economy (Germany); or social economy/economia social (England, Spain, Portugal, Greece).

These sectors were institutionally created and fostered under the umbrella of the so-called Welfare State from the post-World War II period until the advent of neoliberalism in 1983. The Brazilian experiences of strengthening policies to promote and cover popular segments of the economy have their own characteristic brands that cannot be compared with those of Western Europe and the United States of America. That's what the following sessions seek to reveal.

SCENARIO OF PUBLIC POLICY FOR SOLIDARY ECONOMY IN BRAZIL (2004-2016)

The first government public policy in support of the solidary economy emerged in Porto Alegre/RS, in 1994, during the government of Olívio Dutra, who was also a pioneer in the implementation of a state policy in the Government of the State of Rio Grande do Sul, in 1999.

This model was the reference base as a historical experience that served as a reference in the implementation of similar policies by other PT rulers before becoming a national public policy under Lula (BITELMAN, 2008).

Through solidarity economy programs, the government began to support the unemployed to set up their own small businesses or cooperatives, so then, gradually, they could gain autonomy through their self-employment, and become independent of minimum income programs, work fronts and other similar social assistance initiatives (SINGER, 2002; PITAGUARI et al., 2012, p. 45).

In the context of the 1990s and the 2000s, public policies focused on the meaning described above were sought with the caveat that the formulation of a new framework of relations between traditional civil social assistance entities and, on the other hand, union and social movements were sought for a revision of the General Law of Cooperativism (CUNHA, 2012, p. 368).

Throughout the decade 2003 to 2013, we saw the clash of these two major

currents mentioned above, traditional civil social assistance entities that did not aim at the socioproductive inclusion of the unemployed, and the trade union and social movement identified with the public promotion for the expansion of social cooperatives in the country, aimed at productive inclusion.

It is worth reminding that the constitution of the field of public policy of solidarity economy (mentioned below only as PPECOSOL) had a remarkable moment that was the first manifestation of the social and trade union movement for the creation of a National Secretariat of Solidarity Economy by the then candidate of the left-wing in Brazil, Luiz Inácio Lula da Silva[19].

The document was prepared as an open letter signed by 12 national entities and networks that, at different times and levels, participated in the Brazilian Entities groups: Brazilian Network of Solidarity Socioeconomy (RBSES); Alternative Policy Institute for the Southern Cone (PACS); Federation of Organs for Social and Educational Assistance (FASE); National Association of Self-Management Business Workers (ANTEAG); Brazilian Institute of Socioeconomic Analysis (IBASE); Brazilian Caritas (charity); Landless Workers Movement (MST/CONCRAB); University Network of Technological Incubators of Popular Cooperatives (ITCPs Network); Solidarity Development Agency (ADS/CUT); UNIWORK; Brazilian Association of Micro-Credit Institutions (ABICRED); and some public managers who in the future constituted the Network of Managers of Public Policies of Solidarity Economy (FBES, 2022).

At the end of 2002, resulting from the electoral process that culminated in Lula's victory, the Brazilian WG prepared the Letter to the Lula Government entitled "Solidarity Economy as a Political Development Strategy".

That document of dialogue with the future government presented the general guidelines of the solidarity economy and called for the creation of the National Secretariat of Solidarity Economy (SENAES). The preparation and approval of the letter took place during the 1st Brazilian Plenary of Solidarity Economy, held in São Paulo, on December 9 and 10, 2002, with more than 200 people.

In 2003, SENAES was created by Law No. 10,683 of May 28, 2003, and by. Decree No. 4,764, June 24, 2003. The National Council of Solidarity Economy (CNES) was established as an advisory and propositional body between society and the government. Paul Singer was the first holder of the CNES.

The new Secretariat was implemented in the Ministry of Labor and Employment; from there, we have witnessed attempts to build an institutional place of the solidarity economy in the first Lula government (2003-2007). Its budget support began with the negotiation of the necessary resources for the new PPECOSOL with the Executive /Planalto Palace and at the same time with parliamentary groups of several states. This process culminated in the inclusion of SENAES in the 2004 PPA. With reference to the preparation of the PPA (TO CHECK SENAES BUDGET FIGURES 1st YEAR IN THE PPA (CUNHA, p. 203).

There was great difficulty in these negotiations, mainly due to the resistance of the economic policy area of the first Lula administration; the dominant argument was that the solidarity economy was subordinated to the public policy arrangements of the then Ministry of Labor and Employment, and therefore had no character of productive and economic investment.

Such issues have provoked recurring articulations between the Secretary of SENAES, the Office of the Civil House (José Dirceu) and President Lula. In the midst of these negotiations, the position of the political allies in the Ministry of Labor (led by the PDT) was situated, with little affection to support PPECOSOL with an effective decision.

The construction of SENAES was marked in this period (2003-2006) by more decisive and politically relevant support by all the pressures exerted by the twelve founding entities. In this phase, the creation of a Brazilian Solidarity Economy Forum (FBES, 2022) was formalized.

Since the beginning of SENAES, the option of its team was to strengthen the newly created Brazilian Forum as the main instance of articulation of the diversity of the solidarity economy, since the understanding was that internal contradictions of the FBES threatened its unitary character.

The perception among the actors of the secretariat was that a strong and articulated movement would strengthen public policy itself and contribute to its expansion and institutionalization.

In this sense, it was seen that one of the first actions of the secretariat was to support the Forum foundation, as well as to the activities of strengthening state forums or creation where they did not exist (CUNHA, 2012, p. 235).

A strategic point for the future of PPECOSOL was to identify, in the popular economy, the so-called Solidary Economy Enterprises (EES) as a need for both statistics and recognition of the actions promoted by the Brazilian Solidarity Economy Forum.

This effort was strengthened in the elaboration of the Atlas of Solidary Economy

[19]The set of entities and institutions that signed the document expresses a coalition between these two major sectors: social and union movements joined the segments of religious assistance (Catholic Church, predominantly). These were the forces recognized as Brazilian GT. Three articulators stood out in this process: Ademar Bertucci (national advisor of Caritas Brasileira); Dione Manetti (then director of solidarity economy in the government of Rio Grande do Sul); and Sonia Kruppa (then coordinator of the ITCPs Network) (CUNHA, 2012, p. 191).

in Brazil as an integral part of an Information System on Solidarity Economy (SIES). The creation of SIES aimed to raise and disseminate information about solidarity economy enterprises throughout the national territory.

The Atlas had two editions that were made available to the public as "Atlas of Solidary Economy". The first, from the research conducted in 2005, and the second, in 2007 (BRASIL, (c), s/d.). SIES (BRASIL, (d), s/d.) and described in Pitaguari (2010). (PITAGUARI, DOS SANTOS, DA CÂMARA, 2012, p. 47).

In the period 2007-2010, the actions of the "Solidarity Economy in Development" Program (PPA 2008-2011) were created. This period was marked by a double movement of tensions and redefinitions in government-civil society relations and social movements.

We have seen the consolidation of SENAES in a position of budget lack, going through a constant crisis of resources; on the other hand, there was more pressure from PPECOSOL's supporters to openly criticize the economic area of the second Lula administration for the difficulties experienced by both SENAES managers and popular leaders (CUNHA, 2012, p. 248).

The criticisms were answered by the government, especially those responsible for the economic area, in the sense of defending themselves by the fact that there was no economic recession, open unemployment and the employment rate of the working class was one of the highest in recent decades. The year 2008 would be particularly difficult for the implementation of policies under the coordination of SENAES, being perceived internally as a "lost" year (CUNHA, 2012, p. 230).

Since the creation of SENAES by Law No. 10,683/2003 and Decree No. 4,764/2003, the operation of a National Council for Solidarity Economy (CNES) was already foreseen. This advisory and propositional body, with the role of creating mediations (recommendations, evaluations, criticisms and representation) between society and the government, had a prominent role to legitimize the recognition of SENAES as part of sectors with political influence in the Lula era.

The Council was led by Paul Singer, the first holder, who sought a broad policy of dialogue and recognition of agents, entities, networks and organizations of the solidarity economy in Brazil (SOUZA et al., 2013).

In addition to understanding the solidarity economy that emerges in Brazil from the 1980s to 2000s, it is necessary to refer to the set of forces previously pointed out around the twelve founding entities.

These various organizations such as churches, unions, educational institutions, social movements, pointed to the existence of alternatives to workers mainly subjected to

the mood of the precarious labor market, without access to policies of requalification and education of young people and adults and especially without access to credit.

One of the characteristics of the solidarity economy movement present in the National Council of Solidarity Economy was precisely to seek formulations that would help workers to play a leading role in four directions:

- cooperation: recognizes common ownership, division of responsibilities and results;
- self-management: the role of the participants in the management of the enterprise;
- economic dimension: it is what drives efforts and brings interests together; and
- solidarity: it is noticeable in the equal distribution of results, in the production of opportunities to improve the quality of life of those involved.

The main characteristic of the movement is, therefore, to propose the development of a popular economy whose economic enterprises should not necessarily escape the employer's economic enterprises. The vision of solidarity economy resides precisely in creating a field of self-management among collectives of work without a boss.

Therein is one of the toughest challenges of the solidarity economy. Solidarity economy activities contribute to the reduction of economic and social inequality through shared management of the means of production and the fair division of labor results.

Two national conferences on solidarity economy were organized in 2006 and 2010, seeking precisely to reveal to the general public that thousands of experiences accompanied by PPECOSOL public policy were a viable reality.

Due to this official promotion, the solidarity economy, organized in cooperatives, associations and forums, was incorporated as public policy in hundreds of municipalities and became the object of study in several universities throughout the country.

The National Council of Solidarity Economy had as its purpose and competences to encourage and promote actions for the engagement of civil society and government in solidarity economy policy; establish guidelines for solidarity economy policy; propose improvement measures for both legislation and for the activities and proposals of the MTE and the National Secretariat of Solidarity Economy; mediate the partnerships established between the civil society entities represented in the council and the SNES; and then, finally, act together with related councils.

Until its dissolution after the 2016 coup, the CNES was composed of 56 members, including: 19 representatives of the federal government, state labor departments and state and municipal agencies to support the solidarity economy; 20 representatives of solidarity economic enterprises; and 17 members of other civil society organizations and social services.

In 2005, in an important study conducted by SENAES through the National Secretariat of Information on Solidarity Economy (SIES), information was collected on solidarity economy enterprises present in Brazil. The research produced two Atlases, one in 2005 and the other in 2007 (PITAGUARI et al., 2012, p. 47).

In 2006/2007, there was a second survey conducted by the National Information System in Solidarity Economy (SIES), solidarity enterprises were a reality in Brazil since the beginning of the 20th century and from 1980 there was a marked growth of organizations throughout The Brazilian territory, as quoted below. The SIES identified 21,859 EES throughout Brazil. Although ventures were found in the early twentieth century, the solidarity economy emerged in Brazil as a movement organized in the 1980s [...] (PITAGUARI et al., 2012).

Until 1980, there were only 468 ESS. From that year to 1990, 1,903 new EES emerged, from 1991 to 2000 8,554 EES were created, and in the period from 2001 to 2007, another 10,653 EES were created (PITAGUARI et al., 2012, p. 47).

Singer (2008, p. 208) highlights equal rights and collective means of production as central elements of the solidarity economy, as well as self-management by saying that

> [...] solidarity economy [is] a way of production that is characterized by equality. For equal rights, the means of production are the collective possession of those who work with them – this is the central characteristic. And self-management, that is, solidarity economy enterprises are managed by the workers themselves collectively in an entirely democratic way, which means that each member of the enterprise is entitled to one vote.

In another complementary definition in 2012, Singer apud Pitaguari et al. (2012) defines the solidarity economy highlighting ethical values and citizenship:

> [...] solidarity economy can be defined as an open socioeconomic system, based on the values of cooperation and solidarity, in order to meet the needs and desires of material and coexistence, through mechanisms of participatory democracy and self-management, aiming at emancipation and individual, community, social and environmental well-being (PITAGUARI et al., 2012, p. 35).

It can be understood by the above considerations so far that one of the highlits of PPECOSOL's attempt to mobilize public funds (state) by governments (federal, state and municipal) to implement transfer of resources is precisely the constitutional character that ensures its juridical legality.

This legality would ensure, in the view, the necessary coverage for the politicians, managers and civil servants involved to put into practice arrangements for the transfer of resources between the State and civil society entities (NEDER, 2011).

From 2012 to 2014, this was the focus of the work that resulted in the new Framework of Civil Society Organizations (Law No. 13,019/2014). As a result of a commitment by the Dilma administration, the so-called MROSC legitimized the important role of CSOs and social movements in reducing poverty, inequalities and strengthening democracy in Brazil, providing a legal environment for organizations and their relations with the State.

By acting in collaboration with the State, CSOs do not become public entities. They are civil entities, but supported by the new law, which allows to eliminate historical confusions that put them in a fragile situation. This is a response to the organizations' demands to address so-called "bureaucratic criminalization." The universe of CSOs is broad and plural. In Brazil, there are 323,000 civil society organizations that operate in various areas such as culture, social assistance, education, health, sustainable development and in defense of the rights of historically excluded groups, such as people with disabilities, women, Indigenous, traditional peoples and communities, blacks and LGBTs.

CSOs employ about 2.2 million Brazilians, which demonstrates their relevance also to the country's economy and labor market. Civil society organizations participate in the formulation and social control of public policies through councils, conferences and dialogue tables created by the federal government. They are also present in the implementation phase of these policies, such as the "One Million Rural Cisterns program in the Semi-arid", Minha Casa Minha Vida (My House, My Life) or in programs to protect threatened people.

Stimulating the creativity, advanvances and proximity of the beneficiaries is the element that helps concretizing this important path, still under construction, of the relationship between the State and the citizen, further strengthening democracy. With the new law, while valuing transparency in the application of resources, we advance in the construction of a Democratic State of Law and a free, fair and solidary society.

The law consolidates its own legal regime of partnerships with civil society from the creation of terms of promotion and collaboration in the replacement of agreements, ensuring transparency in the application of public resources, mandatory public call for the whole country, clearer rules and democratization of access to public resources.

The MROSC has national coverage, and its validity has been inserted in the Union, Distrito Federal and State since 2016 - January 2017 in the municipalities. At the same time, the bill for a national solidarity economy policy, unlike the Civil Organizations Framework, has been paralyzed since 2017 (House Bill no. 137, 2017 - no. 4,685/2012, in the House of

Representatives - provides for the National Solidarity Economy Policy and solidarity economic enterprises, creates the National Solidarity Economy System and provides other measures).

In 2018 PLS 292/2018 amended the law 11.947/2009. Thus, the Education Commission approved the PL, which includes ES in the 30% of the preferred share of PNAE resources. In 2019 MP 870/2019 debased SENAES to the undersecretary. Then, there is the fragmentation of policies to support the ES: rural sector for the Ministry of Agriculture - Secretariat of Family Agriculture and Cooperation - and Urban Sector for the Ministry of Citizenship.

On February 12, 2020, the Constitution and Justice Committee (CCJ) approved, in the House of Representatives, the proposed amendment to the Constitution to include the solidarity economy between the principles of the national economic order (Agência Senado). Menu: adds item X to Art. 170 of the Federal Constitution to include the solidarity economy between the principles of the economic order – PEC 69/2019.

THE SCENARIO OF THE MOVEMENT FOR SOLIDARITY ECONOMY IN BRAZILIAN SOCIETY (1990-2017)

The late 1990s marked the beginning of a major social movement in the country in defense of overcoming the structural conditions generated by unemployment and hunger.

The following timeline allows us to affirm that these events were responsible for the direct pressure of civil society, and social movements for the creation of an area in the federal government, capable of formulating public policy directed to the popular segments of the economy outside the formal labor market.

Timeline[20] 1/3

1993

The **Action of Citizenship** is born.

President: Itamar Franco.

On April 21 - plebiscite: Brazil would remain a presidential republic.

May: Fernando Henrique Cardoso took over the Ministry of Finance.

August: currency is now called Real. Economic instability still frightened the country.

There are two slaughters in Rio de Janeiro: that of Candelária and that of Vicar General.

Alarming levels of indigence - intensifying the poverty situation.

Ipea's map indicated 32 million Brazilians below the poverty line.

"Citizenship Action Letter" (signed by artists and personalities engaged in combating the problem of hunger in Brazil), gave rise to the movement "Action of Citizenship Against Hunger, Poverty and For Life".

The Citizenship Action was launched on April 24 at a great ceremony at UERJ, with the participation of the most expressive names in Brazilian society.

On April 28, the "Rio Committee for Citizenship Action" was created.

Several events related to the campaign against hunger occurred during the year:

- The River Pedaling Against Hunger
- Show For Life
- 24 Hours in The Fight Against Extreme Poverty
- Art Week Against Hunger
- Swimming Against Hunger, for Brazil
- Nelson Freire performs a concert for the benefit of The Action
- The First Christmas Without Hunger

Figure 3 – Source: Citizenship Action (2021)

1994

The First Year of Fighting

February to July-Real Unit of Value (URV) began to deploy the Real.

May 1: Ayrton Senna dies.

July: Brazil wins the four-time world soccer championship in the United States.

October: Fernando Henrique Cardoso was elected the 34th President of the Republic.

December: Tom Jobim dies.

The Citizenship Action consolidated its work on several fronts:

- Food against hunger. Work against Misery
- Cinema with citizenship action
- Tribute to Rio
- May 1st - Work against Misery
- State Food Safety Conference
- 1st Meeting of Committees of the State of Rio de Janeiro
- Sun
- Job and income generation projects
- First National Food Security Conference
- Bankers against hunger
- Creation of the Rio Committee Association
- Creation of the National Forum
- Providence Fair
- "Christmas without Hunger" in supermarkets
- Vigília (vigil)
- Christmas Without Hunger 94.

Figure 4 – Source: Citizenship Action (2021)

[20]Elaborated from: Citizenship Action. Available in: https://www.acaodacidadania.org.br/, and Alternative Policy Institute for the Southern Cone. Available in: http://pacs.org.br/.

Timeline[20] 2/3

1995

One year for the democratization of land

Fernando Henrique Cardoso assumed the presidency.

Action for Citizenship took the land as the center of its attention - the movement preached "the land to plant and live", disclosing the existence of 200 million hectares of unproductive land.

The mobilization had great support from public opinion and culminated in the "Earth Letter" (1987).

The text, signed by Betinho, encouraged citizens and organized civil society to participate in the struggle for the democratization of the land.

Ten thousand copies of the letter were made and distributed by the Citizenship Action in 1995, in addition to thousands of other copies made and sent throughout society, reaching more than 500,000 signatures delivered to the National Congress.

Figure 5 – Source: Citizenship Action (2021)

In that year, the Citizenship Action consolidated its work on several fronts:

- Job and income generation projects
- Meeting of committees of the state of Rio de Janeiro
- National Citizenship Action Forum
- Cry of the Earth
- Prato Fundo Project
- Workshops for the preparation of social projects
- Health Agent Courses
- Solidarity Map
- Plenary
- II cycling Against Hunger
- Citizenship Gymkhana
- Ball Hunger
- Star Trek against Hunger
- Great Toll
- Vigil 95
- Christmas Without Hunger 95

1996

Completing four years

Massacre of Eldorado dos Carajás: 19 members of the Landless Rural Workers Movement were killed by the Military Police during the government's crackdown and police apparatus. The conflict of matter and the posture adopted resulted in a fake narrative of "confrontation" in Pará; the massacre was part of the struggle for agrarian reform in Brazil.

The Citizenship Action has kept several fronts active:

- Job and income generation projects
- Assistance to the homeless
- National Citizenship Action Forum
- Voto Cidadão (citizen vote) booklet
- New America Workshops
- Plenary Sessions of the Committees
- Rio 2004 – Candidate City
- Joint Effort for solidarity
- 4th vigil
- 4th Christmas without Hunger

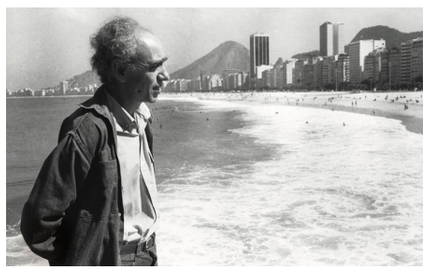


Figure 6 – Source: Citizenship Action (2021)

1997

The first year without Betinho

January: re-election amendment was approved.

On April 20th: The Indigenous pataxó Galdino Jesus dos Santos was murdered, by five students in Brasilia.

On August 9th, Betinho dies, but the Citizenship Action continued: the challenge was already everyone's.

Several events occurred during the year:

- Survey Children Out of School
- Culture Construction Space
- Profile of beneficiaries of "Christmas Without Hunger"
- Tribute to Betinho - At the 15 days of Betinho's death
- Rio Committee Journal
- Workshops
- Group of day care centers
- Monthly plenary sessions
- Scream of the Excluded
- Betinho's Birthday in Candelaria
- Petrópolis in "Christmas without Hunger"
- 5th Vigil
- 5th Christmas without Hunger

Figure 7 – Source: Citizenship Action (2021)

1998

The year of "CD Brasil são outros 500"

Fernando Henrique Cardoso was re-elected President of the Republic.

The Palace II Building collapsed in Rio de Janeiro.

The former military policeman Marcos Aurélio Dias de Alcântara was sentenced to 204 years in prison for having participated in the 1993 Candelaria Slaughter, ten other ex-military police officers, accused of participation in the Slaughter of Vicar General, also from 1993, were acquitted by the Justice of Rio de Janeiro.

The Citizenship Action continued its work, always increasing the agenda of challenges:

- Citizens' Faces;
- Citizen Easter;
- May 1st;
- Food campaign for the Northeast and Jequitinhonha Valley;
- Baskets for Macaé;
- Turning Fund;
- Novamérica Offices;
- Pro-Cooperativism Movement;
- Group of day care centers;
- National Citizenship Action Forum;
- Voto Cidadão (citizen vote) booklet;
- Cry of the Excluded;
- Tribute a year without Betinho;
- Journal N'Ação Cidadania;
- Monthly plenary sessions;
- Committee meetings;
- CD Brasil São Outros 500;
- 6th Vigil;
- 6th Christmas without Hunger.

Figure 8 – Source: Citizenship Action (2021)

[20]Elaborated from: Citizenship Action. Available in: https://www.acaodacidadania.org.br/, and Alternative Policy Institute for the Southern Cone. Available in: http://pacs.org.br/.

Timeline[20] 3/3

1999

Herbert de Souza Citizenship Action Restaurant Year

Fernando Henrique took over his second term.

"Central do Brasil", by Walter Salles, won the Golden Globe in the category of Best Foreign Film.

On March 11: There was the first "blackout", reaching ten states of the South, Southeast and Midwest regions and the Distrito Federal.

Citizenship Action Events of that year:

- Food donation;
- Meeting of young people;
- Literacy courses;
- Joint Effort for the eradication of hunger;
- Novamérica Offices;
- Monthly plenary sessions;
- Cooperatives;
- Herbert de Souza Citizenship Action Restaurant;
- Recycle a Life Campaign;
- The Cry of the Excluded;
- National Meeting;
- Space for The Construction of Culture;
- Click Fome website;
- Rice, Beans and Education;
- "Christmas without Hunger" motorcycle event;
- 7th Hunger Vigil;
- Christmas without Hunger.

Figure 9 – Source: Citizenship Action (2021)

2000

Meeting of culture and socio-solidarity - Alternative Political Institute for the Southern Cone (PACS) - Solidarity Socioeconomy Site

January: a Petrobras leak spilled more than 500,000 liters of oil in Baía de Guanabara in Rio de Janeiro, the worst environmental accident since 1975.

June: a bus line 174 was hijacked by Sandro Barbosa do Nascimento, who held ten hostages for four hours in Rio de Janeiro.

List of activities of the Citizenship Action:

- Space for The Construction of Culture;
- 50 families are selected for the School Scholarship;
- Partnerships of the Bolsa Escola da Ação da Cidadania;
- Cell phone batteries;
- Health agents in STD/AIDS;
- Wings of Citizenship;
- Clickfome wins iBest;
- May 1st;
- Partnership with the Internal Revenue Service;
- Plenary;
- Enough is enough! I Want Peace;
- Peace debate on July 18;
- Literacy course in July;
- Ask for "João e a Rosa";
- Sweater donation Campaign;
- Voto Cidadão (citizen vote) booklet;
- Christmas without Millennium Hunger;
- One km of solidarity against hunger;
- Active Citizenship;
- The "Christmas without Hunger" of 2000 stands out for the partnerships;
- National Culture Day;
- Alcione Araújo takes office as president of honor of The Action of Citizenship;
- 1st Herbert de Souza Citizenship Award;
- Federal and Municipal Public Utility;
- Vigil Against Hunger;
- Distribution at CONAB;
- Culture Warehouse.

Figure 10 – Source: Citizenship Action (2021)

[20]Elaborated from: Citizenship Action. Available in: https://www.acaodacidadania.org.br/, and Alternative Policy Institute for the Southern Cone. Available in: http://pacs.org.br/.

2001

The beginning of a new century

Explosion of platform P-36 in The Baía de Campos - the balance of eleven dead tankers.

June: Gustavo Kuerten won the three-time tennis championship at Roland Garros.

Deaths: : Mário Covas, Maria Clara Machado, Jorge Amado, Roberto Campos, Cássia Eller among other illustrious Brazilians.

List of activities of the Citizenship Action:

- Census of the excluded
- Rock in Rio III
- Citizenship Action presents challenges for 2001 / 2002 in the area of education, culture and citizenship
- New home
- Anniversary of the Action
- Citizenship Action is one of the Brazilian charities chosen by the Philanthropy Guide
- Click Hunger wins one more iBest / Social Actions
- Space for Construction of Culture presents its first musical
- Adult literacy course
- Washing of the Culture and Citizenship Warehouse
- Political and Social Training Course
- Citizenship Action launches award
- Cycle of debates Society and Citizenship
- Food waste
- Chico Alencar gives lecture on education
- Young people from Casa das Artes da Mangueira attend the show "Menino no Meio da Rua" and exchange experiences in the Culture Construction Space
- Inaugurated the first rooms of the schools of informatics and citizenship
- UERJ invites Action to speak at the Community Leadership Course
- Action at the International Seminar at SESC Rio Arte
- Solidarity Credit
- 1st Christmas without Hunger planning meeting 2001
- Regional Council of Physiotherapy and Occupational Therapy honors Citizenship Action
- National launch of "Christmas without Hunger"
- Prisons against hunger
- ALERJ gives medal to Citizenship Action and citizen title to Maurício Andrade
- Solidarity at sea
- Citizenship Action honors Dr. Ruth Cardoso
- National Kilo Day
- Chain of solidarity for a "Christmas without Hunger"
- Final balance of the "Christmas without Hunger"
- Homeless from the rains

Figure 11 – Source: Citizenship Action (2021)

2002

Beginning of lula's government

Luiz Inácio Lula da Silva is elected, with 52 million votes.

List of activities of the Citizenship Action:

- Donation from the Internal Revenue Service
- Rehearsals for "Menino No Meio Da Rua" (Boy in the Middle of the Street) begin
- Citizenship Action against Dengue
- Reformed Culture Construction Space
- Minister welcomes proposal for action against dengue
- Registration of new committees
- Citizenship Action participates in D-Day against Dengue
- Action discloses results of dengue survey
- II Citizenship Fair
- XI Citizenship Action Forum brings together 23 states
- Plenary celebrates the nineth anniversary
- Philanthropy 400
- Countdown to elections
- Click Hunger wins iBest again
- "Recycle a Life" wins another partnership
- "Menino No Meio Da Rua" (Boy in the Middle of the Street) in the project "Educating the Citizen of the Future"
- Citizenship Action receives tribute in PE
- "Menino No Meio Da Rua" (Boy in the Middle of the Street) is a success
- Citizenship Action receives Top Social Award
- Training of agents in STD / AIDS
- Committees meet to discuss violence and ethical voting
- "Menino No Meio Da Rua" (Boy in the Middle of the Street) is a critical success and goes to Villa-Lobos
- Action participates in the project "Educating the Citizen of the Future"
- Citizenship Action launches "National Campaign for Ethical Vote"
- "Menino No Meio Da Rua" is nominated for the Shell Award
- "Menino No Meio Da Rua" participates in Criança Esperança
- "Campaign for ethical vote" wins the streets of Rio
- Firjan receives citizenship action
- Lama Lawang blesses Culture Building Space
- Maurício Andrade participates in a debate at ABI
- Action launches "Brazil without Hunger"
- First meeting of "Christmas without Hunger - Year 10"
- Participation in the Peace Letter to a Friend program
- Committees receive donations on Children's Day
- Partners take on "Christmas without Hunger– Year 10" launch
- Citizenship Action receives Certificate of Social Merit
- Last plenary session before "Christmas Without Hunger"
- "Christmas without Hunger" receives first donation
- Record in the launch of "Christmas Without Hunger - Year 10"
- Capiba against hunger in CCBB
- "Christmas without Hunger" in all 92 municipalities of Rio de Janeiro
- Partnership with Texaco opens 219 collection stations in "Christmas without Hunger"
- "Christmas without hunger" makes first distribution of food
- Against the hunger of culture in Santa Teresa
- Citizenship Action participates in meeting with Zero Hunger team
- National Kilo Day
- Citizenship Action Sites in the TOP 10 of the iBest Award
- Christmas Citizenship Action for Brazil Without Hunger
- Event in the lagoon mobilizes population for the "0500 against hunger"
- Donation to the homeless of Angra dos Reis
- Citizenship Action begins rice planting in Goiás
- Culture Construction Space celebrates a great year
- 1st Meeting of the Strategic Council of Brazil without Hunger
- "Christmas without Hunger" receives donation from TCO Celular
- Solidarity Bazaar
- Brazil Without Hunger Fund receives donation from Itaú Social Foundation
- Joint Effort at CONAB to assemble the baskets
- "Christmas without Hunger Year - 10": joy and hope of a Brazil without hunger

At the end of 2002, as a result of the 1st Brazilian Solidarity Economy Plenary, a letter was prepared containing the general guidelines of the solidarity economy and the creation of the National Secretariat of Solidarity Economy (SENAES).

The proposed letter, entitled "Solidarity Economy as a Development Political Strategy", was presented to the Brazilian government by the Brazilian Gt de ES, on the occasion of Lula's election as President of the Republic. (FBES Website). The Brazilian Solidarity Economy Forum (FBES) was definitively constituted in the III Brazilian Solidarity Economy Plenary, in June 2003. As a result of the movement that took place in 2001, preparatory to the 1st World Social Forum (FSM). Pitaguari Dos Santos, of the Chamber (2012), mentions the role of FBES as "society's interlocutor with SENAES". (SANTOS et al. 2012, p. 46-47).

Figure 12 shows the structure and way of functioning of the solidarity economy in Brazil since the Solidary Economy Enterprises (EES), support and promotion entities and public managers.

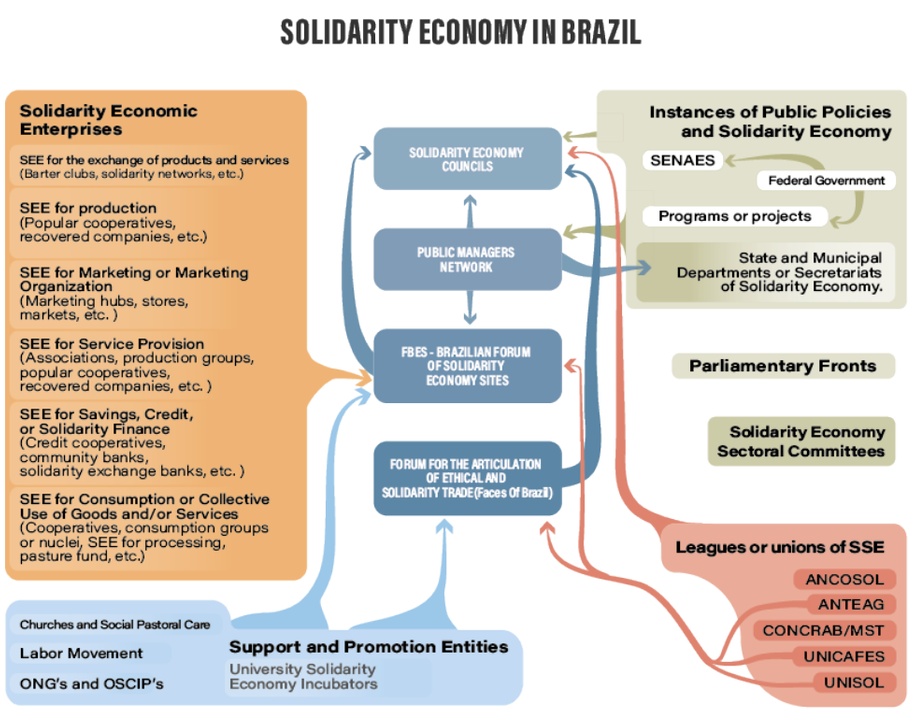


Figure 12: Adapted from FBES (2005)

If the historical data described above were considered, the solidarity economy as a movement would be plausible (CUNHA, 2012). In fact, in the period mentioned before, the organization of the solidarity economy in Brazil seems to have acquired a flow of actions present in the territories that are constituted through social movements, unions, and institutions such as the Catholic Church and the State in its municipal, state and federal instances.

As already mentioned, this process of organization of the Brazilian solidarity economy took place from the 1980s on. According to the text "Solidarity Economy – Another economy at the service of life happens" (CF/2010), in the 1980s the Catholic Church, through Caritas, replicating the economic crisis that was affecting the country, sought to encourage communities by supporting the creation of Alternative Community Projects (PACs).

In the Brazilian scenario, a set of initiatives were presented to support the solidarity economy. In 1990, the Landless Workers' Movement created the Cooperative System of the Settlers (SCA) with organizations at the local, state and national levels.

Universities also mobilized by creating the Technological Incubators of Popular Cooperatives (ITCPs). The Federal University of Rio de Janeiro (UFRJ) was the first to create ITCPs in 1995.

In 1999, the Single Workers' Center (CUT) created ADS – Solidarity Development Agency (SANTOS et al. 2012, p. 44-45).

Lechat (2002) recorded some moments that marked the history of the thought/movement of the solidarity economy in Brazil: in 1993, the Southern Cone Alternative Policy Institute (PACS) organized the I Self-Management Seminar; in 1995, the 7th Brazilian Society of Sociology National Congress took place; in 1996 the III Meeting of the National Association of Self-Management Workers and Enterprises (ANTEAG) takes place.

From the 1st World Social Forum (FSM), held in 2001 at the Workshop of Popular Solidarity Economy and Self-Management, the Brazilian Working Group on Solidarity Economy was born. Initially, the Brazilian WG was composed of different groups and solidarity practices from rural and urban areas. Twelve national entities and networks that, at different times and levels, participated in the Brazilian-GT:

- Brazilian Network of Solidarity Socioeconomy (RBSES);
- Institute of Alternative Policies for the Southern Cone (PACS);
- Federation of Organs for Social and Educational Assistance (FASE);
- National Association of Self-Management Business Workers (ANTEAG);
- Brazilian Institute of Socioeconomic Analysis (IBASE);
- Brazilian Caritas;
- Landless Workers' Movement (MST/CONCRAB);
- University Network of Technological Incubators of Popular Cooperatives (ITCPs Network);

•Solidarity Development Agency (ADS/CUT);
•UNITRABALHO - University and Work;
•Brazilian Association of Microcredit Institutions (ABICRED);
• Network of Managers of Solidarity Economy Public Policies (FBES webSite).

ANALYTICAL VISION ON THE RELATIONS BETWEEN SOLIDARITY TECHNOLOGY AND SOLIDARITY ECONOMY: STRUCTURING ISSUES

Figure 13: Source: Citizenship Action (2021)

Given the correlations between the popular segments of the economy and the business sectors of the formal circuit, it is essential to represent the complex exchanges between the social subjects of the economy as a whole.

We can situate two ecosystems: one we call the economic-social complex driven by conventional (A) technoscience. The other (B) solidarity technoscience.

The following diagrams present basic elements of complexity that involve the dimensions of sociotechnical, institutional and financial support for workers to constitute cooperatives, association groups, and solidary economy enterprises.

It is notable the fact that employers in the formal sector rely on self-employed, temporary and precarious in the informal sector to not pay the benefits and salaries guaranteed to the staff of the formal sector; both in Brazil and in high-income economies, this situation is repeated with different characteristics (SCHOLZ, 2016).

Both in the United States and Western Europe and in Brazil, the two stylized segments in diagrams A and B are not separated or divorced from each other. On the contrary, they are merged. DIAGRAM A shows the tendency to support the scientific and technological development of jobs aimed at formal companies inclined to adopt a technological standard fundamentally saving labor.

Diagram B below explores another possible path for the transition from the informal economy to platform cooperatives with solidarity-based economic enterprises. One of the conditions is the adoption of promotional measures and multilevel regulations to consider that employers in the formal sector cannot transfer transaction costs from companies to autonomous, temporary and precarious informal sector.

International experiences (within the European situation) point to solutions through the "individual social security account" (SCHOLZ et al. 2016-2019). In Brazil, this type of social security fund is already being experienced by about 80 million people who received emergency aid during the Covid pandemic 19; all registered in data of Caixa Econômica Federal.

The prerequisite for carrying out the gradual and continuous transition of part of this 80 million to solidary economy enterprises lies in the massive promotion of cooperatives of all types and key sectors of the popular economy.

To increase the investments in the science and technology system in Brazil – to generate more jobs, with improved qualifications and above average income – these popular segments of the economy are fundamental:

1. Recycling;
2. Construction;
3. Handmade manufacture;
4. Metallurgy and polymers;
5. beekeeping;
6. agriculture, fruit growing, organic and agroecological oil extraction;
7. Feeding;
8. Confeccion and clothing.

Diagrams A and B describe the conditions for another transition of the popular segments of the economy, which goes through the solutions indicated in diagram A as SOCIOTECHNICAL MANAGEMENT 1 and 2, and as GOALS 1, 2, 3 and 4 in diagram B.

To work with the segments of the workforce previously discriminated, surveys and diagnoses with georeferencing, sociotechnical mapping, identification of their cultural base, functional records and database on the economic environment and its links with the formal economy are indispensable.

In summary, without knowledge of the networks in the territories where these segments of the workforce operate, it is not possible to take any consequent actions for socioeconomic, ecological-environmental and institutional sustainability in the generation of jobs. Crucial is also the knowledge of the local situations of the urban and rural land structure.

DIAGRAM A describes how for-profit companies relate to workers and members of the informal economy segments, and how technoscientific knowledge is used.

Diagram B describes how the threads between the human, technical, political, economic, cultural power elements and, above all, the relations with the sustainability dimensions, which incorporate other values into the economic system, operate.

DIAGRAM 'A' - ECOSYSTEM OF TECHNO-SCIENCE MOBILIZED AROUND BUSINESSES - (FORMAL SECTOR)

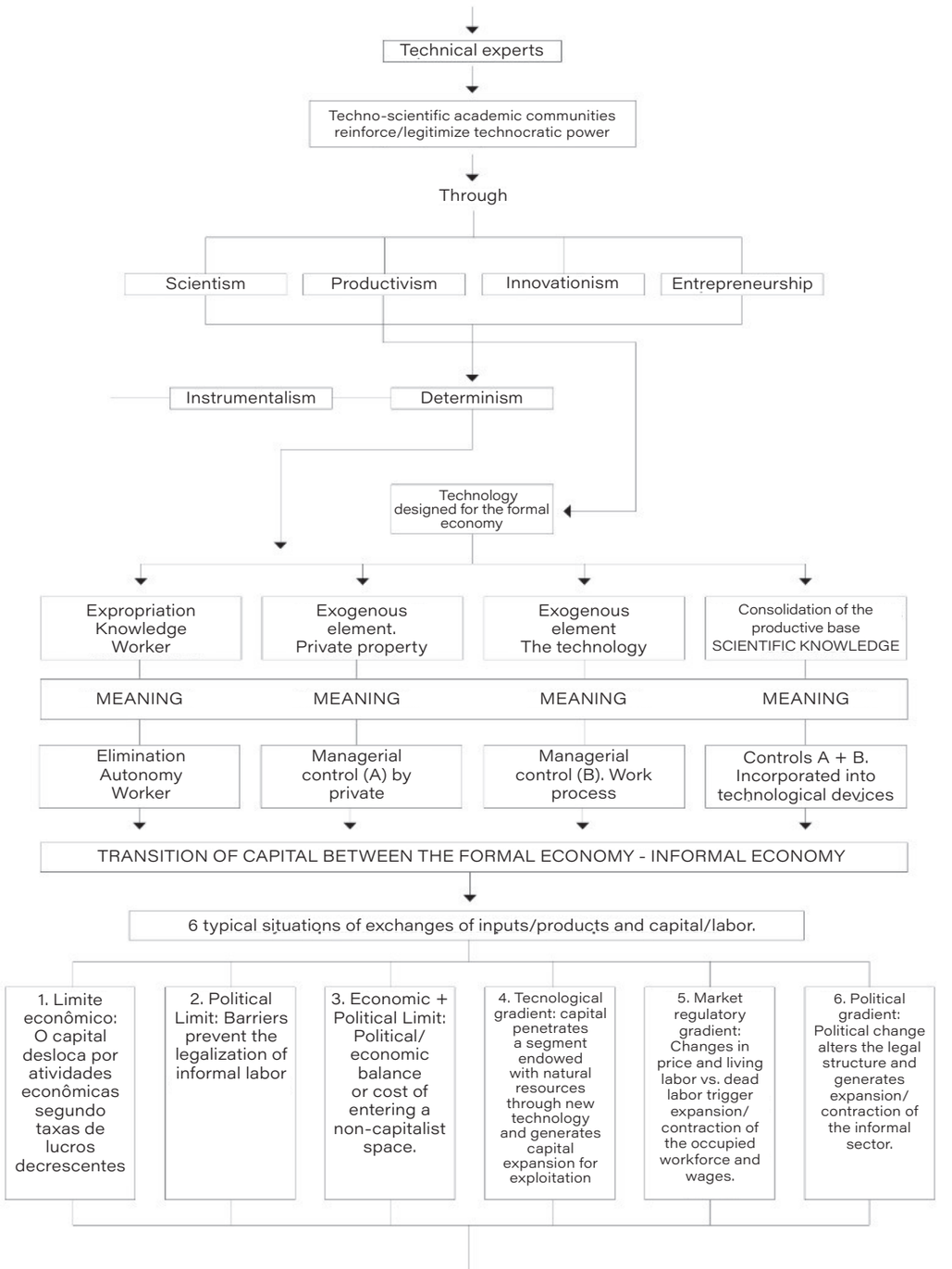
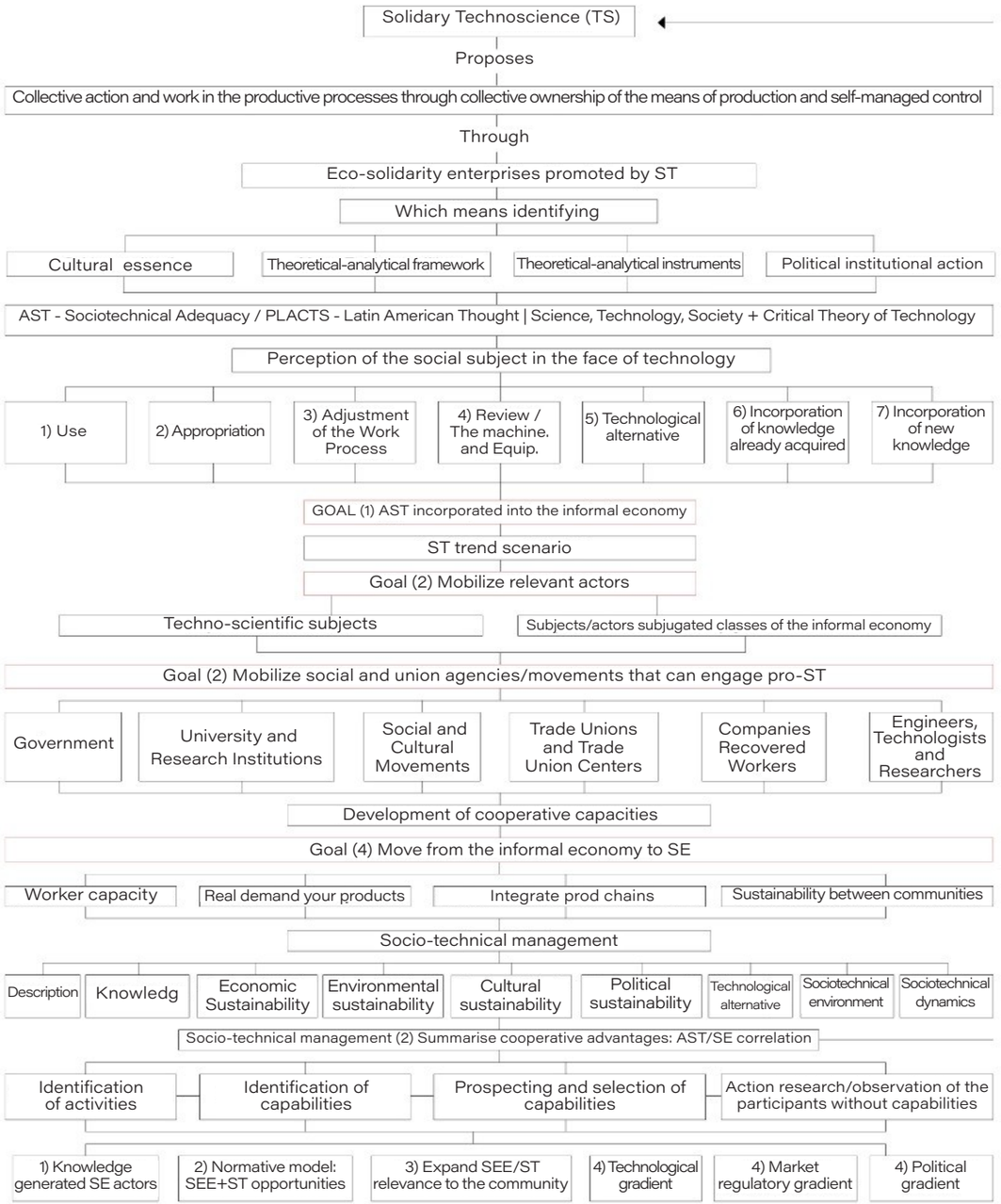


DIAGRAM B - ECOSYSTEM OF SOLIDARITY ECONOMIC ENTERPRISES THROUGH A MULTILEVEL APPROACH TO IDENTIFY



Source: DAGNINO, 2004, 2019; NEDER, 2015A, 2015B, 2017, 2018; 2019. Preparation: Ricardo T. Neder

GLOSSARY - BASIC CONCEPTS TO UNDERSTAND THE RELATIONS BETWEEN SOLIDARITY TECHNOLOGY AND SOLIDARITY ECONOMY

TERM	CONCEPT	AUTHORS
SOCIOTECHNICAL ADEQUACY	It seeks to promote an adequacy of scientific and technological knowledge not only aiming at the technical-economic issue, but encompassing other aspects that involve the survival strategies of the human being, identity of the sociotechnical subject and its relationship with nature, which constitute the relationship Science, Technology and Society.	NEDER, 2015
DECISION-MAKING AGENDA	Originated from the problems brought by social actors. It is a set of problems, demands, issues that the government (political coalition that occupies the executive power of the state apparatus) selects (or is forced to select). It is formed by the particular agendas of the actors (including the government, whose agenda is the coalition government elected due to the correlation of existing forces in society).	DAGNINO, 2016
PRIVATE AGENDA	Set of problems perceived and faced by it when involved with a public policy. In a "normal" policy, it is the materialization of its political project.	DAGNINO, 2016
SOCIOTECHNICAL ARTIFACTS	Material sets that express a cognitive basis derived from some technoscientific knowledge. Artifacts result from sociotechnical relations between human and non-human actors, this last ones understood as endowed with the ability to influence, alter and/or create bonds between human actors.	LATOUR, 2000 NEDER,2013
SOCIAL ACTOR	Person, group or organization participating in a social game; has a political project; controls any relevant resource; accumulates (or give away) forces in its course and can produce facts to enable your project.	DAGNINO, 2016
SELF-MANAGEMENT	In the context of the solidarity economy proposed in Brazil since the years 1990/2000, self-management is associated with the free organization of producers who organize themselves without a boss, jointly and severally from horizontal relations. Self-management is related to the Marxist criticism of the worker's alienation in the face of the generated product, also called a heteronomous work. Or the opposite which is the typical self-employed self-management work. As a provocation for further research, the human's work and the autonomous work are in constant tension. Where very vertical hierarchical relationships predominate, solidarity self-management relationships can hardly evolve. In general, self-management is a challenge in the face of horizontal requirements to distribute qualifications, specializations, experiences and working time between men and women.	DAGNINO, 2019 SINGER, 2003 TAUILLE, 2001 TRAGTENBERG, 1980

NEOLIBERALISM	Theory of political and economic practices proposes that human well-being can be better promoted with individual entrepreneurial freedoms and capacities within an institutional structure characterized by solid rights to private property, free markets and free trade. Neoliberalism became hegemonic as a type of discourse and began to affect so widely the ways of thinking that it was incorporated into the everyday ways of many people interpreting, living and understanding the world.	HARVEY, 2008
COGNITIVE ACTOR MODEL	Set of ideas from which the actor will describe, explain and prescribe the object of politics, its context, and participate in the decision-making process. An actor's cognitive model is sensitive to the influence of other actors. When this knowledge that possesses the dominant actor has a character of "unquestionable truth", the other internalizes their cognitive model.	DAGNINO, 2016
CONCEPTUAL ANALYTICAL FRAMEWORK(MAC)	The set of concepts, variables, models, stylized facts etc. designed in line with culture to understand and explain reality.	DAGNINO, 2019
INSTRUMENTALIST CONCEPTION	This conception is in line with liberal, positivist, modern optimism in progress and that technology is the result of a search for truth and efficiency, so the technology would be neutral.	DAGNINO, 2019 NEDER, 2013 FEENBERG, 2013
CONCEPTION OF THE SUBSTANTIVISMO	It denies the idea of neutrality, but retains the deterministic conception. In this case, the capitalist values and interests incorporated in the production of technology condition to such a point in its dynamics that they prevent its use in alternative political projects.	FEENBERG, 2013 DAGNINO, 2019
DETERMINISTIC CONCEPTION	It understands that technology is an application of science, and maintains the belief of technology neutrality. This technology, when appropriated by the working class, could be used – within the matter of other social relations of production – to build socialism.	FEENBERG, 2013 DAGNINO, 2019
CONCEPTION OF CRITICAL THEORY	It denies the idea of neutrality, disagreeing with instrumentalism. It considers technology to be a carrier of values. It does not accept the idea of the substantivism that capitalist values give immutable characteristics that prevent social change. It considers that technology can be controlled, thus denying determinism.	FEENBERG, 2013 NEDER, 2013 DAGNINO, 2019

POLITICAL AND CULTURAL PROJECT	Political projects are not limited to strategies of political action, but link broader cultural matrices and transform the cultural repertoire of society. Culture is not a sphere, but a dimension of all institutions – economic, social and political; is a set of material practices that constitute meanings, values and subjectivities. This implies that the power relations between the actors cannot be understood without knowledge of their active "cultural" character, as far as they express, produce and communicate meanings.	DAGNINO, 2016
POLITICAL ACTOR PROJECT	A set of beliefs, interests, conceptions of the world and representations of what life should look like in society, which guides the political action of the different actors involved with a policy.	DAGNINO, 2016
COUNTER-HEGEMONIC PRACTICES	Civil society can be understood as the place of the construction of hegemony. Hegemony does not exist only passively as a form of domination, in this case, there is continued resistance to this process. Therefore, it is necessary to consider the concept of counter-hegemony that is associated with the concept of resistance, thus existing practices that enable a new intellectual, moral and political development of social groups from education.	GRAMSCI, 1978 WILLIAMS, 1977
ANOMALOUS POLITICS	It refers to the science and technology policy defined under a decision-making agenda that does not present proposals for a particular agenda of its own, consistent with the political project of the social actor. Its anomalous character comes from the fact that the content of this decision-making agenda is defined by scientific communities located in other countries, namely four main ones: the United States, Germany, France and Japan.	DAGNINO, 2016
COGNITIVE PLATFORM	When we look at technology, the first notion of common sense is to take it as a finished device. A second notion of technology reminds us of the idea of capacity or realization of possibilities, desires, wishes, or power. The third notion of technology leads us to ask how, when, and who developed such a device, so this notion is directly linked to the knowledge implanted in the technology. When we talk about cognitive platforms , we refer to this third dimension. Both social technology and solidarity technology are implanted knowledge of people and social groups before they become devices.	NEDER, 2013 DAGNINO, 2019
PLACTS	Historical description of science and technology policy in Latin American countries implemented from the 1940s to 1980s (Argentina, Brazil, Uruguay, Chile, Venezuela and Mexico). The importance of the current reading on the Placts lies in the fact that from neoliberal reforms in Latin America, after the 1980s, the autonomy and sovereignty of these countries in formulating their own C&T policy has been considerably reduced, whether for the business sector or for the public policies of their national states.	DAGNINO, THOMAS E DAVYT, 1996 VARSAVSKY, 1975 SABATO, 1975 HERRERA, 1975
PERIPHERAL COUNTRIES	Critical and Marxist reading of the reproduction processes of underdevelopment in the periphery of world capitalism.	DAGNINO, 2016

SOCIOTECHNICAL RESISTANCE	It emphasizes the notion that technoscientific knowledge is the consequence of an attempt – when successful – of a social actor to change a work process to achieve some goal of its interest.	DAGNINO, 2019
TECHNOSCIENCE	A cognitive result of the action of a social actor on a work process, in which, in general, other social actors also act that relate to artifacts, aiming, also in general, at the production of goods and services.	DAGNINO, 2019
CAPITALIST TECHNOSCIENCE	It is interpreted as a fusion between science and technology and regarded as a characteristic of the stage of product development, or of neoliberalism.	DAGNINO, 2019
SOLIDARITY TECHNOSCIENCE	A cognitive consequence of the action of collectively producing on a work process that, due to a socioeconomic context (which thinks of the collective ownership of the means of production) and a social agreement (which legitimizes associativism), which include, in the productive environment, a control (self-management) and a cooperation (voluntary and participatory type), causes a change in the generated product which the material result may be appropriate according to the decision of the collective (solidarity enterprise).	DAGNINO, 2019
SOCIAL TECHNOLOGY	Every product, method, process, or technique is created to solve some kind of social problem that meets the requirements of simplicity, low cost, easy applicability (and replicability) and proven social impact. In the version that was disseminated in the non-specialized and specialized public, social technology comprises replicability of products, techniques and/or methodologies, developed in interaction with the community and representing effective solutions of social transformations.	DAGNINO, 2019
NETWORK ACTOR THEORY	Social agents are never located only in entities, but, on the contrary, an actor is a network shaped by heterogeneous relationships or an effect produced by this type of network.	LATOUR, 2000

Table 4 – Glossary - Basic Concepts To Understand the Relations Between Solidarity Technoscience and Solidarity Economy. Source: Systematized by the team.

CONCLUSIONS

Technology and extension-solidarity residence (for whom and for what?)

Figure 14: Source[21]

The news was the maximum
From the paradox
Extended in the sand
Some to be desired
Your goddess kisses
Others to be desired
His ass to free
Oh! World so unequal
Everything is so unequal
[...]
Oh! On the one hand this carnival
On the other total hunger.

Gilberto Gil

In Latin America, the priority place of action of university extension projects with residence in the territory (ERT) requires institutional promotion, theoretical-praxis awareness, and expansion of the conception of science, technology and society, in addition to the immersion of researchers, students and technical specialists. Immersion, of course, with the popular social classes and employed and unemployed workers – a condition that becomes a key to access to local demands.

In general, this proximity of the university is not a physical issue, as this also does the police, politicians, public administration entities, banks, etc., when they seek to focus on

[21]Drawings, collages, watercolor and acrylic by Paulo Andrade, Brasília, 2018. He is part of a series of works based on reading "Assim Falou Zaratustra", by Friedrich Nietzsche, entitled "O Eterno Retorno", by the artist Paulo Andrade. It consists of works carried out between 1982 and 2016, resulting from collages of postcards, web images and made in size 37cm X 55 cm with screen prints, drawings, watercolors, and acrylic, finally printed in 2018 in Fine Art Print on Canson Rag Photographic 310gr paper. Paulo Andrade (Minas Gerais, 1953) is a designer, painter, graphic designer and consultant in Visual Communication, having exhibited his works individually and collectively in Brasilia, Rio de Janeiro, São Paulo, Goiânia, Washington D.C., New York, Costa Rica. He has worked in several newspapers, magazines and publishers in the Federal Capital. It's self-taught.

the territory. It is worth remembering the term "banking education"[22]. It requires closeness, but it means that the teacher sees the student as a bank in which he puts his knowledge. In practice, it means that the student is like an empty safe in which the teacher adds formulas, letters, and scientific knowledge until enriching the student.

In this sense, methods and approaches of the extension itself (which approach banking education) should be problematized, because the conventional extension has a propaedeutic presupposition (initiation in the minimum contents) to apply to learn and then make the content become training for work. Only then does it involve generating income?

This propaedeutic sequence, placed by conventional extension, is due to territories marked by relations of domination and subordination, resistance and struggle of social subjects in constant vulnerability. Such a formal sequence is not feasible for the university to act with the popular layers. If the objective is to develop its own forms of strengthening the chains of goods and services under the institution of solidarity associations and cooperatives (therefore, distinct from the economy of capitalist companies), the way cannot be banking education.

The precariousness of our popular layers requires escaping banking education and adopting a cognitive twist of our conceptions and practices about who and what scientific production is directed at. In other words, it requires the redesign of the research process (RPI) that takes place in a context of coexistence in daily life with the demands placed by the social reproduction of the popular layers.

The RPI – ert's propaedeutic base – is linked, without separateness or discontinuities, to the social reproduction of focus groups, segments by ethnic groups, neighborhood relations, gender, identities and ancestry of indigenous, Afro-Brazilian peoples and their inter-ethnic confluence with the society of whites of the proprietary classes and holders of the technological means of social reproduction.

The RPI, therefore, requires a curriculum and research agendas with these profiles, fueled by demands from segments historically relegated from their citizenship rights, abandoned in their needs, knowledge and practices; become vulnerable subjects and abandoned by the dominant system. Faced with an oppressive dynamic against the popular layers, conducted by the police apparatus and institutionalized violence, the conception

[22]These terms – banking education and problematizing education – are discussed in "Pedagogy of the Oppressed", work of Paulo Freire, 1968. It is a geminal contribution to contemporary pedagogy; Freire was in exile in Chile when he completed the book, after persecution by the military dictatorship. It was published in Brazil in 1974. In 2016, "Pedagogy of the Oppressed" is placed as the third most cited by researchers worldwide (70,000 citations, according to the London School of Economics, Science and Politics); Open Syllabus: the only Brazilian work that is the one in the list of the 100 most requested books by universities. V. www.uol.com.br/ecoa/ultimas-noticias/2020/12/01/o-que-sao-a-educacao-bancaria-e-a-libertadora-formuladas-por-p-freire.htm?cmpid=copiaecola

of ERT exposed in this chapter questions the basis of the propaedeutic orientation of conventional extension.

In its place, it proposes to form, learn and reproduce with the segments previously described of the working classes (outside the formal circuit of wage and subordination to capital, and in which forms of survival for work and income are historically marked by the exclusion of all kinds in three popular circuits of the economy, detailed in this chapter).

From the data presented here, the conditions of housing, food, transportation, urbanization and all aspects involving the social reproduction of the popular classes, have followed a pattern that mixes social oppression, political repressive policies and the formation of consumer markets in which fabric of exchanges between the popular circuits of the economy is captured by large companies.

Political responses against this situation are not clearly identified as such but relate to movements and basic organizations that seek, with a lot of difficulties , technical advice and administrative and legal, economic and political-organizational guidance to change the context economic status that surrounds the three circuits of the popular labor market (presented in the first section of this chapter).

All these collectives – generally individuals and family collectives damaged by labor sacrifice, but with knowledge of the surroundings and practical conditions for obtaining income – require access to factors of production (resources, credit, machinery and equipment, knowledge of markets, promotion, etc.).

Talking about access to the means of production may seem like a buzzword , but in the Marxist sense of the term is strictly what it is about. This demand appears in different ways in each of the three segments. Equipment and devices are valued as a factor of production and life (vehicles, engines, data technology, computers, goods and machinery, raw materials): they are part of the needs suffered by the members of these economic segments in the localities.

Research cannot be disciplined, because, if it is, each of the professional fields involved will make partial or segmented readings, without being guided by the problems defined by the actors themselves in negotiation with the university.

The demands transformed into research problems become objects of technoscientific solidary research from the ethics of an epistemological policy committed to the historically excluded. It is worth remembering that multi-professional methods and approaches – and interdisciplinary guidance for practical problems of large companies, corporations and monopolies – are already part of the arsenal of technoscience weapons at the service of capital markets.

It is about overcoming this impulse for commercial domination and the war of Orthodox technoscience in the Northern Hemisphere, through the redesign of the research process through interdisciplinarity. Who first put urgency in the criticism of positivist science, specialism and specialists were the forces of social sciences and humanities, which have always pointed to the risk of technocracy (government dominated by executives, managers and technologists, currently through the intensification of exchanges by the Internet in what is being treated as platform capitalism[23]).

The descriptions and data, historical information and trajectories of the movement through the solidarity economy throughout the years 2000 and 2016 – in parallel with the construction of a launch platform that gained a national identity as "social technology" – presupposes interdisciplinarity for the redesign of the research process (RPI) to work with these social segments in their territories.

The RPI challenges society to reconceptualize, reanalyze and repropose other empirical clippings, the paradigm of linear extension of the offer (ELO), in order to overcome the myth in the traditional conception of progress that guides the foundations of the university. What is ELO? The hegemonic conception of the university's functioning presupposes that research is considered a precursor, and feeds teaching and extension.

As a result, the research confers certain characteristics and guides the latter. It is taught in academia, and as a rule also in basic education, exclusively the knowledge that resulted from the previous research. It extends – through extension – knowledge not demanded by demands involved in the problems of the contexts in which the extension is concerned:

> Included values are extended in technical devices, incompatible with values, with the practices of this context. Dagnino calls this extension an offeret[24]. Knowledge/values/practices committed to the maximization of private profit are extended, compromising the social relevance of the university. In summary, models of society are extended (AULER, 2021, p. 159).

To this notion of offered extension, we can add the idea of its uncritical or linear acceptance by the traditional extension policy. By doing so, we find underlying the myth of progress, which is strongly embedded in the traditional conception of scientific production. Among most of our researchers at the university, the conviction that scientific development (DC) is indispensable because it produces technological development (TD) predominates. This, in fact, is a generator of economic development (ED), which will expand and improve

[23]CASANOVA, Pablo. The New Sciences and the Humanities. From the Academy to Politics. 1st ed. São Paulo: Ed. Boitempo, 2006
[24]DAGNINO, 2010.

the possibilities of society having access to better products and services. Therefore, it will be from this economic development that science and technology will create social development (SD).

This design can be represented as well:

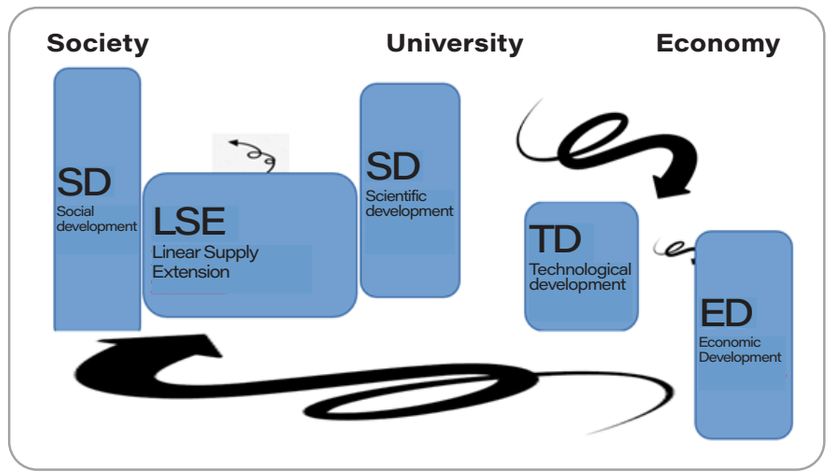


Figure 15: Representation of the bases of the ELO: scientific development (DC) determines technological development, which generates economic development, which creates wealth that will result in social development (SD). Source: (FREIRE, 1977; AULER, 2021: 158-164; DAGNINO, 2010)

Most selfless and valuable colleagues at the university who are dedicated to summing up their research with the extension (one-third, perhaps even less, depending on the disciplinary area and the university) adopt the ELO. Whether because they have a partial critical view of the role of the university, or because they do not take a more daring step in admitting the mythical side of the progress of science and technology in their deterministic connection with economic and social development, or because they think they are highlighting figuratively the validity of funds directed to education, science, and technology.

This scheme of traditional extension is opposed to the counterintuitive notion that the connections between DC - DT - D - DS, instead of being linear, present a complexity marked by the findings of CTS studies - science, technology and society. Science and technology are constructions with the aspect of values of the society that produces them.

That is, the social construction of science takes place assuming values that are overdetermined. The values, in themselves scientific, remain, but to them, they are merged – without the possibility of change, separation, or distinction – with other layers of values (of social class, ethnic subjects, of gender, of territory, of extra-scientific interests of all orders , personal idiosyncrasies of researchers and their collectives)[25] .

The connections between DC - DT - DE - DS acquire and are guided by the complexity of their surroundings in society. Cases such as micro-technology companies born in incubators of controlled companies – by the idea of the profitability of technological innovation – or startups, will be influenced in the context of their projects by the conditions of capital reproduction in segments or chains in which innovation promises to be converted into merchandise[26] .

In the case of solidarity technoscientific projects, which take into account the conditions of social reproduction of the popular classes and workers, a similar situation occurs with a changed signal: family units and workers are always transiting between forms of subordination to the formal sector/wage capitalist nucleus and in the popular circuits of the economy.

The scientific problem is the same. From coherent political decisions to promoting solidary technoscience, infrastructure can be created to generate expanded possibilities of well-being, comfort, sociocultural security, local and regional identities. These are the results of a process that begins with the broader political decisions, determining in these cases – as occurred with the paradigm of startups emulated in Brazil by legislation and regulations created between 1999 and 2015.

The popular movement environments of community values carry out compensatory exchanges, economic exchanges for relations of reciprocity, family and neighborhood ties, in a dynamic of solidarity economy, because they depend heavily on spontaneous associated work.

If it is organized, promoted or emulated by university extension as a solidary economy enterprise, there will be a relationship of symmetry in Brazilian university politics. Internal symmetry, in fact, in the extension policy for residence with solidarity technoscience, given the enormous amount of resources and infrastructure, promoting edicts and staff in the field of incubation of solutions in the paradigm startup. There are, therefore, two paradigms: one hegemonic, and the other counter-hegemonic. The second

[25]By the way, see NEDER, R.T. The gambiarra and the panopticon. Essays on the morality of technology. Marília/SP: Ed.Lutas Anticapital, 2019.
[26]V. NEDER, R.T. and MORAES, R. Where does the university go in the face of science and technology policy in Brazil?. Campinas/Uberlândia: Ed. Sailing. 2017

involves the formation of networks and chains of goods and services through associations and cooperatives governed by the EES.

Based on the data presented here, it is concluded that the Brazilian State – submitted to business interests of all kinds – has made efforts to emerge and mature public and community policies linked to the ESS as possible. By the way, most countries in the capitalist nucleus of the northern hemisphere have 20% to 25% of their economic fabric formed by networks and complex chains of social economy, community economy, the non-profit sector, cooperative economy, producer associations and services that are not formally subordinated to the hard core of capitalist enterprises; this fabric is a buffer to prevent large IAP contingents from being thrown into poverty, extreme poverty or absolute economic abandonment.

Returning to the theme of the new extension, in addition to overcoming these resistances, ERT establishes a relationship of conflict and, at the same time, continuity and cooperation with the traditional extension policy type ELO. Conflict because it requires that extension-residence be put into practice in parallel with current efforts to formalize extension practices in the university curriculum.

Cooperation because this basis of recognition of the extension, in general, will open the door to more structured proposals of action of the university with communities, and above all will allow the opening of public-laboratory policies.

Public-laboratory policies are the institutional matrices applied to attract university researchers to accomplish what the traditional extension cannot do. The dynamics of conventional extension face integration resistance in different specialist fields, especially because the institutional form of awards, stimulus and award of points in the university career for those who make extension is based on personal authorship.

The promotion of extension policies of the rectory of IFES in Brazil rewards the professor who extends alone in the university (1 researcher = 1 project), which does not add any benefit to the target audience, the main beneficiary.

How to generate an institutional space to integrate researchers of the exact with social and earth sciences, combined with the action of social assistance and the humanities? There are several modalities of interdisciplinary promotion favorable to carrying out programs and projects of continuous extension. Mobilizing multidisciplinary and interdisciplinary teams – in their root conception – is equivalent to uniting the projects. Its structuring challenges are born from communities, from movements. For the university to leave the commonplace and advance between leaders and social movements, unions and forms of demand for solutions in the field of solidarity technoscience, it is necessary to

have researchers from all areas, overcoming the vision of ELO.

The ELO – when frequented by technologists, engineers, architects, professionals of public and private management, and professionals of the social sciences and humanities in general – oscillates between a fatalistic attitude of neutrality and another of extracting of data and information, which will compose scientific works whose language will be inaccessible to the interviewees and object of research. The following table provides an overview of the differences in approach between ELO and ERT:

ASPECTS OF OPERATION MODE TYPICAL	ELO LINEAR EXTENSION OFERT	RE-PROJECTING/ERT EXTENSION RESIDENCE IN THE TERRITORY
General design posture	Extraction of data and information without returning the results in a language accessible to the subjects and final stakeholders.	Co-learning and co-production of data and associated information, with a prediction of a return methodology that works on the language of the mobilized group.
Type of relationship with target audience	Sporadic visits to apply questionnaires, verify data, and confirm or ratify information.	The experience of researchers takes place in mixed regimes of extension and residence in the same territory
Project schedule	Short-term projects (1 to 2 years)	Medium to long-term projects (up to 10 years)
Heuristic basis of the project (critical theoretical-methodological paths)	Varied design methodologies, oriented to subject x object relationship; clinical research; intervention projects (administrative); operations research.	Different open methodologies and interaction with social subjects; action research, participant research; research by immersion and experience; extension-residence (with experiential internship).
How to return project results	Publication/dissemination of CBT, master's thesis, doctorate or final technical report of restricted access to pairs and the funding agent; development of applications that generate patents or intellectual property rights; registration of products or services that apply to the formation of small and medium businesses; interests driven by profit maximization .	Micro plans and micro projects of local action; FOFO (strategic participatory) planning; regular return workshops for organized groups (focus groups); website, an application available for real-time access of beneficiaries; publication at the university: CBT, master's thesis, doctorate or final technical report with restricted access.
Epistemic political foundation	Separation between conception and execution; seeks solutions to local issues based on knowledge designed and produced on demand from an international agenda.	Seeks to overcome or eliminate the distance between those who conceive (think and research) and those who perform (practitioners and final beneficiaries); the starting point is no longer conventional technoscience (DC and DT), and in its place solutions are sought from available knowledge (AST - Sociotechnical Adequacy).
Link with technological development	It uses, implicitly or explicitly - accepting its assumptions directly or indirectly - technoscience in the linear extension model (DC-DT-DE-DS).	It adopts the perspective of solidarity technoscience: solutions and matrices of problems defined by communities become the starting point for generating research and extension problems that can be development based on knowledge already acquired (AST).

Table 5 – Source: author's elaboration

The arising of the ERT movement in the Brazilian university in the 2000s takes place in the context of convergence between (i) CTA and PLACTS – Latin American Thought of Science, Technology and Society – and (ii) the historical moment in which public-laboratory policies for formatting multiple sectoral actions are sought, to focus them on solidary economy enterprises (SEE)).

This convergence – wounded by the 2016 coup – is fundamental, as seen throughout this chapter. Firstly because it mobilizes the capacity, energy, and agency potential of the protagonists of movements that postulate solutions that neither capital nor state policies alone can offer to the vast majority of the working classes, in urban and local communities, in metropolitan municipalities (33% of the 5,800) and in the other that are the majority in Brazil, in the countryside and in smaller and medium-sized cities.

A public policy for the ESEs represents diversity, inventiveness, multiplicity and improvisation of solutions from fragmented experiences of the subjects. And it couldn't even be any different! For this, the redesign of the research process (RPI) with the popular social classes and workers is of great importance. It is worth reminding that the theoretical-methodological basis of this redesign is originated from the Freirean notion of generating themes. And how are the generating themes produced?

For Freire (1987), the generating themes result from a thematic investigation-reduction process built in five stages, pari passu, between researchers and social subjects:

a) preliminary survey: this is the recognition with details of the conditions of the social, cultural, political, organizational, economic and access to technical ways through secondary sources and informal conversations with varied individuals, therefore it is a first approach to a data collection;

b) analysis of situations, choice of codifications that contain lived contradictions and preparation of the codifications that will be presented in the next stage;

c) decoding dialogues: the researchers return to the site for the decoding dialogues, and - throughout this experience - they obtain the generating themes;

d) thematic reduction: consists in the elaboration of the program to be developed for an application, in the 5th stage. From an immersion of interdisciplinary teamwork, knowledge necessary for a contextualized

understanding of the themes identified in the previous stage is identified and selected;

e) work in the laboratory and classroom: only after the four previous stages of investigation with the established program and the prepared didactic material, didactic work occurs and the formulation of the research strategy and its consequences for the subjects. It is, therefore, the application of the RPI from this state of the five steps.

Environments where the precarious segments live, whose workers are outsourced, temporary and linked to work for the social reproduction of families, will require intervention strategies specific to each segment. To do so, the groups of researchers need to be open to the modus vivendi in this environment – which operates between the chaos of resistance and the struggle for rights against everyday exploitation; resignation and revolt among millions of people due to the abandonment and non-governmental recognition of their social, cultural, political and economic existences.

At the same time, RPI also means establishing mediations – political, economic, financial, technological and socio-technical – with these more poor and precarious segments of the working classes, usually with few years of schooling to increase the capacity of an agency in search of independence and autonomy, with self-management and associated work. Work of extreme relevance is to distinguish philanthropy – new or old – from research intervention, because most of these communities are victims of state violence and are private by the capital side, which prevents it from legalizing the popular circuits of the economy to not dispute the purchases of the state.

A minority part of the precarious working classes, it manages, with harsh penalties, to find niches and loopholes to acquire goods and services, open its business and operate machines – now that financial capital has discovered the potential of this platform economy via invasive applications on mobile phones. These segments become a network with thousands of street and precarious distributors of goods under the standard imposed by capital. In doing so, these segments become more obedient and faithful to the chains of wholesale and semi-wholesale SMEs – small and micro enterprises that, in turn, live overwhelmed by the intercapitalist competition maintained by large wholesale companies. The system charges its access to technologies that provide it with standardization and standardization, in addition to tax protection, credit and legal access to state purchases, whose notices are written to privilege the "legal" forms of enterprises, throwing all the other illegality.

This standardization of goods and services is implicit, in turn, as a way of capturing the production chains and popular services, which are common in cities and in the countryside. The lower middle-class people, subjected to salaries and forms of remuneration demeaned by inflation, acquires industrialized products of deplorable quality, cheap per unit, from cookies, milks, pasta and seasonings to durable clothing and consumer goods that integrate the basket of wage goods. All – and everything – in the popular circuits are converted, as a universal rule, into merchandise-workforce and commodity consumers.

Nothing escapes this logic of capital, and when it does not enable this operation ready, creates conditions of chaos by promoting the invasion of these territories through the purchase of real estate assets (land and buildings in peripheral areas as a reserve of future value) and the acquisition of current assets (small networks of local markets operating as SMEs, more valued by large networks).

Such market orientation is promoted as a way to create a local consumer market by the habit in which loyalty – and the lack of alternatives – makes them buyers, as final consumers or intermediaries. This expansion, however, finds locks and barriers. Its movement is governed by two contradictory forces:

a) A movement necessarily leads to unemployment, precarious access to monetary income, hunger in families and the destructuring of traditional popular circuits not subordinated to capital – as imposed by the economic crisis of shrinking state investments, and through the destruction, in 2016, of the social protection network of Bolsa Família and the tripartite social security system;

b) The second contradictory movement is its scope among the popular circuits of the economy: those included are only a tiny part of the 70 million people. Faced with an IAP of 180 million and a formal salaried sector that ranges from 30 to 40 million between crises, there are 140 million left, half of which make up the complexity of the popular circuits of the economy.

For the most part, popular enterprises are – in the millions' scale – family nuclei that meet favorable conditions to survive this pattern of destruction and uniformity of the markets of products and services, labor, and raw materials. They oscillate between the precariousness and lack of access to credit and technological resources, and the constant danger of pauperism and misery.

Finally, it is worth emphasizing that the popular circuits of the economy need the state budget and the overcoming of barriers to access of economic enterprises in solidarity with four resources:

- credit solutions and tax regulation;
- pension solutions;
- strong and decisive labor standardization;
- institutional purchasing market of the State.

These four fronts of resistance and struggle guide the possibilities of contributing a new extension-residence and its consequences – the posture of working interdisciplinary with the RPI, which means putting the university to carry out the necessary mediations in order to prevent the standardization, regulated by capital, continues generating the periodic destruction of the survival conditions of the various popular segments and throwing millions into the basin of souls of a labor market countered between the work of financial speculators and bankers in the country, with high salaries and the jobs of almost 100 million people whose greatest wealth lies in its workforce.

Faced with the production crises imposed by neoliberalism, with the destruction of labor markets, production and circulation and the precariousness of labor and its relations, the people are left with the struggle for autonomy and understanding of the contradictions experienced by the popular layers.

The solidarity economy is a part of the real economy of the popular circuits of the economy. Knowledge and knowledge – together with the characteristics demanded by the movements to put into practice such immersion in interdisciplinarity – become a requirement of the time, both for the need to cheapest sociotechnical advisories (integrated teams), as well as for the development of co-learning and co-production solutions between (i) the trade union movement and social movements (community, ethnic, indigenous, unemployed); (ii) researchers and technical and scientific staff in general, including and especially those of ITCs. There is a new horizon called the digital platform for solidarity cooperatives.

A technological solution that is coming through solidarity technology is applied in a digital platform controlled by workers' self-management, with the support of researchers and popular leaders when assuming the sociotechnical character. As such, it approaches other workers with the humbling of those who will learn.

Popular experts are valuable for mediating and multi-professional integration of university researchers; Brazil does not have the experience of working in interdisciplinary teams, as it is sectionalized in professional areas and departments.

The two dimensions – interdisciplinary projects integrating experts and the development of platform cooperativism, self-managed by associations and cooperatives – can contribute to removing millions of families from both structural unemployment (due to technological changes) and unemployment due to insufficient public and private investment.

This is the historical requirement of the university in Brazil today. It is not a question of asking something that the university does not know how to do (generate jobs), but what it knows: to create cognitive and propaedeutic bases of research-extension with residence in order to enable a theoretical basis to converge the attention of specialist areas, combined around social problems that generate research problems, with the search for knowledge and solutions to the ills of structural and conjuncture unemployment.

These two dimensions need to be converged and articulated from a counterintuitive finding. The private sector is no longer interested in expanding the qualification and training of the workforce in the current stage of late capitalism in Brazil (except for the already educated contingents that enter the S system). Its characteristic is to combine growth – when in fact it occurs – without generating new jobs. It is about overcoming the misunderstanding of common sense of the private sector and public managers, affection to use the purchasing power of the State only with companies in the formal sector. It is essential to insist on the fact that social and solidarity enterprises (EES) are incubation environments for future cooperatives and associations that can enrich the economic fabric as a whole. How to do this with the resources of the solidarity technology of the digital platform?

* * *

In recent decades, and particularly in recent years, the imagination of many parts of society, including a portion of institutions and workers themselves, has permeated the idea that changes such as Economy 4.0 in companies have changed the nature of labor relations, leading to considerations about wage earns themselves, as if it were in decline.

For Filgueiras (2022):

> companies that identify themselves as "applications" and "platforms" are the current traditional that radicalized this narrative, stating that workers are not their employees, but their customers. It is in this wake that the argument that workers have autonomy, freedom and flexibility to define where, how and when to provide services (FILGUEIRAS, 2022a).

1. This is a scenario devoid of empirical basis, but which is often assumed, even partially, even by those who criticize the poor working conditions in the "applications". Business rhetoric leads to confusion, misinformation and contradictory positions by many institutions – including academia – and workers. It is still common to read and hear the following justifications so that "application" workers do not have their labor rights recognized (via LTW):
a. "We would be dealing with new employment relationships that do not fall within employment";
b. Workers (or "entrepreneurs") have more autonomy, flexibility and/or income without LTW;
c. Labor legislation in Brazil is precarious, does not guarantee good working conditions;
d. "Application" workers would not like to have the employment bond recognized, and this should be respected.

2. These arguments are not supported, among other reasons because the relations between workers and "applications" are clearly wage-employed, marked by complete subordination that borders on tyranny. They are companies like any other, but that use, among other instruments, a technological tool (the platform / application) to manage production and work. The applications, once privatized, serve as a tool of domination among individuals, and it tends to be all the more brutal the smaller the role of labor law.

3. "Application" workers have lower incomes, longer hours and less rest time, and face greater despotism from employers compared to workers with a signed license.

4. In fact, the LTW is precarious, but it provides for conditions higher than those experienced by these workers – therefore worse without it – and is only a starting point of the dispute, a minimum level from which to fight. On the last argument, it is necessary to reflect a little on what is implicit in its statement. There are fundamental points to question this supposed option of workers because they do not have rights, and the main one is the requirement of non-renunciation (of rights) as the basis of the labor law itself, without which the limits to exploitation tend to disappear, since the "non-want" of workers is promoted by the repression of the labor market. To understand the concrete case of "applications", it is necessary to keep in mind the massification of market discourses and commercial interests at various levels, such as the campaign of a company that spread lies to demobilize the claims of its deliverers" (FILGUEIRAS, 2022a).

Finally, the rhetorical statements of entrepreneurs about supposed changes in labor relations are not new, and neither do they present differences. Outsourcing, cooperatives, partnerships and "buyer" companies have been presented as different phenomena than they are as a legitimation strategy, and have already caused much damage around the world. As the field of work has not faced the premises of these capital strategies, they are being radicalized.

An assumption for a struggle that is more effective, for the field of work, is not to take by appearance the employer's discourse. And, in the specific case of the content of labor relations, it is not assumed that companies are effectively moving away from work management. On the contrary, they seek to deepen new ways, by applications, of controlling workers, and use the rhetoric of remoteness precisely to reduce the chances of limiting exploitation.

Another hypothesis resulting from the previous one is the fact that the popular circuits of the economy (as we call it here) are in considerable numbers in Brazil today, around just over half of the Working Age Population (IAP of 180 million). These are

considerable contingents that do not have a job perspective (with or without platforms) and, therefore, their condition public political demand of considerable dimensions, because they are contingents that have continuous presence as popular circuits. These are segments that cannot be treated as if they were "residual" in the economy, since it is only one, and precarization is part of advantages obtained by the formal sector.

The economic performance of the popular circuits of the economy, in turn, is a generator of occupation, labor and income. Hence the importance of exploring a scenario from which platform cooperativism can be an instrument of social mobility and socioeconomic inclusion of segments here named and conceptualized in six chains of generation of goods and services.

REFERENCES

CITIZENSHIP ACTION: Historical photos: since our foundation. Available in: https://www.acaodacidadania.org.br/galeria-de-fotos. Accessed: 10 Aug. 2021.

AULER, Decius. Communication or co-production and co-learning: dialogue with the work Extension or Communication? Curitiba: Appis, 2021.

BITELMAN, M. F. The Dissemination of Local Public Policies of Solidarity Economy in Brazil: The cases of São Paulo and Osasco. 2008. Dissertation (Master's degree in Public Administration and Government), FGV, São Paulo.

BRAZIL, MROSC - Law 13.019/2014. Regulatory Famework of Civil Society Organizations: Secretariat of Government of the Presidency of the Republic; Brasilia: Presidency of the Republic, 2016.

CUNHA, Gabriela Cavalcanti. Other policies for other economies: networks in the construction of federal government actions aimed at the solidarity economy (2003-2010). 2012. xi, 444 f., il. Thesis (PhD in Sociology) - University of Brasilia, Brasília, 2012.

DAGNINO, Renato. «A story about science and technology, or starting with university extension.» In: Renato Dagnino et al. Social Studies of science and technology & science and technology policy: alternatives to a new Latin America. Campina Grande: Eduepb. 2010 (p. 293-324).

DAGNINO, R; BRANDÃO, F. C.; NOVAES, H. T. «On the analytical-conceptual Framework of social technology». In: Social technology: a strategy for development. Rio de Janeiro: Banco do Brasil Foundation, 2004.

DAGNINO, Renato. Solidarity Technology: a strategic manual. Anticapital Fights. Marília, 2019.

DAGNINO, R. THOMAS, H.; DAVYT, To. Thinking in science, technology and society in Latin America: a political interpretation of his career. NETWORKS 7. 1996. p. 2-27.

FEENBERG, A. «What is philosophy of technology?». In: NEDER, Ricardo Toledo (org.) Andrew Feenberg's Critical Theory: Democratic Rationalization, Power and Technology. Brasilia: Ed. Observatory of the Movement for Social Technology in Latin America/ School of High Studies of CAPES/CDS-UnB.2013:49-96.

BRAZILIAN SOLIDARITY ECONOMY FORUM. Rescuing the history of the Brazilian Forum of Solidarity Economy. Available in: https://fbes.org.br/linha-de-tempo/. Access on: 3 May. 2021.

FREIRE, Paul. Extension or Communication? 12. ed. Rio de Janeiro: Ed. Paz and Terra. 1977.

_____. Pedagogy of the Oppressed. 28th ed. Rio de Janeiro: Ed. Paz and Terra. 1987

GRAMSCI, A. Maquiavel, Politics and the Modern State. Rio de Janeiro: Brazilian Civilization. 1978.

HARVEY, D. Neoliberalism - history and implications. São Paulo: Ed. Loyola, 2008.

HERRERA, A. Science and Politics in Latin America. Mexico: Siglo XXI, 1975.

_____. «The Social Determinants of Science Policy in Latin America». In: SABATO, J. (comp). Latin American thought in the problematic science-technology-development-dependence. Buenos Aires: Paidós, 1975.

HERRERA, A. et al.. «The Planning of Science and Technology in Latin America: elements for a new benchmark.» In: Science Technology and Development, n. 2, Brasília, CNPq/UNESCO, 1983.

IPEA - Institute of Applied Economic Research. Expansion of Participation in Public Management. A study on national conferences conducted between 2003 and 2011. Research Report. Brasilia, 2013.

LATOUR, Bruno. Science in Action. How to follow scientists and engineers around the world. São Paulo: Edunesp, 2000.

LECHAT, Noelle Marie Paule. The historical roots of the solidarity economy and its appearance in Brazil. II Seminar of Technological Incubators of Popular Cooperatives. Campinas, SP, Brazil, 2002.

LIMA, Deborah De Boni. Healthy cities – relationship of the ecosystem vision of collective health and environmental sanitation: the case of Structural. Monograph Reabilita, Brasília, 2017.

NEDER, Ricardo T. Sociotechnical network and social innovation for urban water sustainability (a study on the blocks to the diffusion of the new paradigm of quality for sociotechnical innovation through the democratic governance of hydrographic basin committees in Brazil). São Paulo: Ed. Malhuhy/FAPESP, 2008a.

_____. Social Technology as technological pluralism. Brasilia. Social Technology Network Portal - RTS. 10, November, 2008b.

_____. «State and civil society relations in the face of the new solidarity economy in Brazil (what governance and controllability?)». In: Revista Tribunal de Contas do Estado do Rio de Janeiro. No. 39 2009a. (p. 63-73)

_____. Three groups of technology signifiers (social): implications for interactionism. Technology Colloquium in Teacher Training Education. Cátedra Unesco, UnB, November 2009b. Available in: http://www.fe.unb.br/catedraunescoead/areas/menu/publicacoes/artigos-sobre-tics-na-educacao/tres-grupos-de-significantes-da-tecnologia-social-implicacoes-para-o-interacionismo. Accessed: 10 Aug. 2021.

_____. In defense of a scientific and technological policy with solidarity economy. Science & Social Technology Magazine. Unb. volume 1 - number 1 - July 2011.

_____. What does (us) mean the critical theory of technology? In: NEDER, Ricardo Toledo (org.) Andrew Feenberg's Critical Theory: Democratic Rationalization, Power and Technology. Brasília: Ed. Observatory of the Movement for Social Technology in Latin America/ School of High Studies of CAPES/CDS-UnB. Issn 2175-2478 no. 3. 2013. (p. 7-24).

_____. CTS - Science, Technology, Society for the Construction of Agroecology. Brasília: Ed. Observatory of the Movement for Social Technology in Latin America/ School of High Studies of CAPES/UNB. ISSN 2175-2478 no. 7. 2014.

_____. CTS studies and education. By a new regime of scientific controversy Presentation. Critical Lines, 21(45), p. 265–274. 2015a.

_____. The practice of sociotechnical adequacy among the peasant: education, science and social technology. Critical Lines, 21(45), 357–381. 2015b.

_____. Where does the University go in the face of science and technology policy in Brazil?. Brasilia: Ed. Observatory of the Movement for Social Technology in Latin America/ School of High Studies of CAPES/UnB.no. 8. 2017

_____. Social production of technology, inequality and the new sociology of technology. Science & Social Technology Magazine. v. 3 n. 1 (2017) p. 1-12.

_____. Sociotechnical and anti-methodology interactionism in ITCPs as agencies. In: ADDOR, Felipe; LARICCHIA, Camila Rolim (Org.) Technological incubators of solidarity economy. Rio de Janeiro: UFRJ Publishing House, 2018.

_____. The gambiarra and the panopticon. Essays on the morality of technology. Marília/SP: Ed.Lutas Anticapital, 2019.

NEDER, R. T. and MORAES, R. Where does the university go in the face of science and technology policy in Brazil?. Campinas/Uberlândia: Ed. Sailing. 2017.

OIT. ORGANIZAÇÃO INTERNACIONAL DO TRABALHO. Plataform labour in search of value. A study of worker's organizing practices and business models in the digital economy. Genebra. OIT. 2021 Disponível em: https://www.ilo.org/global/topics/cooperatives/publications/WCMS_809250/lang--en/index.htm. Acesso em: 10 jul. 2021.

ILO BRAZIL. Cooperatives: changes, opportunities and challenges / edited Armand Pereira, in collaboration with Lucienne Freire and Lizzie Lagana – 1 ed. Brasilia: ILO, 2001.

LETTER FROM TERRA BRASIL. Letter from Earth. Available in: http://www.cartadaterrabrasil.com.br/prt/texto-da-carta-da-terra.htmll. Accessed: 3 Aug. 2021.

PORTAL RIO +20: building the institution of the Rio +20 peoples. The economy we need: declaration of the social economy movement and solidarity to Rio +20. Available in: http://rio20.net/pt-br/propuestas/a-economia-que-precisamos-declaracao-do-movimento-de-economia-social-e-solidaria-a-rio20/. Access: 21 Jul. 2021.

PITAGUARI, S.O.; SANTOS, L. M. et al.. Overview of the solidarity economy in Brazil. The Sustainability of the Solidarity Economy: multidisciplinary contributions. Londrina: State University of Londrina-UEL, p. 33-61, 2012.

SABATO, J. (org). Latin American thought in the problematic science-technology-development-dependence. Buenos Aires: Paidós, 1975. pp 345-349.

SANTOS, Milton. Brazil: Territory and Society at the beginning of the 21st Century, São Paulo: Record, 2001.

SCHOLZ, T. Platform Cooperativism. Contesting the economy of corporate sharing. Trad. and coment. Rafael Zanatta. São Paulo: Fundação Rosa Luxembourg/Ed. Elefante/Autonomia Literária 2016.

SINGER, p. Solidarity Economy. Interview. USP ADVANCED STUDIES 22 (62) 2008 (p. 284-314).

SINGER, p. «Public policies of the National Secretariat of Solidarity Economy of the Ministry of Labor and Employment». In: Labor Market: conjuncture & analysis, 39, Brasília: Ipea/MTE, p. 43-48, 2009.

SOUZA, Clovis et al.. Expansion of Participation in Public Management a study on National Conferences held between 2003 and 2011. Research Report, Ipea, 2013.

TAUILLE, R. Solidarity Economy. Self-management in Brazil: synthesis of a research. Labor Market, conjuncture and analysis. IPEA/MTE 28, year 10: Sep., 2005.

_____. From market socialism to solidarity economy. Work submitted to the international seminar Theories of Development in the New Century. June, 2001 (mimeo).

TRAGTENBERG, M. Administration, Power and Ideology. São Paulo: Cortez Ed. 1989.

THOMAS, H. Social technologies and socio-technical citizenship. Notes for the construction of the material matrix of a viable future. Revista Ciência e Tecnologia Social. CTS. No. 1.

VARSAVSKY, O. A. Science, politics and scientism. Buenos Aires: Centro Ed. de América Latina, 1975.

WALLERSTEIN, I.; BARRETO, J. F.; SILVA, A. M. O. R. «Capitalist restructuring and the world system». In: Perspectives: Journal of social sciences. V. 20/21, 1997/1998. p. 249 - 267. Available from: https://periodicos.fclar.unes p. br/perspectivas/article/view/2069. Accessed: 5 Feb. 2020.

Freirean Education and Labor Culture

Chapter 02

Authors:

Raquel de Almeida Moraes | Ana Luiza Aureliano Silva | Laiane Tavares de Rezende
Antonio Carlos de Mello Rosa | Yasmim Whitney Moura Benjamin
Valmor Cerqueira Pazos

FREIREAN EDUCATION AND LABOR CULTURE

Raquel de Almeida Moraes[1]
Ana Luiza Aureliano Silva[2]
Laiane Tavares de Rezende[3]
Antonio Carlos de Mello Rosa[4]
Yasmim Whitney Moura Benjamin[5]
Valmor Cerqueira Pazos[6]

SUMMARY: This chapter presents discussions that incorporate the concepts of solidary technoscience, sociotechnical adequacy and solidary economy and the dimension of work and income from the Freirean perspective, which considers education from the culture of work. Within the matter of the discipline "Fundamentals in Science, Technology and Society - CTS – Habitat, Agroecology, Solidarity Economy and Ecosystem Health", which is an interdisciplinary approach that promotes the integration of knowledge about habitat, agroecology, solidarity economy and ecosystem health, the construction of this chapter, held in a dialogical way, complemented the thematic discussions presented in the classes. From the exercise of evidencing the convergence between Frerian thought and solidarity technoscience, the chapter is divided between theoretical foundation and reports of experiences in the territories, addressing in a transversal way the theme of the discipline

[1]UnB; rachel@unb.br/ [2]UnB; alaurelianosilva@gmail.com/ [3]UnB; laianetavaresrezende@gmail.com/ [4]Decent Work Institute; antoniocarlos@institutotrabalhodecente.org.br/ [5]Cepafre (Centro Educação Paulo Freire Ceilândia), Mopocem (Popular Movement for a Better Ceilândia), Vida & Água nas Aris Project; yasmimblack@gmail.com/ [6]UnB, pazos@unb.br

INTRODUCTION

In the matter of the course "Fundamentals in Science, Technology and Society - CTS - Habitat, Agroecology, Solidarity Economy and Ecosystem Health", this chapter addresses the fundamentals presented in the course – solidarity technoscience, sociotechnical adequacy and solidarity economy – in a Freirean perspective, which considers education from the culture of work.

For Freire, education is conceived as a practice of freedom (FREIRE, 1987), and should not surrender to market logic. What commonly occurs, however, is the practice of a "banking" education in which the teacher, as a holder of knowledge, deposits "communications" in the students, who will receive them. "In the banking view of education, knowledge is a gift from those who think they are wise to those who think they know nothing" (FREIRE, 1987, p. 38). For Freire, this "donation" is based on an "ideology of oppression", aiming at the alienation and immobility of the oppressed through ignorance, denying "education and knowledge as a search process " (FREIRE, 1987, p. 38). Liberating education is conceived as overcoming this context, so that everyone – educators and students – can learn from each other (FREIRE, 1987).

Banking education perpetuates the "culture of silence" and stimulates the contradiction between a teacher – the one who knows everything – and a student – who knows nothing (FREIRE, 1987). This logic is systemic and serves a marketing model that involves not only basic education, but also higher education institutions. The cartoon of the Italian pedagogue Francesco Tonucci (Figure 16), who signs his illustrations as "Frato", performed in the 70s, clearly shows how education is "produced" in order to standardize results aiming at a career in the market, discarding the socially vulnerable, those who do not fit the market standard. If the educational practice has a business vision, of course, there is no room for those who are not inserted in the logic of the market and are socially excluded. According to Dagnino, so is the Brazilian cognitive policy, focused on a reality totally different from that experienced by society: a training focused on the reality of companies (DAGNINO, 2019).

Education as a practice for freedom is necessary for emancipation in the neoliberal context, which persists in making absolute truth in the midst of society.

> The fatalistic ideology, immobilizer, that animates neoliberal discourse is loose worldwide . With airs of postmodernity, he insists on convincing us that we can do nothing against the social reality that, from historical and cultural, becomes or turns "almost natural" (FREIRE, 1996, p. 19).

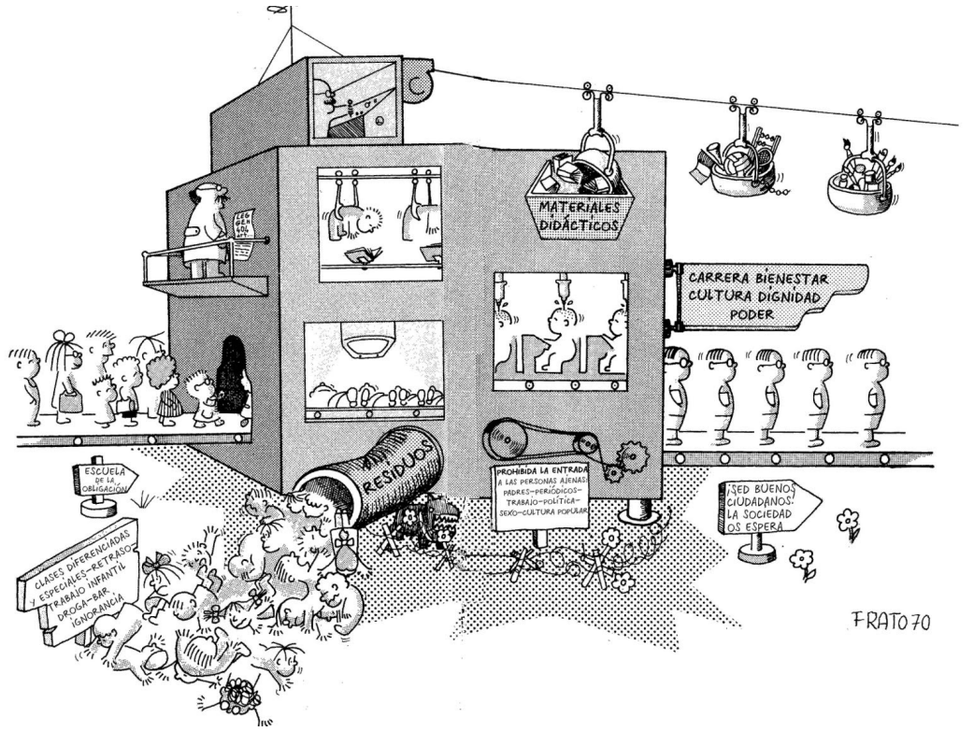


Figure 16: Charge on the educational system. Author: Frato (Francesco Tonucci). Source: Apprentice Portal[7].

For Freire, from the point of view of this ideology, for educational practice there is only one way out: "Adapting the student to this reality that cannot be changed" (FREIRE, 1996, p. 20), although education represents the opposite. True education, based on the life and needs of workers and society, leads the student to a role not only "of those who see what happens, but also of those who intervene as a subject of occurrences" aiming at the possibility of transformation. "In the world of history, culture, politics, I see not to adapt, but to change" (FREIRE, 1996, p. 77).

In the conditions of true learning, the students become the real subjects of the construction and reconstruction of the knowledge taught, alongside the educator, equally subject of the process. Only then we can really talk about teaching knowledge, in which the object taught is perceived in its reason for being and, therefore, learned by the students (FREIRE, 1996).

It is necessary to assume education as a "permanent practice", not by a preset of external factors, but by the human being's awareness of his boundlessness and, thus,

[7]Available in: https://portal.aprendiz.uol.com.br/2020/05/18/francesco-tonucci-casa-como-lugar-de-brincadeira-e-aprendizado-durante-pandemia/. Accessed: 03 Feb. 2021.

by his notion of existence in the world. "Not only to know that he lived, but to know that he knew and then to know that he could know more" (FREIRE, 2001, p. 11), and thus to find himself in continuous formation. "It is not possible to be a person without, in this or that way, finding themselves weirdly inserted in a certain educational practice. And entrenched not in temporary terms, but in terms of a lifetime" (FREIRE, 2001, p. 13). Freire also highlights the importance of "thinking right", a dynamic between educators and students that not only respects the knowledge of students but increases teaching from shared experience and critical positioning. In this sense, for him, the educator who "thinks right" must:

> not only respect the knowledge with which the students, especially those of the ordinary classes, come to it socially constructed knowledge in community practice – but also [...] discuss with the students the reason for being some of this knowledge in relation to the teaching of the contents. Why not take advantage of the experience that students have of living in areas of cities careless by the government to discuss, for example, the pollution of streams and water brooks and the low levels of well-being of populations, the dumps, and the risks they offer to the health of the people. Why are there no dumps in the heart of the rich neighborhoods and even purely in the repaired ones of urban centers? This question is considered in itself demagogic and reveals revealing the lack of effort of those who make it. It is a question of subversive, that's what certain defenders of democracy say.(FREIRE, 1996, p. 30).

In search of a transformation with regard to Brazilian cognitive policy, Dagnino theorizes the foundations of solidarity technoscience precisely in a context of counter-hegemonic struggle, which incorporates life in society in its process. For the author, solidarity technoscience is "the cognitive platform for launching the Solidarity Economy" (DAGNINO, 2020, p. 63). The fact is that, if technoscience was indeed adopted by capital, as we will see below, solidarity technoscience presents itself as a possibility of research agenda, teaching, and counter-hegemonic extension. With regard to the educational practice carried out within universities, Dagnino argues that it is essential to have the solidarity economy as an anchor of the university in the social context, not submitting to the "Four Horsemen of the Apocalypse: Scientificism, Productivism, Innovation and Entrepreneurship", inherent in a cognitive policy that, in the name of a "neutral science", turns its efforts, even within public institutions, business demands (DAGNINO, 2020).

The convergence between Frerian thought and solidarity technoscience takes place precisely in the context of emancipation. From a true education, a pedagogy that is part of the daily life of students, one can arrive at an action that actually frees from what is put as a general rule and that excludes a large portion of society, as well as its ways of living and producing. It is a question of, from the awareness of, seeking the "production and consumption of goods and services in networks of solidarity economy" respecting collective values and interests (DAGNINO, 2020).

The awareness of who we are leads us to the transformation of the world. This awareness is made from counter-hegemonic education and, as we will see later, from a political action focused on the solidarity economy, which works as an anchor of cognitive thinking in society, transforming itself from sociotechnical adequacy (DAGNINO, 2019). The fact is that this Freirean perspective of popular wisdom, of a collective knowledge that actually transforms the world, already establishes in the field of living its dynamics. Survival dynamics become counter-hegemonic struggles from the organization of the collective, by the awareness, in order to move forward, during the inevitable crises of capitalism. These dynamics transform learning, culture, and the world of work as we know it, or how it is "sold". The importance of solidarity technoscience is found precisely in the ability to bridge the gap between technical and scientific knowledge and society, breaking with the educational bias that seeks to meet capital and corresponding to the longings of those who actually support Brazilian public education: the working people.

Dagnino believes that the university with society can make this transformation in the agenda of research, teaching and extension that is not based on the interests of capital, an agenda "based on the reconfiguration of expanding CTS teaching" that is able to guide teachers and students in a more "accurate and effective" way (DAGNINO, 2020). For the author, this strategy allows the materialization of the "intention that excites us": "Through the action of the State, generate a knowledge for the production of goods and services (Solidarity Technoscience) capable of promoting the sustainability of solidarity enterprises that are emerging within the matter of the Brazilian peripheral capitalist economy" (DAGNINO, 2019, p. 19).

The result of an initiative that seeks dialogue with society, making solidarity technoscience, this chapter attempted to elaborate the concepts worked in the discipline, dialoguing with Ffreireana pedagogy from the work culture. Collectively constructed, the first part of this work deals with theoretical foundations, subdivided into the following topics: "Foundations in solidarity technoscience, sociotechnical adequacy and solidarity economy"; "Labor, occupation and income (TOR) and solidarity economy"; "Sociotechnical adequacy and sociotechnical advice for Freirean education and work culture". The second part, also collectively constructed, presents experiences lived in the territories that dialogue with the perspectives of solidarity technoscience, sociotechnical adequacy, solidarity economy and Ffrerian pedagogy. The initiative of this discipline makes a political struggle to defend solidarity technoscience as a vector of orientation for the teaching, research, and extension agendas of Brazilian universities.

FUNDAMENTALS IN SOLIDARITY TECHNOLOGY, SOCIOTECHNICAL ADEQUACY AND SOLIDARITY ECONOMY.

To conceive the concept of solidarity technoscience, we need to understand why we come to these terms if we always learn that science and technology are separate things. It is common sense that science is knowledge or a collection of knowledge that translates truth, observed, obtained, and tested by a scientific method. Technology, on the other hand, is the application of knowledge generated by science to achieve a practical result, such as goods and services. But historically are these two concepts separable? The human species has always sought to improve and meet its needs through the search for knowledge that was applied in some useful way. Based on this principle, what man has been doing is historically technoscience. What led us, then, to the concern about the separation of these themes?

For Renato Dagnino (2020), the separation between science and technology leads to the engendering engender of scientific knowledge, and the control of its application to an elitist level, codified and dominated by a few, with exploratory purposes within the capitalist logic. That is, the holders of capital know the operation, leaving the workers (the people) to do what they are taught, in a compartmentalized way, without knowing the "science behind" their work, now exploited by capital (DAGNINO, 2020). Capital dominates, therefore, knowledge (science) and its application (technology), which means that technoscience is also part of a capitalist context. It is used for profit, capital accumulation, and income concentration. The work of the mass, of the people, is exploited, and as the people supposedly have little knowledge, it remains the submission and sale of the force of their work for the measurement of profit by those who hold money, the means of production and the science applied in technology. However, this dominance of capital over work accentuates inequality and misery.

That is why a new concept is needed. The concept of solidarity technoscience. Capitalist technoscience, as stated above, is a tool of capital accumulation, which generates and maintains social inequalities and injustices, the big sickness of our last centuries. Solidarity technoscience would be the denial of all this. The hegemonic control of the means of production has been ineffective infor the search for peace and social justice, leaving the majority of the population to a daily struggle for survival, exploited by capitalist logic. Hunger, poverty and growing inequalities, exacerbated at the present time because of the pandemic, demonstrate that we need production models that allow the breakdown of the employment/salary logic and a glimpse of the logic of work/income generation, based on knowledge constructed from social movements, collective property, and self-management, with workers being the protagonists of this story (DAGNINO, 2020).

In this sense, Dagnino, when referring to the concept "solidarity technology", conceived as a programmatic alternative to terms such as "innovation" and "technology", points out that solidarity technology brings us to some different understandings: i) the way it deals with specialized terms (original, open, mutant and adaptive); ii) knowledge of any nature (scientific, technological, religious, ancestral), in the sense of being the set of knowledge or principles that conduct a particular group; and iii) origin, such as the set of terms of a specific area (academia, companies, originating peoples, popular movements, excluded) (DAGNINO, 2020, p. 69). For him, all these elements should be used through capitalist sociotechnical adequacy, aiming at the production and consumption of goods and services in networks of solidarity economy in which the values and interests of certain groups are respected. However, it teaches us that we must, as a priority, take into account the satisfaction of collective needs (DAGNINO, 2020).

Singer conceptualizes the term "solidarity economy" as a "type of production characterized by equality, having a nuclear definition of the perspective of equality within the enterprises, which causes an environment of self-management" (SINGER, 2008 apud ALVEAR et al 2012, p. 20). In the same sense, Gaiger recognizes self-management, equality between workers and internal democracy as fundamental to the characterization of solidarity enterprises (GAIGER, 2000 apud DAGNINO, 2014, p. 62). Thus, it can be said that for the authors the central focus of solidarity enterprises is on the suppression of the dichotomy between boss and employee.

For Dagnino (2014), the movements that fight for social change in capitalism, as is the case of the solidarity economy movement, have two goals that usually occur, when successful, as sequentially tied processes. The first, known as "awareness" [of the exploited], implies the transformation of "latent conflicts" – those that, despite harming us, are not even perceived by the exploited, since obscured or naturalized by mechanisms of ideological manipulation – into "covert conflicts".

> "Awareness", then, does not immediately give rise to confrontations between the exploited and the dominant elites; latent conflicts do not turn into "open conflicts". It is as if the exploited were waiting for an opportunity, a change in the correlation of forces, or an increase in their power in front of the elites to "open" their "covert conflicts" (DAGNINO, 2014, p. 219).

The second process, known as "empowerment" [of the exploited], happens when "covert conflicts" or, less often, "latent" – when the process of "awareness" occurs

simultaneously to a change in the correlation of forces – turn into "open conflicts".

The solidarity economy movement tends, therefore, according to Dagnino, "to guide the processes of 'awareness' and 'empowerment' of workers of solidarity enterprises in the direction of self-management; which is clearly contrary to the interests, especially long-term interests, of the elites" (DAGNINO, 2014, p. 219).

For the achievement achievment of the intention to "formulate an analytical-conceptual framework to address the technoscientific issues associated with the solidarity economy", Dagnino mentions that this objective required "a critique overcoming the concept of social technology used in the solidarity economy movement" (DAGNINO, 2019, p. 42-43). For the author, social technology is considered "all product, method, process or technique, created to solve some kind of social problem and that meets the requirements of simplicity, low cost, easy applicability (and replicability reapplicability) and proven social impact" (DAGNINO, 2019, p. 43). However, the search for solidarity economy requires overcoming this concept as well as two myths that are presented at the cognitive level and that hinder social inclusion: the first is the separation between science and technology; the second is that of the neutrality of technoscience.

Dagnino's criticism (2019) of the concept of social technology is based on four conceptions, based on Andrew Feenberg's contributions, they are: instrumentalist, deterministic, ecological economics and critical theory. The instrumentalist conception, which would submit to external control and ethics "to satisfy infinite needs of society", "supposes in line with liberal, positivist, modern optimism in progress, that technology, resulting from a search for truth and efficiency, is neutral" (DAGNINO, 2019, p. 47). The second, deterministic, is based on the conception of conventional Marxism, which understands technology as an application of science. Maintaining a belief in the neutrality of technology, it incorporates the notion that its development occurs through the demands of efficiency and progress that it establishes itself. Conventional Marxism accepts the idea of neutrality "which is at the root of its economic-productive and social construction". In a capitalist context, it attributes the "development of productive forces" to the productive interest of the entrepreneur, which is guaranteed by the private ownership of the means of production, because "given that it is linear and inexorable, this development is responsible, in the long term, for the change of modes of production" (DAGNINO, 2019, p. 47-48). The third conception is that of ecological economics, which denies the idea of neutrality, but maintains the idea of determinism, preserving capitalist values and interests. Unlike the other two conceptions, the ecological economics is "pessimistic about the future of humanity since it would tend to hide correlations of changing forces" (DAGNINO, 2019, p. 48-49). The fourth and final conception, called critical theory, denies the idea of neutrality, thus disagreeing with instrumentalism and determinism, and considers technology as a carrier carier of values. Critical theory also does not accept the idea of ecological economics that "capitalist values give it immutable characteristics that prevent social change". This conception considers that technology can be controlled (DAGNINO, 2019, p. 48-49).

It is in critical theory and "in considerations regarding the convenience of using the category of technoscience in place of science and technology" that Dagnino (2008) formulated the concept conception of Sociotechnical Adequacy (DAGNINO, 2008 apud DAGNINO, 2019, p. 49). Dagnino (2019) announces Sociotechnical Adequacy as an "engaged and optimistic posture", since it is configured as a social construction, "and can be redesigned through the politicization and internalization of alternative values and interests, as well as the observance of precepts of plurality, internal democratic control and, firstly, in the institutions where it is usually produced" (DAGNINO, 2019, p. 49). The Adequacy also incorporates social actors interested in redesign to this process of redesign, with a "knowledge for the production of goods and services consistent with their values and interests" (DAGNINO, 2019, p. 50).

For the construction of a generic concept of technoscience, Dagnino (2019) points out that to be consistent with his forays into the theme of the philosophy of technology, guided by the contribution of Andrew Feenberg and aligned with Marxism, he was able to provide an adequate guide to make appear, in the concept he sought, elements such as: "social actor, work process, control (self-management or management managment by another worker during the absence of the owner), property of the means of production (private or collective)" that characterized in an appropriate way the solidarity technology (DAGNINO, 2019,).

The author also points out that:

> in addition to bringing embedded elements that make a social actor try to modify a work process to better meet his interests, it was necessary that the concept serve the purpose of formulating a concept substitutive to that of social technology that avoided the ambiguity of that commonly employed in the context of social movements, NGOs and government agencies involved with the solidarity economy. And that, thus, could contribute to increasing the effectiveness of its actions (DAGNINO, 2019, p. 51).

Dagnino (2019) presents the generic concept of technoscience as the cognitive result of the action of a social actor on a work process, controlled by him, which allows a modification (qualitative or quantitative) in the generated product (in the generic sense of output) that may be appropriated according to his interest. The author makes it evident

that an alternative technoscience, such as solidarity, emerges in spaces where values and interests converge with an "alternative development", "which are by extension counter-hegemonic to the dominant ones in those environments where capitalist technoscience is generated" (DAGNINO, 2019, p. 60).

Work, occupation, and income - TOR - and Solidarity Economy

For Dagnino, solidarity technoscience is the cognitive result of collective action on a work process that:

> due to a socioeconomic context (which engenders the collective ownership of the means of production) and a social agreement (which legitimizes collaborationism) which include, in the production environment, a control (self-management) and cooperation (voluntary and participatory type), causes a change in the generated product whose material result may be appropriate dearly according to the decision of the collective (solidarity enterprise) (DAGNINO, 2019, p. 62).

The author also informs that, after the concept of solidarity technology is placed, its political bias should be emphasized, emphasizing that it:

> it follows from the intention, through the awareness, mobilization, participation, and empowerment of popular movements and through the action of the State, to generate a piece of knowledge for the production of goods and services capable of promoting the sustainability of solidarity enterprises that are emerging within the Brazilian peripheral capitalist economy (DAGNINO, 2019, p. 62).

We can say that the political perspective of the transformation of solidarity technoscience is found in its solidary values, distinct from those that move capitalist technoscience. The purpose of solidarity technoscience is "to involve in its development (socio-technical adequacy) workers today located in the informal economy and who should be incorporated into the Solidarity Economy" (DAGNINO, 2019, p. 20). The practice of transformation by knowledge, from a counter-hegemonic perspective, is common to Dagnino and Freire.

Paulo Freire (1987) thinks about the path of the formation of consciousness to transform the world against oppression, against exploitation. To understand Freire, it is important to make interactions with other authors, such as Karl Marx. In this sense, Carnoy (1990) points out that Marx drew attention to a characteristic of the alienation of work, because people sell their workforce directly or indirectly and, in this relationship of sale of the workforce, often the worker does not realize that this is part of a system of worldwide exploitation. In common sense, what prevails is "gratitude" for work, even though workers are almost always exploited in a rude, ferocious, unhuman and vile way.

Workers are obliged to accept these conditions because, in the context of capitalist reproduction, they find no other way to survive. That is why Marx (2008) characterizes work in the capitalist system as an alienated work, a work that does not collaborate in the formation of consciousness. Thinking about the struggle of classes, Marx (2008) alluded that consciousness has two precious moments that must be the object of workers' organizations, social movements, groups, networks, settlers, and the MST (Brazilian Landless Workers' Movement). First, it is very important that the workers perceive themselves as united alongside other workers, that is, that the peasant, the teacher, the doctor, the architect, in short, all the people who sell their workforce feel united with the other workers. This is not an easy task, since the hard life of the worker leads him to think about the problems and perspectives from the condition that is currently, an individualized condition. Marx (2008) draws attention to the need to get out of such a condition – engineer, technical worker, architect, teacher, precarious worker, any worker who sells his workforce to applications, etc. – and perceive himself as a worker, as a working class. This awareness, of perceiving himself as a worker, Marx called it the class itself. According to Marx (2008), to overcome alienation it is necessary to prepare yourself for in struggles, in various fields: in work, in university extension, in occupations, in territories, and in movements. The understanding that you are inserted in the working class is important, but it is not enough, because it is necessary to lead a common working-class history, to build a society that expresses the longings, the needs of the whole from the insertion of everyone. This is the second moment of consciousness: when workers are building their own society, they are defining the processes of rupture with capitalism that ruins society, including removing rights and causing democracy itself to collapse from within.

In the context of collective transformation, Dagnino (2020) brings attention to the pandemic context and to how the solidarity economy is necessary and considerable, at least as a local policy at the municipal level, since it is impossible to be conceived within the current government. Faced with the "new normal", even in neoliberal capitalism financed, solidarity must be incorporated. For the author, in the current moment, propositions appear "which dialogue closely with the problem and the 'solucionatic' of the ES", and complements:

> Even characters aligned with the conventional view, so far exclusively focused on "employment and salary" and "income distribution", are likely to consider the strategy of "work and income" and "income generation for the poorest" (DAGNINO, 2020, p. 66).

Sociotechnical adequacy and socio-technical advice for Freirean Education and Labor Culture

Freiriano's thoughts take place in a luminous context of Brazilian history, a moment, in a way, combative. First, it is necessary to remember that Freire was thinking about the theme of popular culture and literacy at a time when progressive governments were struggling to make social reforms (agrarian, urban, educational, tax and electoral)[8]. In this context, with President Jango (João Goulart) in the presidency of the Republic, there was a movement around the theme of literacy. Illiteracy reversed the Brazilian political issue: in Brazil, the bourgeoisie restricted the right to vote of the illiterate, from 1881 to 1985, when illiterate voters were able to participate in the elections for the choice of mayors[9].

In this context, during the first government of Miguel Arraes in Pernambuco, together with the University of Recife in the Extension Center, Paulo Freire developed the Popular Culture Movement[10]. Paulo Freire did in Angicos, Rio Grande do Norte, his literacy experience as awareness[11]. What unifies these experiences is the effort to raise the number of literates, raising the conscience of peasants so that they could vote for governments that make social reforms. For the so-called basic reforms to become a reality, there was a need for a majority in Congress, but since a large part of the Brazilian population did not vote because it was not literate, literacy also became a political game. It was not in the interests of the great bourgeoisie, of the landowners, the literacy of the workers, and even less literacy that led people to become aware.

For Paulo Freire (1987), the first goal of literacy is to remove peasants, and workers from the condition of the mass manipulation. Freire seeks to identify each human face as a person "of flesh and blood" (this can be understood with one recognizing one another and vice versa) (FREIRE, 1987). For the educator, these people would have to be possessed of dignity, rights, and, above all, means to build history, and make history, and this for the bourgeoisie, which still dominates the country today, is inconceivable. Fighting against dominant forces on the eve of a military coup, at that time it was not possible to expand and democratize literacy – nor neither education. The Jango government's move to create a national literacy plan was seen as "the end of the world": "Howhow do the subordinates have

[8]Available in: http://memorialdademocracia.com.br/card/marcha-reage-com-deus-contra-jango. Access on: 05 Mar. 2021.
[9]Available in: https://www12.senado.leg.br/noticias/materias/2016/11/04/por-100-anos-analfabeto-foi-proibido-de-votar-no-brasil. Access on: 05 Mar. 2021.
[10]Available in: https://www.paulofreire.org/paulo-freire-patrono-da-educacao-brasileira. Access on: 05 Mar. 2021.
[11]Available in: http://g1.globo.com/rn/rio-grande-do-norte/noticia/2013/04/1-turma-do-metodo-paulo-freire-se-emociona-ao-lembrar-das-aulas.html. Access on: 05 Mar. 2021.

the audacity to put these people, who should be mute, to vote and define the directions of the country?", "these people can not vote", and can not define the directions of the country". In this context, not only the attacks took place, but the military business coup itself – precisely to block the movement – also prevented preventing these experiences from being carried out.

When talking about the Freirean education, it is important to consider this whole context and the fact that Freire's performance in Angicos was not a class agenda, a socialist agenda, or even an anticapitalist agenda. It was, first of all, an agenda in favor of basic rights, social rights, and basic reforms, that is what was at stake for him. Advancing a little more in Freire's thinking at that time, it is possible to notice his perception that workers did not have the right to study, that they could not attend a school during the day, a school with good conditions. Freire (2002) calls the awareness of the great mass of these workers "intransitive", because it is a consciousness very attached to a fatalistic logic (FREIRE, 2002), something like when one person asks the other why he is poor, to which the other responds that he is poor because God wanted or because it does not rain for planting, that is, the blame fell on nature. A fatalistic, superstitious consciousness that does not allow us to understand the essence of exploration.

The goal of the Freireana pedagogy is to overcome, put an end to intransitive awareness and do what he called transit to the insertion in a society that guarantees social rights, and dignity to workers. This process he called transitive awareness (FREIRE, 2002). From the Freirean perspective, it is the consciousness that makes it possible to understand the problems: "Why drought?", "Why exploitation?", "Why don't we have labor rights?". For the educator (2002), already at that moment, the transitive consciousness needed prose, dialogue, and community union – he needed to change the teacher's place so that he would stop being the person who knows everything to join the people who know nothing.

It's about listening, proselytizing proselytising, and dialoguing. Critical awareness must problematize the "magic answers" – "I am poor because God wanted" – for an in-depth analysis of how society is constituted, of how social rights are constituted, and it is in this perspective that Paulo Freire begins to deepen the concept of "formation of consciousness". In the Freirean conception of science in the field of literacy, culture circles stand out (Figures 17 and 18). Culture circles make room for each participant's voice. They create the idea that a dialogue is needed, that every process of literacy is a process of cultural elevation of human beings, who begin to better understand what nature is and what society is, in addition to how men and women historically interact with each other (FREIRE, 1987, 1992). According to the report published by G1/RN (2013), the Freriana literacy method is interesting because it

Figure 17: Paulo Freire during a visit to the Gama Culture Circle in September 1963. A circle of digital culture in which the students watched the projected films and then related the plots to their own lives. Source: Museum of Education of the Distrito Federal[12].

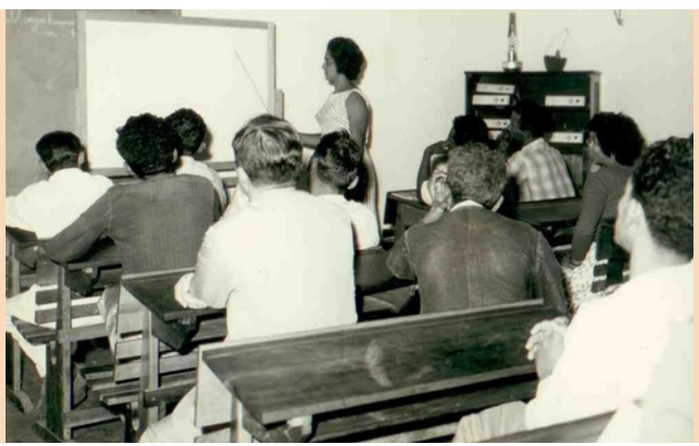


Figure 18: Circle of Culture of the Gama, in September 1963. A circle of digital culture in which the students watched the projected films and then related the plot to their own lives. Source: Museum of Education of the Distrito Federal[13].

[12]Available in: http://samudex.museudaeducacao.com.br/photos/listall?page=1. Access on: 05 Mar. 2021
[13]Available in: http://samudex.museudaeducacao.com.br/photos/listall?page=1. Access on: 05 Mar. 2021.

brings a vocabulary universe contextualized in the circle of culture, and from this vocabulary universe the generating words originate. For example, the word "brick" opens the door to other questions: who makes the brick? Who's going to live in the house that has the brick and who's going to live in the wattle and daub house? The From the generating words opens the interpretation not only for the reading of the word, but also for the reading of the world, and this is what is called awareness. Therefore, Freire sought to bring people to understand their real conditions, to understand the place of the oppressed, so that they could act in favor of their own liberation. This is the second point (Figures 19 and 20).

Freire understands that the fight against oppression has to be the work of a pedagogy of the oppressed, and not for the oppressed. That is, pedagogy should not be aimed at workers, but belonging to them. This logic is clearly inserted in an anticapitalist perspective, which deepens and systematizes in a theoretical reflection when Freire travels to Africa (Figure 21) and met the socialist struggles, especially with Amilcar Cabral (FREIRE, 1978). From this meeting with Amilcar Cabral, Freire reflected on other dimensions important for the present day, such as oppression by racism and sexism.

Paulo Freire is a writer/theorist who is necessary nowadays, because we are living in a world that is still tied to oppression, racism, and intolerance. In this sense, Freirean pedagogy understands that the socialist struggle is a struggle to restore the dignity and word of every human being.

The pandemic of covid-19 served to ratify for the whole society the social inequalities that permeate the educational field in Brazil, especially in the territories of more social vulnerability. In this context, students are being neglected regarding the right of access to education, as standardized by the CF of 1988, by Law No. 9394/1996 (BRASIL, 1988; BRAZIL, 1996). Despite the efforts of all education professionals in the school environment, such actions do not meet the main needs alone, since it is necessary to create and implement public policies for digital inclusion for students, among other actions that are silenced and neglected by the State. Not to mention the problems in the dimension of the school space, such as safety and even food, especially for children and young people. More than ever, solidarity technoscience, through Sociotechnical Adequacy, is necessary to rethink new paths to Brazilian educational policy, observing the realities so distinct that they are configured in the territory and enabling new dynamics around community organization, which is present in many places in the face of the crises of capitalism, often building networks of solidarity economy.

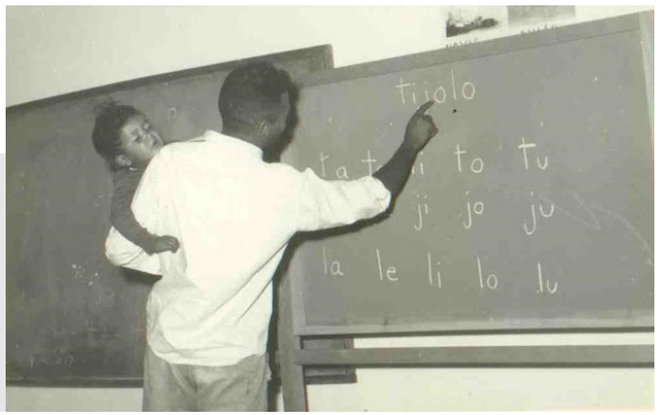


Figure 19: Man being literate in the Circle of Culture of Gama, in September 1963. Literacy from the generating words. Source: Museum of Education of the Distrito Federal[14].

Figure 20: Slide of the training experience in Brasilia. Source: Museum of Education of the Distrito Federal[15].

Figure 21: Paulo Freire, 1st National Literacy Seminar, Monte Mário, Democratic Republic of São Tomé and Príncipe, 1976. Source: BRANDÃO, 2005.

[14]Available in: http://samudex.museudaeducacao.com.br/photos/listall?page=1. Access on: 05 Mar. 2021.
[15]Available in: http://acervo.paulofreire.org:8080/xmlui/handle/7891/3442. Access on: 05 Mar. 2021.

METHODOLOGICAL PATH

This chapter is one of the fruits of the discipline "Fundamentals in Science, Technology, and Society - CTS – Habitat, Agroecology, Solidarity Economy and Ecosystem Health", conceived in a multidisciplinary way and with the objective of forming a transdisciplinary epistemological basis to include university extension in graduate studies through a multi-professiona l residency project CTS - UnB. Developed in an innovative way, based on didactic procedures that allowed the approach of multiple themes arising from the speech of teachers from different areas of knowledge, the discipline allowed a valuable exchange of diverse knowledge. In its remote modality, due to the conditions of social isolation imposed by the pandemic of covid-19, for the exchange of knowledge, there were no geographical or academic barriers (since it was opened to society in the format of an extension course), which allowed an even greater diversity of realities, cultures, histories and accents present in the course.

This multiplicity and sharing of knowledge, constitutive of the backbone of the discipline, remained in the realization of this chapter. From the Google Docs platform and exchanges through social networks and online meetings, this work, done from multiple perspectives and realities, was built in a Freirian way from a dialogical perspective, present throughout the route. From the theoretical foundation to the following reports, we sought to realize transversality between the experiences and the foundations of Freirean education from the culture of work. A theoretical-methodological sense is embedded into the experiences that follow, reported by some members of the group.

The experiences emerged spontaneously during the conversation circles and encompass, to some extent and intentionally or not, some of the concepts that worked in this chapter. Above all, all these experiences dialogue with a Freirian perspective of learning and the possibility of Sociotechnical Adequacy as a way to build new collective practices, they could be education, social organization, income generation, or the struggle for rights.

EXPERIENCES IN THE TERRITORIES:

Community of Lead - Poconé/Mato Grosso
Liberdade, slavery and union at work for emancipation

The community of Nossa Senhora do Chumbo – a district of the municipality of Poconé, one hundred kilometers away from Cuiabá, capital of the state of Mato Grosso – is a community with 126 years of existence, of quilombola origin and in the process of regularization since 2005 (Figure 22).

Figure 22: Location Municipality of Poconé/MT.
Preparation: João Lima Farias, 2022

In 1993, a sugar-alcohol plant was installed, a few meters from the community, more specifically on the other side of the road that passes in front of the community, as can be seen in Figure 23.

Figure 23: : Community of Nossa Senhora do Chumbo, Municipality of Poconé - MT. Source: Own elaboration from Google Maps image.

The operation of this plant had an important impact on the life of the community, especially in its economic and social organization, as one of its residents explains, which reported that before the incidence of the plant people in the community had larger properties, and their land was more productive and much of them worked on the land for self-sufficiency. It was also mentioned that after the installation and during the intervention of the plant people sold much of their land, learned a new craft based on the provision of services, reduced their self-sustenance production, and began to live with trade and jobs created by the presence of the plant on site. Some people claim that only at the beginning of the plant's operation there was a lot in the community, referring to socioeconomic aspects, which were initially good. But over the years the work became precarious, until the judicial closure of the company.

With the installation of the plant, there was a strong process of migration of people in search of work, mainly from the states of Maranhão, Piauí, Pernambuco and Alagoas. According to the residents, this migratory flow changed the daily life of the community. The agricultural economic activity, predominant in the community, gradually became transformed. A large part of the community's homes, have become converted into trade and shelter for migrant workers, including the substitution of agricultural work for the provision

of services. What initially seemed like a transformation that would generate more income for the community, gradually turned into a complete dependence on the operation of the plant, which, on the other hand, historically proved to feed a process of overexploitation of workers. Informality, delays in wages, debt servitude, and degrading working conditions led to labor supervision rescuing 400 workers in conditions analogous to slavery in 2005. Another rescue was carried out at the same plant seven years later, involving 20 workers living in the community. The plant ended up closing in 2012, after facing several labor lawsuits and refusing to pay workers' rights.

It is in this context that the action of a pilot project called "Integrated Action" begins, which includes the workers rescued from the plant, most of them living in the Lead community, natives and migrants, in a process of professional training for inclusion in the construction works of the World Cup stadium, which would take place between 2011 and 2013. This project, much celebrated by some as an innovative initiative in the socioeconomic reintegration of victims of slave labor, also received criticism from others for being extremely protective , for moving workers close to their families, and for having an individualistic approach to the problem, without palling to the fundamental issue: the vulnerability that the plant brought to the community (Figure 24).

With the support of the International Labor Organization, in 2016 the Integrated Action Project was proposed an approach of community strengthening, not individual, so that the vulnerabilities faced by the Lead community could be overcome. Initially, it was thought that the solution for the community was to bring technologies and methodologies of work organization, because by bringing this new tool to the community, its population could engage in productive activities on of an agroecological and community basis. Here a first question came up, when a preliminary survey of actors who had already worked with the community was made. The main criticism of these actors is due to the fact that the knowledge brought to the community was not used in its entirety and had low effectiveness.

Happy was the meeting of the Integrated Action Project with two organizations that worked directly with community groups, the Pastoral Land Commission (CPT) and the Burnier Faith and Justice Center. A new perspective was born from this encounter. What do people in the community really want? Who are they and what's their story? A first provocation was brought to the project team, quite Freirean: Is it a liberating process being proposed? Should the population itself not be the protagonist of the construction of its autonomy?

Figure 24: Sequence of images of actions in the Lead community. Source: Images provided by the project.

It was from this happy meeting that a new approach was adopted. A group of residents was constituted in the community who, together with the project team, carried out a community diagnosis with the survey of geographical, social, ethnic, and economic aspects, even mapping the production and size of the land of the communities. The planning exercise that followed, conducted with the leadership of the community itself and support of the project, allowed the diagnosis of the existence of a great capacity for the implementation of productive backyards.

The technicians, initially hired to be the "transmitters of knowledge" about agroecology and productive backyards, ended up acting as supporters of true teachers, local producers, "thus creating possibilities for their own production" (FREIRE, 1996, p. 12). The truth is that the population already knew what and how it should be produced, leaving

the project to create the environment for this community union to happen (Figure 25).

Figure 25: Sequence of images of actions in the Lead community. Source: Images provided by the project.

One of the aspects in which the project really collaborated, a fact corroborated by the residents, was the diagnosis that the migratory process had transformed the thought of community unity that people had, characteristic of their quilombola's origin and that this fact caused, of course, conflicts among the residents. With this conclusion, came the idea, organized jointly by the project and the group that led the process in the community, of an initiative of painting houses with paint made of glue and earth. Apparently, such an activity would not contribute to the search for community autonomy, income generation and the prevention of slave labor, but once again mentioning the Freiriano thought: no one frees anyone, people free themselves in a community (FREIRE, 1987). The activity consisted of painting, by the neighbors, a house per week, always finished with a community snack and a discussion about the learnings of the day. Not all were flowers, but the process in fact brought the approximation of the various groups of the community, which led to different social and economic dynamics.

One of the notable results of this whole movement, which still continues, was the increased capacity of the community to come together to ask for their rights to municipal management authorities. These demands resulted in the establishment of a quilombola state school in the district and in actions of the city to improve the distribution of water in the community (Figure 26).

A larger community organization became visible with the ordinary ecological fairs once a week, and which had the participation of the community. The project took place in a rotation form at the fair in the center of Poconé. In this format, the products are delivered by the producers, cataloged and each week a member of the community participates in the fair. The result of sales is divided proportionally between the producers who delivered their products.

The main conclusion of the group that led the Integrated Action project was that no similar initiative should happen without the protagonism of the community. This team learned new techniques and new approaches with the technology that the community already had. The one who taught learned far more than the one who was supposedly "learning."

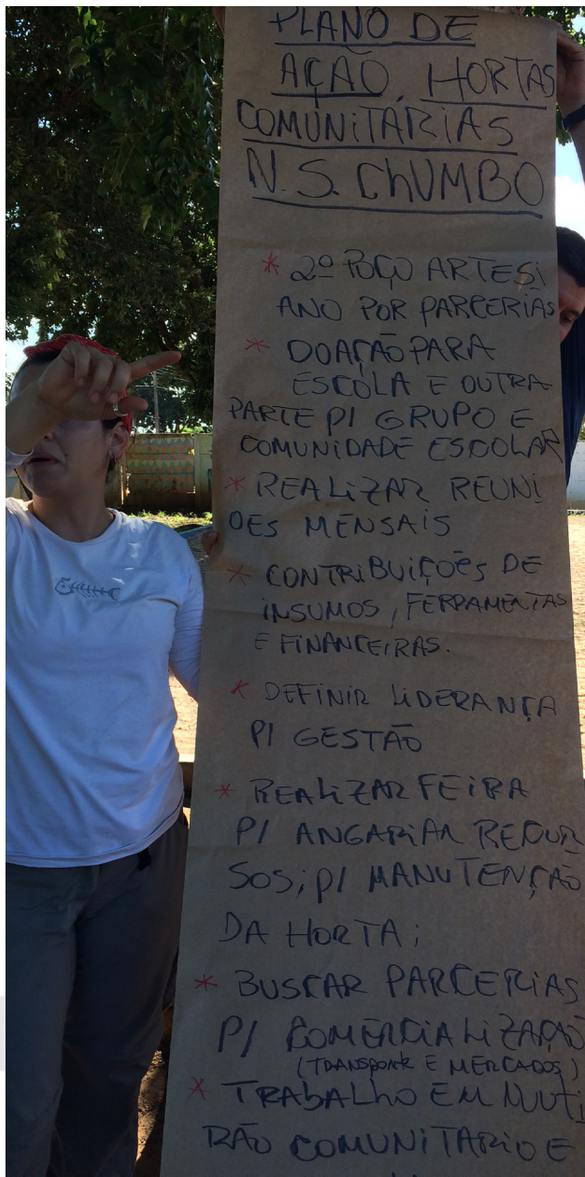


Figure 26: Action in the Lead community. Source: Image provided by the project.

Paths to urban pedagogy:
Two Experiences within the Peripheral Group

Maricato (2002) presents "Urban Illiteracy" as a problem to be fought. According to the author, it is necessary to "rescue the theme" of the technical curriculum of urban planners and expand the vocabulary beyond the "hermetic urban" (MARICATO, 2002, p. 4). Urban illiteracy, reported by Maricato in 2002, does not seem to have been overcome, even if they have been created – and currently emptied – previously unpublished channels of democratic participation and management, such as the drafting of the Statute of Cities in 2001 and the creation of the now defunct Ministry of Cities in 2003. The urban issue does not seem to have been appropriated by much of society and in many cases by the municipal administrations themselves. In this same sense, Ámez (2021) points out that, being historically elitist, urbanism can make it even more difficult to understand its dynamics due to the terminologies used by technicians and planners, failing to actually incorporate local participation.

Local dynamics are fundamental in understanding, planning and managing territories. The recognition of the city and the urban area as the space of emancipation from the place implies the knowledge and apprehension of this space, the overcoming of the "space conceived" (LEFEBVRE, 2001) by and to the capital and the fight against urban illiteracy. For this it is necessary to decode the world, the terms, the valorization of local knowledge. A pedagogy of space is necessary, which goes against Freirian's pedagogy, understanding that "Reading the world precedes the reading of the word" (FREIRE, 1989, p. 9).

The valorization of local knowledge and the search for true learning and a "liberating education" (FREIRE, 1986) are present in the work of the "Peripheral Group". The Research and Peripheral Extension Group – Emerging Works, from the University of Brasília, has been working with sociotechnical advice in ordinary territories, usually in a situation of conflict for the right to land, involving communities and articulating or brokering associations and collectives existing in the process of architecture and urbanism projects elaborationn of: social housing in the countryside and in the city; participatory urbanism (land planning, neighborhood plans, village plans) in urban occupations to contribute to the process of land regularization; urban pedagogy in public schools for young people and children; socio-productive spaces in the field; construction of more sustainable and agroecological scenarios in rural settlements; afro-rural planning for quilombola territories; community and cultural equipment; public spaces and urban parks; cultural circuits; abandoned squares; deteriorated roads; and alleys (Figure 27).

Figure 27: Sequence of records - Peripheral Group. Actions of the peripheral group in the occupations Dorothy Stang (first and second images) and Sister Dulce (third image). Source: Peripheral Group.

The Group treats the teaching-research-extension triad as a continuous movement, through the development of innovations in teaching processes with active methodologies and social inclusion. In this sense, it adopts the development of solidarity technoscience with communities within the scope of projects, through sociotechnical adequacy. An action that seeks to accomplish the "extension with intent"[16] with the solidarity economy as an ally and considering a research agenda with real problems. With an interdisciplinary and transdisciplinary approach in the areas of sustainable development, libertarian education, health promotion, solidarity economy and human rights, it seeks a social construction in order to promote an exchange of knowledge: between researchers/students and the community, and between it and the university to meet the problems and identify local potential.

In summary, the group's methodology considers the concept of sociotechnical adequacy (AST) in which the subjects of scientific knowledge share their technical codes with the organized social subjects, generating the concept of "pedagogical and sociotechnical interactionism" (NEDER, 2016). The process of the urbanism project is divided into 5 interrelated stages: (i) analysis of the physical and social context with involvement of the local population; (ii) elaboration and systematization of spatial patterns and events based on the information gathered; (iii) participation workshops, mind maps, affective maps and set of patterns; (iv) construction of scenarios, alternative proposals of the preliminary study for decision making; and (v) delivery of the illustrated technical notebook to the population. This is the stage of completion of the work developed. In this notebook, there are pieces of information of the survey, the process, and the project, and this compilation ends up being an important tool of the population in the fight for the guarantee of rights in the territory[17]. The big challenge of the group is not to transform this extension activity into a "cultural invasion", citing Freire (1970, p. 149), but only to bring content that reflects the worldview of those who propose to those who passively receive.

Believing in the practice of liberating education to promote changes in the education of students at the level of professionalization and observing the social function of the profession, one of the axes axis of action has the insertion of the Extension in the Final Undergraduate Works (GFR), held in the final stage of the Architecture and Urbanism course according with Article 7 of Resolution no. 7 of the CNE 2018 on the Guidelines for Extension in Brazilian Higher Education, that advocates student protagonism and community involvement. Thus, we also seek the transformation not only of the research and extension agenda, but also of the teaching project established at the Faculty of Architecture and Urbanism of UnB.

In this sense, two of the many works developed by undergraduate students within the group stand out here. Both works deal with urban pedagogy and the possibility of the architect and urban planner in the school environment as a way to promote a greater interaction between the city, the school, and the knowledge present in both spaces, taking the school environment as an important place for the process of urban literacy, as a collective construction and political tool in the construction of citizenship. Both studies are based on the method developed by the Peripheral Group, with adaptations necessary at each elementary school level. Seeking to respond to the demand for an understanding of urbanism, also as a tool in "awareness-making", these works were chosen because they are part of a perspective of the transformation of the educational tripod – teaching, research and extension – by proposing new perspectives of action and training for architecture and urbanism, while exceeding the university environment and establishing a dialogue with basic education in peripheral territories, in an invitation to exchange knowledge. In this perspective, the works carried out by the then FAU undergraduate students, Caroline Soares Nogueira and Natália Maria Machado Côrtes, in 2018, as Final Undergraduate Works, both guided by Professor Liza Maria Souza de Andrade, converge when dealing with the pedagogy of the city from the school space.

Nogueira's work (2018), entitled "Projeto Rima - Making the City a great learning", was carried out in a public school in Itapoã, in the Distrito Federal (Figures 28 and 29), with students that were late for the eighth and ninth grades. From the perceptions of public school students about the urban space surrounding the school where they attend, the Architecture and Urbanism undergraduate decoded them into spatial parameters and new scenarios, so that they could benefit from the emergence of learning spaces beyond the school walls. This project was compiled in a physical notebook by the undergraduate, which was presented and exhibited by the participating students, under their supervision, both to the school community at local events, as well as to the university community in conferences and congresses. These shares contributed even more to these young people acquiring a new, more critical, and conscious look at urban space, valuing and demanding improvements (Figure 30).

[16]DAGNINO, 2021. As presented by Dagnino in an open class, available at: https://www.youtube.com/watch?v=YCM0nCyTog0&t=5367s. Access on: 05 Mar. 2021.
[17]For more information visit: https://www.perifericounb.com/. Access on: 05 Mar. 2021.

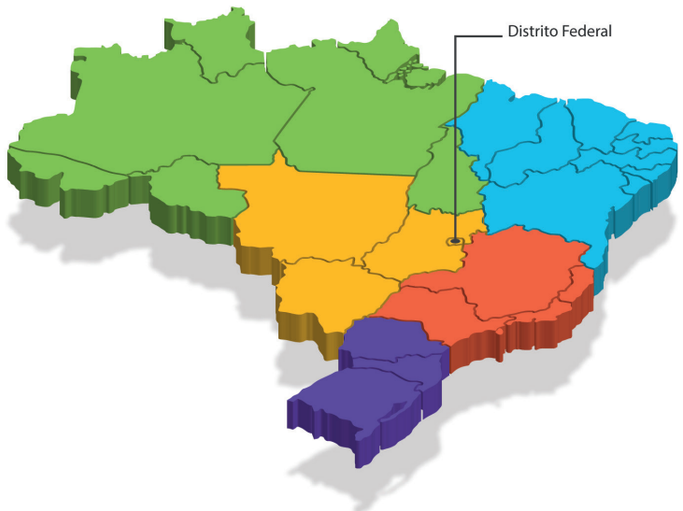


Figure 28: Location Distrito Federal.
Preparation: João Lima Farias, 2022

Figure 29: Map - Mestre D'Armas, Planaltina and Itapoã, Located in DF.
Source: Own elaboration from Google Earth image.

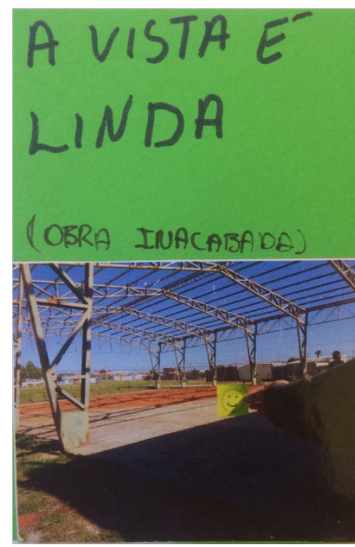


Figure 30: Sequence of records of the "Rima Project". Activities carried out during the "Rima Project", in Itapoã-DF. Source: Author's personal collection.

The work of Côrtes (2018) was carried out with classes of the third and fifth years of elementary school I of a school in the Mestre D'Armas Condominium, in Planaltina, in the Distrito Federal (Figures 28 and 29). The name of the place, inspired by a city personality, inspired the name of the project, entitled "Imaginary Master". The experience of the project was dedicated to a movement of rediscovery of the city by children, in order to contribute

to the construction of a more welcoming and inclusive city. Workshops were developed together with teachers and volunteer residents, using language and materials accessible through storytelling, drawings, character creation, reading maps and physical models, which motivated children to work on understanding the territory, exploring the local context, discovering its characteristics, potential and existing problems (Figure 31).

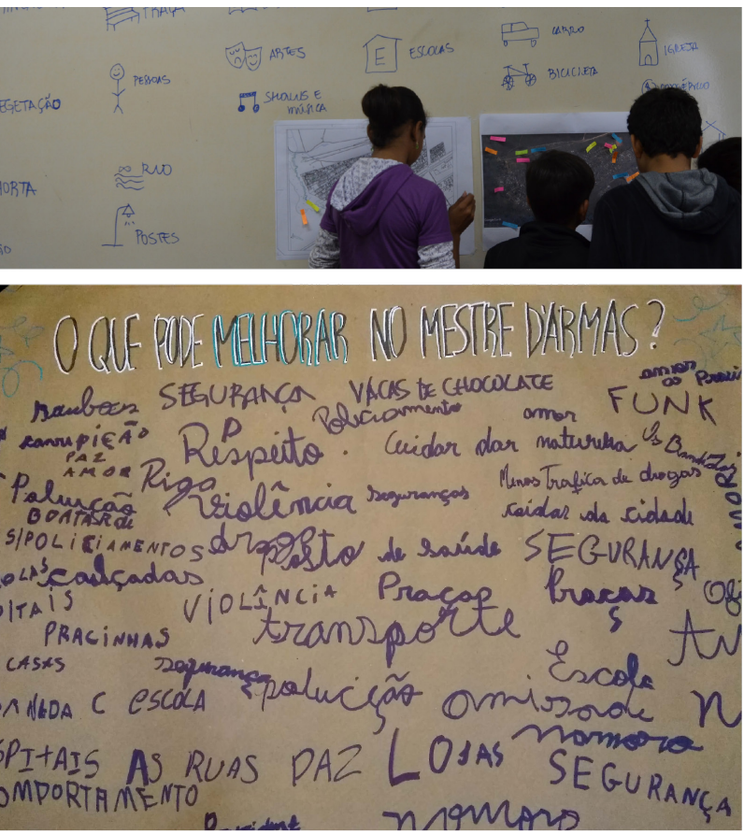


Figure 31: Sequence of records of the "Imaginary Master" project. Activities carried out during the project "Imaginary Master" at Mestre D'Armas in Planaltina-DF. Source: Author's personal collection.

Both works deal with experiences in urban pedagogy in the school environment, dedicating themselves to the movement of rediscovery by students. The contribution is revealed not only as a possibility of building better cities, but also as in the practice of a liberating pedagogy that incorporates the elements of everyday life, agreeing with the need for a pedagogy of the city that, as evidenced by Gadotti (2006), teaches us to deal with this space of differences: "We need a pedagogy of the city to teach us to look, to discover the city, to be able to learn from it, from what it has, to learn to live with it. The city is the space of differences" (GADOTTI, 2006, p. 139).

From the perspective of the possibility of Sociotechnical Adequacy, the experiences revealed two fundamental points. One is the pedagogical potential of the spaces from their decoding through a pedagogical approach different from that imposed by the system. And the other point refers to the need for a transformation in higher education in Architecture and Urbanism that considers the degree in the area as a possibility of training and performance, in order to carry out, from the territories, education and urban, new possibilities of emancipation – responding to Dagnino's question: "To what extent does the task of extension not also have to be a task within the university?"[18] – and pointing to a path of transformation not only of the way we do extension, but by modifying the structures of teaching.

The EJA within the Freirean principles

The following report was made by the student of the discipline "Fundamentals in Science, Technology and Society - CTS - Habitat, Agroecology, Solidary Economy and Ecosystem Health", Yasmin Whitney Moura Benjamin, who is a popular pedagogue and literacy teacher and is as pedagogical coordinator of the Paulo Freire de Ceilândia Education Center (CEPAFRE) (Figure 32).

To develop the work of Literacy of Young People, Adults and Elderly Workers (AJAIT), it is necessary to have at least incomplete high school and to do training within the methodology of Paulo Freire. It is necessary a space in which it is possible to accommodate 14 to 25 literacies since to open a literacy class of the program in the city takes a minimum of 14 people. In the field, this number can be 10 people, with a maximum of 25. If there is more, it is possible, but we understand that a class with more than 30 literacies can compromise the methodology, making it a little more difficult for the literacy to work with the class. AJAIT

[18]DAGNINO, 2021. As presented by Dagnino in an open class available at: https://www.youtube.com/watch?v=YCM0nCyTog0&t=5367s. Access on: 05 Mar. 2021.

can be held in a school space, in associations, institutions, organizations, etc.

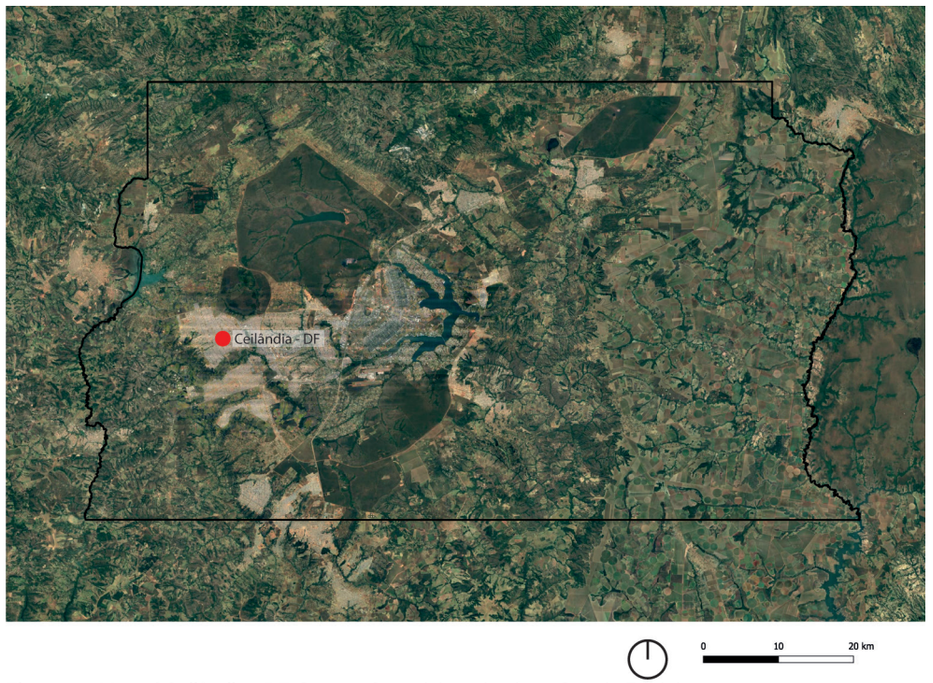


Figure 32: Map of Ceilândia - DF. Source: Own elaboration from Google Earth image.

To develop the work of Literacy of Young People, Adults and Elderly Workers (AJAIT), it is necessary to have at least incomplete high school and to do training within the methodology of Paulo Freire. It is necessary a space in which it is possible to accommodate 14 to 25 literacies, since to open a literacy class of the program in the city takes a minimum of 14 people. In the field, this number can be 10 people, with a maximum of 25. If there is more, it is possible, but we understand that a class with more than 30 literacies can compromise the methodology, making it a little more difficult for the literacy to work with the class. AJAIT can be held in a school space, in associations, institutions, organizations, etc.

Respecting the proposal of Paulo Freire, who was the forerunner of this type of teaching in Brazil, AJAIT takes place in a very different way from early childhood education. One cannot use the same methodology used in early childhood education in AJAIT, because these people already have a structure of life and characteristics with specific demands. The biggest difficulty is reading and writing, because most people know mathematical

questions of reasoning. Some are masons, seamstresses, bakers, cleaners, housewives and the elderly, construction workers and people of formal and informal trade. That is why Paulo Freire said that "reading the world precedes the reading of the word" (FREIRE, 1989, p. 9).

These people already come with areading of the world, with experiences throughout their lives, and Paulo freire's proposal is this, to respect this guy who owns his own history. Therefore, AJAIT should be held in a "circle of culture": literacy students make the circle of culture with the tables and chairs in the space where the classes will take place, respecting the differences of each literacy in relation to skin color, religion, education, and gender. There is a whole form of equality between those who are involved in the circle of culture, that is literacy learners, literacy teachers and observers. In the circle of culture, the spatial disposition allows everyone to look at each other, it is not like in the classrooms of traditional teaching, organized in rows where students are positioned behind each other and the teacher in front, being the holder of knowledge. In Paulo Freire's methodology and in the Circle of Culture, is a democratic form of teaching, where everyone learns and teaches (Figures 33 and 34).

Figure 33: Example of poster unsuitable for the word generator SCHOOL. Author: Júlia de Oliveira Rodrigues. Source: TÔRRES *et al*., 2020.

Figure 34: Example of the correct poster for the word generator SCHOOL. Autora: Júlia de Oliveira Rodrigues. Fonte: TÔRRES *et al*., 2020.

We affirm the EJA as the modality of the Law of Guidelines and Bases of Education of 1996 and affirm the EJAIT as a political position of the Pro-Alfebtization Working Group (GTPA) - EJA/DF Forum, included in the PDE/2015-2024 law. We defend the EJA in the integrated form of Professional and Technological Education (EJA/EPT). Therefore, we consider "the" EJA expression legally inappropriate and politically delayed, because instead of referring to EDUCATION, in its broad sense of human development, it is restricted to teaching.

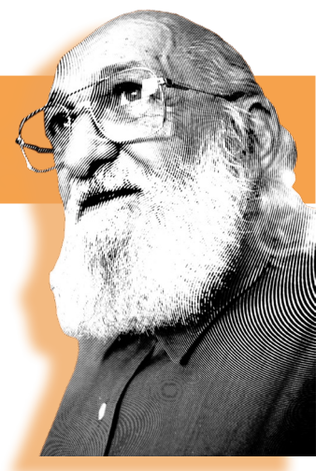
We understand that AJAIT is not inseparable from The EJA:

> The Literacy of Young people and working adults will be considered as the beginning of the 1st segment (early years of elementary school), in compliance with the Organic Law in Art. 225 and Transitional Provisions Art. 45. As such, literacy learners will be regularly enrolled with the public call, with the participation of the school community and organized civil society (GTPA-Forum EJA/DF, XXII MEETING OF YOUNG AND ADULT WORKERS OF DF, 2013, p. 10-11 apud RÊSES et al., 2017).

The education of young people, adults and elderly workers is not just about reading and writing, it is actually a liberating practice of education. Respecting the world reading of these literacies, when everyone learns and teaches with their life experiences, the education of young people, adults and elderly workers understands that these people are subjects of the ground they step, owners of their own history. That is why we return to Paulo Freire, who speaks of this historical subject understanding that we only become subjects of our history when we know our own history, and this is only possible when education is not banking and oppressive, but established through a dialogical between literacy teachers and literacy learners.

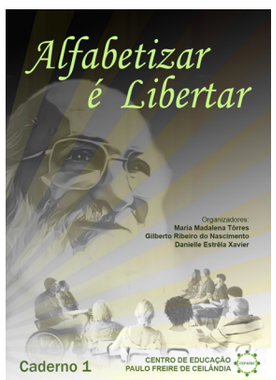
"No one educates anyone, no one educates himself, men educate themselves, mediated by the world."

Paulo Freire (1987)



To learn more:

If you want to know more about how the EJA works, here are two suggestions for you:



Video: A Step To Tomorrow
Available on You Tube

Literacy Notebook is Liberating.
Link: https://drive.google.com/file/d/1g_dH0fuH6dvgINrIgQG4Obvk3KsJ9xwb/view

CONCLUSIONS

From the elaboration of this chapter, it was possible to highlight the convergence between Freiriano thought and solidarity technoscience. Dialogically and collectively, it was possible to conceive the ideas presented here based on the experiences of the authors interacting with the foundations presented in the discipline. Thus, considering the need to build a counter-hegemonic education based on the liberating education proposed by Paulo Freire, new perspectives were launched around shared experiences. It was noticed that the collective experiences presented represent models of solidarity technoscience and true education that comprise the world of work, the context of the subjects and that seek, from active methodologies, social transformation. Based on practices that consider what is experienced by social groups, one can achieve models not focused on a cognitive market policy, but that in an insurgent way meet social demands, allowing social emancipation through an "education for freedom" (FREIRE, 1996).

REFERENCES

ALVEAR, C. A. S. et al. The solidarity economy in ordinary territories: an exploratory research on the socioproductive tissue in four communities of the city of Rio de Janeiro. Rio de Janeiro: Ufrj Technical Solidarity Center / Special Secretariat for Solidarity Economic Development, 2012.

Amez, Joseph De La Riva. The language of urban planning excludes. The country. Boston: 2021. Available in: https://elpais.com/elpais/2021/02/24/seres_urbanos/1614170699_362936.html. Acesso em: 5 mai. 2021.

BRANDÃO, Carlos Rodrigues(Paulo Freire, educate to transform: photobiography / Carlos Rodrigues Brandão. São Paulo: Cultural Market, 2005. 140 p.

BRAZIL. Constitution of the Federative Republic of Brazil of 1988. Brasília, DF: Presidency of the Republic, [2020]. Available in: http://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Accessed: 3 Apr. 2021.

BRAZIL. Law of Guidelines and Bases of National Education. 1996. Brasília, DF. Available in: http://www.planalto.gov.br/ccivil_03/leis/l9394.htm. Access on: 5 Mar. 2021.

BRAZIL. Resolution 7 of 18 December 2018. It establishes the Guidelines for extension in Brazilian higher education and regulates the provisions of Goal 12.7 of Law No. 13,005/2014, which approves the National Education Plan – PNE 2014-2024 and provides other measures. Ministry of Education/National Council of Education/Chamber of Higher Education. Brasilia, 2018.

CARNOY, Martin. «Marx, Engels, Lenin and the State». In: State and Political Theory - 3. Ed. – Campinas, SP: Papirus, 1990, p. 63-87.

CÔRTES, N. M. M. Imaginary Master. Final work of undergraduate graduation from the Faculty of Architecture and Urbanism of the University of Brasília. Brasilia. 2018. Available in: https://www.perifericounb.com/educacao-e-arquitetura-e-urbanismo. Accessed: 7 Jun. 2021.

DAGNINO, Renato. Neutrality of science and technological determinism. Campinas: Ed. of Unicamp, 2008.

_____. ESCT and Solidarity Technoscience. In: Brazilian Association of Social Studies of Sciences and Technologies (Org.). CTS in Focus, n. 01: Technoscience and democracy in times of pandemic. Bulletin. Oct-Dec 2020.

_____. Solidarity Technology: a strategic manual. Marília: Anticapital Fights, 2019.

_____. Social Technology and Solidarity Economy: building the bridge. In: Social Technology: conceptual and methodological contributions [online]. Campina Grande: EDUEPB, 2014, p. 207-265.ISBN 978-85-7879-327-2.

FREIRE p. Pedagogy of the oppressed. 17th ed. Rio de Janeiro, Paz e Terra, 1987. (The world today, v. 21).

_____. The importance of the Act of Reading: in three articles that are completed. São Paulo: Authors. Associated with. Cortez, 1989.

_____. Letters to Guinea-Bissau: records of an experiment in process. 2nd ed., Rio de Janeiro, Paz e Terra, 1978. 173 p. ilust. (The World today, v. 22).

_____. Education as a practice of freedom. Paz and Terra Publishing House. Rio de Janeiro, 1986.

_____. Education and Brazilian News. 2. Ed. São Paulo: Cortez; Paulo Freire Institute, 2002.

_____. Pedagogy of Autonomy: knowledge necessary for educational practice. São Paulo: Peace and Earth, 1996. – (Reading Collection).

_____. Pedagogy of Hope: reunion with the Pedagogy of the Oppressed. Rio de Janeiro: Peace and Earth, 1992.

_____. Politics and Education: essays. São Paulo: Cortez, 2001.

GADOTTI, M. «The School In The City That Educates». Cenpec Notebooks - Education and City. São Paulo, n 1, p. 133-141, first half of 2006.

GAIGER, Luiz Inácio. «The paths of the solidarity economy in Rio Grande do Sul». In: SINGER, Paul; SOUZA, André Ricardo de (Orgs.). The Solidarity Economy in Brazil; self-management as a response to unemployment. São Paulo: Contexto, 2000, p. 267-86.

G1. 1st class of the Paulo Freire method is moved to remember the classes. Available in: http://g1.globo.com/rn/rio-grande-do-norte/noticia/2013/04/1-turma-do-metodo-paulo-freire-se-emociona-ao-lembrar-das-aulas.html. Accessed: May 19. 2021.

PAULO FREIRE INSTITUTE. Paulo Freire, Patron of Brazilian Education. Available in: https://www.paulofreire.org/paulo-freire-patrono-da-educacao-brasileira. Accessed: 20 Apr. 2021.

LEFEBVRE, H. The right to the city. São Paulo: Centauro, 2001.

MARICATO, Erminia. Eradicate urban illiteracy. Fase Magazine, March, 2002. Available in: http://www.fau.us p. br/depprojeto/labhab/library/texts/maricato_analfabetismourbano.pdf. Access: 18 Jul. 2019.

MARX, Karl. Communist Party Manifesto / Karl Marx, Friedrich Engels, 1. Ed. São Paulo: Popular Expression, 2008.

MEMORY OF DEMOCRACY. Central rally: 300,000 support reforms. 1964, March 13. Available in: http://memorialdademocracia.com.br/card/marcha-reage-com-deus-contra-jango. Access on: 4 May. 2021.
NEDER, Ricardo Toledo. Sociotechnical interactionism and culture of resistance in incubation policies of popular cooperatives: seven strategic dimensions in ITCP as an agency, as evaluation indicators. Northeastern Meeting of Incubators of Solidarity Economy. In: «Democracy and solidarity economy: impasses and opportunities». Juazeiro do Norte - Federal University of Cariri, 2016. Available in: https://drive.google.com/file/d/0B2XSQkhlClBabmV5WjhjOGtRbUE/view. Access in: 3 Sea. 2021.

NOGUEIRA, C.S. Rima Project: making the city a great learning experience. Final work of undergraduate graduation from the Faculty of Architecture and Urbanism of the University of Brasília. Brasilia. 2018. Available in: https://www.perifericounb.com/educacao-e-arquitetura-e-urbanismo. Accessed: 4 Jun. 2021.

PAULO FREIRE CONTEMPORARY. Documentary [HD]. Part of the documentary was watched in the 2nd semester of 2017, in a presentation of a seminar on youth and adult education, of the discipline Brazilian Education Organization - O. E. B., at the University of Brasília - UnB. Available in: https://www.youtube.com/watch?v=5y9KMq6G8l8. Accessed: 20 Jun 2021.

RÊSES, Erlando da Silva; SILVEIRA, Dimitri Assis; Maria Luiza Pinho, PEREIRA. Education of young people and working adults: critical analysis of the Brazil Literate Program. Brasilia: Editora Paralelo 15, 2017.

TORRES, Mary Magdalene; NASCIMENTO, Gilberto Ribeiro do; XAVIER, Danielle Estrêla (Orgs.). Literacy is freeing. Brasília, DF: Paulo Freire De Ceilândia Education Center - Cepafre, 2020. (Popular education; 1) 72 p. Available in: ttps://drive.google.com/file/d/1g_dH0fuH6dvgINrlgQG4Obvk3KsJ9xwb/view. Accessed: 5 Jun, 2021.

Territorial Connections, Social Struggles and Solidarity Networks

Chapter 03

Authors:

Perci Coelho de Souza | Letícia Miguel Teixeira | Clarissa Sapori Avelar
Gabriel Ribeiro Couto | Geraldo Fábio Alves de Souza | Juliana Leal Santana
Kamila Dos Santos Pita | Cinthia Mariane Nolaço de Oliveira | Sarah Lima Cirino

TERRITORIAL CONNECTIONS, SOCIAL STRUGGLES AND SOLIDARITY NETWORKS

Perci Coelho de Souza [1]
Letícia Miguel Teixeira [2]
Cinthia Mariane Nolaço de Oliveira [3]
Clarissa Sapori Avelar [4]
Gabriel Ribeiro Couto [5]
Geraldo Fábio Alves de Souza [6]
Juliana Leal Santana [7]
Kamila Dos Santos Pita [8]
Sarah Lima Cirino [9]

SUMMARY: This chapter is the result of discussions of the discipline of Fundamentals in Science, Technology and Society - CTS, which promoted the integration of knowledge about habitat, agroecology, solidarity economy, ecosystem health and urban and rural social struggles. The understanding of the concept of solidarity technoscience, which is in dialogue with the expression of social technology, is related to a knowledge that empirically seeks, in a simple and accessible way, to solve a problem of broad social impact through products, methods and processes of low cost and easy applicability, and can be replicated in community. The group that composed the course was formed by regular students of UnB graduation programs, special students and people from outside the academy, especially for their performances in their communities. The group was divided into six thematic groups, and the present work was developed by Axis / Group 3 - Territorial Connections, Social Struggles and Solidarity Networks - with the method of investigation and understanding of social technology theories, informational reach, sociotechnical networks and sociotechnical subjects.

[1]UnB; perci@unb.br/ [2]UnB; leticiacidades@gmail.com/ [3]UnB; arq.cinthiaoliveira@gmail.com/ [4]UnB; clasapori@gmail.com/ [5]UnB; arq.gabrielribeiro@gmail.com/ [6]UnB; fabiojf@gmail.com/ [7]UFAM; juhleal@hotmail.com/ [8]UNIME, kau.kamilaarquitetaurbanista@gmail.com/ [9]UnB, arqsarahcirino@gmail.com

INTRODUCTION

The discipline of Fundamentals in Science, Technology and Society - CTS, despite being offered by the graduation of the Faculty of Architecture and Urbanism of the University of Brasília, due to the covid-19 pandemics, in the remote form,this experience was the first, and must be the embryo of a multidisciplinary residence. In this sense, it promoted the integration of knowledge about habitat, agroecology, solidarity economy, ecosystem health and urban and rural social struggles through exhibitions of thematic seminars and debates among its participants. In addition to the multidisciplinary faculty, it had the participation of UNB graduation students, predominantly of the Architecture and Urbanism course, and with members of the external community, especially social leaders and people involved in urban, rural, gender and racial struggles.

According to the concepts exposed and discussed in the discipline and that will be developed throughout this chapter, it can be considered beforehand that each individual who contributed to the debates and elaboration of this text is a subject-network within their action groups, a sociotechnical agent.

Science, Technology and Society – CTS is a type of knowledge that demonstrates, through academic investigations, that not only the science produced in formal academies, and universities, in fact, science and technology, but also popular knowledge and social technology, modalities of knowledge that need to be recognized and valued, and can even be used in the implementation of public policies that need to be better suited to the realities of society. The debates about the CTS also sought to reflect on the consequences of the hegemony of technical-scientific and academic knowledge and its consequences for society.

Often, hegemonic technology, disseminated as the only correct one, comes only to refer to patterns of consumption of food and products harmful to individual and collective health, but that serve the interests of dominant economic groups in the landmarks of capitalist consumer society. Aligned with such interests, hegemonic science generally operates for the benefit of market power, as in situations where science reveals that the consumption of certain foods is harmful to health and, subsequently, through market pressures, denies such information.

However, popular and counter-hegemonic knowledge has always existed in parallel, and in this global era, through the expansion of forms of communication, they were strengthened through sociotechnical networks, and human connections that rely on technology to unite sociotechnical subjects. In group 3, the work was coordinated by the professor of the social service department of the Institute of Human Sciences of the University of Brasília, Perci Coelho de Souza. The professor proposed a dialogue between social technologies – the essence of the discipline of CTS Fundamentals – and his work of analyzing social relations from a new non-technological sociotechnical condition (in the reductionist sense of the term, of "hard" technology), which he has developed since the mid-2000s, based on French Marxist theory. The concept of network is worked by Professor Perci Souza from the perspective of the Informational Revolution proposed by Jean Lojkine (1999) and Paul Boccara (1984), and confronts some proposals of Manuel Castells (1999). The network is understood as a socio-technical condition of the dynamics of capitalist accumulation in the current moment.

Figure 35: network image of individuals. Own elaboration, 2022.

According to Professor Perci Souza (2006), this puts us immersed – considering the concept of subsuming work to capital – in a logic of disorder of value production. If capital does not have living work, individuals (not the work of machines, which is not alive) conditioned to networks, will not be able to produce value. It needs to free the workforce of its productive potential in a network. That is why large companies have their headquarters in developed countries and production in underdeveloped countries in Asia or Latin America.

This perspective confirms the network as a socio-historical imperative, not technological. Capital is the social relationship of classes – the producing class and the capital gains extraction class. But the conditions are no longer industrial, but digital.

This relates to the territory as we understand it as an expression of the social relations objectified in space. That is, overcoming the ancient geographical notion that understood the territory only as a part of the land, physical space in which the State is concretized– a basic understanding of the territory linked to the geopolitics of the configuration of the National States still in the nineteenth century. The "used territory" term, created by the philosopher and geographer Milton Santos, refers to a territory that had its dynamics historically made by the social battles of the groups, and it is a central theme that reveals the conflicts that globalization and liberal capitalism of the 21st century have imprinted on the less affluent classes. But these, with solidarity and creativity, have survived with resilience to the injustices of every order: lack of opportunities for education and employment, lack of decent housing and even the restriction of access to food and water. Against all this, the poor population has been learning to "fend for themselves", but, as highlighted by Milton Santos (2000) in his book For Another Globalization, the poor class is aware of its exclusion from the upper circuit of the urban economy, where there is formality, legality, CNPJ, institutional and governmental support, the middle class, which lives in competitiveness, individualism, and low solidarity, still maintains the illusory belief of achieving a status observed in the more affluent class.

The lower circuit of the urban economy, where informality is observed, the improvision of solutions, is often criticized by the middle class, which is not seen in this same process of cruelty and low solidarity. Milton Santos (2000) speaks about the perversity of globalization that popular culture has been learning to avoid, because scarcity teaches. The illusion of the ambitious ostentation of the middle class is used against itself as a mass of maneuver to legitimize the interests of those who have been in power for centuries and want to remain with their privileges, deceiving everyone with the discourse that everything is right, providing mistaken judgments about perfection that is never achieved.

Another concept of Milton Santos is the "concentrated region", which deals with the scientific-technical informational device that, from the end of the 20th century, began to connect the space of social relations. This has to do with the material platform that sustains the internet. Professor Souza then develops the idea of informational reach that:

> it supports all informational urban relations and tends to convert and converge all the old bases of support of urban social relations. It becomes, therefore, the process of subsuming the urban material space to the new immaterial condition of the city information networks, especially through telematic networks. This new urban condition succeeds the urban-industrial pattern, becoming the new urban-informational condition (SOUZA, 2006. p. 103).

Thus, there is no separation between the public sphere and the sphere of production. The dynamics of social struggle take place through networks. It is important to highlight that these are not metaphorical, normative, or methodological networks: they are networks due to the historical condition that capital has come to assume. There is, therefore, a sociopolitical conditioning factor, but also potential for the dissemination and action of social struggles. The very execution of this virtual mode CTS discipline demonstrates this theory.

Through the communication networks (e-mails, social networks, virtual applications, etc.) it is possible to connect the "nodes" that Souza (2006) conceptualizes as collective equipment and services connected by these virtual means. Nodes can also be understood as institutions connected by these information networks. From the moment that there is information exchanged between two nodes – a source and an information receiver – it paves the way for a set of other informational interactions that will form a circuit that, as a whole, creates a social network that is the constituent of an informational reach of a geographical space. The possibilities of the informational reach as a space of politics and immaterial production are very wide, and from some cases brought by the members of group 3, we seek to analyze and interpret how they occur in these practical cases.

FUNDAMENTALS IN SOCIOTECHNICAL ADEQUACY AND SOLIDARITY ECONOMY

In order to democratize access and production of knowledge through the new sciences, it was necessary to address the foundations of solidarity technoscience, which the main source adopted were publications by Renato Dagnino, a pioneer in solidarity technology and CTS (Science Technology and Society) in Brazil. The solidarity economy is an autonomous way of managing human and material resources with principles of solidarity, self-management and economic viability.

Figure 36: solidarity economy scheme. Source: https://economia.culturamix.com/medidas/apresentacao-da-economia-solidaria. Adapted by the team.

Technoscience is understood as the knowledge acquired by a social actor for the production of goods and services, but in this chapter, it is treated as solidarity, because its model is self-managed and is based on the collective ownership of the means of production, where material gain can be appropriated according to the collective's decision. It is a combination of science, technology, culture, and beliefs, the result of attempts and failures. There are attempts that work out at improvements made on a product or service are right.

This technoscience presents a bias oriented in the intention of generating knowledge for the production of goods and services, capable of promoting the sustainability of solidarity enterprises that are emerging within the Brazilian peripheral capitalist economy (DAGNINO, 2019). Solidarity technoscience enables the strengthening of the production forms – associated and self-managed – based on the collective ownership of the means of production, typical of the solidarity economy.

Cognitive policy, controlled in a hegemonic way by the scientific elite, rarely benefits the social actors who maintain the science produced by it (from the collection of taxes). Opposite to the thought (which still hangs even in the left-wing) that it should be expected neutral technoscience that replaces this, currently contaminated by capitalist values, the proposal of Sociotechnical Adequacy is to "contaminate" the spaces of production of goods and services through sociotechnical agents, with an alternative production style of development and with the values and interests of social actors, who will benefit the most from its implementation. For this, it is a fundamental activity of awareness within these public institutions, so that there is an expansion of these spaces and dispute for the hegemony that will lead to their reorientation (DAGNINO, 2019).

It is important to clarify that it is not interesting that conventional technology, which develops in academies and industries as high technology, disappears, but that social technoscience is supplemented to this technology with the proposed new model, a more democratic model. The economic-productive agent that will ideally take the place of companies is understood as an interested and participant in the design and use of the technology necessary for the production of goods and services. The solidarity enterprises, in this conception, assume an active character, of an agent interested in the concept of technology, in the sense that it incorporates its interests and values, well different from that passive one still predominant in certain circles (DAGNINO, 2014).

Sociotechnical Adequacy (AST) is a process within alternative technologies that, in addition to the results obtained, prioritizes the procedures of construction and adequacy of a technological resource. It must be based on action research to be, in fact, effective. Therefore, sociotechnical agents should consider the technoscience already used in the territory, without expropriating the knowledge of social actors.

According to Dagnino (2019), there is a difference between replication and reapplication of technologies. The reapplication presupposes a high proportion of operations and appropriation of technology by the community. It involves the community in a participatory and compensatory way in direct (income) or indirect (improvement of quality of life, etc.) types. The reapplication of technology is sociotechnical adequacy which can also be defined as "empirical and spontaneous know-how which mixes with technical knowledge and generates a third process of incorporation, which differs from the previous ones, which we call sociotechnical adequacy" (NEDER, 2015).

Work, occupation, income, social technology and solidarity economy

Dagnino (2014) establishes, in his article Social Technology and Solidarity Economy: building the bridge, a relationship between social technology and solidarity economy, understanding the need to establish a link that connects these two fields of knowledge that, for the author, were separated. Social technology is such a broad concept that it has academic references and even from organizations such as SESC and Rede Globo, so it considers it a polysemic term that was, in a way, appropriated by the right-wing.

According to Renato Dagnino (2019), solidarity enterprises need social technology, which is the search for experiences that involve the interaction of people from a community

in favor of solutions to everyday problems, which often go unnoticed and without recognition. They are characterized by the collective ownership of the means of production, by the self-management work process, and by the need for a formal scientific basis, since the processes of exclusion generate social technology. Thus, the popular protagonism of social technology is basic for understanding its essence and the need to establish recognition of the informal sector of the economy.

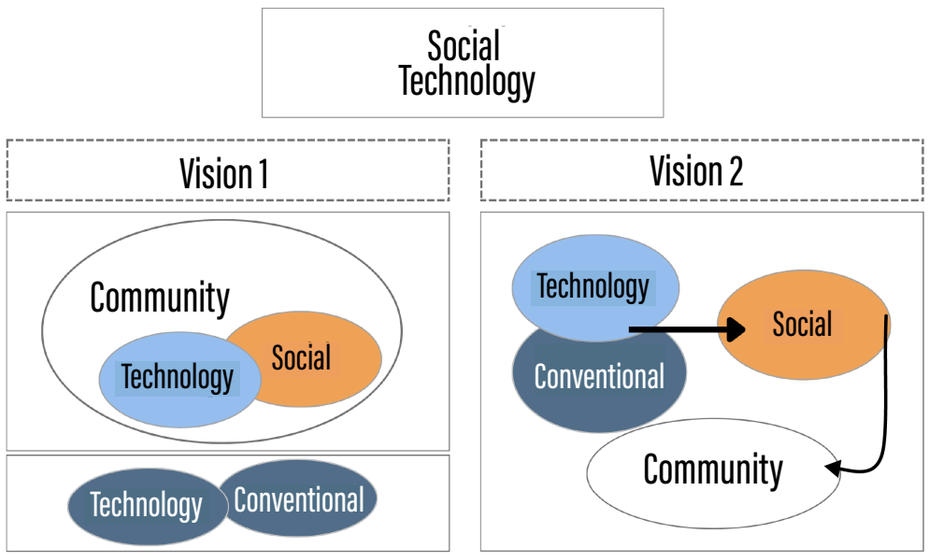


Figure 37: Visions which the concept of TS are based, according to Duque and Valadão (2017). Adapted by the team.

From the need to question the myths of the neutrality of science and technological determinism, Dagnino (2019) advanced on the concepts of social technology and solidarity economy elaborating the concept of solidarity technoscience. Dagnino (2019) defines the concept of solidarity technoscience as a cognitive result of the action of a collective of producers that organizes itself in order to create resistance to performing a work process in which socioeconomic context engenders solutions directed to the collective ownership of the means of production. These forms of resistance come from a social agreement – which legitimizes associations as a way of defending and fighting for common social interests – and influence the productive environment, either aiming at control (self-management), or under cooperation (participatory volunteer). This process causes a change in the generated product, whose material gain may be appropriate according to the decision of the collective of a solidarity enterprise (DAGNINO, 2019, p. 63).

The geographer Milton Santos (1979) created a theory called "Circuits of Urban Economy" to explain the process of urbanization in peripheral countries, using the concepts of the upper circuit and lower circuit of the economy. Without making confusion with the terms, because it is an incorrect simplification to call informal economics a lower circuit, the theory of the two circuits of the urban economy seeks to explain how cities in peripheral countries such as Brazil have two subsystems of urban economy: the superior subsystem – composed of large companies, financial and high-tech activities – and the lower subsystem – composed of activities with the use of labor intensive and informal, that have no support from the formal economy.

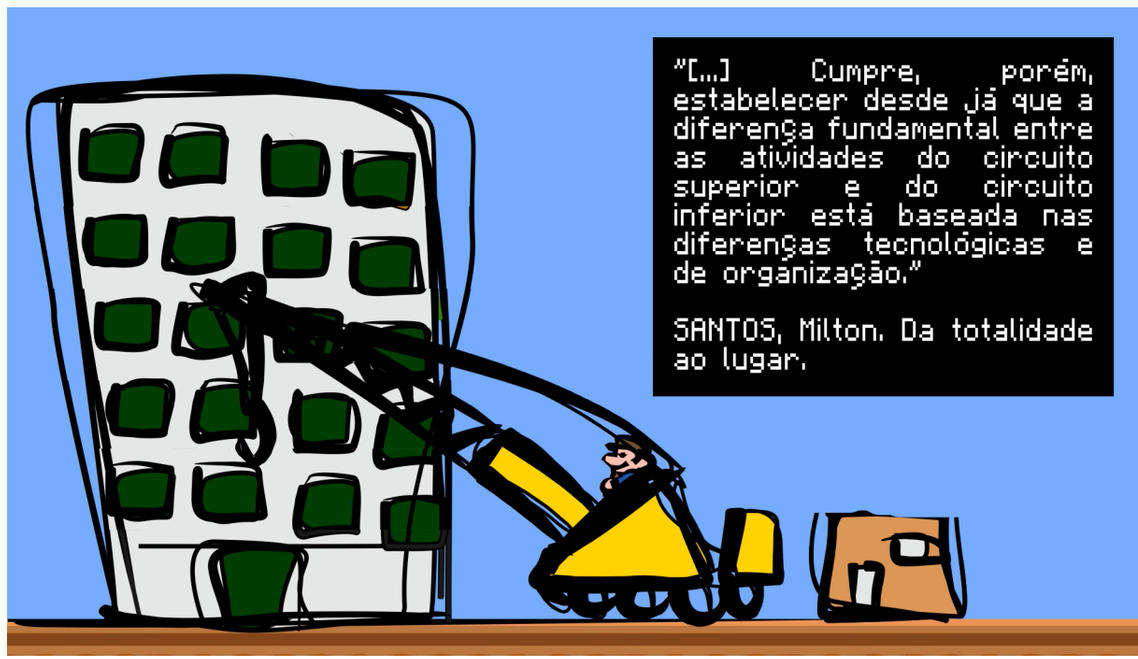


Figure 38: Lower and upper source economy circuits. Source: Perfifau, on youtube. Video: https://www.youtube.com/watch?v=1nBCsL_px5w.

When we think of popular socio-technical knowledge, there is a connection with this lower circuit of the economy, which is actually what guarantees the survival of a large part of the population that is far removed from the reality of formal employment.

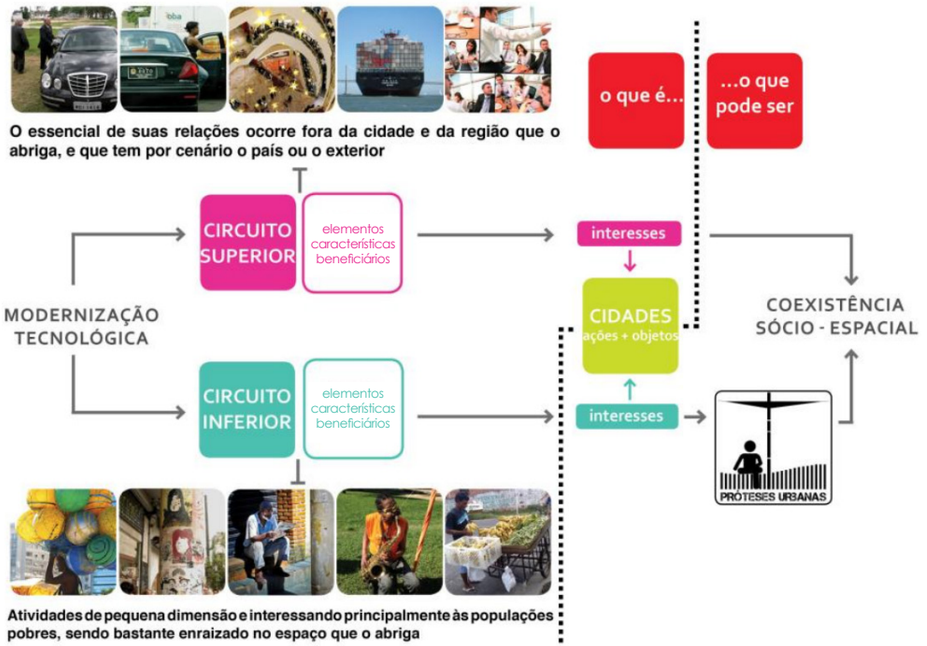


Figure 39: Lower and upper economy circuits. Source: NASCIMENTO *et al*, 2010. Available from: http://www.nomads.us p. br/virus/virus04/project/virus_04_project_2_pt.pdf

In informal territories and in the circuit environments of the popular economy, there is no traditional legal, fiscal, financial and banking certainty. The work and the provision of services and exchanges take place frankly, and even credit is shared by bonds of the neighborhood, tradition and habit of loan partnership and friendship. This orientation is shared by the Brazilian experiences of creating microprojects demanded by groups and neighbors community in ordinary neighborhoods to access currency and social resources through community development banks.

In popular territories, the right to the city and housing is equivalent to the creation of the right to social technology, understood as a dominant of self-managed forms of production through the associated work of communities. In the city, under the historical characteristics of the so-called self-construction and its organizational forms, this domain of the productive cycle over the sociotechnical conditions of organization of leaders, social and popular movements, can be promoted by semi-structured projects of teaching-research-extension in the form of multiprofessional residence.

Sociotechnical adequacy and sociotechnical advice for territorial connections, social struggles and solidarity networks

Considering the Sociotechnical Adequacy (AST) as a stimulator and bridge between technology and society, in a process of integration of technical knowledge with the popular and empirical know-how, which merges with the process of incorporation and redesign (DAGNINO, 2019), in addition to the sharing of generating codes among the subjects, the concept of "pedagogical and sociotechnical interactionism" (NEDER, 2013) is generated. According to Dagnino (2019), these processes assume a strategy that involves awareness, mobilization, participation, and empowerment of popular movements and emerging counter-hegemonic collectives, which build powerful networks and tactics in the territories – understanding the territory as a used territory (SANTOS, 1999), a space practiced by the feeling of belonging and having an identity – constituting through the demands, identities and existing knowledge, involving and potentializing communities and territorial connections in a participatory manner. Therefore, sociotechnical adequacy, according to Neder (2013), is understood through the condition of incorporation of knowledge by social groups and people, so that they can only change and transform reality.

This exchange of knowledge between the subjects is made mainly through sociotechnical counselings in the territories, which have an important role in the articulation and involvement of these networks and connections, aiming to achieve solidarity technoscience, developing active social technologies in an interdisciplinary, transdisciplinary and which grows with communities. This advice, in the area of Architecture and Urbanism, for example, already arises through a strong articulation between social movements of struggle for housing between the late 1970s and the beginning of the 1980s, in direct actions of land occupations and land regularization in search of urban improvements. In this context, sociotechnical counseling assumes that there is a political-cognitive and ideological reality in the various groups and social movements and creates bridges between communities and sociotechnical subjects, giving potential to the multiple networks and relationships with their territories in the adequacy and socio-technical democratization. The important thing is also to consider that sociotechnical advice is a two-sided path for those who offer the service, because it also receives a lot of practical knowledge from the counselor, in a Freirian line that those who teach learn to teach, and who learns teach when learning.

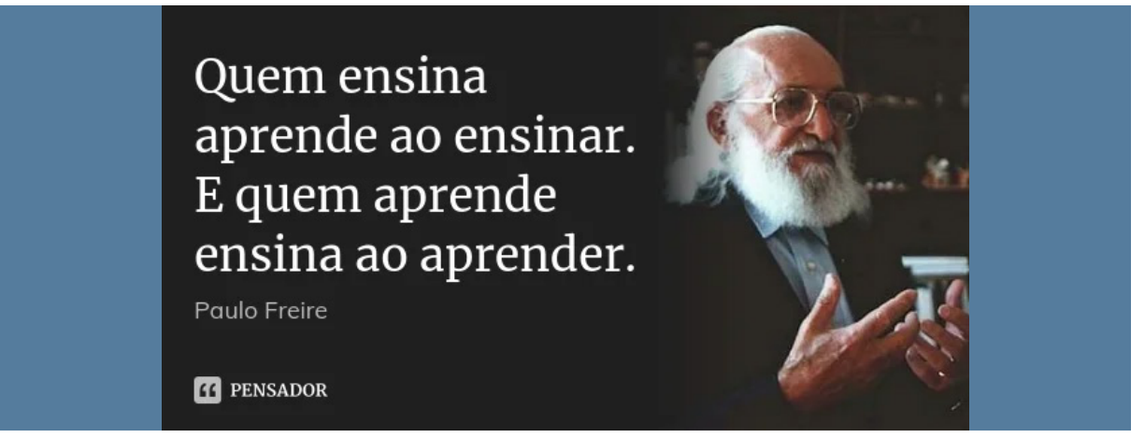


Figure 40: Source: www.pensador.com

Topics that will be addressed in the modules of the CTS Residence

The residency in Science, Technology and Society - CTS provides for the integration of knowledge related to habitat, agroecology, solidarity economy and ecosystem health, and specifically related to the topics addressed: territorial connections, cultural issues, identity, right to work, informality, political participation and social movements; agrarian reform, agroecology, politics and well-being; governance, health, sanitation and environment, SDGs, self-built production, microplanning, resilience tactics, affective cartography of action and patterns of organization, micro-basins and popularization of geoprocessing, community ties, gender and racial affirmation, privilege recognition, combating sexism, racism, homophobia, protection of traditional knowledge.

METHODOLOGICAL PATH

After weeks of initial exposure to the theoretical references of the disciplines, with synchronous virtual classes (due to the pandemic of covid-19) of professors Renato Dagnino, Ricardo Neder, Liza Andrade, Perci Coelho de Souza, Raquel Moraes, Flaviane Canavesi and Aldira Dominguez, the group began to develop the skeleton of a chapter. This material is a record to share experiences of exchanges between the sociotechnical subjects of regular students and actors of different social movements, who met to discuss the theme of Group 3, the discipline and course of Fundamentals in CTS. Although there is a predominance of architects and engineers in the group, with a greater objective of contributing to the formulation of a multidisciplinary residency extension course in the area of social technology, the exchange of experiences allowed us to understand that many sociotechnical subjects were not formed exclusively by direct professional practice in their fields of activity.

Professor Perci, group 3 advisor who presented his Life & Water Project for ARIS 2020/2022, which has been happening during the covid-19 pandemic with virtual meetings and WhatsApp group permanence, was able to exemplify the structuring parameters of connectivity, accessibility, and political direction that experience has demonstrated. Many of the members of Group 3 are also part of the collective BR Cidades, a DF nucleus, which constitutes a sociotechnical network due to the articulations for exchanges of knowledge and experiences involving people from academia, social movements, public institutions and the third sector.

The methodology guided by Professor Perci was initiated with the elaboration of a form for identification of the network subjects and their social struggles, which were connected through Groups of WhatsApp. This strategy was based on the work developed since his doctorate, about which he was mentioned in the introduction of this chapter. The form was made available digitally to Group 3 participants on the Google Forms platform. There were questions divided into six thematic groups, in order to allow the characterization of the network subjects that integrate different social struggles.

Each participant brought an experience, to which we sought to expose the potential and how their network connections occur. This starting point allowed us to analyze who are the socio-technical subjects and the network subjects. The following framework is the answers found in the questionnaire that allow the characterization of our group.

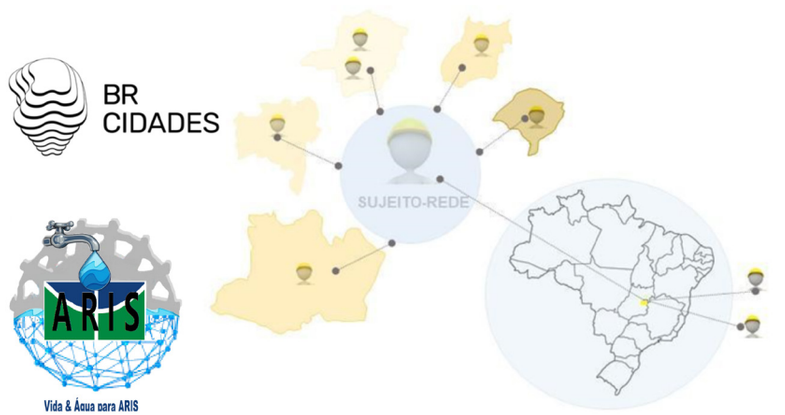


Figure 41: BR Logos, Cities and Life and Water project for ARIS, and schematic representation of the territorial distribution of the group/Axis 3 network subjects in the national territory. Although gathered from the Distrito Federal, the origins are from various locations in the country. Source: authors, 2021.

Network Subject Identification

The informational reach is cited by Souza (2006) as the new territory of social interaction – immaterial and not physical, but intuitive – and as a means of constituting informational circuits and connecting "us" of publicization and expansion of cooperation, productive and political networks. This communication network takes the physical space of relations established between network-subjects for a new modern spatiality, divergent from the traditional urban environment and its interactions, and which is now established through a virtual reality capable of having greater informational and strategic reach in favor of cooperation between groups and social struggles, becoming an effective instrument for discussions and decisions made by public opinion.

The purpose of this work is to understand how the network subjects consolidate urban social relations with space through the immaterial/intangible condition of information networks, with emphasis on the use of communication applications as a model to support the social bases that are currently established.

For the identification of the subjects by the research, criteria such as gender, schooling and relationship of the individual with the territory were analyzed. The research refers to the clipping of indicator sets from the interaction of the subject-network with the Internet, for the monitoring, sharing of information and interaction of groups and organizations, and to promote the discussion of topics raised and relevant nowadays. It was identified as a gender of greatest representativeness of this female network-subject, with higher education in Architecture and Urbanism. Other formations mentioned were also in the area of Engineering and Pedagogy. Most of the group resides in the Distrito Federal, and only two individuals are in other federative units: Anápolis, Goiás and São Paulo (capital). However, most individuals live in federative units different from that of their birth, as shown in Figure 41.

Through the collection of information from the network subjects, the effectiveness of the cyber net environment could be verified as a new social space where connection networks are formed for monitoring and cooperation to exchange information about network activities.

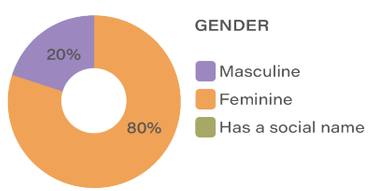


Figure 42: Result of the forms of the characterization of the subjects-network in social struggles. Source: authors, 2021.

Perspective in the Territory

The diagnosis obtained from the subject's perspective in the territory showed that the majority evaluates their place of residence as satisfactory or very satisfactory for the provision of basic sanitation services (water supply, urban cleaning, urban drainage, solid waste and rainwater management), telephony (fixed with broadband, cellphone), teaching equipment (daycare, elementary school, middle school, high school, higher education, and graduation), urban mobility (bus, applications, taxi, light vehicle on rails - VLT, subway, bikeways), emergency service (hospital, fire station, police station) and entertainment equipment (bars, restaurants and shopping malls), but are divided as to the equipment of culture and entertainment (newsstand, cinema, theater, museum, pay TV) and prayer or meditation.

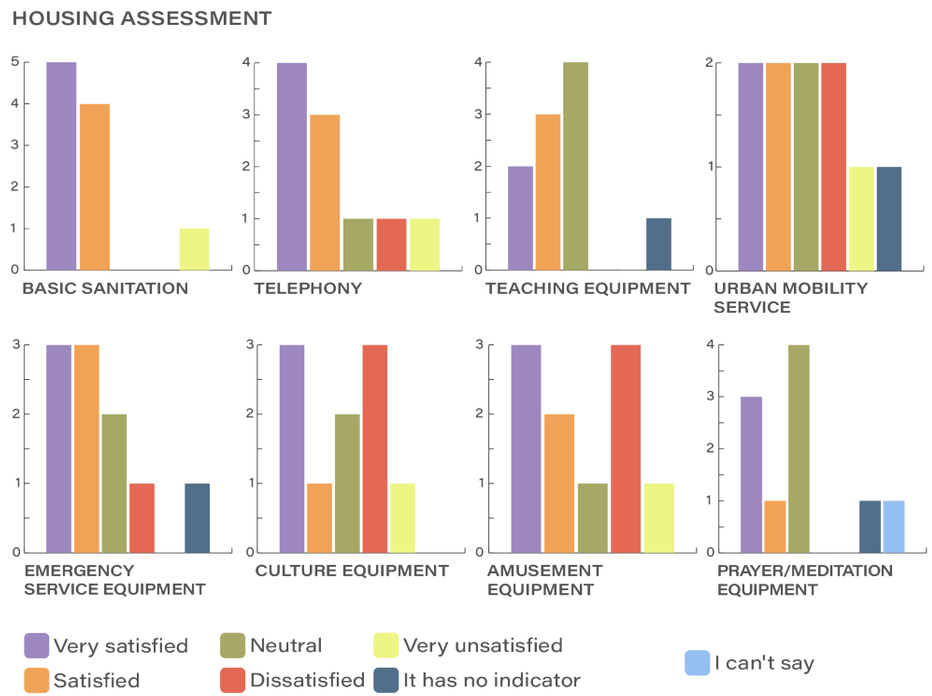


Figure 43: Result of the characterization forms of the network subjects in social struggles regarding places of housing and work and infrastructure and equipment services. Source: authors, 2021.

When the questionnaire is directed to the workplace, the network subjects, in percentage terms, check evaluations in the same pattern as the place of residence, except for the equipment of culture and entertainment, in which evaluation indexes did not indicate a predominance of positive or negative consideration, ranging from very satisfied to very dissatisfied. And of the fun equipment, half considered themselves satisfied or very satisfied, and the other half, dissatisfied or very dissatisfied.

Social struggles

The action of the subject in social struggle movements was molded by the dominant typology in environmental/socio-environmental movements, followed by the housing of social, feminist, black and homeless workers (MTST). Most of them worked less than 6 months or more than 24 months, and the subject's relations with the movement are divided into: half who declared to establish a social-based relationship, and half – indirect professional counseling – who presented motivations of personal subjective order and the dominant scale in a local municipal character, which may mean that the motivations articulate more personal interests than work and that most subjects have more affinity with their surroundings, although they are engaged in social struggles – despite the scenario of social segregation in which they live.

Figure 44: Result of the characterization forms of the network subjects in social struggles regarding the type of entities. Source: authors, 2021

The experiences reported were as follows: Jardim Esperança Association, in São Paulo; Collective Territorial Term Project; Movement around the recovery of Ribeirão Sobradinho; OCCUPATION CCBB; ATHIS Brasilia; Moura RRP; Guardians of the Environment; and racial and educational struggles.

Subject-network digital connectivity

The scenario of social distancing imposed by the health crisis of the covid-19 increases the need for digital connectivity of the subject-network, a condition revealed by the answers of the group members, who sought to demonstrate this condition. The information obtained by the form revealed that seven of the ten members have an average daily time of more than four hours connected to the Internet. Of these ten members, nine use WhatsApp as a connecting device with social networks linked to their movements, which explains the informational and operational reach of the sociotechnical network in the current pandemic scenario, which limits and prevents throngs and contact in the territories. However, at the same time, it allows effective network connectivity with different subjects, as explained in the data collected, which indicates that the largest portion of the members groups has more than 30 people.

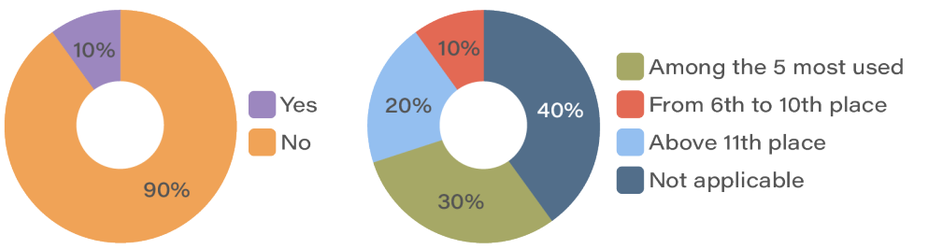


Figure 45: Result of the characterization forms of the network-subjects in social struggles, demonstrating that in 90% of the WhatsApp cases are used as a connecting device, but in the second graph the WhatsApp groups related to the chosen movement occupy what place in their ranking of the most used DAILY? Considering the period of validity of your participation in the movement. Source: authors, 2021.

The information obtained shows WhatsApp as the main connectivity tool, but other data show that the groups of the platform related to the movements listed by the members occupy varied positions in the rankings of the most used daily. That is, the connectivity factor presents the most unequal data among the members, which reveals different types and powers of engagement and relationship with their movements, and reinforces the character of the informational reach under social movements today.

Subject-network accessibility in their digital circuits

The accessibility of the network subjects through the networks of message applications was a starting point to think about the experiences of the sociotechnical subjects. Focusing on the use of WhatsApp as a means of communication and exchange of information between the network subjects and movements, four forms of interaction were specified in the form: (i) use of the application for listening and monitoring of publications in the movement group, representing 50% preference of respondents; (ii) use of the application to share information authored by third parties, with 40% representation of responses in the chart; (iii) use of WhatsApp for external sharing on other networks about group information in the application, representing 10% of responses; and (iv) use of WhatsApp to produce self-authored information. There were no answers or identification regarding the alternative (iv), and another interaction option through WhatsApp was not expressed, giving the understanding that all respondents feel covered by at least one of the options.

Figure 46: Result of the forms of the characterization of the network-subjects in social struggles, demonstrating information exchange activity via WhatsApp with the movement during the period in which he participated. Source: authors, 2021.

About the collaboration between network-subjects and movements, and the impacts that have accessibility in digital circuits for updates, communications and exchanges. This model ensures the possibility of sharing content formulated by a group member (or by others) that may allow the understanding of the context more comprehensively, including being possible to ensure the involvement and sharing of information on other networks. Among the main positive impacts of the contribution of the network-subjects to the movements, the fast exchange of information made possible by digital networks such as WhatsApp is the one that most strengthen the collective. Highlighting some points accentuated in the individual responses, the ability to involve a large part of the team and leadership in one place was cited, and although not all beneficiaries of the movement have access to telephone or applications, it is a digital mechanism that involves the team, even if it does not reach its audience in a majority way.

In another case, from the sharing of information by the application, collaborative mapping processes are carried out with the participation and contribution of those who are in the group. Positivity is demonstrated regarding the use of the application as a way of exchanging information and as a way of keeping the team aligned and organized in the activities developed by the movement. In another contribution, a positive appreciation is presented about the articulation with the group, which also enables the strengthening and empowerment of movements such as the one of the black population and also of people with different incomes and experiences and their individual views of the world.

It was found that, in general, the use of the WhatsApp application as a tool for contribution and interaction of the movement is positive, being useful for exchanging knowledge, empowering individuals, engaging with actions within the movements, positioning, and discussing on topics pertinent to the group's actions.

Political Directness Device

We sought to raise the main negotiating agenda of the movements, with the possibility of including them as a struggle for equipment/public policies of human and social rights; recognition of the identity of minorities; alternative to economic or social policy order; alternative to ethical standards (corruption) at different proportions of the State; right to housing with land regularization; and environmental awareness for the preservation of natural resources.

Four struggles were identified, most of them by human and social rights equipment/ public policies. The descriptions of these struggles included issues such as the promotion

of safe housing, combating forced removal, promoting public policies that advocate racial rights and equality for blacks, and promoting rights for people in conditions of social, sanitary, and housing vulnerability caused by the covid-19 pandemic, in a set of initiatives contrary to the policy of social hygiene and exclusion to which the various social segments are subjected.

One of the representatives of Group 3 is inserted in a movement to fight for the right to housing with land regularization, which tries to promote the collective ownership of the land dissociated from the individual property of the houses of those involved.

Another fight identified was environmental awareness and preservation of Ribeirão Sobradinho, in the Distrito Federal. And finally, there is a record of a movement of the struggle for the recognition of the identity of the Banto culture, its knowledge and struggles in various territories.

The last survey of the questionnaire sought to know the ideological affinity of the social movements approached by the members of Group 3 in relation to the categories: radical right; center-right; center; center-left; radical left. There was also the possibility of ignorance or non-application of this framework. The answers are shown in Figure 47.

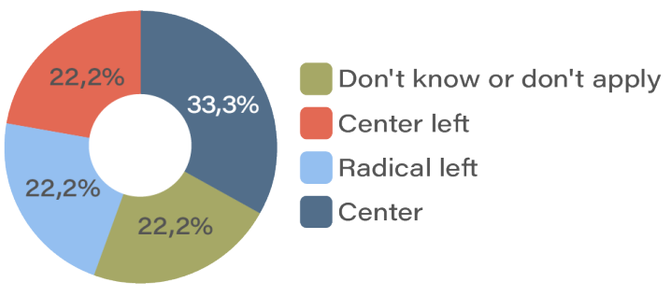


Figure 47: Result of the characterization forms of the network subjects in social struggles, demonstrating the main point of the negotiating agenda during the participation period. Source: authors, 2021.

Commenting on the previous question, group 3 members made considerations in a broad spectrum of possibilities. There were answers about the lack of political direction of those who were talking about environmental movements, some consider that there are participants from various political directions, while others define it as a movement without political positioning. Some have related the political direction indicated as support to the public authorities with a view to guaranteeing a certain right, and not as an explanation of its own political-ideological position or the movement in which it participates.

One of the group's participants commented that social struggles, race struggles and educational struggles are not political, but to "prove and say that I am a human being, regardless of my skin color." The question of political direction also incited a commentary on intense and unequal dispute in the territory and strong resistance.

On the other hand, there was an explanation that the answer given was related to the fact that the movement was anticapitalist and in support of minorities and still marginalized groups. Finally, one member said he had associated the movement with the center-left, even though there was no explicit statement about it. The classification was attributed to being a struggle that makes counter-hegemonic propositions in a capitalist reality, but it is not a revolutionary struggle, which is fought against the status quo and private property.

EXPERIENCES IN TERRITORIES

The group brought six experiences that include issues of urbanization, self-construction, technical advice for housing solutions, urban struggles, issues of tradition, environmental, gender, and racial and their connections through networks. In addition to the information extracted from the questionnaire, the experiences described in this chapter sought to relate the concepts presented by Professor Perci with each of the cases, in order to exemplify the theory and dialogue with it.

Case 1 - Practical Project in ATHIS Araras: Jardim Esperança Association

Description and contextualization

The Practical project in ATHIS Araras is the result of a public call of the Council of Architecture and Urbanism of the State of São Paulo (CAU/SP) in 2021, which consisted in the formation of a professional field to act in technical assistance for housing of social interest in the countryside.

The institution Projeto Generations is a non-profit organization that works in partnership with the Federation of Community Associations of the State of São Paulo (FACESP) in the formalization and organization of groups of people in vulnerable situations, in addition to promoting professional training courses. It was one of the organizations contracted by CAU/SP in this notice.

Among the associations registered in FACESP, the selected was the Jardim Esperança settlement, which for four months will receive advice from thirty architects, remunerated by CAU/SP, to produce a dossier in the process of land regularization and housing improvements with the municipal government.

The community fights for the right to decent housing in the municipality of Araras, in the state of São Paulo. Formed by "Ararenses", it settled with improvised shacks in a space that was once the disposal site of stolen vehicles and debris, an area of a decommissioned railway line of the São Paulo S/A Railway (FEPASA), on the banks of the São João Plant, in 2010.

The work methodology involves data collection of historical, legal and socioeconomic data, technical visit to the occupation (to recognize the area and its residents) and workshops with the participation of all of the community. This first part of the activity was carried out in a training course, also promoted by the Generations Project in partnership with CAU/SP, during the months of August and October 2020. The result of data collection and analysis provided the starting point for the projects and for the preparation of the REURB-S requirement.

Description and contextualization of the territory

The area of occupation is in the rural area (Figure 48) and belongs to the Union, which, sought by the municipal government, expressed interest in passing the area to the Municipality of Araras. At the moment, the documentation issued by the Superintendence of The Union's Patrimony (SPU) is awaited to prove the transfer.

Figure 48: Location of occupancy. Source: Image obtained from the final report of Groups 5 in the EPAATHIS Course, promoted between August/2020 and October/2020.

Composed of fifty-six families distributed in the extension of one kilometer, the occupation does not have access to basic sanitation services. The distribution of drinking water was started in 2015 by the help of a tank truck, twice a week. Access to electricity comes from alternative sources such as photovoltaic panel, battery and generator.

The health center where residents seek care is 15 kilometers away, and everything is carried out there, because the hospital is even further away. The state public school is 12 kilometers away, and to be able to move these students with municipal bus it was necessary to set up a camp in front of the City Hall.

The area has no transportation services or road infrastructure. Without offering municipal public transport, paved roads, bike path and walking, many residents make the commute to work in the city walking or by bike. The nearest bus stop is on the Anhanguera highway – a kilometer and a half away – which has an insufficient number of lines. There is the case of a resident who walks two hours to his place of work.

Figure 49: Offer of large equipment. Source: Image obtained from the final report of Groups 5 in the EPAATHIS course, promoted between August/2020 and Oct/2020

Because they did not have a sewage treatment station, one of the community leader joined a course and elaborated a biodigester septic tank (Figure 50) viable for each dwelling.

Figure 50 - Sewage treatment through biodigester. Source: Image obtained from the final report of Groups 5 in the EPAATHIS course, promoted between August/2020 and Oct/2020

As described in the previous paragraphs, the lack of public transport and the distance to the center make it impossible to access the leisure equipment available in the municipality. As an option for leisure and entertainment, the residents only have the "Facão Stream" (named so by the residents), but it is polluted, which makes it perform only a contemplative function. In addition, the lack of street lighting causes a feeling of insecurity for night shifts.

Presentation of good practices

The Project shows the importance of movements organizing and seeking support from qualified professionals who fight for the rights of this portion of the population, respect their trajectory, and are allies in their fight for rights guaranteed by the Brazilian Federal Constitution, not always fulfilled.

Collaborations and potentialities

The contribution of architecture and urbanism professionals to the occupation through technical assistance did not include the availability of funds for the construction of improvement proposals but transmitted the understanding that housing is not only the possession of land, because it involves an environment with the provision of public services.

The community already builds through a joint effort, but the guidance of professionals can help in making decisions regarding the choice of more viable materials and environments more suitable for thermal comfort and the need of each family.

Case 2 - Collective Territorial Term Project

Description and Contextualization

The Collective Territorial Term (TTC) is an instrument that unites legal, social and urban planning dimensions, aiming to ensure the permanence of residents in their places of residence and offer affordable housing continuously (RIBEIRO et al., 2018). The name is a translation of the term Community Land Trust (CLT), and can be defined concisely as a model in which land ownership is dissociated from building ownership, the first being managed collectively and the second individually, but according to rules established by the group. The functioning of TTCs presupposes the existence of an autonomous organization of those involved in the planning and management of the territory.

The model emerged in the United States in the 1960s in rural areas, through the organization of the black civil rights movement. Self-organized groups that lived and practiced agriculture in rural lands were the pioneers of experiences that worked through long-term land lease agreements or the collective purchase of areas supported by long-term financing or subsidies, and about this situation, there are several cases. In 1980, the first urban experience arose in Cincinnati. Over time, more groups have come to control the areas occupied in their own governance structures that also involve representatives of the neighborhood, local governments, and various organizations involved or affected by each of the CLTs. That is, administrative structures vary on a case-by-case basis. However, there are key elements that characterize all CLTs:

.Collective land ownership: the land belongs to the group of people with the same interests in its use;

.Individual ownership of buildings and improvements: each house belongs to an owner and all of them are subject to investment and transfers. The value of the house remains more accessible than elsewhere by not including the value of the land in the sale price – since the land belongs to the TTC;

.WWAccessible to perpetuity or permanence: removal of the land from the market, making it impossible to divest and increase its price in the sale value of individual houses. Thus, it is intended to guarantee permanently affordable housing;

.Spontaneous support: TTC participants should choose to be part of the TTC, committed to their goal of investing in the community and keeping it permanently affordable.

Other structuring aspects of the model have become more common over time, as communities began to interact with each other, systematize information about experiences, and have empirical confirmations of successful or unsuccessful policies. Currently, there are hundreds of varied experiences around the world, such as in Canada, England, Scotland, Australia and Kenya.

In Brazil, the NGO Comunidades Catalisadoras (COMCAT), which works with projects to bring an emancipatory approach from the favelas to the formal city, held workshops on the instrument in 2018, bringing some residents representatives of the CLT of Caño Martín Peña, a group of eight favelas in San Juan, Puerto Rico, to present the experience to the residents of Rio de Janeiro's slums. Among the various CLTs in the world, the Puerto Rican situation has several approaches to the Brazilian reality. From there came the TTC project, which operates for the implementation of the first experiences of the instrument in two communities in the city of Rio de Janeiro: the Trapicheiros favela, in the large Tijuca region, and conjunto Esperança – a venture of Minha Casa Minha Vida Entities – in the Jacarepaguá region.

The idea of the instrument is that the management of the land, the rules for the alienation of individual houses, as well as the use and care of the collective space, are determined by the residents themselves. It is important to point out that the TTC does not require the total support of residents of a community. That is, only those who are willing to assume the collective conditions of the instrument participate.

The project was organized on two fronts, one of community mobilization on the model, and another that works on legislative proposals that can formally introduce the instrument into the Brazilian legal system, simplifying its implementation. The network of people and institutions involved in the project was organized from the beginning with groups of distribution of emails and messages in the WhatsApp application for the structuring of project activities. The existence of the two mobilization fronts culminated in the creation of distinct thematic communication groups – legislation and mobilization – and a general group, in which plenary meetings are even convened.

In 2018 and 2019, the focus of the project was to carry out mobilization activities in the communities concerned, seeking to reach the maximum number of residents and deepen knowledge about the TTC. Several activities were thought and carried out in this sense, from community workshops and playful meetings to dynamics of territorial planning, and door-to-door activities, among others. The project also began to receive invitations to present the TTC through classes and lectures, in addition to having representatives who published papers in academic congresses related to Urban Planning and Land Law.

In 2020, since the beginning of the global crisis of covid-19, all activities have been transferred to the virtual environment. The project sought to adapt to the new circumstances, supporting partner communities in their demands, and dedicated itself more ahead of the legislation, since mobilization has some limitations in the virtual environment. In total, eight legislative proposals have been executed to today involving changes in current legislation – at the municipal, state and federal levels – to support the development of TTCs, and a chapter to be proposed as an adhering to existing federal legislation.

In addition to the meetings of the TGs and the monthly plenary sessions of the whole group, some webinars, lives and lectures were promoted by the network. Despite having a direct impact on the engagement and mobilization meetings of community residents, the virtual environment also allowed the participation of employees and stakeholders from other parts of Brazil and also from abroad.

Figure 51: Image of some of the participants of the Virtual Plenary of the TTC of February 2021. Source: CatComm

The territories

1. Trapicheiros

Trapicheiros favela has existed for about 80 years and it is located in Tijuca, a middle-class neighborhood in the northern part of Rio de Janeiro, not far from the city center. Over the years, the community – which was still a little far from the formal city – began to have nearby middle-class buildings and, with this, there were episodes indicating that the presence of the community is uncomfortable for residents of the region who arrived later. Residents received concrete removal threats, linked to the movement of real estate speculation in their surroundings (COMCAT, 2019).

The community was already going through a process of land regularization, associated with the NGO Comunidades Catalisadoras, when there was the workshop with the CLT of Caño Martín Pena. The mobilization efforts of the TTC Working Group have produced several results, including the submission of a law project by the Association of Trapicheiros Residents and an alderman for the recognition of the community as an Area of Special Social Interest, which will facilitate the regularization of land ownership and protect the community from real estate speculation.

2. Hope Set

This community of seventy families is the result of a struggle for rights of almost 20 years, planning actions and self-construction as task force. Through the Minha Casa Minha Vida Entities program, residents who once lived precariously as tenants in the city's slums, or were homeless, were able to build their homes in a collective process integrating social and environmental potentialities (COMCAT, 2019).

There is a powerful route of mobilization and dedication, with all residents participating intensely in the construction process, a prerequisite to qualifying to receive a home. Those who participated in the whole process have a strong sense of collectivity. The residents' plan has always been to own the land collectively, initially considering a cooperative model. However, due to Brazilian bureaucratic barriers, residents have adopted the TTC as a more appropriate means of land regularization, which will simultaneously strengthen and help recover the collective spirit of the community.

Figure 52: Residents of Trapicheiros in an organization meeting of the TT Pilot Project. Source: https://rioonwatch.org.br/?p=44304

Figure 53: Final phase of the work of Conjunto Esperança in 2015. Source: https://rioonwatch.org.br/?p=44304

Good practices

The TTC project, in summary, seeks to expand the list of housing policy instruments in the Brazilian context. The construction has been part of the assumption that the Collective Territorial Terms depend on the construction of a proprietary arrangement that combines individual and collective interests. Thus, the protagonism of the communities that are fighting for the implementation of the instrument is an example of good practice of the project.

CatComm has played an important role in supporting, listening to, and strengthening communities that carry with them many examples of struggle and a lot of potentials to win their rights.

Collaborations and potentialities

We can affirm that the group of individuals and institutions that are involved in the TTC project configure, based on Souza (2006), the informational reach that supports the social relations existing in the communities of application of the instrument. In addition to The ComCat and the group of residents of the two communities of Rio de Janeiro, which can be identified as the central nodes of this reach, there are many others: residents of other communities interested in the instrument; representatives of various public sector organizations, such as the Federal University of Rio de Janeiro (UFRJ), the State University of Rio de Janeiro (UERJ), the Public Defender's Office, the Institute of Land and Cartography of the State of Rio de Janeiro (ITERJ), the Oswaldo Cruz Foundation (Fiocruz); civil society that operates on various fronts for the right to housing, such as the National Union for Popular Housing (UNMP) movement; collective Manivela Project; Engineers Without Borders; and TECHO. In sporadic opportunities, connections with researchers and members of TTCs outside Brazil were also made, further expanding the informational reach of the TTC project.

In a broader look, the TTC project as a whole can be interpreted as a node of an urban-informational network that currently acts in the two communities of Rio de Janeiro. At the same time, it participates in a broader informational reach, which brings together the set of movements and institutions that act in strategies to guarantee the Right to Housing in Brazil, inserting itself into a much more comprehensive circuit.

The main potential of the project is to realize and guarantee the right to adequate housing through the introduction of the Collective Territorial Term in Brazil, a new reference of public housing policy for the country, aligning itself with the conditions of urban planning solutions at the local level. If this instrument is implemented, the entire informational reach will disseminate the experiences as an example to other territories. Thus, the potential of network connectivity will become more evident in this case. Many communities and families living in informality and suffering from serious problems related to the right to housing and insecurity of ownership could be benefited. Moreover, the strengthening and recognition of existing community organizations bring strength for subjects to fight for other collective rights, such as access to urban infrastructure and public services on a local proportion, among other issues that constitute the right to the city.

Case 3 - Movement around the recovery of Ribeirão Sobradinho

Description and contextualization of the territory

With 28 kilometers long, the Sobradinho Stream is the most important watercourse in the Sobradinho region, in the Distrito Federal. Given its importance, the sub-basin of the Ribeirão Sobradinho is defined, which in turn is in the São Bartolomeu River basin. On the national proportion, it is located in the hydrographic region of the Paranaíba Basin. And the final destination is the south of the continent. That is, the waters that surface in the region of Sobradinho join the largest river in the Distrito Federal, the São Bartolomeu River – which is 200 kilometers long and cuts through the region in the north-south direction – and continue until its waters get to the mouth of the Rio da Prata.

Figure 54: One of the waterfalls of Ribeirão Sobradinho. Source: https://blogsosribeirao.wixsite.com/sosribeirao.

The São Bartolomeu River was the gateway of the Bandeirantes in the region of the Distrito Federal. Since the inauguration of the new capital, this river has been tipped to be a reserve of drinking water to supply the Distrito Federal, as a second artificial lake. However, due to irregular urban occupation and high pollution, the plan was cancelled[10] . As a solution, the government carried out a million-dollar work – a cost of more than 300 million – to pump water from the Corumbá River in Goiás, which has São Bartolomeu as one of the main tributaries.

Figure 55: Group of volunteers makes visits to check the situation of the soil erosions. Source: : https://blogsosribeirao.wixsite.com/sosribeirao.

What is perceived is a disconnection between the conservation of the environment and the actions of the public authorities. The area of the Ribeirão Sobradinho basin suffers from irregular occupations, sewage dumping in water bodies (including by state company), removal of original vegetation, deforestation, and irresponsible land use among other problems such as the precarious drainage structure. This scenario presents a dead stream from the environmental point of view.

It is worth mentioning that the first springs of the Ribeirão are located near the newly created Alto da Boa Vista condominium. There are already the first attacks on the existence of the Ribeirão. When traveling the stretch of an urban area, about 8 kilometers, the aggressions suffered to make the river unsuitable for leisure and even for irrigation purposes. Currently, the stream is classified as class 3, according to Resolution no. 02/2014 of the Water Resources Council of the Distrito Federal.

As the process of environmental aggravation of the Ribeirão is relatively recent, the population realized, through their affective memories with Ribeirão Sobradinho, the need to act to recover this natural resource. Although, of course, there are other contexts for creating environmental movements and actions around this important basin.

This case study aims to analyze some of the projects that are in the fight network of Ribeirão Sobradinho, which has several movements in defense of ecology. Although not formally instituted, through the union of these projects there is a network from which we will analyze three links.

SOS Ribeirão Sobradinho Association

The SOS Ribeirão movement, a project developed in 2010, had as its starting point the completion of the master's degree in the environmental area of one of its founders, Raimundo Pereira Barbosa. Legally, the movement is classified as ANNG.

The initial discussion of SOS Ribeirão involved the affective memories of the founders and the possibility of future generations being able to enjoy the same resource. Among the activities of the NGO SOS Ribeirão and its volunteers, there are campaigns and lectures to disseminate and sensitize the population, which thus articulates and resumes the discussion on the revitalization of the Ribeirão and maintenance of this water resource for the enjoyment of the next generations.

Figure 56: Team of volunteers and participants of SOS Ribeirão Sobradinho; Activity in the house of the Ribeirão. Source: https://blogsosribeirao.wixsite.com/sosribeirao.

[10]https://www.correiobraziliense.com.br/app/noticia/cidades/2017/11/20/interna_cidadesdf,642033/lago-sao-bartolomeu-em-brasilia.shtml.

The formalization of the movement, with CNPJ and statute, in addition to other formal aspects, allows a better articulation with public agencies and the various instances of civil representation. For example, the SOS Ribeirão Sobradinho Association is sitting in working groups, basin committees, and public hearings. It is also noteworthy that the current movement's center, Casa do Ribeirão, is an agreement between the local administration for the assignment of public space. These actions are possible by formalizing the association.

On the other hand, on a daily basis, most of the practical actions of SOS Ribeirão are made possible by the voluntary contribution of individuals motivated to contribute and often do not even formally approach the organization. Other arms of the Ribeirão arise with the symbiosis of groups and individuals who conduct their own social and environmental projects.

Guardians of the Environment

The union of initiatives and people who acted with the same purpose – awareness for the reconstitution of the riparian forest and cleaning of the marshes, springs and tributaries of the Sobradinho Stream for the preservation of natural resources – led to the creation of the collective Guardians of the Environment: an informally structured group that uses social networks to disseminate their work and also to raise materials, equipment and new volunteers. However, sometimes some members use resources from their own pockets to provide demands that arise during the struggle for Ribeirão and its survival.

Acting essentially voluntarily, the founders of the Collective Guardians of the Environment accumulate success in the work proposals. The initiative of Professor Heron de Sena Filho, who made himself available to create a project to raise awareness among elementary school students at Escola Classe 5 (The Class 5 School) in Sobradinho I about the importance of the environment, explaining how degradation ends up interfering in the health of the river, is an example of success since 2016. The project developed in the school works in an interdisciplinary way and addresses recycling, composting, reuse of water and the preparation of seedlings for reforestation of the watercourse.

Another initiative with project status is the Environmental Nelsão, starring Nelson Rodrigues. The reuse of tires for the manufacture of urban art is one of the main works of this guardian. The various works spread throughout Sobradinho and gained prominence in traffic roundabouts and some gardens. To ensure the long reach of the initiative, the activist also involves children. Taking the project to the elementary school, Nelsão Ambiental creates the opportunity for the children themselves to participate in environmental education and recycling activities.

The preservation activities were recognized by the community and as a curricular activity, in addition to the study, the production of organic fertilizer – from material produced in the school itself, properly separated to be used in composting sites – and the reuse of water, previously wasted in drinking fountains, are developed in the school to irrigate the seedlings produced in the school. The project became a model and there is the possibility of implementation in other educational units of Sobradinho.

In addition to the projects that have come together around the nickname of the Guardians of the Environment, there are other environmental activists who act as volunteers in the demands presented. The fact is that, by coming together, they managed to constitute a larger network, established from the network that each individual brought with them, capable of making larger articulations around the Ribeirão. Hence the efficiency of one of the most powerful weapons of the group, the complaints of irregular situations, mainly about the Ribeirão, but also aspects of local life. The intention of the movement is "to make the community see the environment with other eyes and start charging the government more actions", as summarized by one of its participants in an interview with Jornal Correio Braziliense, on March 26, 2021.

The collective has no hierarchical posts or regulations. Those who are there work on several fronts of protection and struggle for nature.

Figure 57: Environmental education activities are carried out by members of the Guardians of the Environment in the elementary schools of Sobradinho. Source: https://blogsosribeirao.wixsite.com/sosribeirao.

RRP Moura

"Revitaliza, Recicla e Preserva" (Renovate the vitality, reclyce and preserve) are the maxims of the RRP Moura project, which has as creator one of the Guardians of the Environment, Antônio Moura. In block 1 of Sobradinho, about 12 years ago, the large area that ceased to be green to become a dump became the challenge of the environmentalist. It was the withdrawal to charge the State effective actions in the area that led Moura to start the work of cleaning, planting seedlings and protecting the springs of the Ribeirão.

Figure 58: Antônio Moura in the RRP Moura project conceived by him. Source: https://blogsosribeirao.wixsite.com/sosribeirao.

However, although it is the creator who is most dedicated to the project, the activities have volunteers from the neighborhood and the community, who participate or not in other projects such as guardians of the environment. With regard to the dynamics of networks, this project does not have WhatsApp groups, and the information circulating is on personal websites or by citation of other groups.

The work has an effect, and visitors to the area recognize Moura's contribution to renovating the vitality and healthiness of the Ribeirão. Thus, it goes towards the consolidation of its goals, which are: to include the area in an ecological park on the marshes of the river and, through the planting of seedlings, to recover the riparian forest.

Presentation of good practices

The action of a network in favor of a common objective shows its efficiency in the analysis of the cases presented. We could propose a classification in three stages of the social movements presented.

At level I would be the Project RRP Moura, which does not have specific social networks, not even in the application WhatsApp. However, because he has a more exact action, he achieves good articulation with volunteers, often those are nearby neighbors.

At level II would fit the initiatives with articulation in social networks, such as Whatsapp and Facebook, but without formal aspects of organization, be it CNPJ or internal structuring, as positions. In this case, the collective Guardians of the Environment.

At level III would be projects more organized from the point of view of social and legal networks, as it is the case of the SOS Ribeirão Association.

Thus, it is verified that although there are projects that do not present formalities from the organizational and legal point of view, the effectiveness of the movement is guaranteed. Therefore, the specific actions of more personal initiatives complement each other with larger actions. From an informational point of view, more residents of the surrounding area and other interlocutors are accessed.

The various projects can, in different spheres, propose complaints and demands of the community, such as the proposition of expansion of the polygonal of the Jequitibás Park. The movements claim the creation of Conservation Units as a way to stop real estate speculation that threatens Ribeirão Sobradinho.

The group, which is often the fusion of various movements, is acting in the recovery of several river springs and in the cleaning of these places, asking for support from the population on a voluntary basis.

The problems demanded can be solved by actions of the competent agencies, but the issue of environmental education is fundamental in this process since most of the population does not know the Ribeirão, especially the young. Hence the importance of actions with schools in regular education.

Figure 59: In the area that was once a dump, social and environmental activists planted seedlings. Source: https://blogsosribeirao.wixsite.com/sosribeirao.

Another important action is the collection of movements with government agencies, such as the issue of rain nets and the release of effluents from the treatment plant by CAESB.

Technical studies for the creation and reclassification of conservation units, the Ribeirão Sobradinho hydrographic unit and specifically part of the socio-environmental diagnosis, are of paramount importance, since they deal with the need for dialogue/capture of socio-environmental conflicts and on possible interest groups, as well as potential activities to be developed.

Collaborations and potentialities

Sobradinho's socio-environmental projects began to apply changes in the population's mentality about nature and to pressure the public authorities to clean up the River. Through the union of projects and the collaboration of the community itself, with the activities around this Distrito Federal objective, the network that is formed indicates the potential for mobilization, including the involvement of children in the learning process of the preservation of natural resources.

Once full and expanded, the network of social struggles around The Sobradinho Stream becomes a world of potentialities to be explored. Here are some ideas for exploring this potential.

Association with rural producers: ecological sanitation and food security

The position of the stream is strategic, as it embraces the city of Sobradinho, in the original layout of the city. Thus, an urban area and a rural area (semi-urban) delimited by the aquatic environment were formed. Both zones contribute to the polluting load. The "chacareiros" (an owner of a small piece of land) and occupants of the rural area of Sobradinho release sanitary effluents and also contribute to pollution by the use of pesticides.

As the urban extension of the river is relatively small, the actions have a lower complexity, from the point of view of accessing those involved. From the network, it is possible to propose a coordinated work of transformation of agricultural production to the agroforestry model, or production without pesticides, with a guarantee of commercialization of producing for a permanent market in the warehouse of the river. And also carry out the implementation of sewage systems in an ecological way. Thus, from the water quality control, verify the efficiency of the techniques employed and serve as a pilot for other points of the Distrito Federal.

Sewage treatment plant: popular pressure on the government

Today the sewage treatment plant of CAESB (state company) dumps semi-treated effluent in Ribeirão Sobradinho, nicknamed by the population "mouth of the princess". As there is the regular collection to users of sewage service tariffs, under the justification that "wastewater must be adequately treated before returning to the environment", a large mobilization can be carried out to suspend the payment of tariffs in the Sobradinho region, so that CAESB fulfills its role. Such a move can be encouraging so that other sites pressure the company to carry out the treatments.

Of course, there must be a legal study about the best form to operationalize the lawsuit. But the fact is that CAESB does not meet what it sells to the consumer: "this treatment will improve the environmental quality of the soil and water bodies of the Distrito Federal and the life quality of the population" [11].

Memories rescue

A specific project can be proposed, through the affective memories of the community, to retell the history of the Region of Sobradinho. In the region near the watercourse of the Ribeirão there is an occupation of indigenous peoples of the Xucuru ethnic group (including, at another point, there is a FUNAI building), umbanda terreiros (an specif kind of a temple of African-rooted religion), leisure clubs, the sanctuary of Our Lady of the Rainbow and other actors that would certainly enrich the narrative of the riverside's neighbors.

Broad network favoring discussion for shared management

As a public good, water resources can be managed in a shared way. The network established around the social struggles of Ribeirão Sobradinho favors the identification of the various characters from the context of the Ribeirão, as well as the articulation of these agents.

If shared water management is possible, projects such as the creation of the city

[11]Available in: http://www.adasa.df.gov.br/images/stories/anexos/perguntas_contas_agua_tarifas.pdf. Access in 5. set. 2021.

Urbitá, which will host about 120,000 people, with water supplies coming directly from the water table, could be stopped.

Case 4 - Occupation CCBB Resists

Description and contextualization of the territory

This occupation, located 1 km away from the Planalto Palace, in the Asa Norte (Plano Piloto, DF) and next to the Banco do Brasil Cultural Center (CCBB), has resisted for more than 40 years. In fact, there are working families living there, they do the collection and recycling of materials for a living and remain in the place because they have already constituted and consolidated a relationship and a workflow. It is an area abandoned by the government for decades, and which is now the target of strong real estate speculation, being claimed by the Government of the Distrito Federal (GDF) for the possible construction of an Audiovisual Park, intended for private communication companies, such as television stations and producers – a hypothesis discussed since 2017. Therefore, the target condition of these families intensifies even more, as they are victims of consecutive evictions in the middle of the pandemic, ordered by a necropolitics rooted in the current Brazilian State.

In 2020, with the advance of the pandemic, the governor of the Distrito Federal, Ibaneis Rocha, intensified eviction operations, ordering and orchestrating five short-term operations in the CCBB Occupation, executed by the Legal DF and the Military Police in a violent manner, without any prior support of social protection services of the removed families, which increased the vulnerability of residents in the face of the health crisis, in addition to disrespecting District Law 6657/2020, accepted in August 2020, which prohibits eviction orders during the pandemic.

According to data from the Zero Eviction campaign – national action, with international support, which aims to suspend evictions and is focusing on states and municipalities to pass specific laws to prevent them – more than 72,000 families in Brazil are threatened with removal and more than 12,000 have already been evicted.

In addition, Bill No827/2020 in the process of Congress also advocates the suspension of eviction orders during the covid-19 pandemic period. In other words, the agenda is urgent, and necessary and has been provoking support and social mobilizations from various spheres. Housing is a right and a minimum condition of survival in the pandemic. The approval of this project affirms the commitment pro-life and denies the genocide agenda that Brazil is experiencing at this time.

Figure 60: Violation of District Law no. 6657/20. Source: Nando Motta (@desenhosdonando)

The Distrito Federal is historically marked by socio-spatial tensions, struggles and resistance since its birth, expanding in a process of planned segregation (CAMPOS, 1991) through a policy of exclusion, hygiene and expulsion of its population to the peripheries, tens of kilometers of the Plano Piloto, placed as an elitist "functional center". This factor explains the birth of the Ceilândia Administrative Region (RA), which comes from "CIS", arising from the campaign to eradicate invasions created in the 1970s with the aim of moving the residents of the favelas of the Plano Piloto to other areas, further away from this center. This also reveals one of the main problems and impasses in the Distrito Federal: the land issue, segregation and socio-spatial inequality. The CCBB Resists case materializes the situation of several families in the Distrito Federal and exposes the historical condition imposed in these territories.

The CCBB Occupation has been the target of five eviction operations so far. The first occurred in June 2020, and the second on March 22, 2021, after the decision of the president of the Superior Court of Justice (STJ), Humberto Martins, authorized the removal of the 38 families. Contrary to district law no. 6657/2020, the second operation resulted in the wrecking of the houses and the school of the place, founded in 2020, in the middle of a pandemic, to ensure access to education for the 20 children of the place in a situation of vulnerability, each having a volunteer teacher so then it wouldn´t occur throngs, with the pedagogical arm of the collective BSB Invisible.

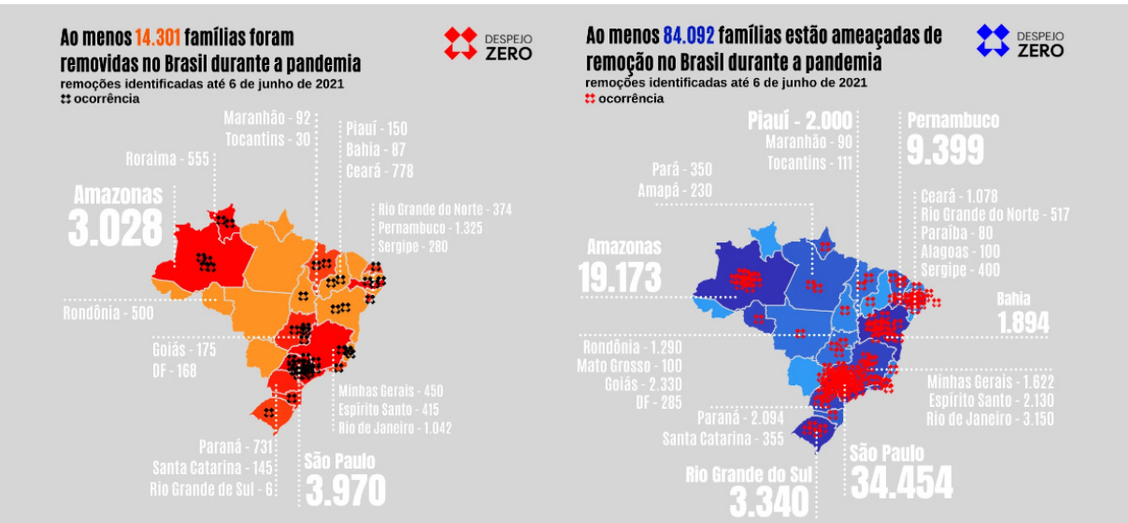


Figure 61: Information from the National Zero Eviction Campaign between March/20 and Feb/2021. Source: Zero Dump

The second eviction operation in the CCBB occurred quite violently, with the support of the shock troops, Military Police and DF legal, all equipped with tractors to wreck the Cerrado School, which was rebuilt by the leading resistance activist, Thiago Ávila, and several collectives of the Distrito Federal. They, together in the territory early in the morning, formed a collective hug around the School, as resistance to prevent its wrecking after the arrival of the task force on the site, in addition to calling for a broad movement of solidarity and mobilization on social networks by raising the hashtags #ocupaCCBBresiste and #DespejoNaPandemiaéCrime. But it wasn't enough to stop the joint battle, which forcibly removed the group of people hugging around the structure from taking down. After that, the Police Force ordered the arrest of Thiago Ávila in an aggressively way, who was the last to leave the roof of the school, and other protesters who accompanied him in the resistance. The school was demolished once again.

Between April and May, there were three more evictions, which materialize the historical exclusion imposed in the Distrito Federal along with the genocide policy orchestrated by Governor Ibaneis, which reproduces fallacies and false hegemonic and elitist narratives about the production of urban space as a justification for unjustifiable acts of eviction. In a statement, Ibaneis said: "In invasions, I will pass the tractor the way it is being done and I will arrest the real land grabbers of this city", referring to the families

and occupations of the territories. The STJ itself points to the case of the CCBB occupation as "damage to public order under the urban aspect", disqualifying it as an "irregular and disorderly" occupation, corroborating Ibaneis. That is, the government of the Distrito Federal ignores, breaks laws and neglects the basic rights of its population.

Figure 62: Group of people hugging the school along with the pressure of the joint battle. Photo: Scarlett Rocha

Figure 63: Wreck of houses and school by operation. Photo: Scarlett Rocha

Presentation of good practices

In the resistance to this scenario, a broad and powerful network of rooted solidarity has been formed – articulated in the territory and in social networks – through various movements, organizations, collectives, politicians and activists, who fight for the families of CCBB Resists and for the end of evictions in the Distrito Federal. This tactical network has been important in the collection of solidarity funds, with the collective BSB Invisible as a centerpiece in the articulation of resources, as well as Movimenta and the collective Dividir, which together with other activists have been important also in the articulation in social networks, especially in WhatsApp, with support teams, prevalence and fast

articulation in the territory. This solidarity chain was essential in the various moments and evictions that occurred in the CCBB Occupation, creating campaigns at various levels, such as joint fundraising by online "whip-round" and donation of tents, blankets and food as quick measures to get homeless families out of the streets. At a later moment, the DF BR Cidades Center and the Zero Df Eviction Campaign have brought ample legal and assistance support, articulating leaders of important and professional movements in various areas of activity, strengthening resistance.

An important piece of resistance in the CCBB Occupation was the Cerrado School, which resisted, rose up again, was overthrown and will now be transformed. Assembled with a lot of collective effort, with donations, and made of improvised materials, he served 20 children of the occupation, bringing education and food to all of them, who today are unstructured and studying on the ground and outdoors. So that children do not run the risk of being left without school again, the project, with the help of the network of actors involved, wants to set up a school inside a Kombi, where materials can be stored and the reach of children can be greater, that is, a mobile and itinerant school, made by the collective union of efforts that is turning increasingly into a reality.

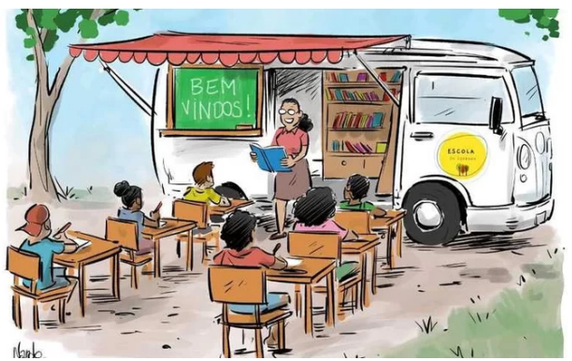


Figure 64: Collection campaign for the Itinerant School. Source: https://voaa.me/escola-itinerante/

The CCBB Resists, as an already emblematic case, has the power to contribute to the fight for the right to housing, education and the end of evictions in the Distrito Federal, forming a wide network of actors at various levels and scales of action, in addition to reporting and exposing the historical processes/projects of "social hygiene", exclusion and segregation imposed in the Distrito Federal. As long as living is a privilege, occupying is a right!

CASE 5 - Technical Assistance for Housing of Social Interest

The Technical Assistance Law for Housing of Social Interest (ATHIS) (Federal Law no. 11.888/2008), created by architect and urban planner Clóvis Ilgenfritz, provides for projects and decent housing for low-income families.

Clovis was a Democratic architect with a very important role in public policy and student politics. He defended the creation of a council only for Architecture and Urbanism and had direct participation in the creation of the Laws Statutes of the City and ATHIS.
ATHIS is a law aimed at the provision of basic infrastructure needs and the right to housing for a large portion of the Brazilian population living in precarious conditions. People who receive up to three minimum wages have, guaranteed by Federal Law no. 11,888/2008, free and public technical assistance – provided by qualified professionals responsible for the preparation of projects – and monitoring of renovation works, expansion or land regularization of their homes.

Despite being a policy aimed at ensuring decent housing for low-income populations, ATHIS is still not much publicized by communities, professionals, and academics in the areas of civil construction. It is clear the lack of awareness of the various forms of precarious housing in Brazil and in the world, and there are still few families having assistance in relation to the number of people who live in precarious situations and who are likely to be contemplated by ATHIS.

In addition to ensuring adequate housing, the policy focuses on the movement of the economy and local commerce with the requalification of buildings by ATHIS, generating jobs and income in civil construction, improving the quality of life of people in communities, and reducing spending resulting from poor housing health conditions.

There are several collectives, independent people, social enterprises and institutions mobilized by the cause, which generates a listening and network of voices for the responsible bodies. In addition, CAU/br, as well as all CAUs, since 2016 allocate part of their budget to encourage the implementation of the law in ATHIS.

According to CAU/RS, ATHIS serves the population where it is, avoiding the creation of new demands for infrastructure, services and transportation. In addition:

.ensures the construction of housing in appropriate areas, in accordance with urban and environmental legislation, qualifying the urban space;

.includes the low-income population in social policies and in the formal market

through the regularization of the property;

.promotes small-scale civil construction, associated with popular housing from the purchase of materials and hiring local labor (Figure 64);

.improves the quality of life and productivity of the population in the school environment and at work;

.lowers public health costs. Well-lit, ventilated houses with installed infrastructure prevent the emergence of diseases (Figures 65 and 66).

Figure 65: Before and after ATHIS. Source: CAU/RS collection.

Figure 66: Improvements in housing: a healthier home prevents numerous diseases. Photo: CODHAB DF.

Healthy Home Program - CAU/RS

According to the ATHIS CAU/RS office (2020), Casa Saudável is a Technical Assistance program (ATHIS) created by CAU/RS with the objective of contributing to the implementation of the Technical Assistance Law (Law No. 11,888/2008) in the municipalities of Rio Grande do Sul. For this, we seek an integration of the professional architect and urban planner with the teams that work with the Family Health Strategy (ESF), taking advantage of an existing structure and complementing the work of health professionals.

Most of the houses suitable for contemplation by Law No. 11,888/2008 present several unhealthiness caused by precarious constructions, which, for the project, is considered a sick house. Thus, the objective of the project is to unite architects who can contribute to the project solution of these defects from the construction, renovation and adaptation of bathrooms, septic tank, roofs, windows, floors and also favoring ventilation and lighting to bring a quality of life and health to residents who live there.

According to the ATHIS CAU/RS office (2020), a family that receives technical assistance can immediately start the renovation and improvement of their home, or the municipality can organize the collective demand and also seek resources of its own or other institutions.

Healthy Home Program - CAU/RS

Today, with 13 years of law, it is possible to see several Brazilian regions empowering and acting in ATHIS. This performance has generated great results, and although there is still a long way to go, with many families to be contemplated, the result is inspiring and satisfactory.

In Brasília, in 2015, there was the opening of technical assistance posts in regions where the demand profile for ATHIS predominated. The Housing Development Company of the Distrito Federal (CODHAB/DF) is responsible for some actions in housing and urban improvements that have been successful during these years.

I Technical Assistance Day in Housing of Social Interest of Brasilia (JATHIS, 2017)

In order to promote information and mobilize communities, institutions, professionals and students in the area, the I Technical Assistance Day in Housing of Social Interest of Brasília took place in October 2017. Held in 3 days, it divided its activities into

theory and experience in the neighborhoods Sol Nascente, Puerto Rico and QNR, located in Ceilândia, a region considered as one of the largest Brazilian favelas, according to an estimate by the Brazilian Institute of Geography and Statistics in the 2010 census, on the so-called subnormal clusters.

The event had several lectures and workshops that had as general objective to perform basic training in projects in ATHIS. According to the workshop plan, made available by the organization of the event, the specific goals were: to encourage the work of future professionals in Architecture and Urbanism for practice at ATHIS; understand the process of Technical Assistance (TA) as multidisciplinary and complex, which requires several steps and time for it to be matured and implemented; and develop technical capacity to intervene in self-construction dwellings, identifying and highlighting the positive aspects of construction.

Event structure:

Venue: IESB Asa Sul Auditorium
Place of experience: Sol Nascente, UniCEUB and FACIPLAC

The event totaled 5 locations: 4 in the Sol Nascente and 1 in Santa Maria, with 20 families attended. The training of about 100 students of Architecture and Urbanism, divided into 20 teams of up to 5 students, had the technical support of CODHAB and teachers from 8 educational institutions. The event had other face-to-face editions in 2018 and 2019. In 2020, due to the pandemic, there was an adaptation and the event took place virtually, with the participation of people from all over the country, which brought a broader connection with other work experiences in ATHIS.

During the editions, it was possible to prove the need to act with a set more ample and multidisciplinary of other agents, in addition to students and professionals in the area. The engagement of civil engineers, building technicians, agronomists, social workers and others, strengthens the entire struggle for ATHIS. Likewise, community practice with dialogue and understanding, without prejudice with direct stakeholders (local residents), is fundamental to better understanding and meeting their needs, because they are the ones who experience daily the challenges related to housing and collective life as a whole.

Case 6 - Nzinga Institute for The Study of Capoeira Angola and Banto Educational Traditions

The Group Nzinga de Capoeira Angola was created in 1995, in São Paulo, in the garage of singer Vanessa da Matta, in Morro do Querosene, according to Mestre Tião Carvalho, master of popular culture of Maranhão and member of the Nzinga group since its foundation. At the time, Master Janja (Rosângela Araújo), a native of Feira de Santana, Bahia, lived in the city because of the preparation of her doctoral thesis, as well as Master Paulinha (Paula Barreto) accompanied by Master Poloca (Paulo Barreto), who was also in the city due to studies. The three already had the trajectory of capoeiristas in the line of Master Pastinha (Vicente Ferreira Pastinha), who rescued the knowledge and traditions of Capoeira Angola, banto tradition[12] , in the city of Salvador, since the beginning of the twentieth century, having formed an academy of Capoeira Angola located in the region of Pelourinho, an academy that founded other masters, as Master Moraes, founder of the Grupo de Capoeira Angola Pelourinho (GCAP) in the 1980s, at the Santo Antônio fort in Salvador.

Figure 67: Photo of the founding masters: Paulinha, Poloca and Janja. Source: NZINGA DF

Figure 68: 1st CD and group magazine. Source: NZINGA DF

According to studies by Mestre de Capoeira Angola, Cobra Mansa, capoeira developed in Brazil is related to a dance and fighting practice from southern Angola, which the goal is to put the foot on the opponent's head, in a movement similar to the kick of a zebra. This fight called n'golo („zebra" in quimbundo, banto language), was practiced to

[12]The Banto or Bantu tradition concerns a language family that has given rise to several other African languages. Today there are more than 400 ethnic groups that speak Bant languages, all of them in the south of the Equator. The Banto peoples were one of the most numerous groups to arrive in Brazil at the time of slavery, brought from Angola, the Congo and Mozambique, and had significant participation in the formation of Brazilian culture and people. Several words of Portuguese spoken in Brazil originate from Quimbundo, a Banta language of Angola. For example: moleque, cafuné, quilombo, caçula, cochilo, jiló, fubá and farofa.

the sound of drums and had many movements similar to Capoeira Angola. The use of the berimbau instrument also originates from Banto peoples. Capoeira Angola, rescued and disseminated by Nzinga, preaches orality, non-competitiveness and not much emphasis on the physical performance of its participant, in view of the recognition that the practice can be exercised by various bodies and ages. The Nzinga group does not understand Capoeira Angola as a sport, but as a cultural manifestation, a practice transmitted by orality and group experience, emphasizing the values of cooperation and discipline.

The name Nzinga is a tribute to the queen of Ndongo, present-day Angola, the great military strategist and cunning diplomat Nzinga Mbandi (1582-1663), who personally headed the army until the age of 73, maintaining the sovereignty of her kingdom until her death at the age of 81.

Figure 69: Image of Queen Nzinga, Master Pastinha and an assembly with reference to N'golo. Source: NZINGA DF

Spirituality and ancestry are also present in the group, as well as the anti-racist and anti-sexist struggle, the recognition of the privileges of white and cisgender people, and the need for the spread of the pedagogical values of Capoeira Angola to its practitioners and community in general.

Since the creation of the Nzinga group in São Paulo, he has worked for his masters and practitioners in events in the areas of culture and education, both in the practice of capoeira and in the recording of CDs and documentaries, production of books and magazines, in lectures and as militancy in the street, in demonstrations and debates. The dissemination and practice of Capoeira Angola by the Nzinga group occurred and affected middle-class people linked to the university and also needy communities, where he acted with a more social character. All sociotechnical subjects in various ways contribute to the diffusion of the network of capoeiristas around the planet. In the years 2001 and 2002, Nzinga opened centers in Salvador and Brasília, as well as established itself in fact as the Institute of Studies of Capoeira Angola and Banto Educational Traditions. The nucleus of São Paulo, in 2003, was established in Jardim Colombo, west of the capital, in a community with many social needs, where capoeira Angola classes and popular cultures were offered to children and adolescents within the Ginga Muleke project. In Salvador, Nzinga settled first in the Rio Vermelho neighborhood, and later moved to a poorer community, Alto da Sereia, between Rio Vermelho and Ondina[13] , also seeking to offer the transmission of the values of the philosophy of Capoeira Angola, which emphasizes the importance of understanding about the awareness of the relationship between the individual and the community.

In the community of Alto da Sereia, in Salvador, during the almost twenty years of operation, some generations of children participated in the activities of capoeira classes and training involving movement, musicality, an exhibition of educational films at Cine Sereia, Orchestra of Berimbaus, circles on Fridays and on commemorative dates, such as the day of Iemanjá, birthday of Mestre Pastinha, Called A Woman (an event that the Nzinga group promotes for discussion on gender violence within capoeira).

Many students, also for the opportunity to be in the group, became teachers or composed tributes together with the masters to participate in events in other centers, such as a presentation of the Berimbaus Orchestra, the National Conference of Culture in 2013, and the Latinidades Festival in 2015 in Brasilia. The video of the ten-year-old record of Alto da Sereia, which also tells a bit of the story of resistance, can be accessed on YouTube[14].

Figure 70: Photos of a circle at the feast of Yemanjá, which took place every year on February 2, and of an instrument training at the center of Salvador, with children and adolescents from the community. Source: NZINGA DF

[13]Alto da Sereia is an Urban Quilombo stuck in one of the noblest points of Salvador, being a place of resistance to the permanence of families.
[14]https://www.youtube.com/watch?v=QxDEgyXTgao. Fonte: Nzinga.

The center of Brasília, founded in 2002, went through several places, predominantly in training places in the central region, by trying to aggregate the largest number of participants in various points of the Distrito Federal. During these almost twenty years, Nzinga DF participated in activities at UnB, at Elementary School Vivendo e Aprendendo, Conferência Nacional de Cultura (Nacional Culture Conference), Conferência Nacional das Cidades (Nacional Conference of the Cities) and Conferência de Direitos Humanos (Human Rights Conference). Currently, it maintains its head school at CONIC, performing some activities in Zumbi dos Palmares Square and the Setor de Diversões Sul.

He was also present at events of the gender and racial agendas, such as International Women's Day, March of the Daisies and Black Consciousness Day, with activities at the Plano Piloto Bus Station, Praça Zumbi dos Palmares, Esplanada, Casa do Cantador in Ceilândia, Tem Dendê Project (with paranoá children in the candomblé yard of Mãe Baiana, in 2013), Projects at CESAS (youth and adult education school at 602 south) and other events and demonstrations in public spaces.

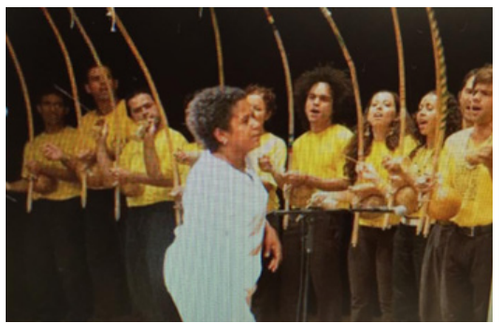


Figure 71: Berimbaus Orchestra. Source: NZINGA DF

Figure 72: Capoeira circle at Funarte in 2004. Source: NZINGA DF

Figure 73: Capoeira circle at Escola Vivendo, in 2015. Source: NZINGA DF

Figure 74: Training of the Berimbaus Orchestra, in 2013, at UnB. Source: NZINGA DF

Figure 75: Capoeira activities at the Social Center, Tia Angelina Day Care Center and Varjão Central Square, in 2016. Source: NZINGA DF

Figure 76: Capoeira circle at the ceremony of decoration orders the cultural merit, in 2015, and demonstrations on the Esplanada in 2016. Source: NZINGA DF

Figure 77: External circle at the Museum of the Republic on May 8, 2015. Source: Nzinga DF.

Figure 78: Circle at Cesas School, 602 south, in 2016. Source: Nzinga DF.

Figure 79: Circle in Praça Zumbi dos Palmares, in 2019. Source: Nzinga DF.

Figure 80: Presentation of the Berimbaus Orchestra at the São Batuque Festival in 2016.. Source: Nzinga DF.

Figure 81: Presentation of the Berimbaus Orchestra at the Latinidades festival in 2015. Source: Nzinga DF.

Figure 82: Procession of berimbaus in demonstration for democracy in 2016. Source: Nzinga DF.

Figure 83: Procession of berimbaus for the end of violence against women, in 2015, at the Pilot Plan Bus Station. Source: Nzinga DF.

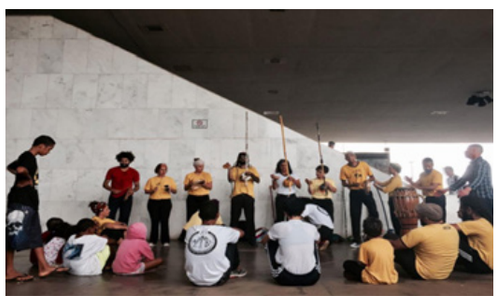


Figure 84: Circle on the bus station for National Black Consciousness Day in 2016. Source: Nzinga DF.

In the years 2020 and 2021, the center of Brasilia did not perform face-to-face activities because of the pandemic of covid-19, However, the foundation in CONIC was prepared for a safe return. An activity was also structured to broadcast the book „Mestre Gato e Comadre Onça" (Master Cat and the Jaguar), which tells the story of capoeira and which the group intended to take to the public network of the Distrito Federal through a project approved by FAC.

Figure 85: FAC Project. Source: Nzinga DF.

Figure 86: Circle in front of the Palmares Foundation in 2017. Source: Nzinga DF.

The story of the book revolves around Mestre Gato, an expert capoeirista who ventures to teach capoeira in the forest, but suffers the threat of Comadre Onça. „Come laze, let's play capoeira!" he invites. „Capoeira is a game of mandingueiro (african wizard or enchanter), tinhoso(furious), with her the jaguar could never," said Mestre Gato. And then actually she shows up, asking for some lessons..."

The activities at the Museu Vivo da Memória Candanga, near the Núcleo Bandeirante. Aimed at students from public schools, the project was proposed in the context in which the idea of starting a work aimed at children in Nzinga DF predominated, in a rhythmic and constant way, in addition to the punctual workshops in schools and other spaces, involving the child audience. With the covid-19 came the adaptation to virtual activities.

CONCLUSIONS

The contribution that this chapter intends to make to the multidisciplinary extension course CTS refers to the experience of looking at the networks of sociotechnical subjects. Social technology breaks with the individualizing ideology of the totality of the subject who reproduced and produced the world we see. The plurality and transversality of themes

involving the informational revolution and the accessibility of the subject-network in a chosen social struggle can be observed in the case examples.

The ability to articulate the subject-network through digital media is something very related to what Milton Santos calls, in his work "For another Globalization", as "information progress". Santos (2001) defines that the revolution of this connected mass can promote another globalization, more solidary, and less dependent on the capital of perverse globalization, which restricts relations and prevents life from following more independent and sustainable courses.

The need to change the pattern of consumption and production, currently in conflict with the maintenance of the planet's natural resources, can be added to the strengthening of the solidarity economy as a solution most appropriate to end the consumption patterns of large capital. Against the hegemonic knowledge of an academy that often stands in favor of the interests of large markets, a new construction of knowledge is necessary, based on the union of practical empirical knowledge with formal knowledge.

In addition, the network analysis by its network subjects was the methodology proposed by Professor Perci, being "network" the socio-historical condition of capital accumulation. The form answered by each subject-network that was part of the research revealed the potential of the network. This research corroborates the notion of Milton Santos (2000) that with advanced communication there would be a rematch of popular culture against mass culture.

The concepts of network, territory and solidarity, in this path of informational evolution, also allow to overcome the individual narrative – hostage of liberalism and modernity – as well as the procedures of solidarity economy and its assumptions.

According to Dagnino (2014), solidarity enterprises need social technology, which is the search for experiences involving the interaction of people from a community in favor of solutions to everyday problems, which often is unnoticed and without recognition. Such enterprises are characterized by the collective ownership of the means of production and by the process of self-management work, with no need for a formal scientific basis, since the processes of exclusion themselves generate social technology.

REFERENCES

ANDRADE, L. M. S. Connection of Spatial Patterns of Urban Ecosystems: The construction of a method with a transdisciplinary focus for the process of urban design sensitive to water at the community level and at the landscape level. Thesis (PhD in Architecture and Urbanism) - Faculty of Architecture and Urbanism, University of Brasilia, Brasília, 2014.

BOCCARA, p. On the information revolution. La Penssé, n. 241, set. 1984.

CAMPOS, Neio. Planned segregation. In: PAVIANI, A. (Org.) The conquest of the city: popular movements in Brasilia. Brasília: Editora Universidade de Brasília, 1991, 266 p. p. (Brasília Collection).

CASTELLS, Manuel. The information age: economy, society and culture. São Paulo, 1999.

COMCAT, Catalyst Communities. Annual Report 2019. Rio de Janeiro, 2019. Available in: https://www.termoterritorialcoletivo.org/biblioteca-ttc. Access in: 2 May. 2021.

_____. Annual Report 2020. Rio de Janeiro, 2020. Available in: https://www.termoterritorialcoletivo.org/biblioteca-ttc. Access in: 2 May. 2021.

DAGNINO, Renato. Social Technology and Solidarity Economy: building the bridge. In: Social Technology: conceptual and methodological contributions [online]. Campina Grande: EDUEPB, 2014, p. 207-265. ISBN 978-85-7879-327-2.

_____. Solidarity Technology: a strategic manual. ANTICAPITAL FIGHTS. Marília, 2019.

_____. The anomaly of scientific and technological policy and its peripheral atypicality. Ibero-American Journal of Science, Tecnología y Sociedad. CTS Magazine, no. 33, vol. 11, Septiembre de 2016 (p. 33-63).

_____. (Org.). Social Technology - tool to build another society. 2a. ed. rev. and ampl. Campinas/SP, Komedi. 2010.

_____. Social Technology: conceptual basis. CTS Magazine - Science & Social Technology. Year 1, number one. 2011. Available in: http://seer.bce.unb.br/index.php/cts/index. Access on: 3 May. 2021.

DUQUE, Oliveira Thais; VALADÃO, José de Arimatétia Dias. Theoretical Approaches to Social Technology in Brazil. Contemporary Thought Magazine in administration. Volume 11 n. 5, Oct/Dec 2017.

IBGE - Brazilian Institute of Geography and Statistics. Subnormal clusters. Available in: https://www.ibge.gov.br/geociencias/organizacao-do-territorio/tipologias-do-territorio/15788-aglomerados-subnormais.html?=&t=acesso-ao-produto. Accessed: 4 Jun. 2021.

LOJKINE, Jean. The Informational Revolution. Trad. José Paulo Netto. São Paulo: Ed. Cortez, 1999.

BIRTH, D. M.; TOSTES, S.p.; SOARES, A.C.B.; RIEIRA, H. R. E.; PINHERO, J. M.; NOGUEIRA, R. C. Z. Urban prostheses: promoting socio-spatial coexistence. V!RUS, San Carlos, no. 4, Dec. 2010.

NEDER, Ricardo T. The practice of sociotechnical adequacy among peasants: education, science and social technology. Linhas Críticas, Brasília, DF, v. 21, n. 45, p. 357-381, May/Aug. 2015.

_____. CTS - Science Technology Society and the production of knowledge in society. Brasília, Observatory of the Movement for Social Technology in Latin America - UnB/Capes - School of High Studies. Notebook First Version. Series 1. Social Construction of Technology. Number 4, 2013.

RIBEIRO, Tarcyla F.; MAYRINK, Priscilla. Collective Territorial Term, Part 1: Knowing the Idea and Possibilities For Favelas. Rio On Watch, 20 Aug. 2018. Available in: https://rioonwatch.org.br/?p=35408. Access: 12 May. 2021.

SANTOS, Milton. The divided space: the two circuits of the urban economy of underdeveloped countries. São Paulo: EDUSP, 1979.

_____. Money and territory. Geographia – Journal of the Graduation Program in Geography at UFF, Niterói, Year 1, n. 1, 1999.

_____. For another globalization: from single thought to universal consciousness. Rio de Janeiro, 4th edition, 2000.

SOUZA, Perci Coelho de. A French critique of urban space. Ser Social, Brasília, n. 17, p. 14-112, 2006.

Sociotechnical Adequacy For The Production of Habitat In The Rural and In The City

Chapter 04

Authors:

Liza Maria Souza de Andrade | Juliette Anna Fanny Lenoir | Camila Pithon Raynal
Bárbara Helena da Silva Montalva | Cláudia Evie Akijama Goddard
Gustavina Alves da Silva | Ivan Lazaro de Oliveira Rocha | Juliana Furlanetto Pereira
Lélio Marcus Munhoz Kolhy | Lucas Mincaroni Neto Radatz | Luiz Souza Neto
Marina da Silva Ribeiro | Tamiris de Oliveira Machado

SOCIOTECHNICAL ADEQUACY FOR THE PRODUCTION OF HABITAT IN THE RURAL AND IN THE CITY

Liza Maria Souza de Andrade[1]
Juliette Anna Fanny Lenoir[2]
Bárbara Helena da Silva Montalva[3]
Camila Pithon Raynal[4]
Cláudia Evie Akijama Goddard[5]
Gustavina Alves da Silva[6]
Ivan Lazaro de Oliveira Rocha[7]
Juliana Furlanetto Pereira[8]
Lélio Marcus Munhoz Kolhy[9]
Lucas Mincaroni Neto Radatz[10]
Luiz Souza Neto[11]
Marina da Silva Ribeiro[12]
Tamiris de Oliveira Machado[13]

SUMMARY: In the context of a peripheral economy, as it is the case in Brazil, public policies for the production of habitat in the countryside and in the city do not reflect the multiple realities and are not able to meet the demand. The housing deficit and the indirect housing conditions demonstrate the need to reflect on these diverse realities and propose alternatives to restrictive housing programs. The concepts of the discipline during which this collective work was elaborated propose to bring Science, Technology and Society (CTS) to the center of housing and urban improvement practices. The participation of sociotechnical subjects in the process of elaboration and execution of projects seeks to adapt them to the various socio-environmental contexts and needs found in the territories. The case studies, presented in the second part of the chapter, allow us to see a sample of the various situations found in a country with the size of a continent such as Brazil and the possible Sociotechnical Adaptations (AST). The experiences in AST, a concept proposed by Dagnino (2019), seek the advent of an awareness about the production of the habitat as a whole, in the city and in the countryside, promoting solidarity economy initiatives, which bring an associated work dynamics and essential income, within the systemic view of habitat, also integrating food production and ecological sanitation, towards a healthy and sustainable environment.

[1]UnB;lizamsa@gmail.com/ [2]UnB; juliette.lenoir@aluno.unb.br/ [3]USP; ba.montalva@gmail.com/ [4]UFBA; raynalcamila@gmail.com/ [5]UnB; claudiaevie@gmail.com/ [6]MST DF; gutabio2017@gmail.com/ [7]Associação Onze8; ivan.lazaro@outlook.com/ [8]jufurlanetto3@gmail.com/ [9]Br Cidades DF; lelio.kolhy@uol.com.br/ [10]POLI/USP (Polytechnic School) and City School; radatz@edu.univali.br/ [11]UNIT/SE; luiz.neto1999@gmail.com/ [12]marinaribeiro.arq@gmail.com/ [13]IFMG; tamiriis@outlook.com

INTRODUCTION

This project discusses habitat production in the light of the concepts of Sociotechnical Adequacy (AST), solidarity economy and Frereana pedagogy. These concepts are part of the paradigm shift proposed by studies in Science, Technology and Society (CTS) in the Latin American context (PLACTS).

Political issues in Science, Technology and Innovation (CTI) arise at the beginning of the 20th century when, for the war effort, they join forces from the "triple helix", that is, "the government, the private company and the university" (NEDER, 2013, p. 9). The view of the university mentioned here is one that serves a logic of entrepreneurship in which the benefits of innovation reach society through consumption and, consequently, the profit of private companies.

In the context of Latin American peripheral economies, the hegemony of the "triple" is questioned in the sense that it serves the interests of capital and has low distributive efficacy (DAGNINO, 2019). Thus, in a counterpoint of the CTI, studies in CTS bring to light the innovations and technical changes arising from society and the solidarity economy. To this end, pedagogy is rescued where dialogue is the starting point for the empowerment of the socio-technical subject.

In 2021, the technical report published by the João Pinheiro Foundation pointed to 2019 an estimated housing deficit for Brazil of 5.876 million homes, of which 5,044,000 were located in urban areas and 832,000 in rural areas. The total number, in relative terms, represented 8.0% of the total stock of permanent and improvised private homes in the country. As for the large Brazilian regions, illustrated in Figure 87, the Southeast presented the highest numbers in absolute terms totaling a deficit of 2.287 million households. Then the Northeast region, with a deficit of 1.778 million units.

In relative terms, the geographic region with the highest numbers is the North, whose housing deficit represents 12.9% of the stock of permanent and improvised private homes. Then, the Northeast appears, with 9.2%; the Midwest, with 8.4%; the Southeast, with 7.2%; and, finally, the South, with 5.6% (JOÃO PINHEIRO FOUNDATION, 2019).

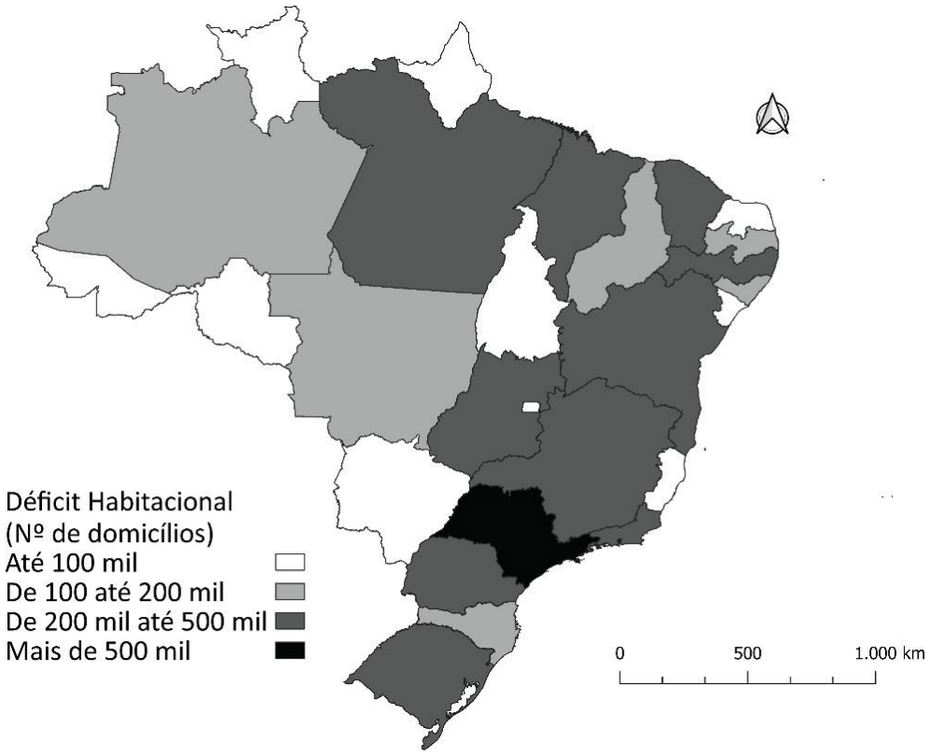


Figure 87: Total housing deficit according to federation units in 2019. Source: João Pinheiro Foundation, 2021

According to the housing deficit and its components defined by the João Pinheiro Foundation, that is, precarious housing, cohabitation, and excessive burden of urban rent, the graphs in Figure 88 show that the housing deficit affects women in a greater proportion. Compared to men, women are on average 10% to 20% more victims of excessive rent burden and live in precarious housing. Also, until 2018, there were both men and women living in cohabitation, but in 2019 there were 15% more women than men living in this situation. Regarding the racial issue, data from the 2010 Census (IBGE) show that in irregular areas 55.5% of the population is brown, 12.9% is black and 30.6% is white. These figures reveal a great asymmetry of gender and race when it comes to access to decent housing.

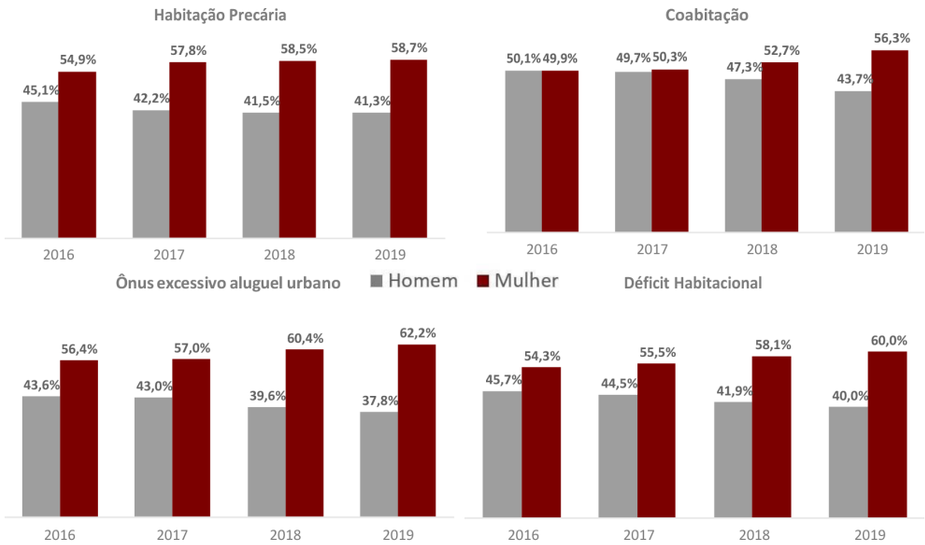


Figure 88: Graph of the second low participation of the person responsible for the homes in the components and housing deficit for Brazil between 2016 and 2019. Source: FJP (2020) based on IBGE data.

The data on the housing deficit in the country indicate the need for a reflection on the sufficiency of the existing territorial production models. The first approach of analysis in this work is to see the housing deficit not only in its quantitative dimension but also in its qualitative dimensions. The second part is to highlight what housing programs do not see as valid in their disciplinary view in which, for example, only housing built in certified materials is considered, limiting self-construction with vernacular techniques such as clay.

This chapter seeks to bring a broad reflection on the habitat in the city and in the countryside, the production and the transdisciplinary understanding of habitat. In this sense, case studies, selected in the experiences experienced or reported by the authors[14], allow to mirror practice and theory and take practice beyond what is proposed in housing programs. Self-management, self-construction, bioconstruction and the relationship between work and housing are hardly contemplated in housing programs.

In this sense, an overview of the issue of self-management in housing policy in Brazil and the theoretical concepts that guided the reflections of the Fundamentals in SC class are presented throughout the elaboration of the chapter. Next, a reflection is made on these concepts in relation to the theme of this chapter, on habitat production in the countryside and in the city. Last but not least, group members report their experiences in the territories and methodologies to promote the Socio-technical Adequacy (AST) of the projects.

[14]People who participated in the extension course Fundamentals in Science, Technology and Society with the students of PPG-FAU/UnB, guided by the tutor and the teacher.

Self-management in housing policy in Brazil

Inserted in housing policy, it is understood that self-management enables the management of public resources under the guidance of future residents and the collective construction (BONDUKI, 1992). It approaches, therefore, what Lefebvre (1968) defines as "use value", when users influence and interfere in the constructed spaces in which they live and do not act according to the exchange value that seeks to increase private profits. The insertion of this possibility in housing policy was a process in which social movements were fundamental actors, but that occurred in a slow manner. It is evident that there is a lack of public support in this context, besides the attention to housing policy being closely linked to private production (RODRIGUES, 2013).

In Brazil, the housing production that allows self-management in its processes arose in a context of diverse actors and mobilizations. Latin American cooperatives of mutual aid are cited as Latin American inspiration self-management programs, for example, and in Brazil, the alternative programs incorporated into the National Housing Bank (BNH), such as the Urbanized Lot (land) Financing Program (PROFILURB), in 1975, the Program for the Eradication of Precarious Housing (PROMORAR) in 1979, and the João de Barro Project in 1984, which allowed for the first time that self-construction was possible under a federal program (CAMARGO, 2016). In addition, we mention the Basic Ecclesial Communities (CEBs) together with housing movements, land occupations in the peripheries, and politicalized technical advisories linked to universities and progressive prefectures, which allowed and financed the joint battle as a possible way to build housing.

In parallel, social housing movements have participated since the Federal Constitution of 1988 in favor of urban policy present in its articles 182 and 183, the Statute of the City (2001), the creation of the Ministry of Cities (2003) and the Council of Cities (2004), in addition to the law of popular initiative (Law no. 11,124/2005) that established the National Housing System of Social Interest and the Social Interest Housing Fund, considered extremely relevant to the country (FERREIRA, 2012).

At the municipal level, there was the program that took place in the city of São Paulo from 1989 to 1992, which is seen as an example of the viability of housing with the principle of self-management: the Fund for The Care of the Population Living in Subnormal Community Housing (FUNAPS-Community or FUNACOM). Success in this program is associated with its proposal linked to a tripod of equality between the actors involved, the State, community

associations and technical advisories, as illustrated in Figure 89 (CAMARGO, 2016).

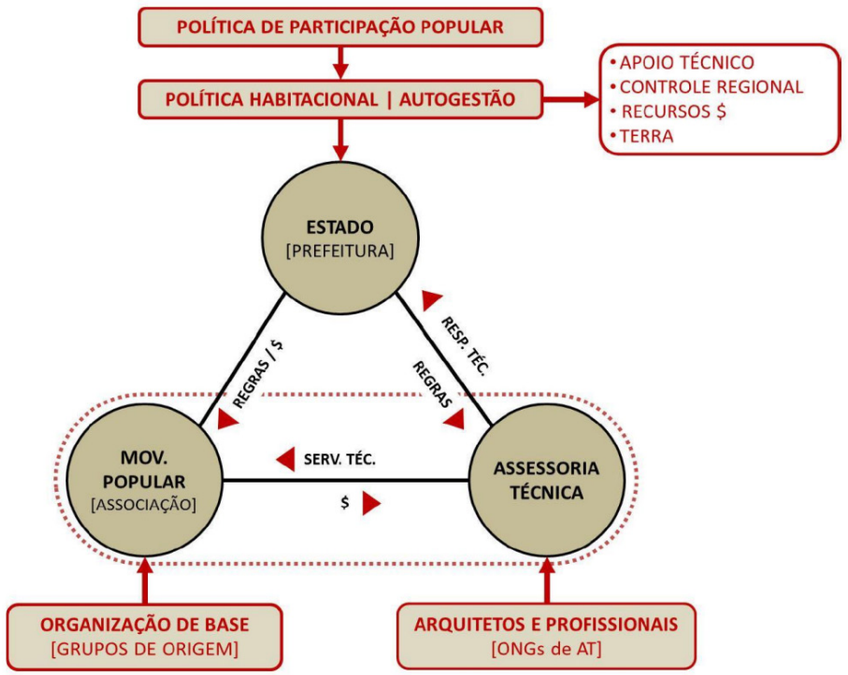


Figure 89: Self-management tripod under FUNACOM.
Source: CAMARGO (2016)

At the federal level in Brazil there were three programs that allowed self-management in their processes: (i) Solidarity Credit Program (2004-2008) which, however, due to bureaucracy, lack of funds and complexity, was extinguished; (ii) Social Housing Production Action Program (2008-2009), with only one project built (FERREIRA, 2012); (iii) Minha Casa Minha Vida (My House MY Life) Entities Program (PMCMV-E), launched in 2009. It is noteworthy that this modality of Entities was created after the mobilization and claim of housing movements because in the same year was launched the Minha Casa Minha Vida Program (PMCMV), in which entrepreneurs and investors in the area of civil construction were at the center of the debate on the formulation of this program (MARICATO, 2011). The PMCMV objective was to stimulate the economy through civil construction in the context of a global economic crisis, focusing mainly on the popular market segment (CAMARGO, 2016).

The PMCMV-E has relevance, is part of a historical claim, and meets the demands of families from 0 to 3 minimum wages, although quantitatively representing a tiny production when compared to the market production. According to Camargo (2016, p. 26), PMCMV-E is cited as "housing production self-management to the Brazilian (or its discourse)". The author explains that this modality, "dug" to enable self-management in its processes, was built based on the policy defined for the performance of PMCMV companies, being required that, to enable housing, housing movements needed to function as companies (CAMARGO, 2016; MARTINS, 2019).

In this context, the famous tripod of equality between actors, cited in the program Community Funaps, was modified in PMCMV-E and, within the matter of this program, an unequal relationship is perceived between the actors in the construction of public policy (Figure 90). Thus, the community association, here called the Organizing Entity (associations, cooperatives, unions, etc.), is responsible for most of the demands and, therefore, needs to practically professionalize to achieve the goal of enabling housing. Among its attributions are: indication and selection of families, choice of technical assistance, project contracts and negotiation of choices with future beneficiaries, responsibility for the management of the work, with the possibility of hiring construction companies or with the organization of the beneficiary families themselves organized through work in a joint effort, in addition to the purchases of materials and even the delivery of keys to families (CAMARGO, 2016).

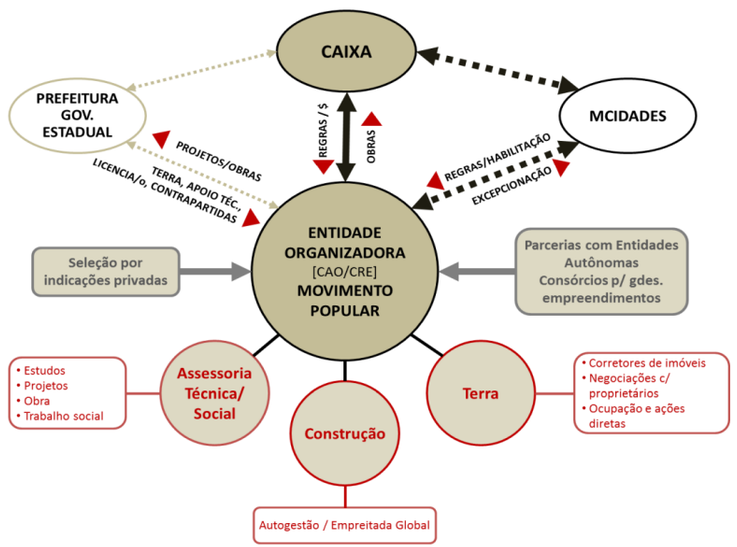


Figure 90: Explanatory scheme of self-management under the PMCMV-E at the Federal level. Source: CAMARGO (2016)

Thus, self-management in housing policy becomes extremely complex and does not meet the reality of social movements, distancing itself from the objective of these, which is the viability of housing. Making housing production possible with the principle of self-management is to enable, among several factors, that future residents participate in the process by understanding its possibilities and limitations. Requiring them to act as a company makes this possibility present in housing policy, but only as a discourse, as Camargo (2016) quotes.

With the end of the My House My Life Program, the investment in PMCMV Entities was also over, an important achievement of social movements, despite criticism. In this context, the National Union for Popular Housing and partners have developed guidelines for the implementation of the Self-Management Bill (PL No. 4,216/2021) to create the National Self-Management Housing Program. The Committee on Participatory Legislation of the House of Representatives approved the proposal, but the proposal remains unapproved in Congress.

In the self-management model, a community manages the housing solution process, participating in all stages of construction, from the selection of the land, project development, and choice of the technical team to the definition of the forms of construction. However, this practice depends on housing-related programs.

The model of housing by self-management is also defended by the Council of Architecture and Urbanism as a way to democratize the work of urban architects, remembering that in the survey conducted in 2015 by this entity, 85% of the country's houses are still built by lay people, and as previously described in the study by the João Pinheiro Foundation, 25 million dwellings are inadequate.

In this context of self-management, it is necessary to move forward in the fundamentals of Socio-technical - AST, in habitat production and solidarity economy, integrating housing to associated work and income.

FUNDAMENTALS IN SOCIOTECHNICAL ADEQUACY AND SOLIDARITY ECONOMY

As previously introduced, the concept of Adequacy Sociotechnical (AST) proposed by Dagnino (2019) uses research in science, technology and society in the Latin American political sphere (PLACTS). AST seeks to promote an approximation of scientific and technological knowledge, taking the focus off the technical and economic issues as a guide of the processes. The CTS relationship proposes to merge aspects that involve the survival strategies of the human being, the identity traits of the sociotechnical subject and its relationship with nature (ANDRADE et al., 2019).

AST is a social construction that can be designed, deductively, in the institutions where it is usually produced, through the politicization and internalization of alternative values and interests and the observance of precepts of plurality and internal democratic control. AST has an additional condition in this process, of the social actors directly interested in having a piece of knowledge for the production of goods and services, consistent with their values and interests (DAGNINO, 2019).

In the context of a peripheral economy, CTS thinking places society at the foreground of production, management and fruition. Hegemonic thought creates a mythical maxim within the various sectors of society by drawing a worldview in which there is no "cornerstone" of the collective construction of objective and subjective processes. Still in our current day, thinking about the collective or planning and programming actions in a network of empathy creates strangeness and, above all, guides these actions and developments that have such guidelines, in the category of exception.

By reversing the logic of production, through insurgent practices, methods, processes, or techniques contributing to the solution of social problems, social and environmental conflicts emerge from collective knowledge and techniques in the solution of social problems, social and environmental conflicts and in the struggle for the essential rights of populations excluded from the process of planning the territory (ANDRADE et al., 2019).

According to Silva (2020), the popular economy interacts with life and not in isolation from the production of goods and services. When the activities of the collective workers take into account care and protection, women and men find alternative ways of living and resist uncertain conditions of simple survival. They resist, therefore, oppressive relations of gender, race or class.

The solidarity economy is a space consisting of production and consumption networks based on the collective ownership of the means of production and self-management, with strong vectors of expansion, threads and overflows, acquiring sustainability within the framework of a peripheral capitalist economy (DAGNINO, 2019). It also emerges in parallel to the need to adapt cognitive processes related to the production of goods and services, to a trend that emerges as a future-carrying fact to achieve the utopia of social justice, economic equity and environmental responsibility and the willingness to face hunger, poverty and social exclusion, in order to avoid its negative implications for the planet and what lives in it.

The rescue of experiences in history – organization of the production and consumption of goods and services based on the collective ownership of the means of production and self-management – resurface in moments of capitalist crisis. The solidarity economy has been gaining strength in the international environment of politics and policy. Politics deals with "politics as a field of confrontation of world views systematized by political parties in search of governmental power", and the policy deals with "politics as a result of this confrontation legitimized by the State as public policies, plans and projects" (DAGNINO, 2020). AST is present in both systems because it has a social demand, however, we can describe it as an implicit policy because it is a demand not yet addressed.

Technoscience , as a generic term, is consistent with the action of an actor on a work process that he controls and that, due to the socioeconomic context, social agreement and productive space acting, allows a modification in the generated product, which may be appropriate regarding the interest. Furthermore, technoscience is the cognitive result of the action of a social actor on a work process that he controls and that allows a modification (qualitative or quantitative) in the generated product, which may be appropriate according to his interest (DAGNINO, 2019).

A Solidary technoscience can be understood as an open-mutant , flexible and adaptive - way of concatenating and brokering, with frequent use of the sociotechnical adequacy of capitalist technoscience, knowledge of any nature - scientific, empirical, technological, religious, ancestral - and their origins, whether in academia, in companies, native people, popular movements, excluded and social actors. It aims to appropriate a material result derived from changes in the process of production and consumption of goods and services in solidarity economy networks, respecting the values, interests and satisfaction of the collective (DAGNINO, 2020).

Social technology, as a concept surpassed by Solidarity technology, is the product, method, technique or process created to solve social problems that meet the requirements of simplicity, low cost, easy applicability (and replicability), in addition to social impact (DAGNINO, 2019). Figure 91 illustrates the three foundations of the movement for social technology proposed by Neder (2011), in which the relationship between the three circles – sociotechnical subject, AST and self-management – is more important than the circles themselves.

One alternative technoscience, such as solidarity technoscience, can only emerge in spaces where:

> there are values and interests consistent with a style of alternative development – such as solidarity enterprises – which are by extension counter-hegemonic to the dominant ones in those environments where capitalist technoscience is generated (DAGNINO, 2019, p. 60).

Also according to the author, there must be another form of ownership, especially in the context of private ownership of the means of production. Not the state, but the collective, characteristic of the solidarity economy.

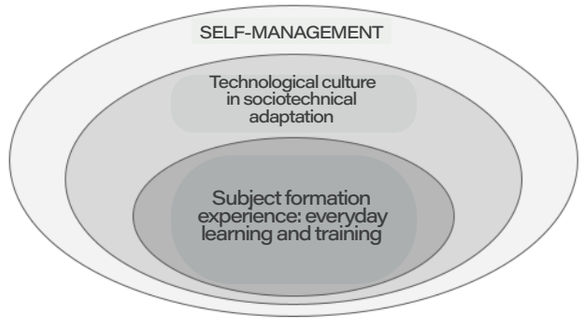


Figure 91: Diagram of the 3 foundations of the movement for social technology. Source: Lenoir, inspired by Neder (2011).

Work, occupation and income

According to the 1st National Plan of Solidarity Economy (2015):

> It is an alternative of work and income generation through work that combines the principles of self-management, cooperation and solidarity in the performance of activities of production of goods and services, distribution, consumption and finance.

Among the actors who are included in these initiatives, family farm cooperatives, agrarian reform settlements, companies are presented as examples of self-managed by workers, solidarity finance institutions, etc., which have become fundamental not only to creating forms of survival, but also by going beyond, redesigning the social fabric (ANDRADE, 2007).

It is observed how the solidarity economy was essential for the local development of the territory, being created in opposition to economic projects coming from developed countries that did not adapt to the realities of the territories of developing countries. Local development models generate income in a more distributed way among the various actors, being a way of thinking about the territory, including the competencies of residents and valuing local values and knowledge. It also embraces the concepts, mentioned above, of self-management and cooperation among residents for activities of production of goods and services (SOLTEC/UFRJ, p. 26, 2012).

The solidarity economy movement resumed in the 1990s, in the face of the strong advance of neoliberalism in world economies, and finds in the "contradictions of capitalism new forms of economic organizations" (ESTEVES, 2017, p. 171). In Brazil, it is a movement that has had a high number of adherence followers and has seen its application increase in the struggles for rights of the new post-democratization and post-constituent social movements (ESTEVES, 2017).

In this context, solidarity economy initiatives brought together workers from various social movements, such as land reform settlements, recovered factories, urban waste collectors, family farmers, members of traditional communities, etc. (ESTEVES, 2017). From this movement arises some social achievements that put the agenda at the institutional level of government policy, such as the creation of the National Secretariat of Solidary Economy (SENAES) in Lula's government in 2003, linked to the Ministry of Labor Employment. Despite this advance in the political sphere, the initiatives still followed as resistance practices within their territories in opposition to the advance of neoliberalism, without losing the essential characteristics of self-management, solidarity and collectivity.

In the context of social housing and habitat production, self-management enterprises within social movements – such as the Homeless Workers' Movement (MTST), The Landless Movement (MST) and the National Union for Popular Housing (UNMP) – show how they have the potential for political proposal stemming from their struggles. The production of organic food within settlements that generate income and feed the population through federal government programs, such as the National School Feeding Program (PNAE) and the Food Acquisition Program (PAA) (MST, 2021), is an example of income generation for the movement, in a fair and collective way. Self-management in these movements for housing also gives another character for self-construction. In São Paulo, when the peripheries began to grow around the 1960s, self-construction was present in dormitory towns: the worker built his house during the weekend with the help of neighbors (KOWARICK, 1993), showing the precariousness present in these neighborhoods, which the basics were not provided by the state, but built by the hands of residents.

Homelessness is still precarious. The social movements of post-democratization have made self-construction a pillar of their struggles, and also a policy, based on the task forces (UNMP, 2019). An example is the Associação Pró-Moradia de Osasco (COPROMO), in the metropolitan region of São Paulo, where residents built a condominium with apartments according to their needs, something also claimed by social movements: "definition of the land, the project, the choice of the technical team, or the forms of construction, in addition to the control of public resources and the work by the community itself" (UNMP, 2019), in this case, the technical advisories of professionals chosen by residents as essential in supporting the fight for decent housing.

The so-called self-production of space becomes central where workers do not separate labor and housing, driven by collective popular initiatives, called by Zerlotini as "spaces for the reproduction of life" (ZERLOTINI, 2020, p. 9), in which other uses are given for previously planned spaces to segregate the activities each in its space. In self-managed spaces, the worker has control over the process, the tools, and the resources and has the notion of the totality of his work, being able to perform it completely, and not just a fraction, with repetitive and alienating movements controlled by a boss. In the self-managed spaces, there is a new way of occupying the spaces, both in the countryside and in the city, which rescues the collective character of work and creates another way of living. An example is the occupations of abandoned buildings, which are given other uses besides housing, such as places of cultural meetings, and activities open to the public, where residents use the space to generate income to maintain families and the space itself, changing the way one inhabits the city, how work becomes a political struggle and creates collectivity and how another economy is created.

Sociotechnical adequacy and socio-technical advice for habitat production in the countryside and in the city

The history of technology in Latin America is characterized by the import of materials, professionals, procedures, norms and typologies from central countries and which, already in the first half of the twentieth century, had become the only organizing structure of the production (called "traditional") institutionally admitted. It is observed, on the other hand, that a significant portion of the population, both urban and rural, excluded from the conditions of access to it, has been prepared to use, within its own limitations, all types of new materials and elements, used or semi-destroyed, industrial products specifically intended for construction and/or for any other purpose, as well as materials of natural origins, such as earth, straw, bamboo, stone and logs (PELLI, 1990).

With the end of the Military Dictatorship, from the 1980s on, organized social movements returned to the political scene that, approaching architects and urban planners, and sought technical advice from professionals to assist them in their claims, especially for the problem of housing (CERQUEIRA, 2009). In the midst of many debates, the first proposals for housing programs, urbanization of slums, land purchases and construction of houses are elaborated, with the participation of users through the self-managed joint battle and

technical assistance (CERQUEIRA et al., 2018).

After two decades, some of these issues arise in the context of the reappearance of the discussion about "alternative" technologies in the midst of social movements, such as solidarity economy networks, technology incubators of popular cooperatives – which already covers almost 40 Brazilian universities – recovered factories and popular cooperatives (DAGNINO, 2008). In the context of solidarity economy, Solidarity Technoscience (TS) can be understood as a way of agency, often through Sociotechnical Adequacy (AST) of capitalist technoscience, knowledge of any nature and origin by social actors that aim at the appropriation of a material result that came from changes in the process and consumption of goods and services in networks of solidarity economy, mainly oriented to meeting collective needs and meeting public accounts (DAGNINO, 2019).

Influenced by the contribution of the critical theory of Feenberg, for whom technology is not neutral because it incorporates values of industrial society, especially from the elites capable of incorporating (or translating) their values (or claims) into technique (NOVAES; DAGNINO, 2004), AST´S proposal can only emerge in spaces where there are values and interests consistent with an alternative style of development – such as solidarity enterprises– which are, by extension, counter-hegemonic to the dominant ones in those environments where capitalist technoscience is generated (DAGNINO, 2019).

In this perspective, AST aspires to the "contamination" of the spaces where TS is dealt with by those who advocate an alternative style of development, with the values and interests of social actors, who will benefit the most from its implementation (DAGNINO, 2020). Technical Advisory Services contribute to this, which work within the notion of citizenship sociotechnical, which are based on solidarity production relationships and that assume that the practices of interactionism, originally proposed by Frerian pedagogy, are also part of the Latin American approach of AST, in which the subjects of scientific knowledge can share their technical codes with organized social subjects (ANDRADE et al., 2019).

Topics that will be addressed in the modules of the CTS Residence

In the context of AST in the construction of the Multiprofessional Residence CTS, the understanding of the production of the human being habitat passes through the notion of Heidegger habitat (2001), the "Being-in-the-world", the way we inhabit this world in "Build, Inhabit and Think". "Inhabiting" does not simply refer to the fact of having a residence, but translates into the way man, when relating to his possibilities of "Being-in-the-world", acts on the world that surrounds him through the technology that makes it possible to build.

When we think of the word inhabit, we then associate it with the idea of construction (housing or place) in which life happens. But does the inhabiting really happen in these places? For Heidegger (2001), the understanding of inhabiting translates into the poetic way man is on Earth. In this sense, in the context of the human-nature relationship, the production of habitat in the countryside and in the city, with its similarities and differences, is reflected in the survival strategies integrated into the way of life – shelter construction, waste treatment, access to water, energy and food – which reflect the way of living in the broader sense, dimensions of sustainability in spatial planning. By grouping ourselves in towns and cities according to the capitalist type of production, labor and income dissociate themselves from living, requiring large displacements, separating housing from work and leisure, as well as from ecosystems and biogeochemical processes that sustain life in cities.

Remembering Henry Lefebvre (1968), the production of space should be regarded as historically produced by man as he organizes his society in politics and economics. Space is a social product, so it involves the contradictions of reality. The constructed spaces, within the capitalist logic, express the standardization and individualism of this rationality, and are, therefore, abstract spaces, prioritized by aesthetic reason and the force of images.

In contemporary cities, that organic order that existed in the groupings and villages was lost. Currently, in densely populated cities or planned cities of the twentieth century, these organic patterns were lost, here understood as a configuration of existing relationships between the way of life and the city's space (ANDRADE, 2014). However, in most cities in colonized Latin America, the self-production of space happens in an emerging way in popular settlements, without the intervention of the State and professionals in the area of architecture and urbanism. In the villages and slums, there are networks of solidarity or collective work, called popular economy, which come together to ensure the conditions of their existence and that end up being related to the space in which they live, opposing the social relations of oppression.

According to Zerlotini (2020), the popular economy has to do with "life", and not

only with the production of goods and services. The spaces of the work collectives can take place in small factories, houses and streets that combine social, cultural and training activities, and, in some cases, environmental activities, mainly to make the improvised sanitation of houses and even streets.

The habitat is part of the right to the city because it has its foundation in several other rights, such as the right to housing, health, mobility and leisure. Therefore, the habitat is related in all the themes addressed in the Multiprofessional Residency CTS, since the relationship between housing and work is one of the topics less contemplated in habitat production.

After 20 years of City Statute, it has not been possible to achieve urban reform, to order the territory with the master plans to meet the constitutional objective of urban policy and comply with the full development of the social functions of the city and urban property to the four groups of purposes established by law: (i) to promote the democratic management of cities; (ii) offer mechanisms for land regularization; (iii) overcome real estate speculation; and (iv) ensure the environmental, social and economic sustainability of urban centers.

It has not yet been possible to promote the general guidelines of Article 20's item I to guarantee the right to sustainable cities, such as the right to urban land, housing, environmental sanitation, urban infrastructure, transport and public services, work and leisure for present and future generations, a key condition for achieving the UN 2030 Agenda in its Sustainable Development Goals (SDGs), in particular the SDG11 "Sustainable Cities and Communities", which the main objective is to "make cities and human settlements inclusive, safe, resilient and sustainable"[15].

In Andrade's view (2014), one of the major challenges for urban space planners is to reconcile, in a systemic way, the demands for the survival of the human being: water, energy, food production, shelters and waste treatment. These demands are related to the densities of occupation and their social benefits in balance with ecosystems, landscape and natural processes, such as the urban water cycle. In addition, there are challenges that become increasingly pressing in the face of the uncertain future of scarcity of natural resources, such as drinking water on the planet, the decline of oil, climate change, the global economic crisis, the increase in social inequalities, the rise in food prices and hunger.

Mare (2008) believes that in the future, with the decline of oil as an energy source, megacities will undergo a reverse migration process with people returning to the countryside or smaller cities due to the scarcity of natural resources. As occurred in some ancient civilizations, the movement "neo-rural" has already been visible today with the social isolation caused by the pandemic of covid-19, in which the flow of people to smaller cities and the countryside has increased.

On the other hand, the promotion of agrarian reform in Brazil faces historical, socioeconomic and political challenges to combat a scenario of strong land concentration. Agrarian reform represents the prioritization of the social function of rural property within the constitutional system that predominates the right to property, which provides, as a means of its implementation, the expropriation of large unproductive areas.

In addition to the social and environmental issue, traditionally addressed by the discussion on agrarian reform, there is a spatial scope that is little addressed, which analyzes the space resulting from the dynamics of land concentration. Currently, the largest amount of productive land in the country is intended for the production of agricultural commodities, mostly grains destined for export with hight quantity production, in properties larger than four fiscal modules (minimum area of a rural property and in which the footage varies according to the municipality). In return, the smallest share of land is destined to the production of food for human consumption in Brazil.

The incidence of these dynamics directly impacts the configuration of the rural landscape and the acceptance of a spatial dynamics that influences life in the field: difficulty in connectivity between rural center, difficulty in accessing public and community equipment, difficulty in designing and maintenance of environmental corridors, lower occurrence of productive variety in areas of intensive cultivation, compromising the genetic diversity of the environment, among others.

In the field, it is still necessary to advance the knowledge and appropriation of peasant reality, so then in universities students, teachers as well as professionals can work more appropriately with territorial planning integrated with the housing project.

In this context, AST, for the production of habitat in the Professional Residence, intends to work on social housing projects in the field and in the city, promoting the design of systems integrated by the inclusion of the concepts of ecovillages, urban ecosystems and permaculture. Also included are self-constructed knowledge and social technology in housing, which means bioconstruction practices, advances in the proposition of socio-ecological infrastructure with water-sensitive places and nature-based solutions to design healthy environments and promote environmental comfort.

The CTS Multiprofessional Residency has the experience of " socio-technical resistance" of the Research and Extension Group "Peripheral, emerging works" of FAU/

[15]Available in: https://brasil.un.org/pt-br/sdgs/11. Access: 04 Sep. 2022..

UnB, which begins with the demands and vocations raised and analysis of potentialities and problems: local identity, existing knowledge, spatial patterns and events. The patterns (parameters) are selected after a participatory diagnosis of the site in the form of affective maps, an analysis of the context that contemplates the patterns of events related to space and social expectations mapped by the analysis of the dimensions of sustainability (environmental, social, economic, cultural and affective), according to Andrade and Lemos (2015). They are important keys to thinking about the complexity of acting in the production of habitat in the countryside and in the city.

METHODOLOGICAL PATH

This chapter is the result of the collaboration of thirteen authors, and students of the discipline of Fundamentals in Science, Technology, and Society, taught in the first semester of 2021. Coordinated by Professor Liza Andrade, the discipline had an original form, alternating a week of presentation of teachers of the future Multiprofessional Residency, and a week of internal discussions to the thematic groups. So the theme of the chapter "Adequacy Socio-technical for the production of habitat in the countryside and in the city" was discussed in parallel with the concepts and experiences presented by the teachers.

In addition, the editorial line of the discipline called for up to five habitat production experiments to be reported. The choice of these took place in a natural way, during the first thematic work meetings with the group and during which each one tried to understand the concepts presented according to his own experience: placed in the collective, doubts about theoretical concepts were mitigated.

In the choice of case studies, it was sought to tension the interaction between theory and practice, in the sense that the approximation of experiences and theoretical concepts of the discipline allowed us to reflect on the level of sociotechnical adequacy of dialogical processes. What role did the participants play during the participatory process? In which stage of the project or execution was there participation? What kind of participation, passive or emancipatory?

In order to present a wide range of habitats, according to the title of the chapter, the choice of experiences was due to territorial characteristics, that is, to have at least one experience of habitat in the countryside, of social movement origin, in the city, of association of residents origin or promoted by the Council of Architecture and Urbanism (CAU) and of the professional practice of technical assistance origin. A sample of habitat diversity was sought and then investigated the methodologies of sociotechnical adequacy were implemented, as well as their limitations, challenges, and innovations.

What kind of problems needed to be solved and what solutions were found in that territory and period? Have the problems been posed and solved by technicians or residents? Has the demand been supported by authorities, public policies, or private initiatives?

In the Sociotechnical Adequacy process (AST), the issue of the language used for communication between technicians and residents is the question. Case studies investigate these issues to varying degrees, according to the particularities of each experience.

EXPERIENCES IN TERRITORIES

The experiences brought by extension course members in the chosen territories reflect the course's intention to work on the approach in which the subjects are co-authors of the technical processes.

These experiences include: (i) the description and contextualization of the territory; ((ii) the presentation of good practice; (iii) the collaborations and potentialities for the understanding of the Fundamentals in CTS applied to the habitat, indicating potentialities for sociotechnical processes and methodologies that can be used in the Multiprofessional Residency CTS.

Onze8 Association (Vitória, ES): experiences in ATHIS and the Territory of Good - Description and contextualization of the territory

With its center in Vitória, capital of the state of Espírito Santo (ES), the Onze8 Association is active and acts by the constitutional right of access to adequate housing through the popularization of architecture and urbanism services. The association was formally founded in 2019 by architects and urban planners who sought to work in the provision of Technical Assistance in Housing of Social Interest (ATHIS). Part of the founders, throughout their academic careers, worked in the Model Offices of Architecture and Urbanism (EMAUs). Thus, the members of the Onze8 Association began to approach the regions of highest socio-environmental vulnerability in the Metropolitan Region of Grande Vitória (RMGV) and civil society institutions organized to understand the reality of the daily lives of communities, their needs and act in the search for solutions.

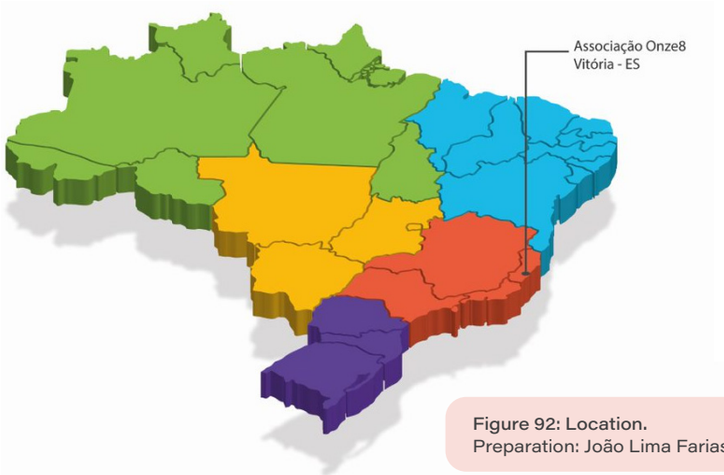


Figure 92: Location.
Preparation: João Lima Farias, 2022

Among the various institutions of organized civil society active in the territories lived by the members of the Onze8 Association, and the Associação Ateliê de Ideias predominates, formally founded in 2003 and focused on the search for community development. This is because of its relevant performance in the state of Espírito Santo and its contribution to the foundation of the community bank: Banco Bem.

The attendance to the idea of acting in the field of housing of social interest suggested by the local population and the exercise of the institution to encompass in its projects students and professionals of civil construction are other examples of how the Association Ateliê de Ideias is pertinent to the theme of this chapter.

The headquarters of Banco Bem, the Associação Ateliê de Ideias and the place where most of the Onze8 Association projects are found are located in the Territory of Good (Figure 93), more specifically in the central part of the island of Vitória, where the neighborhoods of São Benedito, Da Penha, Itararé, Bonfim, Consolação and Gurigica, in addition to the popularly known regions as Jaburu, Constantino, Forest and Engineering. According to the "Research Knowledge, Making Process and Profile of Residents of the Território do Bem (Territory of Good)", this region is composed of 8,272 housing units and has a population of 31,011 inhabitants (Figure 94).

Figure 93: Polygonal of the Territory of Good.
Source: Google Earth Pro

It is important to highlight that this is a region of socio-environmental fragility, where its population is composed mostly of black people with a total family income of one or two minimum wages (ASSOCIAÇÃO ATELIÊ DE IDEIAS, 2019). The region has become popularly referred to as the Território do Bem throughout the implementation processes of Banco Bem, the formation of the Community Development Forum of the Território do Bem (Bem Maior Forum), due to the formation of more community leaders and the execution of various social, economic and environmental projects.

Figure 94: Associação Ateliê de Ideias, Bem Maior Forum and the realization of the Research: Knowledge, Making and Profile of residents of the Territory of Good.
Source: Instagram - Associação Ateliê de Ideias, 2021

Presentation of good practices, collaborations, and potentialities

Throughout the years of operation of the Associação Ateliê de Ideias, actions were put in place to enhance the solidarity economy through social projects carried out together with the residents. Soon, Banco Bem's social technology activity, its credit lines, and the Network of Solidarity Digital Banks, e-money, developed as a digital social currency platform (Figures 95 and 96).

Figure 95: Trade in the Território do Bem and e-money. Source: Instagram - Associação Ateliê de Ideias, 2021

Figure 96: The Territory of Good and the Good Bank. Source: Instagram - Associação Ateliê de Ideias, 2021

Currently, at Banco Bem, three lines of credit are offered to residents of the Território do Bem: housing, productivity , and consumer services. The credit analysis is different from conventional banks: the database of the Brazil Credit Protection Service (SPC Brazil) or similar is not taken into account, but rather a closer assessment of the community, analyzing the possibilities of payment of the borrowers and their families, the different formal and informal remunerations that the applicants receive, as well as conducting consultations with its neighbors.

The Bem Maior Forum is an important partner and consultant for the elaboration of credit analysis criteria. It may also be necessary, as a last resort in the decision-making process – when Banco Bem's credit analysis committee and credit analysis committee reach a greater impasse – that credit applicants submit to the forum to justify their credit taking at the Community bank.

The housing credit offered by Banco Bem was elaborated from the suggestion of a builder who took his inquiry to the bank's management group. According to him, it was not possible to build in the Território do Bem and in the most affluent neighborhoods of the city, because the communities did not have access to credit that would enable this type of practice. It was from this intervention of the residents of the territory itself that the housing credit line was made feasible.

With the advent of banco bem's housing credit and the creation of the Bem Morar cooperative, focused on the manufacture and sale of concrete-soil bricks and also promoted by the Community of The Território do Bem, and the Associação Ateliê de Ideias, the first tests of the provision of ATHIS aligned with the demands generated by the commercialization of bricks are provided. Between 2005 and 2017, this entire network of partnerships previously presented worked and also had the support of the University of Espírito Santo (UFES), the Government of the State of Espírito Santo, the Micro and Small Enterprise Development Agency and Entrepreneurship (ADERES), some municipalities of RMGV, companies such as Companhia Siderúrgica de Tubarão (current ArcelorMittal – Tubarão Unit), Vale, Petrobras and organized civil society entities such as the Caixa Employees Association, BrazilFoundation, The Third Sector Foundation of the State of Espírito Santo and others.

The activities of this network culminated in several attempts to practice the provision of ATHIS, resulting in approximately 15 years of experience in ATHIS, urban interventions, participatory processes and elaboration of environmental and patrimonial projects by architects and urban planners who today make up the founding members of the Onze Association8. In the search for discussion, the tensioning of the different spheres of public power, and by the joint articulation of activist entities and individuals in favor of the right to adequate housing and sustainable urban development, the Onze8 Association began to approach the center of BrCidades (BrCidades ES).

It is important to highlight that projects that enabled housing credit, provided by Banco Bem, were also executed, and added to the technical advice on architecture practiced by the Onze8 Association. However, it was noticed that the values practiced were insufficient to ensure a fair remuneration of the professionals involved and the monitoring of the work, the latter is a very important service to ensure the provision of assistance and the security of application of the granted credit. The interest on housing credit that could adequately remunerate the parties involved would become too costly to borrowers without external financial contributions. Thus, the offer of this service was discontinued.

Understanding the desire and the need to act, the conscious objectives of the partners of that institution became conscious objectives: the indispensability of a diffuse

process of raising financial resources – for the feasibility of the projects of the Onze8 Association – and the search for edicts and partners that could sponsor the operationalization of advisories that would ensure the development of architectural projects and the execution of civil works.

The institution mentioned above is organized in the process of political discussion about decent housing, the right to the city and the tensioning of public authorities and class entities, together with a network formed by the BrCidades ES Center, Associação Ateliê de Ideias and several actors of organized civil society, demanding appropriate public policies.

Collaborations were made in the composition of item 6, "Dignified housing and right to the city", from the document "Inclusive cities, an agenda for the elections of Espírito Santo" (Figure 97), in order to share the experiences of the Onze8 Association and generate proposals relevant to the theme, so that they could be registered in the agenda elaborated by the core of the BrCidades ES in the year 2020.

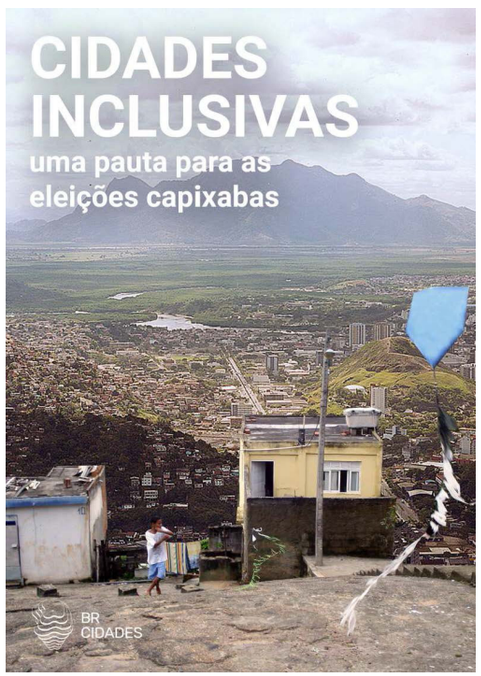


Figure 97: Inclusive cities, an agenda for the elections of Espírito Santo. Source: Site - BrCidades, 2020

Acting in a pandemic situation

In May 2020, in the face of the global health crisis caused by covid-19, the Onze8 Association, in partnership with the Associação Ateliê de Ideias, obtained the financial and operational contribution of the Unimed Vitória Institute to implement the Housing Health project. The objective of the project was to carry out renovations in residences in the Território do Bem (Territory of Good) in order to improve the life quality of families and adapt the wet areas of the residences to better conditions in the care processes against covid-19.

The selection of beneficiaries was carried out based on families in situations of socio-environmental vulnerability, headed by women, and appointed by community leaders who made up the team of professionals participating in the project. The Housing Health was conceived in line with some of the practices of the solidarity economy, seeking the application of financial resources directly in the territory, such as hiring local labor, relocating the beneficiary families in properties of the same territory and purchase of construction materials in developments in the region.

Maria Sônia, one of the women contemplated by the project, is a black mother of three, is 38 years old and married to Benedito. Her house is ordinary and it has distances in its facades which are in the front, in the back and on one of the sides. The building consists of a living room, two bedrooms, a kitchen, a bathroom and a laundry room (Figures 98, 99 and 100). The family was selected for the high state of vulnerability in which the physical and psychological health of the mother was and by the severe condition of the wet areas of the residence. The bathroom, which was located at the back of the residence (Figure 100), had in its roof the water reservoir tank, where it was possible to notice the exposure of the hardware of the slab structure. It was possible to identify the existence of mold and humidity, in addition to the lack of proper connection of the bathroom's sanitary sewage to the sewage collection network present in the neighborhood.

During the project execution process, it was possible to create a closer relationship with the family and thus try to better understand their life dynamics. The approach was carried out in the meetings for the development of the architectural project, participation of logistics operations, monitoring of the execution of the work, process of finishing the project and delivery of the residence.

The parents presented drugs and vices, even leading one of its members to the need to move from the neighborhood. It was possible to identify the sexist environment maintained by the components of the family nucleus and the place of caregiver to which

Sonia was submitted. Being aware of this situation, the professional of The Onze8 Association responsible for the care of this family chose to focus most of the participation of the project decisions on the mother, intensifying the appreciation of it for the family and explaining that it was for her that the family had been selected to be attended by Housing Health.

The Association Ateliê de Ideias connected the family to public health services and to the network of collaborative initiatives promoted in the Territory of Good. It is noteworthy that, during the project process, the cultural vocations and productions of Augusto for rap and Hip Hop culture were identified. In the face of this scenario, the person responsible for the family service contacted the Associação Ateliê de Ideias, which, together with Varal, the communication agency of the Territory of Good, connected him with the NGO Festival, a platform to promote the creative economy.

The need for social distancing and the urgency of family care made it impossible to seek support from local groups and collectives that could contribute to the mapping of local beneficiaries and labor. It was verified, over the time of the project execution, the omission of the necessary information for the selection process by the beneficiary families, as well as the scarcity of qualified local labor.

During this project, the struggles related to the lack of urban structures and infrastructure in territories of socio-environmental fragility were even more hidden, especially because it was being implemented during the covid-19 pandemic. The logistics of construction materials was a difficult challenge to overcome, since the projects for the sale of construction materials deliver the materials only to the roads accessible to vehicles, often distant from the construction site. Struggles were also experienced in rainy periods, because rainwater drainage infrastructure overflowed due to system clogging and irregular connection of sanitary sewage, causing strong flows of contaminated water along the length of the place´s staircases.

Figure 98: Front facade of Maria Sonia's residence. Source: Ivan Rocha.

Figure 99: Frontal distance from the residence of Maria Sonia. Source: Ivan Rocha.

Figure 100: Background facade of Maria Sonia's residence. Source: Ivan Rocha.

Figure 101: Front facade of Maria Sonia's residence after renovation. Source: Ivan Rocha.

Figure 102: Frontal distance from the residence of Maria Sonia after renovation. Source: Ivan Rocha.

Figure 103: Background facade of Maria Sonia's residence. Source: Ivan Rocha.

During the completion of the execution process of the last works, the sponsoring institution also chose to invest in the improvement of the aesthetic conditions of the houses, involving professionals outside the Territory of Good, being these individuals disconnected from the processes of approximation with the communities. It is notable that such action caused a distancing from the initial planning, focused on the hiring of local labor, generating problems with the parallel power existing in the community and distancing the families benefiting from the process as a whole.

The project was completed in March 2021, after a long process of alignment and execution between the different parties involved, causing the presence of beneficiary families that did not fit perfectly in the selection criteria and internal and external labor to the territory. Even if the teams tried to bring the beneficiary families closer to the decision-making processes, the pandemic and the

urgency of care made it impossible to practice this participation more accurately.

Throughout the course of extension Foundation in Science, Technology and Society of the University of Brasília (UnB), it became clear the need for a different form of operation with the communities in which the Onze8 Association works. However, the course provided a review of the network of existing agents and their actions on a prism that strongly signals the role of the Associação Ateliê de Ideias as an entity acting in the adequacy as a potentiator of the democratization of knowledge and emancipation of the Territory of Good.

It is necessary to access this large existing network about the joint work bias and the adequacy focusing on the central role of the territories population of activity. In this way, we value their knowledge and structures to walk together and join forces in the processes of conquest and militancy about the proper housing.

Learning in bioconstruction: a case study in the Pequeno William settlement (DF)

The struggle of residents of rural settlements is predominantly a class struggle, resulting from the concentration of wealth in the countryside since the beginning of our country, being intensified from the so-called "green revolution", which led many family farmers to surrender their land to banks because of indebtedness and the fact that the cities periphery and underemployment were their destine. The difficult life in the cities and the love for the land, inherited from their parents and grandparents, led many of these children and grandchildren of peasants to join social movements fighting for "agrarian reform", creating camps on highway banks and facing all kinds of aversion by the dream of returning to produce quality food and having a decent housing for their family.

However, reality shows that after 8 or 15 years of living under a tarp (Figure 104), many of these campers die along the way or give up the dream, and those who manage to be settled continue to wait endlessly for public policies of housing, water, transportation, education, energy access to health and resources to production.

Sustainable and ecological solutions among agents responsible for the construction of public policies for housing, supply, and rural sanitation are still distant from the National Rural Housing Program (PNHR), not integrating survival strategies (shelter, water, energy, food production, and waste treatment) witnessed in rural settlements of the Distrito Federal. Such solutions represent the reality of architectural design from eco-techniques (SATTLER, 2007), as the habitat with life quality integrated into the configuration

of survival relationships results in the landscape of the striking rural area in the territory.

Figure 104: Tarp shack. Source: Gustavina Alves da Silva.

On the other hand, the National Policy for Technical Assistance and Rural Extension (PNATER) still needs to advance the challenge of overcoming the interconnected challenges in the territories, and not only of a single sector, such as family farming but also rural development and in a broader society project, such as rural sanitation and housing issues, that configure the production of the habitat of peasant knowledge.

The National Rural Housing Program (PNHR), included in the Minha Casa, Minha Vida Rural (My House, My Rural Life) Program (PMCMVR), was created in 2009 with the objective of helping housing production to family farmers and rural workers. However, one of the great criticisms of the PNHR, among others, discussed at the III Habitat and Citizenship Colloquium, held in May 2015 in Brasilia, is associated with the high standardization of projects and construction systems, the lack of direct involvement of residents and the devaluation of specific characteristics of the final beneficiary, resulting in a housing of a strongly urban nature, as a consequence, also, of the lack of specialized technical assistance to communities.

Description and contextualization of the territory

The field visits carried out by the CASAS Model Office and the FAU/UnB Peripheral Group to the mst, Pequeno William, colônia I and oziel alves III settlements, each presenting different stages of social organization and "urbanization", have been conducted in research and extension work on the production of the rural habitat of peasant knowledge since 2015, an integration of research carried out by the peasants themselves of the Landless Workers Movement (MST), scholarship holders in the matter of the graduation of the Rehabilitated Specialization course of PPG-FAU/UnB as well as experiences accumulated since 2015 in extension work carried out in agrarian reform settlements in the Distrito Federal.

Due to the bias of housing self-construction and sanitation infrastructure, the discussion involves the problems arising from the absence of public policies and technical assistance/advice of housing and sanitation for the use of social technology, which ends up creating difficulties for residents in the transition of habitations in shacks of plywood, imposing limitations on housing projects in bio-constructions and the constant lack of water for survival. The long wait for those who were selected for a housing provision policy for rural settlements ends up imposing precarious levels of housing, subjecting families to all kinds of health risks. Most houses are built with materials discarded by urban areas, such as wood, plywood, plastic tarps, old roofing materials, the rest of PVC panels, and other materials found in dumps on the outskirts of cities.

The Pequeno Willian settlement was created in 2011 and is located in the Distrito Federal, in the Planaltina Administrative Region (RA-05), next to Pedra Fundamental, the historic landmark of the creation of Brasilia, in an area of 144.17 hectares, where 22 families are settled (Figures 105 and 106).

Figures 105 and 106: Pequeno Willian Settlement: Location. Preparation: João Lima Farias, 2022. Design winner of the nine draws made by the campers themselves. Source: Google Maps.

Presentation of good practices: building with materials of nature

The research on good practices in the Pequeno William Settlement sought to present solutions developed by the peasants to meet the need for decent housing and that, at the same time, were environmentally correct, economically viable and that could be self-built. Lengen (2008) states that the choice of the material to be used needs to be in accordance with the climate of the region in order to achieve maximum comfort and harmony with minimal costs.

It presents here, therefore, the process of building a kitchen with land, since this is the most abundant material on site. The construction was made with dirt , mainly adobe and the Taipa de Pilão (rammed earth), which exists approximately 3000 years before Christ (bc), in Mesopotamia and Egypt, even in the current farms of the Bolivian mountains, passing through the North African Kasbah of the Middle Ages and the peoples of La Meseta (ONRUBIA et al., 2003).

The construction process began with a meeting of traditional knowledge exchange in the community to rescue the ancient knowledge about the use of materials from the place for the construction. We also sought the participation of the academics (teachers and students) of IFB-Planaltina, and at these moments it was noticed that almost all of the

participants knew some technique or had lived at some point in a house built with land.

Then, the Taipa de Pilão (rammed earth) was chosen for the constructions (SILVA, 2007 apud MOURA, 2013), made in a pilled-up form after all the tests and attempts were done with the local dirt or mud . It was a wonderful experience. The lack of water at the construction site was initially resolved with the supply thanks to a tank truck and, in a second phase, with the roof ready for rainwater capture. Other techniques were used after this study, such as hand Taipa (mud with wood), COB, super-adobe and adobe.

Figures 107, 108 and 109: Pilled up made of Hand Taipa (mud with wood) wall filling. Students of UnB-Planaltina. First taipa (mud with wood) was built on the land ranch. The current house is practically completed. Source: Gustavina Alves da Silva

Collaborations and potentialities

The interaction between peasants, students and teachers showed that the dialogue of knowledge is a way for new proposals for changes in society. Pedagogically, the objectives were achieved with the teaching-learning process that the practice provided. The construction with land, accompanied by a technical housing advisory, specialized in Housing of Social Interest, can reduce the lack and bring more comfort and dignity to the families of the settlements.

Application of ATHIS in São Vicente with a development partnership with CAU/SP

The Council of Architecture and Urbanism of the State of São Paulo (CAU/SP), in order to promote the social function of the Architecture and Urbanism professional in the territory, and apply the Law of Technical Advice in Housing of Social Interests (Federal Law No. 11.888/2008), launched a notice to select Civil Society Organizations (CSOs) and establish a partnership through an Advancement Term for the development and execution of projects that qualify housing for low-income families. The ATHIS law ensures that these families with incomes of up to three minimum wages, settled in urban and rural areas, have access to free public technical assistance from qualified professionals when they need reforms, regularizations, expansions and other services.

The Institute Prococum, with its center in Santos, in the state of São Paulo, seeks to activate and participate in networks in which the focus is to promote social transformation. Since 2018, it has had the ATHIS working group, at LabProcomum, a citizen laboratory that offers interaction spaces and workshops, and welcomes different communities of creation and collective practices. This WG, formed by architecture and urbanism professionals, seeks to perform activities that promote ways to achieve the qualitative improvement of low-income housing.

With surveys and diagnoses obtained through the methodologies of the study groups, the ATHIS WG in Baixada identified territories that urgently need access to technical advice. In 2020, the WG focused its activities on the community of Vila Margarida and Mexico 70, in the macro-region of Baixada Santista, in São Vicente. In addition to promoting the Training Course for Professionals in ATHIS and Mobilization Seminars, already with partnerships to promote CAU/SP, the WG, after signing up for the notice 006/2020 and being contemplated in 2021, selected 60 architects from all over Brazil, through a public call, to participate in workshops and mentoring. These professionals received an aid grant in order to offer, in contrast, in this case, an architectural or urban project in co-creation with the population of Vila Margarida (São Vicente), for improvements to their homes and the neighborhood.

Description and contextualization of the territory

According to the latest survey by the Brazilian Institute of Geography and Statistics (IBGE), conducted in 2010, the Metropolitan Region of Baixada Santista (RMBS) has

approximately 300,000 people living in subnormal clusters. Among the nine cities in the region, São Vicente is the second in the ranking of the occupation of peripheral places, besides being among the 10 cities in Brazil with the highest number of homes built as shanty boats.

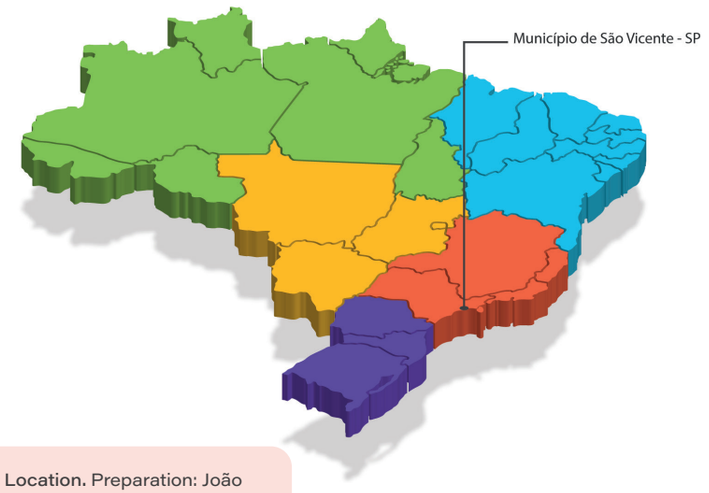


Figure 110: Location. Preparation: João Lima Farias, 2022.

The island has sheltered some of the first urban occupations in Brazil, and therefore suffers the consequences resulting from the deformation of its watercourses and the irregular occupation of its areas of springs. Daniela Colin (2017), architect and urban planner, presents in her master's thesis the urban changes in the water paths of The Island of São Vicente, and states:

> Its territory has a large number of water bodies, including springs, rivers and streams. Because its land is naturally flooded, it took large infrastructure works to address issues related to public health and urbanization. At the end of the 19th century, the sanitary engineer Saturnino de Brito was responsible for the infrastructure project that allowed the drainage of surface waters from the urban area of the eastern region of São Vicente Island, mainly through its drainage channels (BRITO, 1910) (LIMA, 2017, p. 14).

The sanitary infrastructure works designed by Saturnino de Brito were partially accepted by the government, which reported budgetary losses for entire execution drainage plan. This resulted in social and environmental problems in the western part of the Island, increasing the unhealthiness of the territory, which until today suffers from the government's lack of caution .

Due to the lack of state responsibility, and due to the migratory movement of the 1950s, the territory began to suffer the first reflections of bad planning socio-spatial development. The abnormal clusters of Vila Margarida, considered quantitative in the housing deficit, are just some of the problems raised by architects and urban planners hired through the notice. With the listening of the community, data surveys, map production, diagnostics, and historical processes of urban occupation on the island, it was noticed that the urban network located in the west of the hills grew in a less orderly way, disregarding the water courses and mangrove areas, even causing a large number of buildings on shanty boats and dumping of effluents and domestic sewage directly on their courses (AGEM, 2005; CARRIÇO, 2015).

Figures 111 and 112: Shanty boats de São Vicente, in São Paulo. Source: Mariana Cosmassi

There are numerous problems found in this land, such as flood areas, scarcity of quality of public spaces – leisure, contemplation, social interaction and permanence – lack of infrastructure in general – lighting, drainage and sanitation, road pavement, waste treatment, etc.). –, resulting in an unhealthy area with poor socio-spatial adequacy, harming ecosystem health, the solidarity economy, income capture and production of decent habitat.

Ancestral knowledge and peasants are still present in the dynamics of occupation of the residents of the shanty boats. Fishing is the main source of income supply for families resisting in the territory.

Presentation of good practices

The methodology chosen for the production of architectural or urban projects in collaborated creation with the population of Vila Margarida, for improvements in their homes and the neighborhood, in times of pandemic covid-19, was through the elaboration of the participatory process, in which it sought to approach the collective organizations that already operate in the area, mapping the most collaborative residents to approach the community, in order to establish the so desirable process of listening. The whole process is being carried out remotely through digital platforms.

After the process of listening and preparing the diagnoses, the needs plan is implemented together with the community, which seeks to find solutions for a possible adaptation of socio-technical aspects of the space, identifying families, places and dwellings of the extreme urgency of intervention.

Collaborations and potentialities

Despite the territorial context that exists in Vila Margarida, it is notorious the feeling of belonging that the residents have, in addition to the collective thinking that is established every time in the meetings.

Sociotechnical advisory of resistance in Santa Luzia, Structural, DF

Description and contextualization of the territory

Santa Luzia, an informal settlement that emerged in the 1990s on the banks of the Structural City, on the edge of the landfill – then called "lixão da Estrutural – of the Structural Urban Park and the National Park of Brasília, lives the process of "peripherality" (ANDRADE, 2019a). Residents remain in extremely precarious conditions, aggravated by the constant threats of removal by the government, on the grounds of contamination of the soil given by the dump and the worsening risk of ecological degradation of the National Park of Brasilia (PNB).

In 2015, the Public Prosecutor's Office of the Distrito Federal proposed a Public Civil Action (ACP) calling for the reforestation of the buffer range of three hundred meters (Complementary Law No. 530/2012) of the PNB. Due to the developments of this ACP, and due to the impasse of the environmental context, the Housing Development Company (CODHAB) presented a proposal for a linear housing complex of 3.2 kilometers for the relocation of residents of the neighborhood, totally removing the existing solidarity networks in the informal space. However, this proposal is not adequate to the reality of the families of Santa Luzia, and neither does it fit the environmental vulnerability of that area.

The goals, of the Santa Luzia occupation, are to propose solutions within the framework of the neighborhood plan in which the right to the city, decent housing, water and sanitation is guaranteed, and to provide subsidies for land regularization of social interest with popular participation, Reurb-S (Law No. 13,465/2017), which procedures and instruments are regulated in the Distrito Federal by decree no. 40,254/2019.

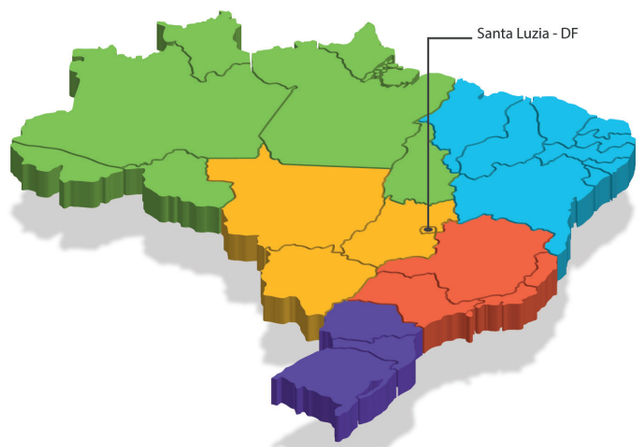


Figure 113: Location.
Preparation: João Lima Farias, 2022

Presentation of good practices: university extension in sociotechnical adequacy

Within the matter of the extension sphere of the University of Brasília (UnB) in Estrutural, the Research and Extension Groups "Peripheral, emerging works" and "Water and Built Environment", of the Faculty of Architecture and Urbanism of UnB (FAU-UnB), have been working more solidary and sustainable solutions, which take into account the informal development process. Barroso (UFBA, 2018) points out that land regularization of unusual occupations, unlike the formal development that, first, deals with the documentation of property and urban planning and then allows the occupation, it should consider the populations already established on the site.

The peripheral group's proposal is to rescue contributions from the urbanism of organic and participatory traditions based on self-organization from the bottom up, which form the basis of the sociotechnical adequacy of the group, where the subjects of scientific knowledge share their technical codes with the organized social subjects and assimilate the sociotechnical knowledge existing in the community, forming the "Freirian and sociotechnical pedagogical interactionism".

The Project Process for Suitability Sociotechnical (AST) is constructed from the demands and vocations raised and the analysis of potentialities and problems: local identity, existing knowledge, spatial patterns and events (Chart 6). The spatial and event patterns, developed by Alexander et al. (1977), and urban ecosystems, developed by Andrade (2014), are selected after a participatory diagnosis of the site in the form of affective maps, an analysis of the context that contemplates the patterns of events related to space and social expectations mapped by the analyses of the dimensions of social sustainability, cultural, emotional, economic and environmental.

These standards are systematized to establish a language with the community and increase their participation in the process, in the form of "generating codes" of solutions for the project development process (Chart 6). In each project, after the selection of standards, schemes and drawings related to each process-generating code are developed, which allows a connection between them in a systemic way, and can be presented to communities as a form of language between designers and community.

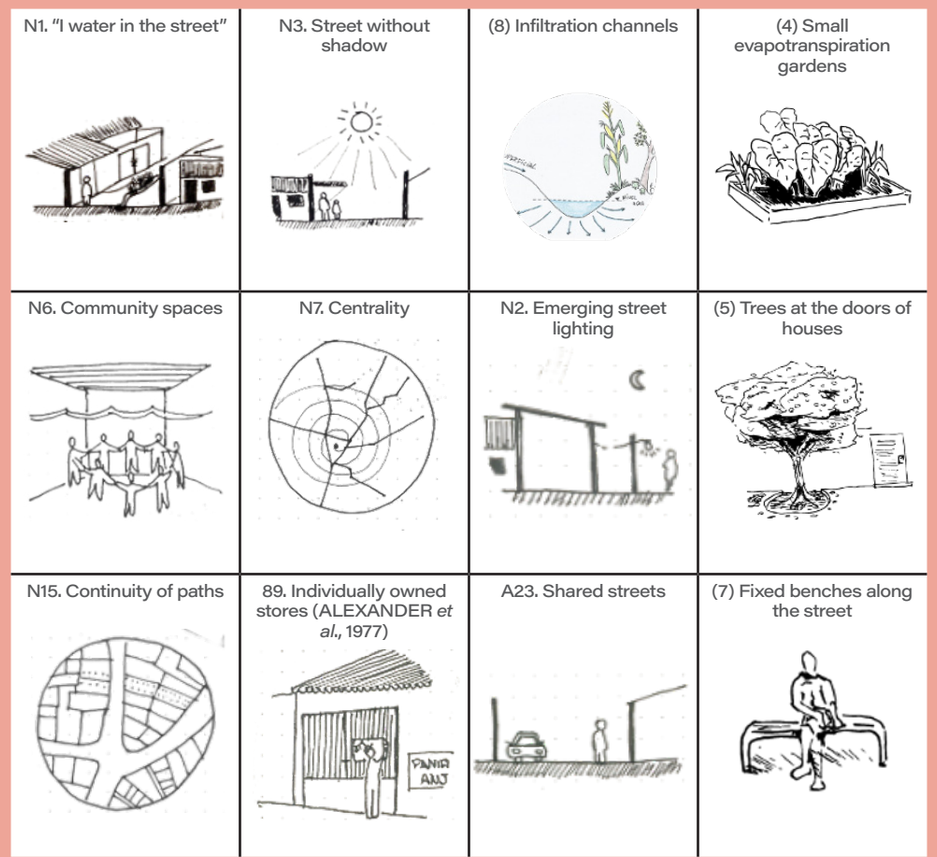


Table 6: Extract from the tables of urban patterns in the central region of Santa Luzia. Source: ANDRADE et al., 2021

The technical advisory actions of the Peripheral in Santa Luzia began at the end of 2018, with the first field visits and first contacts with the reality of the occupation. A set of interviews – with the president of the residents' association, with the coordinator of the Child Development Center and with people in the public space – brought more and more information about the health conditions, the solutions given by the residents, the absence of public services and infrastructure, among others. It was at the end of February that, in a meeting with a representative of the NGO Educamar, the physical space of the institution was obtained for the organization of the workshops. The NGO's contact network was used to apply a questionnaire and spread the next technical advisory activities.

In addition to neighborhood walks, debates and interviews, three mapping

workshops were held to achieve a diagnosis of the Santa Luzia context in the four dimensions of sustainability. The first workshop focused on the social and cultural/affective dimensions, the second on the environmental dimension and the third on the economic dimension (ANDRADE et al., 2021).

The 2019 Neighborhood Plan (Figure 114), developed by Fialho, systematizes the diagnosis and scenarios glimpsed by the residents. In addition, the work includes technical supplies related to water-sensitive planning and the adequacy of the territory with Nature-Based Solutions (SbN). We can highlight the rain gardens arranged along the most integrated roads and the design of a Linear Park that seek to maintain the percentage of permeable areas and offer green and leisure areas for the population.

In parallel to the Neighborhood Plan, which works the proportion of urban planning, the emerging project "The Dwelling of Powerful Women" brings micro-urbanism interventions in the heart of Santa Luzia. Together with the architect Portugal, the residents who participated in the workshops of the Neighborhood Plan designed their houses to adapt them to bioclimatic strategies for greater adaptation to their needs and greater environmental comfort, valuing ventilation and natural lighting in all rooms. On the facades, the railing garden walls refer to the dynamicity of the facades (Figures 115 and 116). Portugal and Rezende worked together on the urban space to open roads and design new lots for medium-sized constructions inserted in the existing fabric. This proposal allows to overcome the housing deficit and making the removal of homes for a better performance of public space worthy.

Figure 114: Santa Luzia Neighborhood Plan. Source: FIALHO, in: ANDRADE *et al.* 2021

Figures 115 and 116: The Inhabit of Powerful Women: Microurbanism in the heart of Santa Luzia and Sociotechnical Assistance on the housing scale. Source: PORTUGAL in: ANDRADE et al., 2021

Collaborations and potentialities

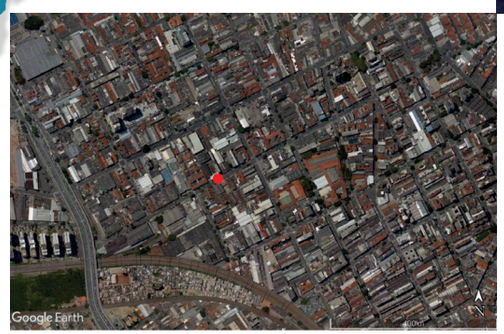
Throughout the work process in Santa Luzia, sociotechnical potentials were highlighted, as it is the case of the Collective of Powerful Women. The meeting with the Powerful Women's Collective took place throughout the participatory workshops, and especially on a day when only two women, Valkyrie and Rosangela, appeared in the workshop. There was no way to continue with the planned activities, so an interview was improvised in which, among other findings, it was discovered how the collective of women was constituted. Monthly, the NGO organizes a bazaar and, to get the first passwords at the opening, many women stayed all night in the street, one bringing coffee, another bread etc. This story seems anecdotal, but symbolizes very well the work process of sociotechnical assistance, emerging practices and solidary practices. Today, the Collective Association of Powerful Women is being formalized to promote the solidarity economy in Santa Luzia. It is interesting to notice how the collective has evolved from a social entrepreneurship to a solidarity enterprise in which artisanal social cooperativism, training and strengthening of the local community are promoted.

The methodology used is based on the assumption that the socio-technical subject can focus on urban planning by the Neighborhood Plan and thus seeks the empowerment of low-income populations. In order to contribute to an alternative solution to the government's proposal, the Peripheral Research and Extension Group has, since 2018, gathered a diversity of technical advisory work developed in conjunction with the population of the Santa Luzia occupation.

The Union Building

Description and contextualization of the territory

In view of the housing deficit and the long daily displacements, initiatives arise with the objective of bringing more residents to the central areas of the city of São Paulo. The following example is the União Building, a vertical building occupied in the 1980s, located at Rua Solon, number 934, Bom Retiro neighborhood, a central region of the city of São Paulo. The morphological insertion of the building is characterized by the great concentration of textile production and commerce, which divides the space with manufacturing sheds, clothing stores, low-rise buildings and old houses, worn over time. The 8-floors, ten-meter-long building was abandoned in its construction phase. A gradual occupation made it a verticalized tenement, which in 2002 had 72 families living (GONÇALVES et al., 2015).



Figures 117 and 118: Location Maps.
Preparation: João Lima Farias, 2022.

Presentation of good practices

In order to develop a social project of physical improvements, FAU-USP started the project of research and extension of services to the community. The Municipal Department of Housing of São Paulo suggested the development, offering assistance to those who agreed to leave the property. Thirty families accepted and then remained 42 families in the building.

Technical interventions, such as the installation of a new electricity grid, initiated improvements at the site. With the help of the Institute of Technological Research of São Paulo (IPT), the Fire Training course was taught to 20 residents of the building, training them in the initial attitudes in case of a fire accident. At that moment the residents organized themselves and the collective efforts solidified, like the cleaning efforts. Industry partners collaborated by donating windows and gates to the front facade of the building. The recovery of the main facade was fundamental to raising the community's self-esteem and further promoting the union of its residents. Thus was chosen the new name of the building: Union Building.

Figure 119: Before, during and after the facade renovation. Source: REHABILITATE PCC US p.

With the help of the Gaspar Garcia Center for Human Rights, the process of Collective Urban Usucapião (Adverse possession) was started. This step raised the confidence of residents, who began to improve their own apartments.

The structure, however, presented corrosion in the reinforcements (Figure 119). The age of the building was approaching the life limit – 50 years – foreseen in NBR 15,575 (ABNT, 2010). A corrective intervention project was elaborated and the residents themselves got specialized technical training to reinforce the most critical pillars. Part of the material used was given by Gerdau and MC Bauchemie. Along with the restoration of the security and stability of the building, came the social gain achieved with the technical training of residents. Figure 120 shows the fabrication of the structural reinforcement armor made by the residents. In addition to the structural reform, the main facade, roof, and internal apartments have also been improved, accommodating the 42 families with relevant comfort and environmental quality.

Figure 120: Extension of the useful life of a concrete structure from the 1960s, which houses 42 families in a vertical tenement condominium in downtown São Paulo. (OLIVEIRA et al., in: Annals of 54th Brazilian Concrete Congress). Source: IBRACON, 2012

Collaborations and potentialities

The partnership between the population, the public authorities, the public university and the private sector form a successful work when collective work, developed through socio-technical work, is recognized.

In 2008, the Requalification Project of the Union Building received the international Award Deutsche Bank Urban Age Award, which includes creative solutions to housing problems.

The socio-technical work developed in the Union Building serves as an example to be applied in the various degraded and empty buildings existing in the centers of large cities. With the ease of infrastructure availability and the proximity of the various economic activities that the center offers, this has become an attractive potential market for housing. These are opportunities for requalification and reoccupation of buildings through social service, to fulfill the right to housing and the city.

FINAL CONSIDERATIONS

The case studies experienced and reported by their respective authors – guided by the concepts of sociotechnical adequacy, solidarity economy and Freirean pedagogy – represent examples of self-construction, bioconstruction, sustainability and self-management within five distinct contexts. In each of the practices, it was possible to connect with the transdisciplinary theoretical references for habitat perspectives in the countryside and in the city, in addition to the proposals made by the current housing programs.

The housing programs usually run into obstacles of excessive bureaucracy, lack of resources and complexity, in addition to trying to remain the housing movements within a logic of capital, working as companies. This distances the interested communities from a pillar of self-management, in which residents are the subjects active in the process and aware of its possibilities and limitations. Sociotechnical Adequacy (AST) comes as a tool for social construction and empowerment of the subjects involved, aiming at learning and training.

The examples reported show us the importance of AST to overcome the inefficiency of the State in relation to the housing of social interest, both in the city and in the countryside. But this assistance cannot be detached from ecological responsibility, ancestral knowledge, local identity and the participation and appropriation of the community itself. The interaction between the experiences reported in this chapter and the concepts presented in the discipline demonstrated a special interest of the rapporteurs in improving the socio-technical adequacy aspects of their processes, whether regarding the relationship between housing and work, self-management or the integration of socio-technical subjects in habitat production.

REFERENCES

ALEXANDER, C.; ISHIKAWA, S.; SILVERSTEIN, M. A pattern language: Towns, buildings, construction. New York: Oxford University Press, 1977.

ALVEAR, Celso Alexandre Souza deet al.. The solidarity economy in popular territories: an exploratory research on the socio-productive fabric in four communities of the city of Rio de Janeiro. Rio de Janeiro: Ufrj Technical Solidarity Center / Special Secretariat for Solidarity Economic Development, 2012.

ANDRADA, Cris Fernandez. UNIVENS Cooperative: from the encounter of politics with work, important psychosocial repercussions of self-management. Solidarity Economy and Subjectivity. Ed. Altamira, 2017.

ANDRADE, Liza M. S. de. Connections of spatial patterns of urban ecosystems, the construction of a method with a transdisciplinary focus on the water-sensitive urban design process at the community and landscape level. Thesis (PhD in Applied Sciences) - Postgraduation, Faculty of Architecture and Urbanism, University of Brasília, Brasília, 2014. 544f.

ANDRADE, Liza, M. S.; LENOIR, Juliette, A. F. ; PORTUGAL, Sofia, F.; FIALHO, Attila, R. Santa Luzia Resists: participatory process and spatial patterns for the elaboration of the Neighborhood Plan and the Powerful Women Housing Project. P@ranoá (UnB), p. 1-31, 2021.

ANDRADE, Liza M. S.; LEMOS, Natalia da S.; LOUREIRO, Vânia R. T.; LENOIR, Juliette A. F. Extension and Solidarity Technology: Peripheral in DF and surroundings. Cadernos de Arquitetura e Urbanismo, Belo Horizonte, v. 26, n. 38, p. 189-234, 27 Dec. 2019. Semiannual. Pontifícia Catholic University of Minas Gerais. Available in: http://seer.pucminas.br/index.php/Arquiteturaeurbanismo/article/view/22188. Access: 15 Mar. 2021.

ANDRADE, Liza Maria Souza; LEMOS, Natalia da Silva; LOUREIRO, Vânia Raquel Teles; MONTEIRO, Maria Emilia. Sociotechnical adequacy for participatory urbanism projects of the research group and Peripheral extension: Urban tactics such as social technology, sustainability dimensions, spatial and event patterns and scenario construction. In: XVIII ENANPUR, Christmas, 2019a.

ASSOCIAÇÃO ATELIÊ DE IDEIAS. Research: Knowledge, Making process and Profile of Residents of the Territory of Good. Victoria, 2019. Available in: https://calangonoticias.com.br/wp-content/uploads/2019/12/2019_Pesquisa-Territo%CC%81rio-do-Bem.pdf. Access: 15 May. 2021.

ASSOCIAÇÃO ATELIÊ DE IDEIAS. Instagram Site - Associação Ateliê de Ideias (2021). Available in: https://www.instagram.com/p/CPYJe88jnls/. Access: 15 Jul. 2021.

_____. Instagram Site - Associação Ateliê de Ideias (2021). Available in: https://www.instagram.com/p/CKCczmkjlU0/. Access: 15 Jul. 2021.

_____. Instagram Site - Associação Ateliê de Ideias (2021). Available in: https://www.instagram.com/p/B_qHaHalmkk/. Access: 15 Jul. 2021.

LONDON. JOÃO PINHEIRO FOUNDATION. HOUSING DEFICIT IN BRAZIL - 2016-2019. Belo Horizonte: Fjp, 2021. 169 p. (Housing Deficit in Brazil). Available from: http://novosite.fj p. mg.gov.br/wp-content/uploads/2021/04/21.05_Relatorio-Deficit-Habitacional-no-Brasil-2016-2019-v2.0.pdf. Accessed: 20 May 2021.

BONDUKI, N. G. Housing and self-management: building territories of utopia. Rio de Janeiro: Phase, 1992.

BRCIDADES - NÚCLEO ES (Espírito Santo). INCLUSIVE CITIES: an agenda for the elections of Espírito Santo. An AGENDA FOR THE CAPIXABAS ELECTIONS. 2020. Available in: https://www.brcidades.org/espirito-santo/. Accessed: 10 Jun 2021.

BRODNICK, C et al. Jumping to the top: catalysts for leapfrogging to a water sensitive city. In: Earth and Environmental Science n. 179. Bristol, Reino Unido. IOP Publishing. 2018.

CAMARGO, C. M. Minha Casa Minha Vida Entities: between rights, urgencies and business. Orientation: Cibele Saliva Rizek. 2016. 293f. Thesis (Doctorate - Program in Architecture and Urbanism) - Institute of Architecture and Urbanism, University of São Paulo, São Carlos, 2016.

CARDOSO, Fernanda Simon; LOPES, João Marcos de Almeida Lopes. Assistance and technical advice: Between discourse and practice. In: XVIII ENANPUR, Christmas, 2019.

CERQUEIRA, Maria Cândida Teixeira de. Technical assistance in MST habitats and the role of architect and urban planner. 2009. Dissertation (Master)- Graduate Program in Architecture and Urbanism (PPGAU). Federal University of Rio Grande do Norte, Natal, 2009.

CERQUEIRA, Maria Cândida Teixeira deet al.. «Experience in technical assistance for land reform habitats: university, state and social movement.» In: Migliorini, Jeanine Mafra. The essentials of architecture and urbanism. Ponta Grossa (SP): Atena Editora, 2018.

DAGNINO, Renato. Neutrality of science and technological determinism. Campinas: Unicamp Publishing House, 2008.

DAGNINO, Renato. The time and turn of Solidarity Technoscience. 2020. Other words, Technology in dispute. Available in: https://outraspalavras.net/tecnologiaemdisputa/a-hora-e-vez-da-tecnociencia-solidaria/. Access: 14 Mar. 2021.

DAGNINO, Renato. Solidarity Technology: a strategic manual. Marília: Anticapital Fights, 2019.

DAGNINO, R.; BRANDÃO, F.C; And NOVAES H. T. About the analytical-conceptual framework of social technology. In: LASSANCE JÚNIOR, A. E. et al. (Ed). Social Technology. A strategy for development. Banco do Brasil Foundation, Rio de Janeiro, 2004 (p. 15-64).

ESTEVES, Egeu Gómez; ANDRADA, Cris Fernandéz. Participatory democracy, state and laicity: social psychology and confrontations in times of exception. São Paulo: ABRAPSO, 2017 [Ca p. Dream, history, madness? Solidarity Economy: a resistance movement in the world of work].

FERREIRA, R. «Social movements, self-management and the construction of the national housing policy in Brazil». 2012. In: LAGO, Luciana Corrêa do. Housing self-management in Brazil: utopias and contradictions. Rio de Janeiro: Letra Capital/Observatory of the Metropolises, 2012. Pg. 116-136.

LEFÈBVRE, H. The right to the city. São Paulo: Moraes, 1968.

HEIDEGGER, Martin. «Build, inhabit, think.» In: HEIDEGGER, M. Rehearsals and conferences. Petrópolis: Voices, 2001.
LEFEBVRE, H. The right to the city. São Paulo: Moraes, 1968.

LEFEBVRE, H. The Urban Revolution. Belo Horizonte: UFMG Publishing House, 1999.

LENGEN, J. V. Barefoot Architect Manual. (Brazilian Book Chamber) - São Paulo - Brazil: p. 364. Ed. Emporium of the Book, 2008.

FREIRE, P (1970). Pedagogy of the oppressed. Rio de Janeiro: Peace and Earth.

JOÃO PINHEIRO FOUNDATION. HOUSING DEFICIT IN BRAZIL - 2016-2019. Belo Horizonte: FJP, 2021. 169 p. (Housing Deficit in Brazil). Available from: http://novosite.fj p. mg.gov.br/wp-content/uploads/2021/04/21.05_Relatorio-Deficit-Habitacional-no-Brasil-2016-2019-v2.0.pdf. Access: 20 May. 2021.

Kowarick. Pike. Urban spoliation. Rio de Janeiro: Peace and Earth, 1993 [ca p. The logic of disorder].

LENGEN, J. V. Barefoot Architect Manual. (Brazilian Book Chamber) - São Paulo - Brazil: p. 364. Ed. Emporium of the Book, 2008.

LIMA, D. C. Do Morro ao Mar: Urban Changes On the Water Paths of São Vicente Island. Advisors: Prof. Dr. Walter Barrella and Prof. Dr. Fábio Giordano. Dissertation (Master) - Santa Cecilia University, Graduation Program in Sustainability of Coastal and Marine Ecosystems, Santos, SP, 2017. Available from: https://unisanta.br/arquivos/mestrado/ecologia/dissertacoes/Dissertacao_Daniela.pdf Access on: 04 Sep. 2019.

MARICATO, E. The impasse of urban policy in Brazil. Petrópolis: Vozes Publishing House, 2011.

MARTINS, L. Right to architecture: inventory of the production of technical advisories in São Paulo. Orientation: Erminia Maricato. 2019. 224 p. Thesis (Master) – Faculty of Architecture and Urbanism, University of São Paulo, 2019.

MOURA, Lexandro Ribeiro de. Alternative construction with the use of adobe in florinda settlement (GO). TCC - Work of Completion of the Undergraduate Course in Field Education, Qualification in Nature Sciences and Mathematics - UnB - Planaltina / DF, 2013. Available from: http://bdm.bce.unb.br/bitstream/10483/5169/1/2013 LexandroRibeirodeMoura.pdf. Access: 28 May. 2014.

NEDER, Ricardo Toledo; MORAES, Raquel de Almeida. Where the university goes in the face of science & technology policy in Brazil. Observatory of the Movement for Social Technology in America. Browsing Publications, Urberlânidia, 2017.

NEDER, Ricardo Toledo. «Sociotechnical interactionism and culture of resistance in incubation policies of popular cooperatives: seven strategic dimensions in ETCP as an agency, as indicators of evaluation Of The Northeastern Meeting of Incubators of Solidarity Economy». In: Democracy and solidarity economy: impasses and opportunities. Juazeiro do Norte - Federal University of Cariri, 2016.

_____. The production of knowledge at the University and the Social Studies of Science and Technology: contributions to Teaching and Research. In: CTS science technology society – and the production of knowledge at the university / Ricardo T. Neder (org). Brasilia: Observatory of the Movement for Social Technology in Latin America. 2013.

_____. «In defense of a scientific and technological policy with solidarity economy». Revist@ of the Observatory of the Movement for Social Technology of Latin America. Science & Social Technology. The critical construction of technology by social actors, volume 1, number 1, July 2011.

NOVAES, Henry Taham; DAGNINO, Renato. Tech fetish. Org. and Demo Magazine. (Marília), v.5, n2, p. 189-210, 2004.

ONORUBIA, J. H.; RAMOS, L. M.; COSSÍO, F. V. Dictionary of traditional construction: Earth. Ed. Nerea, S. A., 2003 – San Sebastián.

Pelli, Victor Saul(Notes for a technology suitable for construction in Latin America. Mascaro, Lucia (coord.). Technology & Architecture. São Paulo: Nobel, 1990.

PERIPHERAL. Emerging jobs. Website: https://www.perifericounb.com/.

PERUCCHI, Gabriel. Chácara Santa Luzia sensitive to water: spatial standards of ecological infrastructure for the more sustainable fixation of the informal settlement of the Structural City. 2019. Scientific Initiation. (Graduating in Architecture and Urbanism) - University of Brasilia,

Coordination for the Improvement of Higher Education Personnel. Advisor: Liza Maria Souza de Andrade. PIBIC Award.

REZENDE, Vinicius, S.; ANDRADE, Liza, M. S. de; RODRIGUES, Sarah, E.; PEREIRA, Italo p. p. ; LEMOS, Natalia da S. The urban ecosystem of the occupation Santa Luzia. P@ranoá (UnB), v. 26, p. 219-240, 2020.

RODRIGUES, E. L. The land strategy of popular movements in the self-management production of housing. Master's thesis. São Paulo: FAUUSP, 2013.

SANTOS, Boaventura de Sousa. The university of the 21st century. For a democratic and emancipatory reform of the University - 3rd edition. Cortez, São Paulo, 2011.

SATTLER, M. A. Lower Cost Housing More Sustainable: The dawn house and the experimental center of sustainable housing technologies. HABITARE Collection, EDITORA ANTAC, Porto Alegre, 2007. Available in: http://www.habitare.org.br/pdf/publicacoes/arquivos/colecao9/primeiras.pdf. Accessed: May 15, 2021.

SILVA, Viviane Zerlotini da. Between home and work: spaces for the reproduction of life. 2020. 132f. Thesis (Doctorate) - Architecture and Urbanism, School of Architecture, Federal University of Minas Gerais, Belo Horizonte, 2014.

NATIONAL UNION FOR POPULAR HOUSING. Developments of the National Union for Popular Housing in the Minha Casa Minha Vida Program - Entities. São Paulo: Journal of Housing Production in Self-Management. 2019.

Sociotechnical Adequacy For Agroecology and Agrourbania

Chapter 05

Authors:

Flaviane de Carvalho Canavesi | Natalia da Silva Lemos | Acácio Machado Alves
Alcyjara Andreia Cruz de Lacerda | Antônio de Almeida Nobre Júnior | Valmor Cerqueira Pazos
Camila Bezerra Nobre de Medeiros | Maria Consolación Udry
Letícia Lara do Carmo | Louise Marie Coelho Guerard | Nayane Karoline França da Fonseca Thaís Tavares Beserra

SOCIOTECHNICAL ADEQUACY FOR AGROECOLOGY AND AGROURBANIA

Flaviane de Carvalho Canavesi[1]
Natalia da Silva Lemos[2]
Acácio Machado Alves[3]
Alcyjara Andreia Cruz de Lacerda[4]
Antônio de Almeida Nobre Júnior[5]
Camila Bezerra Nobre de Medeiros[6]
Maria Consolación Udry[7]
Letícia Lara do Carmo[8]
Louise Marie Coelho Guerard[9]
Nayane Karoline França da Fonseca[10]
Thaís Tavares Beserra[11]
Valmor Cerqueira Pazos[12]

RESUMO: This chapter presents principles of the scientific field of Agroecology that dialogue with the approach of Science, Technology and Society (CTS). It is important to value popular sociotechnical subjects, men and women, since the construction of knowledge is collective and involves various forms of knowledge and dialogues, which may be academic and non-academic. The objective of this chapter is to present agroecological experiences developed from praxis, having as relevance the sociotechnical adequacy in which knowledge and production of goods and services are contextualized to the reality and interests of those involved. The way such experiences are presented reflect, at first, the theoretical understanding of studies conducted in the course Fundamentals in Science, Technology and Society - CTS Habitat, Agroecology, Solidarity Economy and Ecosystem Health, followed by reports that seek to reflect the learning from the experiences presented. It is an exercise of analysis and learning of the way in which the CTS approach can be turned into visible in the construction of agroecological knowledge.

[1]UnB; flavianecanavesi@unb.br / [2]UnB; lemos.natalia@gmail.com / [3]UnB/MST-DF; acaciopadf@gmail.com / [4]National Confederation of Family Farmers and Rural Family Entrepreneurs. laccerdaalcyjara@gmail.com / [5]UnB; anobrejr.unb@gmail.com / [6]UFRN; cabnob@gmail.com / [7]Oca do Sol Institute / Embrapa; ocadosol.instituto@gmail.com / [8]UFSJ; leticia.arq@gmail.com / [9]UnB; louise.guerard.lg@gmail.com / [10]UnB; karoline.nayane1@gmail.com / [11]UnB; thaisquimica1@gmail.com / [12]UnB; pazos@unb.br

INTRODUCTION

The approach of SC in the field of agroecology and its application in experiences such as urban agriculture, with actions involving agriculture in cities, permeates essential issues of science, technology, innovation and sustainable development. It concerns about connections, reflections and interpretations of the inhabited spaces (lived) in the territory with scientific-technological innovation, fields of differentiated knowledge and with social technology, which from the values of those involved characterize their ways of life.

In this journey, subjects, men and women, elect relevant methods, priorities, themes and relevant topics that, from the field of agroecology knowledge, of value condition strategies and the theoretical and conceptual rearrangement of socio-environmental relations in the world of agriculture, are shaping their territorial dynamics.

The chapter presents experiences that reflect the interactions of construction of agroecological knowledge, techniques and visions about territories, bringing different interpretations and particularities that establish prose and verses of a dialogue of knowledge.

FUNDAMENTALS IN SCIENCE, TECHNOLOGY AND SOCIETY - CTS

The foundations in Science, Technology and Society (SC) are involved in the understanding of social technology as a form of scientific application different from the usual and with the purpose of promoting the interaction and advocacy of collective subjects for social transformation purposes.

According to Dagnino (2019), socio-technical adequacy has as its condition the incorporation in the process of redesign of social actors interested in appropriating a knowledge for the production of services and goods consistent with their interests and values.

Understanding must start from the effectiveness of the concept of social technology, breaking with the simple reproduction of conventional technology. It is a vision that proposes the separation of spaces where technoscience is produced by those who defend alternative paths with values and interests of social actors, who will be the greatest beneficiaries. Therefore, it is a path endowed with awareness-raising activities for institutions to expand in the sociotechnical spaces of counter-hegemony.

Fundamentals in sociotechnical adequacy and solidarity economy

The understanding of sociotechnical adequacy has its development from the sciences addressed by scientific knowledge that seeks to overcome underdevelopment, dependence and inequality. The present challenge in sociotechnical adequacy is to conceive technoscientific knowledge aimed at the production of goods and services from the economic-productive arrangements from the informal sector and in the battle against social exclusion. Such arrangements are structured by consumption and production networks, which, according to Dagnino (2019), have their foundations consolidated in the collective ownership of means of self-management and production aiming at a consolidated solidarity economy in effective social inclusion.

For sociotechnical suitability, the author concerns about an optimistic and involved posture by what is given as a social construction, which can be redesigned through the internalization and politicization of alternative values and interests, the observance of plurality precepts and internal democratic control in the institutions in which they are produced. Therefore, one of the conditions is that social actors are directly present and interested in having the knowledge of the production of goods and services consistent with their interests and values.

In the solidarity economy, networks are present as an insistence on the association between solidarity technology and solidarity economy. The characteristics are the same as the collective property of means of self-management, production, horizontal relations, solidarity and the material or economic distribution, decided by the members through work and income strategies elaborated by the State.

The solidarity economy includes some types of microenterprises and economic enterprises with relative independence from competition between capitalist companies: production niches – such as (in)formal units that have workers with or without ties to market circuits – and productive units in economic spaces not exploited by large companies, relatively with degrees of independence from capitalist business competition – although there are conversions in source of profits after proven productive viability of high proportion(food production generally treated as part of clusters in "creative economy" activities).

Authors such as Sabourin (2009) defend, from the perspective of another rationality, the relations of reciprocity that characterize economic exchanges. In this perspective, the experiences could be characterized not by an adaptation, in the sense that they would have to reinvent a business form, but by the consolidation of forms of city-field interaction, which

define the economy, sometimes even with non-monetary forms in the communities. It is important to relativize this different format when dealing with agriculture.

Sociotechnical adequacy and socio-technical advice agroecology and urban agriculture

In particular, by dealing with the adequacy of sociotechnical in the field of agroecology, some fundamental concepts are presented to expose the way in which they are understood in the theoretical development and in the cases of praxis presented in this chapter. The conceptual approach to agroecology seeks to give relevance to the strategies of building sustainable agriculture styles[13] and sustainable development, in order to promote the technical-scientific potential for substantial changes in agriculture and rural areas, as well as to reorient technical assistance and rural extension actions from the perspective of security of socio-environmental and economic sustainability in rural territories.

As it is usually being used to situate the field of agroecology by Wezel et al. (2009), either as science – which deals with the studies of agroecosystems and the paths to the transition to biodiverse and resilient productive systems – as a set of practices that favor more sustainable agriculture, without biotechnological impacts, or as a movement that seeks more ecological and socially fair agriculture. Agroecology converges on a systemic approach of agroecosystems, and according to Caporal and Costabeber (2004), this occurs through systems of analysis units that provide scientific bases, principles, concepts and methodologies in order to support the process of transition from conventional agriculture to agriculture with foundations of easy application of the principles and concepts of ecology in the management and design of sustainable agro-systems and in the construction of socio-environmental knowledge.

In order to establish dialogue between the adequacy of socio-technical and agroecology, according to Professor Flaviane Canavesi, it is essential to think about the dimension of popular sociotechnical subjects. This is because the construction of agroecological knowledge is collective, dialogical and involves the various forms of knowledge, valuing the dialogue between them. In the continuous process of the construction of agroecology as science, the knowledge of family farmers and traditional farmers and traditional peoples are fundamental for the systematization of practice, as they reflect ways of life, interactions with the environment, values and traditions.

In the history of agroecology in Brazil, it is possible to perceive the protagonist character of the subjects socio-technical aspects for advances and achievements. Agroecology emerged in the 1980s, initially as alternative agriculture, in a movement opposite to the model proposed by the green revolution. This model – which generated changes in agri-food systems, both in production, distribution and consumption – took off from ecology and disconnected from local food culture as resistance to the modernization processes of agriculture based on the green revolution, which had as their goal the increase of productivity by area and the denial of a broad agrarian reform. The action of the Ecclesial Basis Communities (CEBS) was important for the construction of a counter-hegemonic movement, because small communities began to meet and, in a commitment to change and for life, formed a network of articulation and struggle.

Alternative agriculture, from the beginning, was constituted by a strong movement of technical discussions, but always articulating with the social discussion. The experiences were emerging fragmented in the territory, and over time they began to understand that they were facing common elements. In 1989, with the publication of the book Agroecology: scientific bases for alternative agriculture, by the Chilean agronomist Miguel Altieri, the term agroecology came to be used broadly and to unify movements. In 2002, the first National Agroecology Meeting (ENA) took place, which promoted the connection between agroecology experiments that were taking place in Brazil with the majority participation of farmers. In the same year, the National Articulation of Agroecology (ANA) was created, which brings together social movements, networks, organizations and associations related to agroecology. In the following year, 2003, the first Brazilian Congress of Agroecology (CBA) took place in Porto Alegre, which proved fundamental to the academic field in the search for the consolidation of agroecology as a science, but always in dialogue with practical experiences. Thus, the Brazilian Association of Agroecology (ABA) was founded in 2004.

The movement grew both in scientific recognition and in the volume of practical experiences of production in the agroecological system and in agroecological transition. The political dimension of agroecology began to stand out as another fundamental aspect, since agroecological movements identify themselves and place themselves in the struggle for democracy, social justice, environment, gender equity, territorial rights of traditional peoples and communities. This aspect makes clear the transdisciplinarity of agroecology, both regarding to the construction of knowledge and in the performance in relation to a change of situation. Despite recent setbacks in public policies for the promotion of agroecology in Brazil, which has already had National Plans for Agroecology and Organic

[13]According to Caporal and Costabeber (2004), sustainable agriculture deals with the relevance that the agroecological approach is placed on the sociocultural specificities of social actors, practice and adaptations necessary for different agroecosystems.

Production operated by the State and with social participation of agroecology networks (GUENEAU et al., 2019), the agroecological movement remains organized.

The adequacy agroecology has as one of the challenges the development of technologies that dialogue with farmers. Universities, over the last few years, have developed various technologies, but more focused on meeting the objectives of modernizing agriculture. They are technologies that, for the most part, are not suitable for agro-ecological production. Thus, to insert the participation of popular sociotechnical subjects in the systematization of their practices and needs is to follow up on the construction of joint knowledge, articulating teaching, research and extension, co-creating technologies.

EXPERIENCES IN TERRITORIES

In this chapter, three experiences are reported in the Distrito Federal. The first approaches the relationship between water and agroecology in a region of water relevance to the city. The second presents a survey of areas with potential for urban agriculture. The third is the experience related to survival strategies enhanced by agroecological techniques of water and food resources in the Pequeno William Settlement, in Planaltina, Distrito Federal.

The experience of Serrinha do Paranoá and its waters that supply the Distrito Federal – agroecology as a practice to emerge water

Description and contextualization of the territory

Serrinha do Paranoá, named after historian Paulo Bertran, shows a mosaic of the areas of rural remnants that extend from the Varjão neighborhood to the Pines of Vila do Paranoá, showing its rock formations from 50 to 100 meters above the level of Lake Paranoá. The region is rich with its springs, which contribute to the formation of nine drainage micro-basin– members of the north sub-basin of Lake Paranoá – and form a kind of frame of the geo-historical heritage of Brasilia. It was considered by Lucio Costa as the bucolic landscape that embraces the Cultural Heritage Brasilia, recognized by UNESCO.

Serrinha do Paranoá (Figure 121) has a total of 4,250 hectares and is located in the administrative region of Lago Norte and in the Environmental Protection Areas: APA of the Central Plateau, Paranoá APA and Cerrado Biosphere Reserve. The population is 5,941 inhabitants, according to the Census conducted in 2014, and is divided into 9 rural nuclei: Bananal, Torto, Urubu, Olhos D'água, Jerivá, Palha, Taquari, Capoeira do Balm and Anteater. The predominant vegetation is the cerrado, with riparian forest formations and cerrado field. Properties vary in size, many of which are smaller than two hectares.

The predominant characteristics are urban-environmental, rural and rural-environmental, contributing both in the sustainable horticultural production and in the conservation and preservation of ecosystem processes, being important the recharge of aquifers. It has a water supply protection area (APM), administered by the Environmental Sanitation Company of the Distrito Federal (CAESB), aiming at the maintenance of water resources.

Figures 121 and 122: Location of Brasília-DF in the Context of Brazil and Serrinha do Paranoá in the context of Brasília-DF. Source: Google Maps. Preparation: João Lima Farias, 2022

Serrinha is a recharge area for Lake Paranoá – therefore of high sensitivity (Figure 122 and 123) – where, during the water crisis of 2017, the capture of emergency water for the supply of part of the Plano Piloto, Varjão, Paranoá and Itapoã was installed. It is also noteworthy that it is included in the Economic Ecological Zoning Law of the Distrito Federal, approved in 2019 (Law No. 6,269), the high environmental risk of the region, being recommended activities of low environmental impact, such as rural tourism, services, among others.

Figures 123: Aerial photo of part of Serrinha do Paranoá. Source: Valmor Filho.

In the region there is a strong process of urban speculation and land grabbing, which has been disfiguring its rural characteristics. High real estate pressure destroys the region. Since the induction of urban expansion, with the Territorial Planning Plan – PDOT/2009, much of the region has become an urban area with rural characteristics, further leading to the transformation to urban areas. Although the land is public, the public management of these lands acts as a private company, and not as a development and territorial planning agency. Therefore, the result is the expansion of the land speculation industry, aggravated by the absence of the state's role for regularization, as shown by the various studies published by the researchers of the Water and Built Environment Group – Water Sensitive Brasilia Research Project, of UnB.

For the region, the performance of civil society, like some of the residents of the rural centers of Urubu and Jerivá, consolidated a partnership with the University of Brasília, specifically with the Research Group Water and Built Environment - Faculty of Architecture and Urbanism (AAC/FAU/UnB), which works the focus of Water Sensitive Design in Serrinha, in particular with the research project "Water-sensitive Brasilia for pilot application in the urban expansion of Serrinha do Paranoá from the perspective of ecological infrastructure standards integrated to social inclusion standards based on solutions based on nature", which was submitted to Edict 03/2018 – Public Selection of Proposal for Scientific Research, Technology and Innovation - Spontaneous demand of the Distrito Federal Research Support Foundation (FAP/DF).

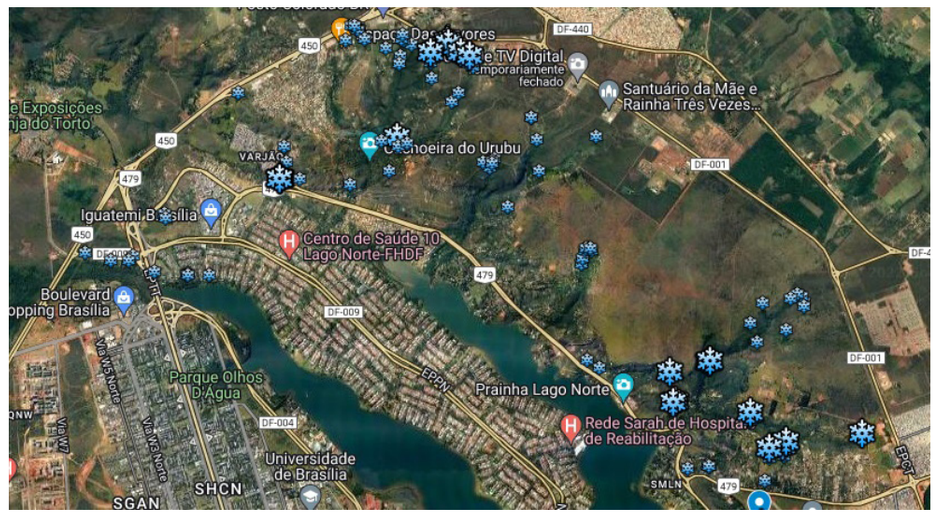
This partnership is a praxis implementation of sustainable development from the geographical unit in the context of drainage micro-basins. In this context, the Águas Project was presented, implemented by the NGO Oca do Sol whose manager is Consolación Udry, a resident of the Urubu Stream nucleus. This mapping was responsible for the identification of more than one hundred springs in the region, with the participation of the residents of Serrinha do Paranoá. By an action on their own cell phones, they shared the locations of the springs, resulting in the consolidation of a local water map. This map had technical support from the Regional Administration of Lago Norte for the production of a map of springs, realized as the geographical and socio-environmental identity of the region. Thus, the actions of the community approach the "water-sensitive" design, allowing to conserve springs or induce the waters to appear over the territory.

Presentation of good practices

The Water Project, created in 2015, trained local multipliers based on a Methodology of Macroeducation. Work meetings and discussions were held involving the communities of residents – civil society organizations and public authorities – to constitute a web of sustainability in Serrinha do Paranoá, however a planning proposal considered the suggestion of ecological corridor. In 2015, the Águas Project applied 1,500 semi-structured questionnaires using Participatory Rapid Diagnostics - DRP tools, with the participation of local residents, volunteers and the administration of Lago Norte. These data aimed to verify the perception of the community in relation to its territory in the thematic axis built collectively, which are: (i) environmental preservation; (ii) management of water resources and sanitation; (iii) environmental education; (iv) land and environmental regularization; (v) culture, sport, tourism, leisure and social development; (vi) agroecology, permaculture and sustainable agriculture.

The basis of the actions is centered on the participation and continued formation of local residents (Figure 124), and in this context the existing public and private schools in the region, as well as the partnership with the Lago Norte Administration, are inserted in this context. To effect these actions, in 2016, the Socio-Environmental Pact of The Waters of Serrinha do Paranoá was signed by public institutions and the Council for Local Sustainable Rural Development (CDRS), representing community associations. The Águas Project captured geographic points through mobile phones, which resulted in the identification of over 100 intermittent and perennial springs, according to the Lago Norte Spring Map, a focus on Serrinha do Paranoá (Figure 125).

Figures 124: Activities carried out by the local community. Source: Hollow of the Sun.



Figures 125: Mapping of springs in Serrinha do Paranoá. Source: Google My Maps

This mapping action developed by the local community and implemented by the Oca do Sol Institute, according to the understanding of the AAC/FAU/UnB Group, is based on Lefebvre's theory (2016), which considers society's actions on the production of urban space as a triad of "perceived-lived-conceived" space: social practice (perceived), representations of space (conceived) and spaces of representation (lived). This characterization is important to understand the need for the participatory process in the construction and rehabilitation of the space.

Collaborations and potentialities

The Government of Brasilia has put in place a tool that seeks to transform the capital into a sustainable city model. It consists on the project "Promoting sustainable cities in Brazil, through Integrated Urban Planning and Investments in Innovative Technologies", implemented by technical cooperation financed by the Global Environment Facility (GEF) and by the partnership of the Government of Brasilia with the Ministry of Science, Technology and Innovation (MCTI) and the United Nations Environment Program (UNEP), through an international cooperation agreement to carry out projects from 2018 to 2022, briefly cited as the GEF Project – Sustainable City.

This tool is administered by the State Department of the Environment of the Distrito Federal (SEMA), which has a local committee including the Secretariat of Planning, Budget and Management (SEPLAG), Secretary of State Management of The Territory and Housing (SEGETH), Environmental Sanitation Company of the Distrito Federal (CAESB) and Urban Cleaning Service of the Distrito Federal (SLU).

The initiative integrates sustainable and integrated planning of the territory with involvement of civil society and government sectors. The GEF project will pass on $6.4 million as a donation over four years. This amount is added to the investment of US$55 million from the Distrito Federal Government for sustainability actions.

In the administrative region of Lago Norte, of which Serrinha do Paranoá is a part, the priority actions of the GEF Project – Sustainable Cities aim to test innovative methods for the implementation of Agroforestry Systems (SAFs) and for agricultural practice initiatives in order to rationalize and optimize water use in the area simultaneously with the guarantee of continuous supply of water production in the Paranoá Lake micro-basin.

Understanding that SAFs implement some systemic initiatives with high degrees of ecosystem diversity and beneficial interactions, as they copy the natural environment, the possible integration of the Waters Project with the SAFs of the GEF Project – Sustainable Cities point to the potential of agroecology as a means of development of the rational and optimized supply of water for human use and recharging offer in the micro-basin of Lake Paranoá.

This is justified because an SAF can be implanted near the springs, since the integrated plants will boost the different cycles, ports and functions, enabling the use for the resumption of the balance of the system over time by complex interactions that promote water efficiency (CARVALHO et al., 2004), creating a microclimate capable of maintaining the temperature and humidity of air and soil, favorable to plant growth and development (VIEIRA et al., 2003) and the emerging of water springs where the soil has or had this characteristic.

It is important to understand that the potential of the two projects to integrate is seen as a reach of the water balance, which, according to Guerra (2014), analyzes the water flowing in and out by a given amount of soil at a given time, which brings a different dynamic from that when the area is maintained so that a natural recovery occurs or for a reforestation project to be established. This is a data that would help in making coherent decisions on urban expansion in Serrinha do Paranoá, since soil waterproofing compromises the water balance of micro-basin, since the SAFs would express the spatial and time variations of the water balance and indicate the need for socio-environmental action at the points of water springs.

The experience shows the potential of participatory planning, which integrates both the preservation or restoration of water in strategic locations, such as Serrinha do Paranoá, as well as the importance of thinking about agricultural practices in sensitive regions. The agroecological perspective in the implementation of forest systems can ensure a greater integration between agricultural practices and preservation, with the objective of generating income. These practices, which are based on socio-techniques in the management of agrobiodiversity, not only generate environmental services but can enhance food production and other pluriactivity activities of a "bucolic" region integrated to the urban center.

Agroforestry systems aim to optimize land use in agricultural production. Agroecology – in the multidimensionality of its principles by the environmental (improvement of ecosystem), cultural and social services (valorization of participatory guarantee systems), economic (commercialization of production) and politics (self-organization and collective management by great levels from local to global) – implies the coexistence between the nature and human beings, the occupation and transformation of the geographical space and also in the power relations that condition the processes transformation. These processes are coincident with the adequacy of socio-technical because it limits the relations of gain and relevant social transformations in the view of the autonomy in which agroecology supports the use of sustainable and fair practices.

The experience of Surveying Areas for Urban Agriculture- University of Brasilia/College of Planaltina

We can call a urban agriculture – urban and periurban agriculture – and citizenship, according to Neder and Costa (2014), as a neologism to Urban and Periurban Agriculture (AUP) that highlights the continuity between urban and agricultural sustainability and the valorization of other public policies in the territory, not directly linked to the function of agriecological food production. This type of agriculture occurs in small areas within a city or in its surroundings (periurban), being destined to the production of crops for use and consumption itself or for small-quantity, in local markets. In urban agriculture there is a scarcity of technical knowledge on the part of the agents/producers directly involved. Often, there is no possibility of exclusive dedication to the activity, which is usually intended for the use or consumption of oneself and the great diversity of crops, usually without the purpose of financial profit.

Description and contextualization of the territory

The following experience report explains an activity held at the Center for Elementary Education (CEF) Nossa Senhora de Fátima, located in Planaltina, Distrito Federal (Figure 126), in association with the School of Planaltina of the University of Brasília, with the theme of surveying areas for agrourbania, where project participants used a location primarily not suitable for the adequacy and activity of urban agriculture.

The purpose was to start the practice and maintenance of the cultivation of vegetables, ornamental plants and condiments on the premises of the school. The project's objectives were: to disseminate knowledge about urban agriculture; promote environmental awareness; to value the spaces provided by the community for the implementation of agro-urban projects; and promote interaction between students and the community close to the college, putting into practice concepts learned in class about rural extension.

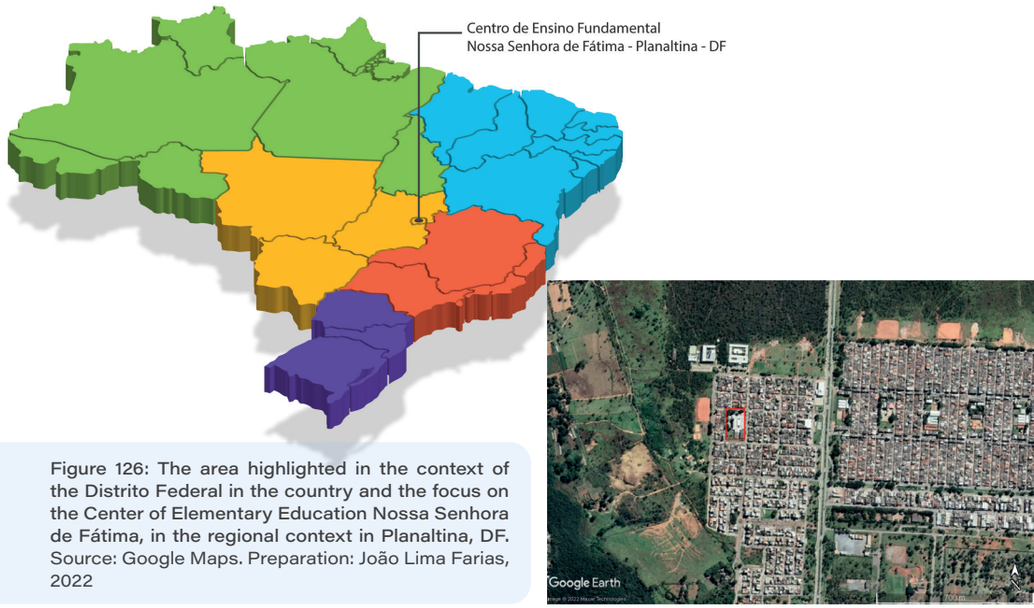


Figure 126: The area highlighted in the context of the Distrito Federal in the country and the focus on the Center of Elementary Education Nossa Senhora de Fátima, in the regional context in Planaltina, DF. Source: Google Maps. Preparation: João Lima Farias, 2022

Presentation of good practices

The students were responsible for finding the area in which the garden would be implemented and for the elaboration of the garden project, as well as verifying the situation of the place, as shown in Figures 127 and 128. After soil management and preparation, a variety of species were cultivated, among them: squash, coriander, carrot, passion fruit and Italian zucchini. Through the project, a certain self-sufficiency was created in food production, which allowed the students of the teaching center to take advantage of the production of the vegetable garden to develop a healthier and higher quality diet, allowing them to have access to 3 parts of vegetables per day.

An awareness work was carried out with students and CEF servers regarding the importance of food in quality of life and the importance of own plant cultivation. In addition, the school improved its aesthetic appearance after the introduction of the vegetable garden. Besides, the cultivation of climbing plants provided the creation of a green wall that helps in the school's climate.


Figures 127 and 128: Initial situation of the abandoned space of the Nossa Senhora De Fátima Elementary School Center and First stage of the revitalization of the disabled space of the Nossa Senhora de Fátima Elementary School Center, after the practices of Urban Agriculture. Source: Louise Guerard and Nayane Fonseca

Collaborations and potentialities

The present report is justified because urban agriculture directly interferes with social, economic and environmental factors. It is important to demonstrate that urban sectors have the potential to accommodate and practice agriculture. The realization of urban agriculture in this school brought several advantages to the community in which it was inserted, enabling the use of an abandoned school space, avoiding its deterioration and transforming this space into a place with potential for cultivation through a community garden.

The experience at Rancho de Terra, in the Pequeno William settlement, Planaltina/DF

According to Caporal et al. (2006), agroecology is understood as a field of knowledge of a multidisciplinary nature, which aims to contribute to the construction of ecologically based farming styles and the elaboration of rural development strategies, with reference to the ideals of sustainability in a multidimensional long-term perspective.

Make suitability of socio-technical in agroecology is, first hand, to change the way of thinking about agriculture, food, health, means of transport, packaging, housing and seek adaptations of existing techniques and/or create new techniques that are appropriate to the new needs proposed. It is to seek ecologically correct solutions to problems such as water scarcity, different types of soil and land, production designs, financial conditions of peasants and culture of the local community.

The sociotechnical advisory should be specialized in sociotechnical adequacy for agroecology, otherwise it will not be able to do this type of assistance. The advancement of agroecology depends mostly on advisors capable of assimilating community culture and working on solidarity technology.

Description and contextualization of the territory

Rancho de Terra is located in The Pequeno William Settlement (Figure 129), in Core 04, Portion 16, in the Administrative Region (RA) 0V – Planaltina, in the Distrito Federal, located in a microregion of storm route deviations, making rainfall indexes smaller than the volume of the rest of the district and with the dry period being a little longer in the locality. Adding this to the abandonment of settlements by the National Institute of Colonization and Agrarian Reform (INCRA) in the last seven years, there was a need to adapt and create local solutions to continue producing minimally.

Figure 129: The highlight of the context of the Distrito Federal in the country and the Small William Settlement in Planaltina-DF. Source: Google Earth base, edited by Acácio Machado. Source: Google Earth. Preparation: João Lima Farias, 2022

Presentation of good practices

Capture and storage of rainwater through the kitchen roof (Figure 130); drip irrigation and manual irrigation; creation of tilapia in storage tanks; cultivation in the less dense spaces of the Cerrado, preserving the trees; cultivation in the lower parts of the land to reduce energy consumption in irrigation; minimal correction of soil acidity to preserve

native species and natural soil microorganisms; organic fertilization using animal manure, organic compound and earthworm humus; dead soil cover; living cover with fertilizing plants; agroforestry system; multidiverse system of annual plants; planting based on family consumption with commercialization of surplus; seed production.

Figures 130 and 131: Kitchen built of clay and reused woods and Chaya to replace cabbage. Source: Acácio Machado.

Technical and management adjustments with the objective of ensuring the sustainability of production were necessary, such as the option of planting species with greater tolerance to soil acidity, water stress and longer life. Option for cultivation of permanent functional food plants that replace the temporary with the same nutritional function, such as Chaya in place of cabbage (Figure 131). Plants with natural storage potential in the soil were chosen and a higher volume of plants per area, with joint service, was adopted for greater use of water. Plants with greater tolerance to shading (Figure 132 to 133), integration between plants and birds – enabling, with management, greater tolerance of birds to insects – own production of most of the seeds used, acceleration of the growth of some species in nursery and, finally, breeding of birds and fish (Figure 135).

Figures 132 and 133: Agroforestry system and lettuce seed production. Source: Acácio Machado.

Figures 134 and 135: Higher volume of species per square meter, greater use of water and dead cover and Rainwater storage tank for production and creation of tilapia. Source: Acácio Machado.

Presentation of good practices

Experience teaches that agroecology is not limited to food production. The construction of housing with low environmental impact, cooperation between community members and between communities, the exchange of knowledge among peasants and, in short, respect for people's rights, respect for the elderly, the child, the planet, race, color, religion, sexuality and respect for the macrodimensions of sustainability, which are: ecological, social, economic, political, cultural and ethical.

FINAL CONSIDERATIONS

The cases presented show the articulation of knowledge interfaces with experiences in which agroecology presents as a science that intends to break knowledge construction processes that did not encompass the diversity of the dimension of areas of knowledge necessary to act in the studied realities. These experiences occurred from academic and non-academic knowledge, in exchanges based on participatory methodologies.

Thus, the practices presented incorporate the management of agroecosystems in which involves technosocial dimensions from the dialectical perspective of participatory action research, established in stages, such as participatory diagnosis and socio-analysis of assemblies, to name a few of the resources used.

Agroecology, in the context of adequacy socio-technical, replaces the questions of ideas, knowledges and certainties linked to the rural, in the rupture of the use of technological packages of ready-made solutions. The cases presented refer to a practice of sociotechnical adequacy that concretizes the diversity of ways of life and production in the resistance of communities and peasants from the sociotechnical solutions they develop.

It will be through the understanding of an organizational perspective of these experiences that can be resisted in the territories, understanding that political action in agroecology enables the strengthening of these experiences, often threatened.

The cases presented start from a reflection based on the elements science, technology and society, in which a two-way pathway is reached by the cognitive symmetry of the different knowledge, which strengthen experiences in the sustainable management of agro-ecosystems.

REFERENCES

ANDRADE, Vanessa de Cássia Tavares. The agricultural use of the territory in Rio Grande do Norte: from agroecology to organic agriculture. 2019. 290f. Thesis (Doctorate in Geography) – Center for Humanities, Letters and Arts, Federal University of Rio Grande do Norte, Natal, 2019.

CAPORAL, Francisco R.; COSTABEBER, Jose A.. Agroecology: some concepts and principles. 24 p. Brasilia: MDA/SAF/DATER-IICA, 2004.

CARVALHO, Rodrigo; GOEDERT, J. Wenceslau; ARMANDO, Marcio Silveira. Physical attributes of the quality of a soil under agroforestry system. Brazilian Agricultural Research, v. 39, p. 1153-1155, 2004.

DAGNINO, Renato. Solidarity technology: a strategic manual. Marília: Anticapital Fights, 2019. 161 p.

DISTRITO FEDERAL. SEMA. Available in: http://sema.df.gov.br/secretaria-de-meio-ambiente-desenvolvera-projetos-sustentaveis-no-df-com-recursos-do-fundo-mundial-para-o-meio-ambiente-global-environment-facility-gef/. Access: 31 May. 2021.

DISTRITO FEDERAL. Law No. 6,269 of January 29, 2019. Establishes the Ecological-Economic Zoning of the Distrito Federal - ZEE-DF. Official Gazette of the Distrito Federal, Brasília, n.21, p. 35, 30 de jan. 2019. Section I.

GUARDIANS OF THE EARTH - Agroecology in Evolution. Director: Antônio Bento Manâncio and Fabricio Menicucci. Director: Vallente Filmes. Youtube, 2020. 1 video (63 min.). Available in: https://www.youtube.com/watch?v=1WMktpu_SKo. Accessed: May 21. 2021.

GUÉNEAU, Stéphane et al.. «The construction of state agroecology policies and organic production in Brazil». Revista Brasileira de Agroecologia, v. 14, n. 2, p. 15-15, 2019.

GUÉNEAU, Stéphane; Eric SABOURIN; NIEDERLE, Paul; COLONNA, Julianna; STRAUCH, William; PIRAUX, Marc; LAMINE, Claire; ASSIS, Willian; AVILA, Mario; CANAVESI, Flaviane; TAVARES, Edson; BARBOSA, Yamira; SCHMITT, Claudia. «The Construction of state agroecology and organic production policies in Brazil». Brazilian Journal of Agroecology, number 14, 2019.

WAR, Sara Carolina Soares. Subsidy to the improvement of irrigation management of agroforestry consortia in a situation of water scarcity. 2014. 104f. 2014. Dissertation (Master in Environmental Engineering) - Federal Rural University of Espírito Santo, Vitória.

LEFEBVRE, Henri. The city's right. Translated by: Cristina C. Oliveira. Itapevi, SP: Nebli, 2016.
MEDEIROS, Camila Bezerra Nobre de. Between rural and urban: socio-environmental relations of AEIS do Gramorezinho and implications in its regulation. 2017. 297f. Dissertation (Master in Architecture and Urbanism) - Technology Center, Federal University of Rio Grande do Norte, Natal, 2017.

NEDER, Ricardo Toledo; MARQUES, Moon Isis Braga. In: ADDOR, Felipe; LARICCHIA, Camila Rolim (Org.). Technological incubators of solidarity economy. Rio de Janeiro: UFRJ Publishing House, 2018. Sociotechnical interactionism and anti-methodology in ITCPs as agencies (Chapter 3 - Part 2, p. 187-210).

NEDER, Ricardo Toledo; COSTA, Flávio Murilo Pereira. «Science, technology, society (ST) for the construction of agroecology». Brasilia: NEPEAS, 2014.

SABOURIN, Eric. Peasants of Brazil between mercantile exchange and reciprocity. 2009.

SANTANDREU, Alain; LOVO, Ivana Cristina. Overview of urban and periurban agriculture in Brazil and political guidelines for its promotion. Belo Horizonte: FAO/MDS/SESAN/DPSD, 2007.

PLOEG VAN DER, Jan Douwe. Peasants and Food Empires: struggles for autonomy and sustainability in the age of globalization. UFRGS Publishing House, 2008.

VIEIRA, Ana Rita Rodrigues; SUERTEGARAY, Carlos Eduardo Oliveira; HELDWEIN, Arno Bernardo; MARASCHIN, Marcelo; SILVA, Aparecido Lima. Influence of the microclimate of an agroforestry system on yerba mate (Ilex paraguariensis St. Hil) culture. Revista Brasileira de Agrometeorologia, v. 11, n. 1, p. 91-97, 2003.

VOLTOLINI, Lisiana Crivelenti; MERCADANTE, Maria Eugenia Gobbo; RAMOS-FILHO, Luiz Otávio; MORICONI, Waldemore; QUEIROGA, Joel Leandro. «Water Use in Agroforestry Systems: A Brief Literature Review». In: Agroecology Notebooks - ISSN 2236-7934 - v.13, n.2, Dec/2018.

WEZEL, Alexander et al.. Agroecology as a science, a movement and a practice. A review. Agronomy for sustainable development, v. 29, n. 4, p. 503-515, 2009.

Ecosystem Health, Sanitation and Governance

Chapter 06

Autores:

Aldira Guimaraes Duarte Dominguez | Diogo Isao Santos Sakai | Alba Evangelista Ramos
Camila Dias de Aragão |Erivan de Jesus Santos Junio | Gleice Kelly Campelo Barbosa (in memorian)
Hisa Dutra Alves | Julia Maria de Oliveira Compan | Plácido Lima Ferreira Sobrinho
Satyam Bömer Dienstmann | Vinicius Araujo Gonçalves

ECOSYSTEM HEALTH, SANITATION AND GOVERNANCE

Aldira Guimaraes Duarte Dominguez[1]
Diogo Isao Santos Sakai[2]
Alba Evangelista Ramos[3]
Camila Dias de Aragão[4]
Erivan de Jesus Santos Junior[5]
Gleice Kelly Campelo Barbosa[6] (*in memorian*)
Hisa Dutra Alves[7]
Julia Maria de Oliveira Compan[8]
Plácido Lima Ferreira Sobrinho[9]
Satyam Bömer Dienstmann[10]
Vinicius Araujo Gonçalves[11]

SUMMARY: This chapter – Ecosystem Health, Sanitation and Governance – aims to present the cognitive bases to equate social problems and mediate socio-environmental conflicts in the struggle for the essential rights of populations excluded from the process of planning the territory, which through resistance practices configure new typologies of urban and rural occupations and solidarity networks. The theoretical and methodological studies presented contain the foundation for the development of the Residency in Science, Technology and Society, a proposal that aims to deepen the approximation between the academic community and the population. It is intended to address the following themes: ecosystem view of health; health and food; primary health – community health agents; healthy cities and neighborhoods – SDGs; community management and eco-sanitation; and integrative and holistic methodologies. The purpose of the chapter is to identify associative and cooperative practices (associated work) with self-management for the themes: ecosystem health, sanitation and governance. The work was prepared by students from various parts of Brazil in the first half of 2021, an opportunity that enabled the meeting of different experiences and contexts, as well as alternatives of participatory experiences. Five experiences were reported in the territories: Tororó Community Safety Council (CONSEG) and the Greater Tororó Region – DF; Women Movement of the Ginga Suburb, Salvador – BA; Environmental Multipliers – BA; Environmental Child Agent, Ceilândia – DF; Local Community Management of Sanitation for the Community of Santa Luzia – DF, with the participation of the FAU/UnB Peripheral Group. All experiences demonstrate the lack of public policies, the protagonism of communities to face the problems in their territories and the collective construction of solutions through the development of specific projects.

[1]UnB; aldira@unb.br / [2]UnB; professordiogosakai@gmail.com / [3]TWRA; alba.ramos@gmail.com / [4]MMSG; acsmiladias@gmail.com / [5]UFBA; sannarchi@gmail.com / [6]FCE/UnB / [7]FCE/UnB; hisadutra@gmail.com / [8]UnB; companjulia@gmail.com / [9]UnB; placidolima@outlook.com / [10]CONSEG; satyambomer@gmail.com / [11]FAU/UnB viniciusaraujo.eng@gmail.com

INTRODUCTION

This chapter – Ecosystem Health, Sanitation and Governance – is part of a set of studies resulting from the collective construction proposed by the extension course Fundamentals in Science, Technology and Society – CTS – Habitat, Agroecology, Solidarity Economy and Ecosystem Health offered by the Graduation and Extension Program of the Faculty of Architecture and Urbanism of the University of Brasília (FAU-UnB).

The project is the result of a partnership between the Science, Technology and Society Policy Center (NPCTS/CEAM/UnB) and professors from the Faculty of Architecture and Urbanism (PPG-FAU), the Faculty of Planaltina (FUP), the Faculty of Agronomy and Veterinary Medicine (FAV) and the Center for Sustainable Development (CDS), the Faculty of Ceilândia (FS), the Faculty of Education (FE) and the Institute of Humanities (IH), and aims to create cognitive bases to equate social problems and mediate socio-environmental conflicts in the struggle for the essential rights of populations excluded from the process of spatial planning, which through resistance practices configure new typologies of urban and rural occupations and solidarity networks.

The construction of new cognitive bases refers to the understanding of the concept of solidarity technoscience as:

> a cognitive consequence of the action of producers collectively on a work process that, due to a socioeconomic context (which engenders the collective ownership of the means of production) and a social agreement (which legitimizes associations), which encourage, in the productive environment, a control (self-managed) and cooperation (of voluntary and participatory type), causes a modification in the generated product which the material result may be appropriated according to the decision of the collective (solidarity enterprise) (DAGNINO, 2019, p. 18).

Well-being, health and sanitary conditions, as well as the quality of the environment, are issues in which conflicts persist, in the same way as the use of so-called "traditional" technological solutions (GOMES; MINAYO, 2006). The example of basic sanitation consists of a set of measures that include the use of techniques and services, such as water treatment, plumbing and sewage treatment, public cleaning, collection and treatment of organic waste and the regularization of sanitary landfills (ÁVILA et al., 2019).

Basic sanitation is also linked to social conditioning, as observed by Ávila, Dantas and Duarte (2019) when analyzing data from the National Commission on the Social Determinants of Health (CNDSS). The data indicate that the Social Determinants of Health (SDH) – social, economic, cultural, ethnic/racial, psychological and behavioral factors – influence the occurrence of health problems and their risk factors in the population (BUSS; PELLEGRINI apud ÁVILA et al., 2019).

Studies conducted by Gomes and Minayo (2006) on the ecosystem and human health found that the insufficiency of unidisciplinary approaches to theorize and understand the dimensions generated by the environmental degradation of soil and water, as well as the degree of involvement of authorities, managers, companies and citizens for the success of strategic proposals, are fundamental points for the construction of new guidelines for action.

The social vulnerability of certain groups is related to exclusion and the lack of representation and opportunities that, added to the lack of specific public policies and precarious infrastructure in their territories, lead to low quality of life and reinforce the problem associated with such deficiencies. As a result, poverty is verified with all its ills: food insecurity, low education, inadequate housing, low sanitation services and, consequently, the occurrence of diseases associated with this precariousness. This is a picture that intensifies as socioeconomic conditions decrease, such that the poor, have a greater susceptibility to diseases (ÁVILA et al., 2019) and, generally, less access to health services.

Leading the search for solutions aimed at life quality has been an important challenge for these populations. This perspective led to a new theoretical and practical strategy called ecosystem health, which seeks to integrate, in a transdisciplinary and dialogical perspective, the analyses generated individually and to call on civil society and the government to participate in the discussions and to commit to solutions (GOMES; MINAYO, 2006).

In this sense, the proposal of the chapter is to identify associative and cooperative practices (associated work) with self-management for the themes: ecosystem health, sanitation, and governance. The work was prepared by students from various parts of Brazil in the first half of 2021, an opportunity that enabled the meeting of different experiences and contexts, as well as alternatives of participatory experiences.

FUNDAMENTALS IN SOCIO-TECHNICAL ADEQUACY AND SOLIDARITY ECONOMY

The concept of sociotechnical adequacy, in which the epistemological orientation incorporates a view on science and techniques/technologies, allows the demystifying of traditional conceptions about science for economic purposes or technoscience, being understood as the most advanced or effective form of knowledge production organization, conducted exclusively by companies (NEDER, 2017).

Sociotechnical adequacy refers to the process of adaptation (or redesign) of techno-scientific knowledge, incorporated in equipment and raw materials (hardware), forms of organization of production (orgware) or in the intangible and even tacit form of mental models (software), not only to the requirements and purposes of a technical-economic character, as has been usual in environments in which knowledge is conceived for the production of (and in) companies, but to aspects of a social and environmental nature until now considered in this process as externalities (DAGNINO, 2014).

> [...] the proposal synthesized in the concept of Sociotechnical Adequacy supposes, ideally, the deconstruction and reconstruction (redesign) of capitalist technoscience; its decontamination of the values and interests deeply internalized in it by the logic of capital – hegemonic in the environments where it is developed – and its recontamination with those of the Solidarity Economy. The Sociotechnical Adequacy – in the seven modalities that are proposed – implies, then, adapting the conventional technology (and even to conceive alternatives) adopting supplementary criteria to the usual technical-economic and applying them to the processes of production of goods and services in solidarity enterprises aiming to optimize their social, economic and environmental effects(DAGNINO, 2014, p. 208-209).

DDagnino (2019) draws attention to those who develop public policies related to the production of goods and services so that they realize the role that the solidarity economy can play in the construction of a fairer and more environmentally responsible society of well-being. The solidarity economy consists of solidarity enterprises or organizations in which the ownership of the means of production is collective, where workers carry out economic activities in a self-managed way and the management and allocation of results is decided in a participatory and democratic way (DAGNINO, 2014).

The socioeconomic development of the most deprived populations has not received adequate public policies. Impact assessments and proposals for public policies on Science, Technology and Innovation (CTI) generally place among their goals the increase of competitiveness and productivity and the strengthening of high-tech segments, separating the socioeconomically disadvantaged groups regarding direct participation in generation and appropriation (ZUCOLOTO; PEREIRA, 2017).

Meeting social demands appears marginal , especially when they specifically impact the lower income layers of the population, and also the analyses and propositions of social programs, for the most part, leave the ICU out (ZUCOLOTO; PEREIRA, 2017).

In this context, social technologies gain relevance, tools developed from popular knowledge about local issues and challenges treated with creativity, determination, and local resources, seeking to solve problems in unconventional ways and seeking to value talents, and human and material resources available (SEBRAE, 2017).

Work, occupation, and Income – TOR – and Solidary Economy

New realities of the world of work demand from the public power answers to labor relations distinct from salaried employment. In 2003, the Federal Government created the Solidarity Economy in Development Program, which mapped the solidarity economy initiatives in Brazil and constituted the National Information System in Solidarity Economy (SIES), composed of a national base and local information bases, which provided visibility to the solidarity economy and subsidized the formulation of public policies through inclusion in multiannual plans (SOUSA; NEVES, 2011).

However, the effort made by the left-wing governments did not prosper with the return of the neoliberal government that applied in the legal frameworks and, with the justification of generating more jobs, promoted a dismantling of labor legislation, without having the courage necessary to advance in the tax reform to balance the tax burden that until today does not tax the great fortunes. As a consequence, Brazil is experiencing the precariousness of labor relations, an increase in unemployment rates, an increase in crime and, since 2017/2018, the return to the world Hunger Map, as revealed by the Family Budget Survey (POF) 2017/2018, released by IBGE (BRASIL, 2018).

In contrast, the changes in the world of work and the strategies of capital in contemporary Brazilian society have brought light to the solidarity economy, which is presented as one of the strategies to combat unemployment, to generate employment and income and, above all, to take political actions to combat the so-called "social vulnerability" (SOUSA; NEVES, 2011).

The solidarity economy includes the participation of cooperatives, associations, self-managed companies, cooperation networks, and cooperation conjunction, among others, that carry out activities of production of goods, provision of services, finance, exchange, trade and consumption (SOUSA; NEVES, 2011).

Socio-technical adequacy and socio-technical assistance for ecosystem health, sanitation, and governance

The ecosystem approach to human health refers to the balance between human health and the ecosystem that go beyond traditional methods (restricted biomedical model and the reductionism of the social vision separated from ecological understanding) from new strategies, generated and applied in line with public and private managers, civil society and the affected population segments (GOMES; MINAYO, 2006).

Ecosystem health interacts with the sanitation service, which includes the treatment and supply of potable water, sewage, rainwater drainage, urban cleaning, and solid waste management, and is directly related to the health of the population and ecosystems, given that about 80% of all diseases and more than one-third of deaths in developing countries are caused by the consumption of contaminated water and, on average, up to one-tenth of each person's productive time is lost due to waterborne diseases (AGUSTINHO, 2012).

In Brazil, there has always been a prioritization of supply in relation to sanitary sewage and solid waste disposal. This resulted in the concern with the quantitative aspects of water, based on a technical model of extensive exploitation of water resources, not paying attention to the social perception of water as a vulnerable resource (VARGAS, 1999 apud AGUSTINHO, 2012), which, according to Neder (2008), is aligned with the interests of the real estate market, often separated from social demands.

Water and sewage treatment coverage are still very unequal. The capitals and major cities of the country partially collect their sewage and treat it at different levels of organic load removal for release into dilution water bodies. In the Distrito Federal, the rate of care of the urban population, according to data from the National Sanitation Information System (SNIS) and the Sanitation Services Concessionaire (CAESB), was 98.98% in 2015 (Distrito Federal, 2017), however a good portion of the most vulnerable population of the occupations of territory – rural area and Areas of Social Interest (ARIS) – still do not have access to these resources. Consequently, the precariousness of ecosystem health is explicitly shown, even in the capital of the country, a unit of the federation that has treatment effectiveness rates higher than the national average: of the 15 existing sewage treatment plants, 7 of them treat the sewages with an average efficiency above 90% of organic load removal, 4 with average efficiency greater than 80% and only 4 with average efficiency less than 80% of organic load removal (DF, 2017).

Topics that will be addressed in the modules of the CTS Residency

The theoretical and methodological studies presented in this chapter include the basis for the development of the Residency in Science, Technology, and Society, a proposal that aims to deepen the reconciliation between the academic community and the population. It is intended to address the following themes: ecosystem view of health; health and food; primary health – community health agents; healthy cities and neighborhoods – SDGs; community management and eco-sanitation; and integrative and holistic methodologies.

METHODOLOGICAL PATH

The methodological path was built from reports of experiences in the territory, presented during the meetings of the Extension Course – CTS. Five experiences were selected with adherence to the basis of solidarity technoscience, socio-technical adequacy and solidarity economy, and in the themes of ecosystem health, sanitation and governance. Among the reports, experiences of actions and projects with different arrangements of participation of the population and other agents were identified.

The cases were organized according to the following script: (i) description and contextualization in the territory – data collection and bibliographic research about the territory where the experience occurred; (ii) presentation of good practices – description of the group's actions in the territory and detailing of a specific experience; (iii) collaborations and potentialities – recommendations of the group as a contribution to the improvement of experiences based on the theory analyzed.

EXPERIENCES IN TERRITORIES

We selected 5 experiences with different levels of social participation as a proposition of socio-technical adequacy to solve conflicts related to health, sanitation and governance. Case 1 dealt with the experience of the Tororó Community Safety Council (CONSEG) as an alternative for community governance and environmental security in the Greater Tororó Region, in the Distrito Federal. Case 2 addressed the Women Movement of the Ginga Suburb, which promotes actions in health, sanitation and governance in the Railway Suburb, in Salvador. The Environmental Multipliers is an environmental education project analyzed in case 3, and promotes actions with the communities of the Lower South Region, in Bahia. Case 4 is the Child Environmental Agent Project, which involves the University of Ceilândia/UnB through the work of teachers and students in the development of ecosystem health education alternatives with students from the public sector. In a similar way, case 5 presents participatory alternatives between university and community, with the experience of the Local Community Management of Sanitation for the Community of Santa Luzia – Distrito Federal and with the participation of the FAU/UnB Peripheral Group.

Case 1 – Tororó Community Safety Council (CONSEG) and the Greater Tororó Region

The Tororó Community Safety Council (CONSEG-Tororó) is a civil group formed by residents of the greater Tororó region who have the opportunity to organize themselves in community security conflicts as a participatory governance alternative. Originally, CONSEGs emerged as entities to support the state police, with a focus on public safety, but CONSEG Tororó also focuses on environmental security.

By 2020, most of the council's attention was directed to policing issues – with PMDF's Rural Guardian program, developed to facilitate security in the countryside – and street lighting. From 2020, CONSEG Tororó was dedicated to community safety as a whole, so safety began to be seen in a broader and systemic way.

The preservation of the environment and sustainability have become new objectives for conventional security since conflicts over natural resources are increasingly frequent. To this end, the Permanent Environmental Volunteer Working Group was created in the first half of 2020. The main objectives of the group are to develop and encourage good environmental practices and to mitigate, inhibit or eliminate disturbances to the environment that could endanger community safety.

Description and contextualization of the territory

The Grande Região do Tororó (Greater Region of Tororó) (Figure 136) is located in the south/southeast region of the Distrito Federal, along the DF 140 highway, its main road axis. The size of the territory is 17,054.74 hectares, starting in the surroundings of DF-001 to the border with the state of Goiás, being neighbor of the districts of Jardim ABC and Mesquita, of the municipality Cidade Occidental. It is a rural region that has two conservation units: the Tororó Ecological Park and the Salto do Tororó District Park. Until 2019, Tororó was part of two distinct administrative regions of the Distrito Federal. The right side of DF 140 belonged to the Administrative Region (RA) of São Sebastião, and the left side belonged to RA Santa Maria. In December 2019, with the Complementary Law No. 958/2019, Tororó became a housing sector of the AR of the Botanical Garden. For this reason, there is still little socioeconomic data specific to the region.

Figures 136: Clockwise: Cachoeira Salto do Tororó, DF 140, main road axis and cerrado area. Source: : https://consegdftororo.wordpress.com/.

The Tororó is part of the Hydrographic Unit (UH) of Ribeirão Santana, which flows into the São Bartolomeu River (Paranaíba River Basin). In this UH are also the springs of the Pau de Caixeta Stream, the Dead Horse Stream and the Santa Barbara Stream. The Pau de Caixeta Stream forms one of the most well-known waterfalls in the Distrito Federal, the Salto do Tororó Waterfall. The region presents great diversity in relation to the physical-territorial

aspects and the environmental sensitivity to urban parceling (Figure 137). Near DF-001 and the Tororó Ecological Park, the area is of high flat landform and in its limits are the springs of the Santana, Cachoeirinha and Maria Pereira streams. The areas of lower altitude correspond to the valley shaped by drainage, formed by tributaries of the São Bartolomeu River. Between the valley and the high plane, there is a hill with steep slopes.

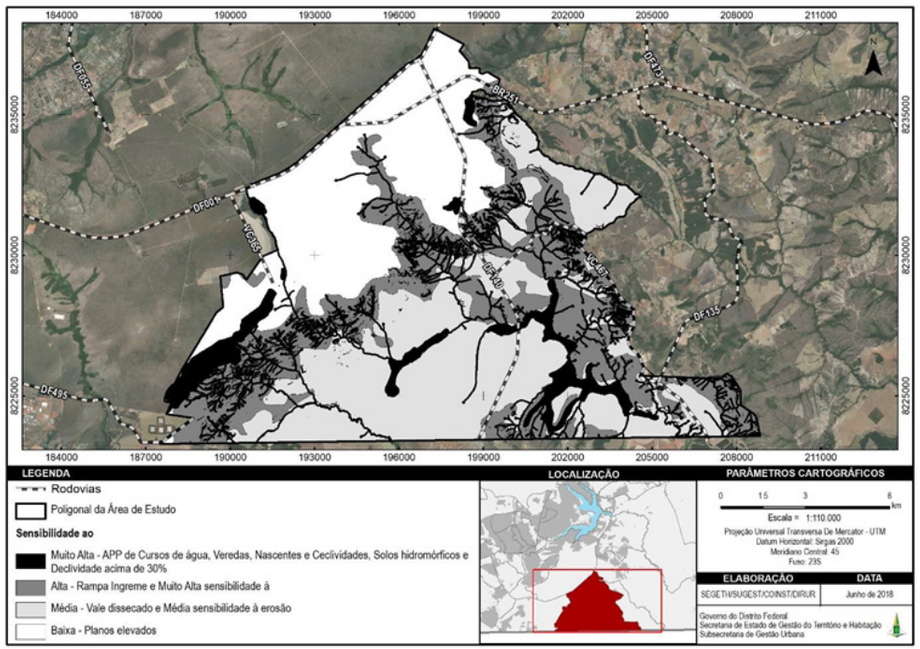


Figure 137: Map of environmental sensitivity to urban parceling in the Grande Região do Tororó and location in the Distrito Federal. Source: Urban Guidelines of the South/Southeast Region (DIUR, 2018)

The Tororó Ecological Park (PET) is the birthplace of the springs of the Pau de Caixeta Stream and has a visitation area with a walking track, lighting and guardhouses with security guards. Its inauguration, which occurred in 2020, took place without the necessary regulation to discipline visitation. This fact stimulated the first action of the voluntary environmental work group of CONSEG, which elaborated, together with the community, a proposal for internal regulations. The Salto do Tororó Waterfall, the main symbol of the neighborhood, is located in the Salto do Tororó District Park (PDST). This park was created in 2015 as a unit of conservation, of full protection according to the District Complementary Law No. 810/2010 of the District System of Conservation Units (SDUC). Although there is an open house, there is still no infrastructure or monitoring. The two conservation units do not have a management plan. From the environmental point of view, the Tororó region is strategic for the connection between two conservation units that are within a radius of five kilometers away, the Ecological Station of the Botanical Garden, next to the Area of Relevant Ecological Interest Capetinga – Taquara, and the IBGE Ecological Reserve, being, then, an important region for the conservation of biodiversity.

According to the District Homes Sample Survey of the Distrito Federal (PDAD/2016) conducted by the Distrito Federal Planning Company (CODEPLAN) (DF, 2018), the population living in Tororó has socioeconomic characteristics similar to those of the RA Jardim Botânico, characterized as medium and high income. However, the research only considered as a parameter 3 condominiums of Tororó, totaling 5,951 inhabitants. It should be noticed that there are currently 15 new residential condominiums that were not considered, as well as the rural population that lives in country houses and farms, which was also not mentioned. It is expected that in the coming years, there will be more information about the local population.

According to the Government of the Distrito Federal and the Urban Guidelines of the South/Southeast Region (DIUR 07/2018), which refer precisely to the territory of the Greater Tororó Region, the area is destined for increasing urban expansion, with a predicted population of almost one million inhabitants by 2050. The project foresees the construction of a complete urban area, with housing supply, commerce, services, industry and leisure in a complete characterization change of the place, which is currently formed by few occupations of urban nature, prevailing rural uses, as well as farms and some urban parcels in part of the region, which correspond to the Tororó Housing Sector.

It is important to notice that, in the Urban Guidelines 07/2018, the Salto do Tororó Ecological Park was not considered, not appearing on the maps, as well as the Salto do Tororó Waterfall, was also not mentioned. In this panorama, important issues arise raised by the community and ignored until then by the official institutions. The community questions why the park and waterfall, which are the community's identity, have been ignored. Does the region have support capacity for the entire projected population? What solutions have been presented to the problem of basic sanitation, potable water and sewage? Does the region have the capacity to support water resources for exponential population growth in the region? And does it also have it for the dilution of sewage? Many environmental problems are already beginning to emerge in the region, especially the improper disposal of solid waste, deforestation and waterproofing with the occurrence of road flooding (Figure 138).

Figures 138: Clockwise: flooding of dirt road due to interventions in Córrego Pau de Caixeta, a deforested area with native tree trunks of the cerrado for condominium construction next to the springs of Córrego Pau de Caixeta, removal of topsoil in Tororó Ecological Park, cerrado area X condominium construction. Source: https://consegdftororo.wordpress.com/.

About 80% of the region's land is privately owned, and the real estate market of the Distrito Federal, in search of expansion, has turned to the Grande Tororó region. The neighborhood is being described in newspaper articles as a "real estate market bet in the DF". Several new condos are being built. The logic of standardized urban planning ignores the physical and social complexity of an urban fabric and does not consider the human interactions of the built environment and the use of natural resources. Understanding the local scale, through dialogue with the community, is essential for the construction of a sustainable community, with the presence of the solidarity economy, ecological urban infrastructures (green infrastructure), strengthening of ecological tourism, the construction of well-being and collective life of the neighborhood, among other factors that could make the Grande Tororó Region a sustainable model in the Distrito Federal.

Presentation of good practices

In one year of existence, the CONSEG Tororó environmental volunteer working group carried out some relevant actions, presented in Chart 7.

N°	Name of Project	Year	Objective/ Target audience	Actions developed	Funder/ Partnerships
1	Proposal Internal Regulations of the Tororó Ecological Park (PET)	2020/1	Develop together with the community of Tororó a proposal for a regulation, to promote the conscious and sustainable use of PET	Proposal for internal regulations developed with the community, 75 online questionnaires were applied	No Partnerships
2	Save Tororó	12/05/2020	Request to the competent institution the construction of the basic infrastructure of the park and awareness of visitors and population	Cleaning with help from a lot of people in the District Park of Salto do Tororó and Open letter - Save the Tororó of 05/12/2020 construction of the basic infrastructure of the park	Administration of the Botanical Garden, Urban Cleaning Service of the Distrito Federal, Ecolimpo Cooperative, Police and Firefighters
3	Reports of various environmental crimes	2020/2021	Report invasions of preservation areas for improper use such as pasture breeding, announcement of land sale in PET, and removal of topsoil from the Cerrado in PET	Letters of complaint to IBRAM	No Partnerships
4	The paths of the waters of Tororó: Water Security in the Community of Tororó	03/22/2021	Start the debate with the community of Tororó on the preservation of water resources and the water capacity of the region - World Water Day	Live open to the public, with lectures on the waters of the region, the forecasts, the challenges, and how to act to maintain the preservation of water resources	Ricardo Minotti - President CBH Paranaíba Maurício Laxe - Manager of the APA of the Central Plateau ICMBio

Table 7: Actions carried out by CONSEG Tororó, 2020-2021. Source: Prepared by Satyam Bömer Dienstmann (adapted)

Among the actions carried out (Chart 7), the experience of the elaboration project of a proposal for the Internal Regulations of the Tororó Ecological Park will be presented, a governance action for the regulation of the Tororó Ecological Park, which will be submitted to the Brasília Environmental Institute, the district agency responsible for the management of the conservation units. The research was conducted entirely by the Google platform, using Google Forms, and lasted ten calendar days, during this time 75 questionnaires were answered by the community. The questionnaire had 15 questions, distributed as follows: (i) user profile; (ii) general knowledge about the Tororó Ecological Park; (iii) importance of the Tororó Ecological Park; (iv) expectation of use of the Tororó Ecological Park; (v) a sense of security that the Tororó Ecological Park offers today; (vi) knowledge of the internal regulation draft ; (vii) opinions not included in the questionnaire. The answers to the questionnaire would serve to validate the content of the Park's Internal Regulations proposal.

The result obtained confirmed the majority of the scope that was proposed by the Draft Internal Regulations and allowed adjustments, especially regarding the hours of operation. Of the 75 people who answered the questionnaire, 52% were men and 48% were women. Young people between 30 and 40 years old represented 62.7% of the participants, which indicates the search of this public for a housing profile with quality of life and

proximity to nature. The age group between 50 and 59 years corresponded to 14.7% of the interviewees, and the age group above 60 years corresponded to 17.3%. More than half of respondents (56%) responded that they have visited the park, and 44% have not.

The vast majority answered that they knew that the park is a conservation unit, and only 4% said they did not know. This shows that the community is enlightened about the objectives of a conservation unit. Although 96% of the interviewees claim to know that the park is a conservation unit, when asked about the limitations that the SDUC imposes on this category, the number drops to 60%, and 40% say they are unaware of the limitations imposed by the legislation on the ecological park category.

The Tororó Ecological Park is divided into 3 sectors, the first sector being the area of public use, and the other two sectors are preservation areas – including the location of the Pau de Caixeta springs. Of the interviewees, 53.3% answered that they know about this sector divisions and understand that only sector 1 is available for public visitation. Of the rest of them 46.7% are unaware of this reality.

When asked about the importance of the park, 80% answered that it is to protect the ecosystems of our region, 77.3% answered about it being a leisure and integration option for the community and 68% answered about maintaining air quality. Only 2.7% answered that they do not consider the park important for the Grande Tororó Region. This question is more complex to evaluate, because it allows numerous simultaneous options, so there was no total of 100% for all answers, only the percentage ratio for each of the answers in relation to the whole.

he question about which activities they would like to have out in the park, we found seven alternatives with significant community interest. The interpretive trails obtained 86.7% of the interest of the community, followed by 58% whose interest is to be able to practice sport in that area and 56% specified the interest in practicing cycling. Cultural presentations represented 54.7% of the interest of those who responded to the survey and 53.3% placed interest in the park being able to offer or promote courses. In smaller numbers appeared the gastronomic fair and handicraft fair, respectively with 36% and 37.3%. Regarding safety, 64% of respondents do not consider the park safe, against 36% who think it is safe.

The result obtained confirmed most of the content proposed by the Internal Regulations Draft and allowed adjustments, especially regarding the hours of operation. It was very positive to realize how the community values the Tororó Ecological Park and considers it as a point of integration, developing sports activities, cultural activities, educational activities and interest in the importance of the park to preserve the ecosystems of the region. The proposal for the Internal Regulations of the Tororó Ecological Park was sent to IBRAM in the second half of 2020, but it did not take a position on the demand of the Tororoense community for its park.

Collaborations and potential

CONSEG Tororó proved to be an example of associative and cooperative practices and alternative self-management for community and environmental safety. In the course of its actions, CONSEG Tororó has been expanding its range of influence as it organizes itself and involves other actors, such as public, private and collective institutions. In this sense, partnerships with educational institutions can contribute to the development of studies and research in order to substantiate technically and, politically, the actions to be developed.

The pressure of urbanization on the Grande Tororó Region, due to its nature and landscape potential, demands more and more organization and action of CONSEG to monitor the evolution of indiscriminate occupation over the area. The experience of community involvement for participatory management and planning proved to be rich, allowing the assimilation of community knowledge for the definition of protected areas, as well as uses such as ecotourism that can articulate adventure tourism. Today the Salto do Tororó waterfall is already included in several tourist itineraries of the Distrito Federal, such as the Cerrado Route.

The threat of disrespect to areas of environmental sensitivity demands that the community have to be permanently mobilized to monitor the urbanization process, to seek that it will be done with less socio-environmental impact and with socio-technical adequacy for basic sanitation within the water capacity of the region. The two parks already have legal apparatus, but lack of adequate infrastructure. Ecological and participatory tourism could make the Grande Tororó Region a model of sustainable occupation in the Distrito Federal.

Case 2 – Women Movement of the Ginga Suburb of Salvador – BA

The Ginga Suburban Women Movement (MMSG) is a Civil Society Organization (CSO) created in 2010 with the objective of combating sexism and racism, in addition to confronting violence against black women in the region of the Railway Suburb of Salvador – BA (Figure 139). The challenges have been faced through the execution of projects aimed at female empowerment, professionalization and social organization. The actions aim to train for the development of activities that contribute to emotional, psychological, social and

financial autonomy, as well as to encourage the report of occurrences of domestic violence and racism.

The Group is formed by women, mostly black, fishwife, day laborers, maids, students, health agents, teachers, artisans, social workers and bachelors in Gender and Diversity. Women protagonists of their stories and the community in which they live, who seek to improve the quality of life, existence and resistance of others.

Figure 139: Logo of the Women Movement of Ginga Suburb. Source: www.mulheres ginga.com.br

Description and contextualization of the territory

The Railway Suburb (Figure 140) is inserted in the Restructuring Macro-area of the Borda da Baía de Todos os Santos, according to the Master Plan for Urban Development of Salvador (PDDU) (BA, 2016). It is considered a strategic area for the urban development of Salvador due to its geographical position in relation to the Baía de Todos os Santos and the Baía de Aratu, which present favorable conditions for nautical and port activities, and other economic activities related to the sea.

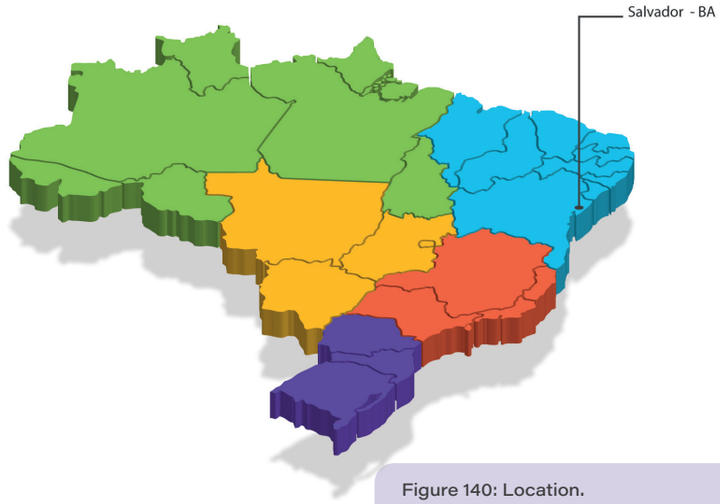


Figure 140: Location.
Elaboration: João Lima Farias, 2022

The region is characterized by the need for urban, economic and social rescue of neighborhoods that form an extensive pocket of poverty with a deficiency of infrastructure networks and provision of public equipment and services, configuring a framework of great urban and social vulnerability (BA, 2016). The Macro-area encompasses the territory that extends from Lobato to São Tomé do Paripe and neighborhoods to the south, located in the upper part of the Geological Fault, in the region of São Caetano and Pirajá, configuring itself as a predominantly residential area of horizontal pattern, and still presents gaps and shelter the population of low and medium income.

The Railway Suburb encompasses 22 popular neighborhoods of Salvador that had their initial population linked to the railway line in 1860, and became a vector of growth towards the Baía de Todos os Santos (JESUS; ROCHA, 2018). The population of about 500 thousand inhabitants is characterized by Afro-descendant culture with a predominance of blacks, poor, low schooling and high levels of urban violence (SOARES, 2009; BAHIA, 2016).

The Railway Suburb and the Miolo have the Human Development Index (HDI) of 0.578, revealing the contrast with that of Salvador (HDI 0.759) and the differences between spaces of the same territory (JESUS; ROCHA, 2018). According to the aforementioned authors, the low HDI is due to constant violence, drug trafficking, prostitution, and lack of sanitation and food. In this context, women represent an important workforce contributing substantially to family income, in addition to accumulating household chores and being, many of them, victims of domestic violence.

This territory concentrates a large part of inhabitants who live with the lack of employment, urban violence, precarious housing occupying risk slopes, demands for basic sanitation, access to the health system, education and security (JESUS; ROCHA, 2018), although it has cultural diversity formed by groups of capoeira, music, samba de roda (circle samba), terreiro (kind of a temple), among others.

In this scenario, the Women Movement of Ginga Suburb has developed numerous projects and actions (Chart 8) for the training of women in various themes, especially those aimed at training around gender oppression, racism, racial identity, domestic violence, professionalization, strengthening of social control networks of public policies, among others.

Nº	Name of Project	Year	Objective/ Target audience	Actions developed	Funder/ Partnerships
1	Untying Knots	2010/ 2011	Professionalization (screen printing workshops; handicrafts); Training to confront oppressions of gender, racism, racial identity: Law 10.639 and Law 11.340/2006	Activities with Black Women who make animal raffles among waste pickers and residents of the Community of Santa Luzia do Subúrbio Ferroviário de Salvador, BA	Females Fund; Brazil Fund for Hunamos Rights; Universal Service Coordination (CESE)
2	Network for the Strengthening of Social Control of Public Policies	2011/ 2012	Installation of a network to strengthen the social control of public policies with 5 organizations	Creation of the Renascer Mulher Association; Itinerant consultations in the communities of the suburb and some peripheries of Salvador on the themes: daycare centers as a right of children, duty of the municipality: autonomy of black women	
3	Blitiz Social of the Suburb	2013	Encourage the compulsory notification of violence against women (Law 10.778/2003) with the UBS (Health Basic Unit) of the Health District of the Railway Suburb	A total of 17 UBSs (Health Basic Unit) were worked through the participatory planning methodology covering public health and education professionals	Social Control Network; CESE
4	Domestic Violence and Compulsory Notification in the Sights of the Women's Network	2014/ 2015	Mapping and training women's autonomy and how to overcome violence, especially domestic violence	Mapped 10 of the 22 communities in the Railway Suburb of Salvador and the island of Maré; trained health, education and safety professionals to notify cases of violence against women seeking care.	They are the Social Investment Fund of Rio de Janeiro; Renascer Mulher Association; Social Control Network
5	Comugerê Project of Rights	2016/ 2017	Encourage and strengthen women's autonomy and confront violence, especially domestic violence	It promoted actions aimed at emotional, psychological, social, financial autonomy, especially domestic autonomy. Enabled the participation in the event "July of Black/2017"	AIDS Support and Prevention Group - GAPA/BA
6	Obirim Olodê Project - Black Women, Street Ladies	2018	Lecture	It promoted a lecture and debate with the title: From the Winning Slaves to the National March of Black Women	
7	Cutting and Sewing Course	2018	Empowering women in cutting and sewing	Empowering women in cutting and sewing	Qualifica Bahia Program of the State Government
8	Cultural exchange with French Guiana	2018	2 months internship for student	Trained student Jean Pierre Maille Love	University of French Guiana
9	Prevent yourself! No Skin to Skin	2019	Prevention of Sexually Transmitted Infections (STIs) and HIV/AIDS for adolescents at the Dantas Júnior State School - Santa Luzia, with emphasis on human rights, sexual and reproductive rights	IST/STD Program for High School Youth	CESE
10	Black Women: Developing Strategies, Strengthening Knowledge	2020/ 2021	Training in raising financial resources and managing them	Training aimed at members of black women's organizations that work with civil society organizations, in order to raise financial resources, expanding networks and promoting the fight against racism and sexism	Baobá Fund - Fund for Racial Equity, through the Program for the Acceleration of the Leadership Development of Black Females Marielle Franco Black Women; Network of Black Women and UFBA (Bachelor of Gender and Diversity Studies)

Table 8: Projects and Activities of the Women Movement of Ginga Suburb. Source: Compiled from https://www.mulheresginga.com.br/parcerias (adapted).

Presentation of good practices

In order to deepen some actions, the experience of the project Prevent yourself! No skin to skin!. The project Prevent yourself! No skin to skin! aimed to carry out an integrated campaign to prevent sexually transmitted infections among adolescents and young people from the community of Santa Luzia do Lobato – Subúrbio Ferroviário de Salvador, also highlighting the need to awaken in the target public the need to fight and defend their rights, especially universal and equal access to the public health service. The title of the project sought to register a cultural aspect existing among the young people of the Railway Suburb of Salvador, who use the term "bareback" or "skin to skin" to refer to unprotected sexual intercourse.

The project contemplated three specific objectives: (i) to involve adolescents and young people in the acquisition of knowledge on the themes of prevention and sexual and reproductive rights; (ii) to produce a situational participatory diagnosis with the perceptions and speeches of adolescents and young people about prevention and sexual and reproductive rights; (iii) give visibility to the theme and the places of tests and treatments during the campaign.

In the first specific objective, 100 young people from the community were invited to four workshops on the prevention of Sexually Transmitted Diseases (STDs) and rights of access to health, each workshop for 25 young people. For the second objective, two conversation circles "Speak what you think" were held for 40 young people/adolescents, divided into two groups of 20 youngers/adolescents. In the third specific objective, the challenge was to reach 500 people in the community with information on the prevention of sexually transmitted infections, as well as to inform the places where to find specific treatments and distribution of information leaflets and condoms to 200 people.

The team that worked in the execution of the activities was composed of the members of the Women Movement of the Ginga Suburb, the Network of Healthy Communities and nurses of the Ribeiro Santos Family Health Program (PSF). The workshops were held at the Dantas Junior State College, located on the steep road of the Fiais, Santa Luzia, in Salvador, using playful dynamics that associated music and a ball of paper passed between the participants until, when the music stopped, whoever had the ball took out a paper and asked a question to all the people present, that they could respond if they knew or passed it on to someone else. The answer was complemented by the facilitator, a nurse from the PSF who continued the dynamic. At the beginning of the workshops, questionnaires were applied to perceive the opinions of adolescents/young people on issues related to sexual practices, ethnic-racial identities and economic and social conditions.

The workshops also promoted training for the correct use of male and female condoms, registering in all 4 workshops the participation of volunteer girls for the practice of condom placement, unlike boys who did not volunteer (Figure 141).

The project reached 650 people, of whom 50% were women and up to 60% were young people. In the initial group, with the support of the PSF, rapid tests were performed on 80 adolescents over 16 years of age to detect Hepatitis B, Hepatitis C, Syphilis, and HIV, and in this sample, one caseof syphilis in a 16-year-old adolescent was found. She and her boyfriend were instructed to attend the PSF to receive treatment and guidance.

Along with health content, the workshops offered information on sexual and reproductive rights, human rights, gender, and race, with a time for teenagers to question and ask questions.

The analysis of the data collected through the questionnaires revealed that 42.7% of the families are single-parent and cared by women. The data also revealed that girls have a greater presence (54.8%) in relation to boys, although a good part abandons studies early, data corroborated by the National Household Sample Survey (PNAD, 2015), which highlights that among young people who dropped out of school without doing high school, boys/men employed in paid activity outnumber by more than twice the girls/women in the same situation: they are 43% (boys/men), and they (girls/women) are 18.3% of the total, possibly with girls devoting themselves to household chores or the burden of an unplanned pregnancy.

Another piece of information brought by the questionnaire data was that the ethnic-racial self-declaration among young schoolchildren was 42%, considered as a consequence of the movements of recognition and rescue of black history in Bahia.

The project also worked on an information campaign and the offer of condoms in the Space of the Ginga Women Movement and in the train stations (Figure 142).

The project participated in the Municipal Health Conference disseminating and emphasizing the prevention of sexually transmitted infections and sexual, reproductive and human rights.

Figure 141: Practice of placing condoms in prostheses. Source: Ginga Women, Diagnostic Report on the Plate, 2019

Figure 142: Information campaign and distribution of condoms in train stations. Source: Ginga Women, Diagnostic Report on the Plate, 2019

Collaborations and potential

The collective Movimento Mulheres do Subúrbio Ginga (MMSG) (Women of Ginga Suburb Moviment) promotes associative and cooperative practices for alternatives in ecosystem health services, sanitation and governance, such as the Prevent Yourself! No skin to skin! project, in which the collective's educational health services stand out with the basic health units. Both stand out for the performance of health agents and nurses in making them socially adequate and accessible for young people, especially for black women. This project has the potential to become a model to be replicated, and its reach can be greatly amplified if there is a partnership with educational institutions.

Given the needs presented in the 15 neighborhoods of Subúrbio Ferroviário (railway suburb), the collective has already been demonstrating engagement and empowerment of the local population, as shown in Table 2. The potential can also be expanded with the participation of institutions that carry out studies and research, making it possible to further strengthen and organize communities in the territory.

Urgent possibilities regarding the vulnerability of food security are glimpsed, with themes that still need to be explored for the development of social technologies in agroecology, use of existing local productive surplus, etc. Another important theme refers to studies on ecologically sustainable occupation through urban design and socially adequate housing that can generate collective, public, productive, healthy urban spaces that guarantee leisure.

As an example of a housing project of the government program Minha Casa, Minha Vida existing in the region, it is possible to see the possibility of space for the implementation of socio-technical adequacy for design sensitive to social and environmental constraints, which can adapt technologies such as organic / community agroecological garden; gardens of medicinal and aromatic herbs; local collection service; solid waste sorting point for composting and recycling as an alternative income; and encouragement of artisanal potential. All these actions structure a solidarity economy for the Railway Suburb of Salvador.

Case 3 – Environmental Multipliers – BA

Environmental Multipliers is an environmental education program organized by the Environmental Action group in conjunction with Michelin Plantations of Bahia (PMB) in the Baixo Sul region, in the interior of the state of Bahia. PMB owns 13,000 hectares of land – purchased from Companhia Brasileira de Borracha (CBB) in the 1980s (LIMA, 2011) – in the municipalities of Igrapiúna and Ituberá, where 3,000 hectares belong to the area of the industry's Atlantic Forest reserve. The remaining 10,000 hectares constitute areas of rubber (Hevea brasiliensis) crops – active for the production of latex, which is made at the processing plant located in the city of Igrapiúna – and abandoned areas that are part of the project of the native forest recovery industry. The program, taught by professors Mônica Pereira and Tarcísio Botelho (Environmental Action), both with training and long experience in the areas of environmental education and socio-environmentalism, reaches approximately 30 young residents of the surroundings of the Private Reserve of Natural Heritage Ouro Verde (RPPN-PMB). Since 2012, the young members of the program have been learning and multiplying knowledge in environmental education.

Description and contextualization of the territory

The Baixo Sul is a region located near the South Coast of Bahia, south of the Recôncavo Baiano and the Baía de Todos os Santos (Figure 143). The practice of dividing the state into micro-regions was a strategy of the defunct Ministry of Agrarian Development (MDA) for rural planning and development (JUNIOR; ALVES, 2020), and defines this territory, composed of 15 municipalities, as Territory of Identity.

Among other factors used for this definition, the main one was the notion of local belonging. The region has remnants of the Atlantic Forest biome in varied geographical configurations, ranging from coastal plains to inland seas, and result in a great diversification of existing environments: mangroves, sandbanks, ombrophilous forests and open forests

found on islands, peninsulas, bars (river morphology), valleys and hills. In the same logic of variations that guarantee such plurality to the landscapes of this region are the settlements throughout the territory, one by one, singular and plural as their landscapes (JUNIOR; ALVES, 2020).

The environmental and social characteristics are a tourist attraction for the whole world, both for the landscape potential and for the ways of life of these communities, which are, as Alves and Junior (2020) affirm, farm hands and river marshes of fishermen, farmers, shellfish gatherers and artisans.

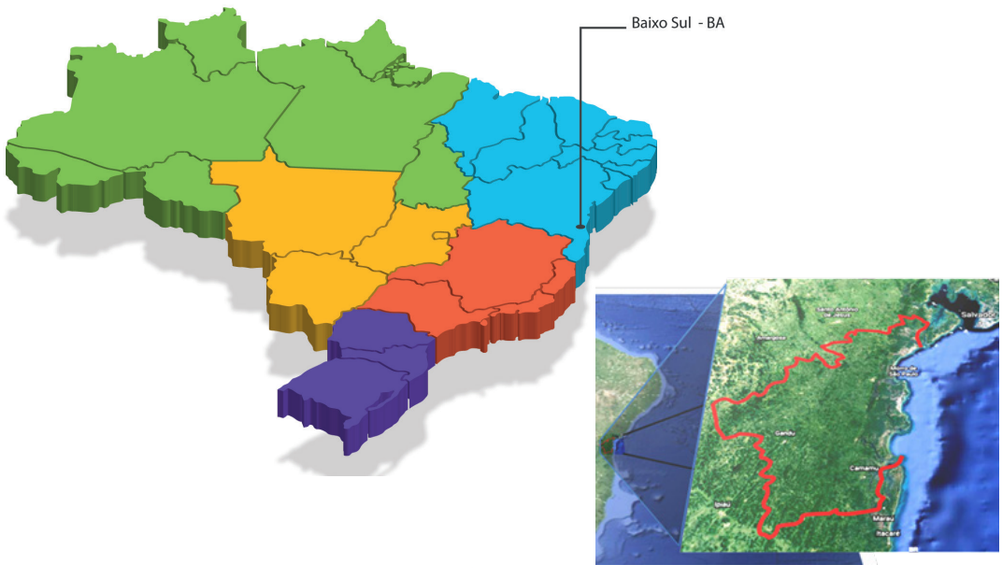


Figure 143: Location. Elaboration: João Lima Farias, 2022. **Polygonal location of the Lower South - BA.** Source: Prepared by Santos Júnior, 2019, from Google Earth.

Biannually, the municipality of Ituberá hosts the Universo Paralelo (parallel universe) Festival, on Pratigi beach, an electronic music event that has gathered about 15,000 people[11]. This contingent is equivalent to more than half of the population of the municipalities of Ituberá which, according to estimates by the Brazilian Institute of Geography and Statistics (IBGE), reaches 28,740 people (BRASIL, 2020), and more: it exceeds the population of the neighbor municipality to the south, Igrapiúna, with 13,347 inhabitants (BRASIL, 2020).

[11]psicodelia.org.

In this context, the Environmental Multipliers in the Lower South program has been working with the objective of promoting educational alternatives for the preservation of the planet, society and the environment, developing workshops and educational trails with the communities (Figure 144). It is composed of young children of small agricultural producers, residents of villages and rural gardens in the vicinity of the RPPN-PMB.

Figure 144: Environmental Multipliers on an educational trail with visitors at the Cachoeira da Pancada Grande Ecological Park. Source: Environmental Multipliers.

Presentation of good practices

The Environmental Multipliers project (PMA) presents alternative experiences for sanitation and local environmental management through training workshops. For the preservation of the Atlantic Forest, activities are developed aimed at apprehending the functioning of the biome from reflections on its natural dynamics. On the other hand, it develops recycling workshops and awareness about materials harmful to nature, such as processed cooking oil, alkaline batteries, electronic materials, among others.

Its main objective is the training and multiplication of knowledge and techniques from the young people of the communities, who become possible agents capable of replicating them in free spaces in the cities mentioned above and in the RPPN in order to build a strong base of defense of the environment in the region. They can become multiplying agents capable of guiding local populations on the necessary care to protect fauna and flora, and alert to the danger of imminent extinction of species.

The PMA envisions that the communities have been sensitized by the educational service of young people and, according to data from the program, it is possible to say that it has already managed to reach more than 300 people directly. Adding this amount to the reach of social networks – around 600 people, in addition to the dozens of students and tourists who have already witnessed the work of these new environmentalists – the reach of the Multipliers actions has reached much more than a thousand people since 2012.

The project also seeks partnerships with research in development in the interior and in the vicinity of the Private Reserve of Natural Heritage (RPPN), at the Center for Biodiversity Studies (CEB) – an initiative of Michelin Ouro Verde – which encourages scientific production and projects for the restoration, preservation and conservation of the Atlantic Forest and which is located inside the reserve. The studies focused on conservation, restoration and preservation of the Atlantic Forest have supported the actions developed by PMA while allowing the exchange of knowledge developed with students and the community.

The workshops are organized based on the demands, such as the campaign in defense of the jaracuçu-carpet snake (Bothrops pirajai), in 2015, a species with a serious risk of extinction in the region. The activity aimed to reduce the impact of communities on the reduction of the species. To this end, we sought to demonstrate the behavior of snakes to demystify popular fear, the main reason for the reduction of the specie. Workshops and guidance on management were held to avoid accidents or care in case of an accident.

The campaign achieved results with good community involvement, and the jaracuçu-mat became a symbol of the activity (Figure 145), with an indication for a model in similar campaigns with mammals and birds.

Figure 145: Environmental Multipliers with the My Unknown Neighbors project.
Source: Environmental Multipliers

The PMA also enabled exchanges with international researchers to exchange experiences, such as cataloguing new species – such as the suçuarana, rediscovered in the region. For almost ten years, the project has been enabling experiments, especially of alternatives for environmental management with social participation (Chart 9).

Nº	Name of Project	Year	Objective/ Target audience	Actions developed	Funder/ Partnerships
1	Planting of Native Species in Abandoned Rubber Tree Areas	2014	To densify the diversity of Atlantic Forest species in monoculture areas of abandoned rubber trees (Havea brasilienses)	Planting dozens of seedlings of native trees in the rows and sangria; report of the action; Photographs	Environmental Action; Michelin Plantations of Bahia LTDA (PMB); Center for Biodiversity Studies (CEB); Young multipliers
2	Interpretive trails: mangroves	2014	Present the possibilities and riches arising from the landscapes of the region; awoke curiosity about the potential of this ecosystem and why it is the source of income for several families in the region	Presentation of the Restinga ecosystem; walks that happens in the paths of the middle of the mangroves; general presentation of the mangrove.	Environmental Action; Michelin Plantations of Bahia LTDA; young multipliers; volunteers
3	Soap Workshop with processed cooking oil	2014	Ensure more sustainable purposes for processed cooking oil, preventing it from reaching rivers and seas allowing the use at home of soap made at home, reducing the need to buy this product.	Presentation of the chemical properties of soap, water and oil; hydrophilic and hydrophobic characteristics; collection of processed oil in the communities.	Environmental Action; Residents of villages and rural communities; Young multipliers; Early childhood schools
4	Herpetofauna of Atlantic Forest	2014	Presentation and contact with reptile and amphibian species present in the Atlantic Forest biome	Lectures and species management	Executive Committee of the Cocoa Crops Plan (CEPLAC; Environmental Action; Michelin Plantations of Bahia LTDA (PMB)); Environmental Multipliers
5	Monitoring of research for survey of felines in the reserve	2015	Contact with the activities performed by the biologist and researcher at the head of the research	Arrangement of motion-sensitive cameras scattered throughout the reserve; trails in search of feline remains; image analysis and final reports	Environmental Action; Bioeducar Institute; CEB; PMB
6	My Unknown Neighbors	2019	Promote knowledge about species at risk of extinction in the region	Lectures and presentations; Votes; reporting	Environmental Action; Bioeducar Institute; CEB; PMB

Table 9: Projects developed by environmental multipliers between 2014 and 2019. Source: Prepared by Erivan de Jesus Santos Junior (adapted)

In the matter of this work, we sought to deepen the project My Unknown Neighbors, a model very characteristic of the other projects executed by the PMA. The project arises from the need to bring the local population closer to the species of the region at risk of extinction. To this end, a week of lectures was organized in municipal schools in the cities of Igrapiúna and Ituberá, in the morning and afternoon shifts. The program's student volunteers receivedtraining and then passed it on to the schools visited. From the content of the lectures, the students of the schools produced exhibition material for the event Jornada Pedagógica in Ituberá, in the same year.

During the event, volunteers encouraged visitors and lecture participants to choose among the endangered species in order to elect the "flag species", that is, the symbol for conservation in the region.

After the presentation of each of the chosen species – suçuarana (Puma concolor), capuchin monkey (Sapajus), jupará (Potos flavus) and jaracuçu-matte (Bothrops pirajai) – a vote was held.

1348 votes were counted and, surprisingly, the suçuarana was elected the flag species of the region, with the jaracuçu-matte being the second most voted species, an interesting fact that goes against the popularity of snakes that, considered less charismatic, are less accepted by the population. In this sense, the matter of the work of environmental education agents in the territory and in the communities represents an alternative of participatory environmental management of endangered species, in which educational services were assimilated with community involvement. The reach can be further increased when there is the involvement of agents such as radio and local media. According to the organizers of the My Unknown Neighbors project, it is estimated that it was possible to reach more than 1500 people, not including data from local media.

Collaborations and potential

The Environmental Multipliers project presents itself as an associative practice capable of generating alternatives for environmental governance and discussions related to sanitation aimed at recycling waste, such as the My Unknown Neighbors project, in which the training of young people from the community by academic volunteers and PMA teachers enabled the adequacy of services through information and techniques on the endangered species of the region.

The participatory arrangement brought together the community through school students, student academics and volunteer teachers and researchers around the environmental issue, but it can reach, involve and relate to other agents, such as teaching, research and extension institutions and the public power, as well as it can incorporate themes that are still outside the matter of the project, from the adoption of an ecosystemic and solidary perspective of the Lower South.

Given the shortcomings presented in the Baixo Sul – BA and the conflicts reported, the PMA is able to improve the involvement of the community, enabling i participation in all the processes of the workshops, from the choice about the socio-environmental conflict to be worked on to its contributions and knowledge acquired in local experiences. By action research methodology, they can, at the same time, gain autonomy to plan and manage, supported and grounded by the other actors. In this sense, issues such as ecosystem health, basic sanitation, governance, habitat and solidarity economy could also be addressed.

Case 4 -Child Environmental Agent Project, in the Distrito Federal

The Child Environmental Agent Project (PAAM) is part of the Extension Program "Stop, Think, Discard", conceived in 2010 by the students of the Collective Health Course of the Faculty of Ceilândia of the University of Brasília in order to implement selective collection on campus and empower collectors of recyclable materials through health promotion actions, in addition to social inclusion and workers' rights.

PAAM proposes associative experiences for alternative health and sanitation services with socio-technical adequacy. The project conducts workshops for elementary school students of the Distrito Federal Education Network and in institutions that have a social program, such as the DF Fire Department, through the Firefighter Mirim (for kids) and Adasa na Escola programs, in order to help in the process of education and awareness on topics related to the care and preservation of the environment.

Community participation in PAAM occurs through the application of workshops aimed at elementary school children in the Distrito Federal, but also through the participation of extension students, teachers and researchers coordinating the program and eventual participation of public and private institutions in the construction of educational workshops, and seeks to involve the active participation of children in natural resources, with an ecosystem focus on health.

The project has a main focus on children, by raising awareness at an early age, and seeks to raise awareness and empower them as replicators of socio-environmental behaviors in their homes and at school. The contribution of investment in the education of children may result in better results, given that children are in training, because it is not feasible to try to change habits already developed and opinions already formed in adults. It is important that they take care and preserve the natural resources that exist today, so that they can continue to enjoy them in the following decades. Thus, it is hoped, with the project, to train children sensitive to the challenges of conservation and environmental preservation and to assume healthier lifestyle habits.

The proposal was anchored in the conceptual framework of reference of ecopedagogy, which works with the theoretical foundation of "planetary citizenship", in which the idea is to give meaning to the action of men as living beings who share with other lives the experience of planet Earth. It is a true political and educational movement whose project is to change the current human, social and environmental relations. The promotion of sustainable societies and the preservation of the environment depend, according to eco-pedagogy, on ecological consciousness, and the formation of this consciousness depends on education (GUTIÉRREZ, 1999).

Description and contextualization of the territory

The Child Environmental Agent Project operates in territories and regions of the Distrito Federal classified as areas of environmental and social vulnerability. The project prioritizes the development of its activities in regions and communities that live in a situation of socio-environmental and sanitary vulnerability, such as Ceilândia, Sol Nascente, p. Norte, Samambaia and Cidade Estrutural. In this chapter, the project activities that have already been carried out in vulnerable areas such as Ceilândia, in 2016, and the Structural City, in 2018, will be taken as an example.

The City of Ceilândia, Administrative Region IX of the Distrito Federal, was created to receive inhabitants of irregular occupations and without basic infrastructure, originating from the favelas Vila do IAPI, Vila Tenório, Vila Esperança, Vila Bernardo Sayão and Morro do Querosene, within the matter of a government action called the Campaign for the Eradication of Invasions (CEI), of 1971.

In 2013, the population of Ceilândia was 451,872 inhabitants, representing 16.22% of the entire population of the Distrito Federal, therefore, it is the most populous in the DF. It is recognized as the RA of the Distrito Federal that has the largest contingent of Northeasterners and their culture (BRASIL, 2015). In relation to its current social and economic characterization, the city has a high percentage rate of workers without a formal contract (40.4%) and non-taxpayers with the INSS (26.6%) (BRASIL, 2019).

Regarding the rates of remuneration and household income, the AR has an average value of R$ 1,931.25. Household income was estimated at R$ 3,171.70, resulting in an average value of R$ 1,125.10 per person. In terms of basic sanitation, Ceilândia has water supply by Caesb for 98.86% of households, and sanitary sewage for 64.08% (DF, 2017).

The Estrutural City, administrative region XXV of the Distrito Federal (SCIA-Estrutural) is part of the administrative region SCIA/Estrutural and is characterized by inequalities in relation to other regions of the Distrito Federal, such as the Plano Piloto, Lago Sul, Sudoeste, Noroeste and Águas Claras. The Structural City encompassed the "Estrutural Dump", considered for many years as the largest in South America (DF, 2017).

The occupation of the Estrutural Dump area originated in the 1960s, with waste pickers attracted to the landfill in search of means of survival and housing. The construction of the DF-095 highway – called Ceilândia Park Road (EPCL), known as Estrutural – in the mid-1970s, to interconnect the Industry and Supply Road (EPIA) to Taguatinga, Ceilândia and BR-070, boosted the occupation of the area by waste pickers.

The territory encompasses the Petrobras gas pipeline and is located in the vicinity of the National Park of Brasilia, in addition to housing the dump. It presents socioeconomic indices that differ from the other administrative regions. The household income of the locality is concentrated between one and five monthly minimum wages, being the lowest per capita income in the Distrito Federal, with an average of R$ 507.30 (BRASIL, 2020).

The HDI of 0.616, together with Recanto das Emas, Samambaia, São Sebastião and Sobradinho 2, contrasts with the average of the Distrito Federal, which in 2010 was 0.824. The region also has the highest illiteracy rate (5.77%) among the administrative regions of the Distrito Federal (BRASIL, 2020).

Most of the population of the SCIA/Cidade Estrutural Administrative Region (93%) is supplied with water by the general network of Caesb, although there is still a small portion that uses water from cisterns. In terms of sewage, 89.8% of the households are already interconnected to the general network of Caesb, although there are still 6.8% that use septic tanks and 3.4% pits. In terms of electricity supply, 91.4% of households consume energy supplied by Companhia Energética do DF (CEB) (BRASIL, 2015).

In this context, PAAM has been developing its activities in schools in regions of socioeconomic and environmental deprivation of the Distrito Federal, involving, since 2016 – when it began its pilot project at the Class 66 School, of the Rising Sun – the children of the communities, students, teachers, researchers and partners of institutions and collectives.

Presentation of good practices

The associative and community experiences made possible by the Child Environmental Agent Project are developed from the extension, with the involvement of academics encouraged to develop participatory workshops on learning technologies and awareness about health and environment for elementary school students.

The workshops developed include topics such as rational use of water, pollution, proper disposal of solid waste, deforestation, global warming, dengue prevention, among others. All themes are addressed in a participatory and experiential way, in order to sensitize and change the attitudes of students, creating the possibility that the acquired knowledge is multiplied in other social spaces frequented by them (Chart 10).

Nº	Area	Workshop Theme	Dynamics
1	Solid Waste	Recycling	Workshops and Gymkhanas
2		Separation	Office
3		Natural resources	Theatres and Lectures
4	Water	Rational Use of Water	Educational Documentaries
5		Water in everyday life	Dynamic
6	Environment	Deforestation	Sensory sensitivity and perception activity
7		Use of Pesticides and Insecticides	Lectures
8		Tropical Diseases (e.g. Dengue)	Mosquito Net Workshop
9	Alternative Theme	Clean Energy	Lectures and Documentaries
10		Cleaning of the Lakes	Sensory sensitivity and perception activities

Note: In addition to the workshops is held a chat with students about what was taken from fruit, the importance and relevance of the theme in society in order to make the student reflect and respond with his own words what happened

Table 10: Workshops offered by the Child Environmental Agent Project (PAAM). Source: Prepared by Vinícius Araújo Gonçalves (adapted).

For deepening, the process of construction of the workshops by PAAM will be described from the experiences that relate to public health, basic sanitation and the environment: Workshop on Dengue: Confection of Mosquito Trap, Workshop Rational Use of Water and Workshop Deforestation and Solid Waste.

PAAM develops participation in different stages and moments in the process of organization and execution of workshops. Initially, there is a lecture of extension students, who are encouraged to develop workshops with content focused on their research. Among the contents of the workshops, environmental awareness and sanitation issues were developed, such as the workshop Rational Use of Water (Figure 146) and the workshop Deforestation and Solid Waste (Figure 147), applied in the class 28 school of Ceilândia Norte, in 2018.

Figure 146: Workshop on the Rational Use of Water applied at the Class 28 school of Ceilândia Norte, in 2018. Source: PAAM (2017)

Figure 147: Workshop Deforestation and Solid Waste applied in the school Class 28 of Ceilândia Norte, in 2018. Source: PAAM (2017)

Similarly, other extension workers developed workshops to build alternative technologies for health-related issues, such as the Workshop on Dengue: Confection of Mosquito Traps, an experience developed at the Estância Pipiripau Community School, in Planaltina, in 2017 (Figure 148).

The project seeks to respect the knowledge and social technologies already existing in the community. Commonly, in the workshops children are encouraged to present their understanding of the environmental theme. Knowledge and techniques are shared with the population through students who have the possibility to replicate and multiply them. These experiences have demonstrated alternatives of practical training in ecosystem

health, both through the democratization of technical knowledge and the academic training of future professionals.

Figure 148: Workshop on Dengue: Confection of Mosquito Traps, an experience developed at the Estância Pipiripau Community School, in Planaltina, in 2017.
Source: PAAM, 2017

Collaborations and potential

The Child Environmental Agent Project, as an associative and participatory strategy, has demonstrated important advances in the involvement of children in educational and technological issues, as well as in the professionalization of academics sensitive to participatory strategies. Its effects can have an immediate impact on serious endemic issues of mosquito-borne diseases, as it encourages the use of the mosquito traps, or in the long term by raising awareness of educational workshops about waste disposal and the importance of water.

The project also contributes to the production of scientific knowledge through the production of bibliographic references in ecosystem health, the orientation of course completion papers and scientific research, and the publication of scientific articles and books.

This impact can be further amplified if the activities are also developed together with other collectives or organized civil agents, including young people and adults in the process. Public agents with effective experience, reach and field knowledge can also be included, such as health and social service agents.

On the other hand, considering the transdisciplinary matter, the project can substantiate and contribute to related areas, such as architecture and urbanism, social work, civil engineering, and education, among others organized collectively or by partnerships in

research and extension projects, such as the Extension Program "Stop, Think, Discard", of the Collective Health Course of the Faculty of Ceilândia of the University of Brasília.

Case 5 – Local community management for sanitation in the community of Santa Luzia, in the Distrito Federal, with the participation of the FAU/UnB Peripheral Group

The experience of local community management of sanitation is the result of the involvement between civil society, the Santa Luzia community, in the Distrito Federal, and the university through the Peripheral Research and Extension Group of the School of Architecture and Urbanism of the University of Brasília (UnB). Santa Luzia is an occupation with more than 15 thousand families, standing out as an example of urban occupation among the 464 informal occupations in the Distrito Federal that do not have systematized data (ANDRADE et al., 2021).

The participation in Santa Luzia was organized by the community in general, by the Coletivo Mulheres Poderosas – a group of welcoming, female entrepreneurs and strengthening of families in the region –, by the Sonho de Liberdade Cooperative, linked to the selective garbage collection of Estrutural, and by undergraduate and graduate students linked to the group.

Since 2018, experiences in the "action research" format have been developed through active methodologies and social mobilization, with a transdisciplinary and trans-scalar vision (ANDRADE, 2014) in order to encourage participatory community management and build participatory teaching alternatives.

The group coordinated by Professor Liza Maria de Souza Andrade and registered with the National Council for Scientific and Technological Development (CNPq), has been incorporating the experience of social participation in the group's activities, inserting it into the design process with the development of active methodologies and in the group's production (articles and participation in events), in addition to the requirement inherent to the Architecture and Urbanism course of the final work of completion of the course and a product technical in the form of an illustrated notebook. These have been shown to be a powerful mechanism to assist in verifying the viability of maintaining the population, such as Santa Luzia.

Description and contextualization of the territory

The community of Santa Luzia is located in Cidade Estrutural, in the Distrito Federal,

in a peri-urban region located next to the old landfill Lixão da Estrutural (Figure 149), in the vicinity of the National Park of Brasília. Its formation process began in the late 1990s, in the north of the region, in a place known as the sector of Chácaras de Santa Luzia, a semi-rural locality near the National Park of Brasília.

According to Miranda (2016), the area is a fast-growing informal settlement that arose from the housing needs of families who had previously been evicted from where they lived. The low availability of sanitary and health infrastructure (Figure 150) and the growing proximity to the park and the Córrego do Acampamento, part of the Bananal Micro-basin, characterize the main socio-environmental conflict of the community (ANDRADE; NERI, 2020).

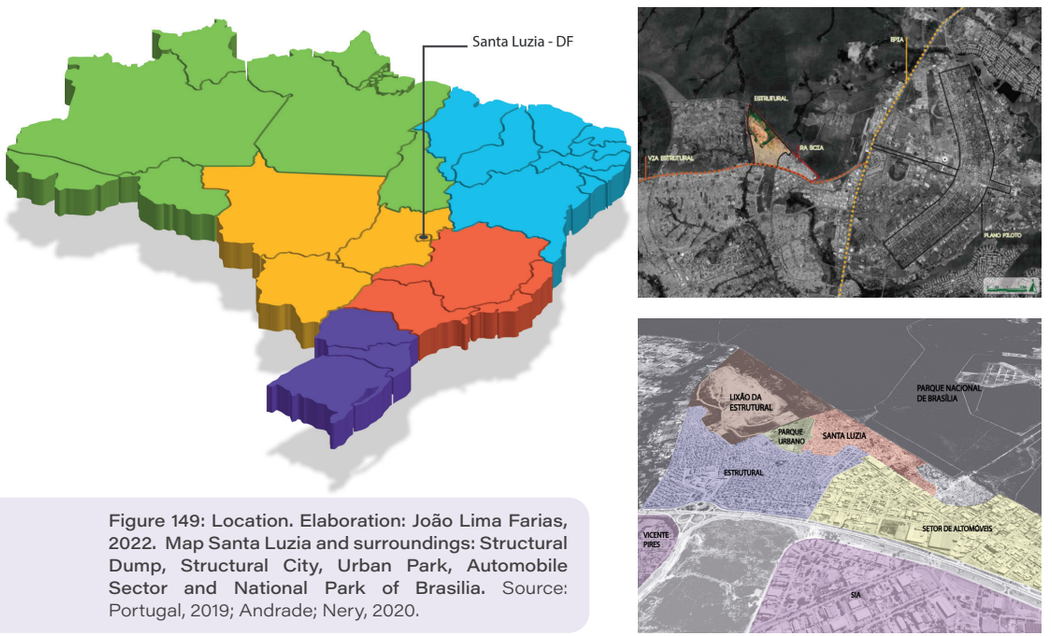


Figure 149: Location. Elaboration: João Lima Farias, 2022. Map Santa Luzia and surroundings: Structural Dump, Structural City, Urban Park, Automobile Sector and National Park of Brasilia. Source: Portugal, 2019; Andrade; Nery, 2020.

On the other hand, the Environmental Sanitation Company of the Distrito Federal (CAESB) does not meet the legal health conditions and also hinders any physical improvement in the living conditions of the population due to existing legislation, an act justified by the land conflicts of the place. In this scenario, many inadequate strategies that involve were identified, which involve the reuse of materials by residents in the search for immediate solutions to their problems, but that can generate harmful effects both for the internal community and for common life within the city (ANDRADE; NERY, 2020).

Figure 150: Images from the Santa Luzia photographic survey. Andrade; Nery, 2020

In this scenario, the Peripheral Research and Extension Group has been working in the Distrito Federal and its surroundings, as in Santa Luzia, from the development of research on peripheral and marginalized themes within the academic system related to the production of space in the countryside and in the city (Urban Reform and Agrarian Reform).

Presentation of good practices

The actions developed in the Santa Luzia community by the Peripheral Research and Extension Group are the result of the application of active methodologies and social inclusion in the teaching processes participated in the development of social technologies with communities in the matter of Urbanism and Architecture projects, through "an interdisciplinary and transdisciplinary approach in the areas of health promotion, solidarity economy and human rights" (ANDRADE et al., 2019, p. 198).

The group enables experiences lived as a social construction to promote a double exchange of knowledge – between students and the community, and between this and the university – in order to meet the problems and identify the local potentialities, without subordination of knowledge and respecting the potentialities of all participants. In this sense, the experiences propose to rescue the contributions of organic and participatory traditions of urbanism, based on the self-organization from the bottom up, the policies of popular housing, the new policies based on public transport, the public buildings designed for learning, socializing, communication and expression of people, draining ecological spaces,

the axis, pedestrian spaces and bike paths that promoted diversity and intersubjective relationships (ANDRADE et al., 2019).

The Peripheral design process is divided into 5 interrelated stages: (i) analysis of the physical and social context, with the involvement of the local population according to the dimensions of sustainability; (ii) elaboration and systematization of spatial patterns and events based on the information collected; (iii) participation workshops, mind maps, affective maps and game of patterns (iv) construction of scenarios, alternative proposals of the preliminary study for decision making; (v) delivery of the illustrated chapter.

Nº	Academic	Year	Product Academic Requirement	Product with Effective Social Power
1	Attila Fialho	2019	Final Paper of Course Conclusion "Santa Luzia neighborhood plan"	Workshops and Neighborhood Plan Proposal
2	Sofia Portugal	2019	Final Paper of Course Conclusion "The inhabitation of powerful women - Sustainable and supportive community"	Contest "Territories lived and imagined"
3	Gabriel Perucchi	2020	PIBIC "Santa Luzia Sensitive to Water: Spatial patterns of ecological infrastructure for the more sustainable fixation of the informal settlement of the Estructural City"	Article IV ENANPARQ: "Santa Luzia Sensitive to Water: Leapfrogging approach with spatial patterns of ecological infrastructure for informal occupations in the Distrito Federal"
4	Guilherme Neri	2020	Final Course Conclusion Work "Micro Local Community Management Plan: Analysis and Urban Proposition of the Sanitary Context"	Technical Notebooks 01, 02 and 03 Cyclical Territories: Ecological Sanitation, environmental education, solidarity economy and territorial governance from eco-affectivity of the Santa Luzia community - DF

Table 11: – Production Academic Requirement and Production with Effective Social Power of the social participation of the Community of Santa Luzia and the Peripheral Research and Extension Group.
Source: Compiled by Andrade and Lacerda, 2020

Among the management actions in participatory sanitation, we highlight the experiences of chapters 01, 02 and 03 – Cyclical Territories: Ecological Sanitation, environmental education, solidarity economy and territorial governance from the eco-affectivity of the Santa Luzia community. Chapter 01: Coming from Clay; 02: Denunciation, pain against love; 03: This is my place (NERY, 2019) and the article "Santa Luzia Sensitive to Water: Spatial patterns of ecological infrastructure for the more sustainable fixation of the informal settlement of the Structural City" (PERUCCHI, 2020).

In the research of Neri (2019), the application of active methodologies for the characterization of the sanitary context of Santa Luzia was developed. The research was described in the form of an illustrated notebook, with accessible language identifying "Patterns of Local Problems" and "Patterns of Local Alternatives" for the socio-environmental conflicts of depletion, solid waste, drainage, water reception and thermal comfort (Figures 151 and 152).

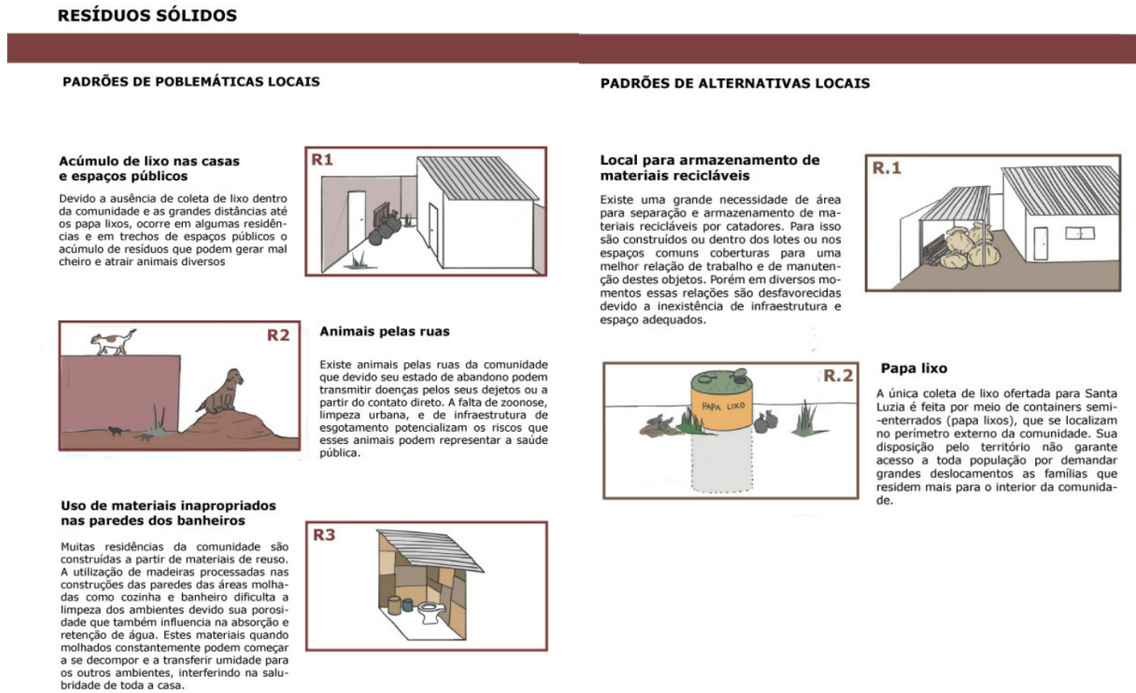


Figure 151: Patterns of Local Problems and Patterns of Local Alternatives for Solid Waste. Source: Andrade and Lacerda, 2020

In Perucchi's (2020) research, the result of community participation resulted in the scientific text "SANTA LUZIA SENSITIVE TO WATER: Spatial patterns of ecological infrastructure for the more sustainable settlement of the informal settlement of the Structural City".

PADRÕES ESPACIAIS DE INFRAESTRUTURA ECOLÓGICA DE DRENAGEM E REAPROVEITAMENTO DE ÁGUA PARA SANTA LUZIA

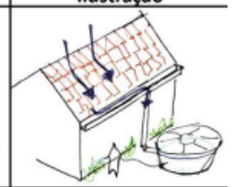
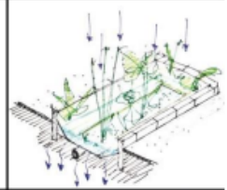
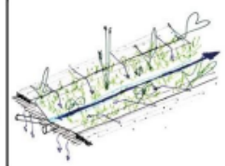
Padrão	Problema/Contexto	Recomendação	Ilustração
Reservatório de Águas das Chuvas	Armazenamento de água das chuvas para fins devidos pode ser útil em situações de crise hídrica e no caso de o abastecimento clandestino que existe em parte das residências de santa luzia seja cortado, assim como para redução de eventuais contas de água das famílias.	Tais reservatórios podem ser uma solução para reaproveitamento de água dos telhados, aplicados no nível do lote, especialmente para lavagem doméstica e irrigação de jardins sem hortaliças.	
Jardins de Chuva	Na época de chuvas, foram percebidos diversos pontos de acúmulo de água e potencial alagamento em vias paralelas às curvas de nível. O solo já etá compactado e infere-se que sua absorção seja baixa.	Recomendados para o acúmulo e reabsorção de água em vias paralelas às curvas de nível, passíveis de alagamento, e em jardins internos a lotes.	
Bacias de Sedimentos	Pontos específicos de maior área do terreno possuem um grande potencial de alagamento, o que pode trazer problemas para os moradores que ali se assentarem.	Como reservam e absorvem grandes quantidades de água, são recomendadas para os pontos mais críticos de acúmulo no terreno. Bacias de Sedimentos possuem grande potencial paisagístico e podem concentrar a sua volta espaços públicos.	
Valas Hídricas	Ruas perpendiculares às curvas de nível recebem água de alta energia de transporte, de maior potencial destrutivo. Permitir a desaceleração e absorção destas águas ao longo de seu percurso é essencial. As valas hídricas são relativamente fáceis e pouco custosas de serem construídas.	Recomendadas para desaceleração da água em vias passíveis de enxurradas e formação de buracos. A linearidade permite seguir o percurso da água. A via dorsal de Santa Luzia é um importante exemplo de espaço para a criação de valas hídricas.	
Wetlands Construídas	Não aplicáveis ao contexto da ocupação	N/A	N/A

Tabela 2 - Padrões espaciais de infraestrutura ecológica para Santa Luzia. Fonte: elaborada por Gabriel Perucchi (2018).

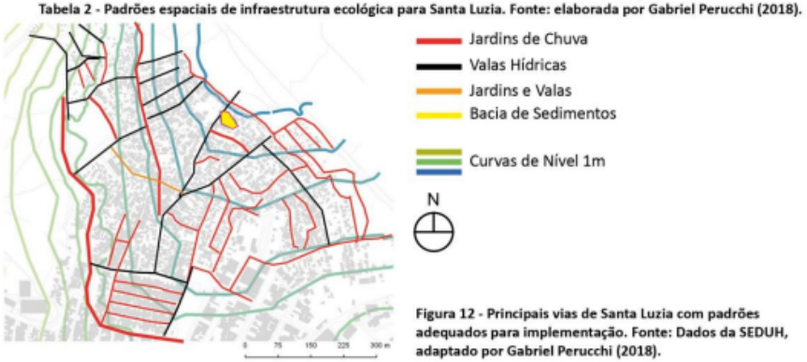


Figura 12 - Principais vias de Santa Luzia com padrões adequados para implementação. Fonte: Dados da SEDUH, adaptado por Gabriel Perucchi (2018).

Figure 152: Mapping of contamination risk of the micro-basin of the region of Santa Luzia, DF. Source: Andrade and Peruichi, 2020

Collaborations and potential

The local community management for sanitation in Santa Luzia is the result of a participative, associative and community experience existing in the region, represented by the collectives Mulheres Poderosas and Sonho de Liberdade Cooperative, with the Peripheral Research and Extension Group of the Faculty of Architecture and Urbanism of the University of Brasília (UnB).

The organization of civil society produces a relevant impact with the realization of actions in the community and in the research developed by the Peripheral Group. On the other hand, the methodological model "action research" enables the collective construction that encourages the autonomy of the community through the technical work generated, meetings, events and possibilities of political claims by the community in public hearings.

The project has promoted the participation of other agents, such as the Public Prosecutor's Office of the Distrito Federal, and can increase the participation of public agents in various scales of action, as well as research projects and extension of related areas.

FINAL CONSIDERATIONS

In the absence of the arm of the State to propose and execute public policies that reach the portion of society in a situation of vulnerability, communities are organizing, seeking self-management, to face problems and difficulties.

The five experiences presented are a source of inspiration for replication in other communities. The experience of the Ginga Women's Movement of Salvador brings this reality. Citizens who live with violence against women, sexism, racism and with the lack of basic sanitation, causing a situation of extreme social vulnerability, organized themselves and left to manage their problems through projects that aim to educate, promote self-esteem and empower women to be protagonists of their lives, doing the coping and seeking the solution of common problems. There are a set of possibilities for expanding actions on behalf of the community, especially those that may include food security and income generation.

The experience of the Environmental Multipliers project is the resilience of local agents concerned with the absence of public power in the maintenance of the region's natural resources. Placing people in the vicinity of forest remnants of native biome in the management plan of these areas, bringing knowledge to them aeir importance as the main

coordinators of the conservation, preservation and restoration of the environment, has proven efficient in the last ten years, such as the growing appreciation for the snake that was once inserted in derogatory myths. However, it is still possible to expand the actions carried out by young people and begin to address other issues also ignored by the government in the region, such as habitat, sanitation and solidarity economy.

The experience of the Child Environmental Agent Project can cover academic teaching, lived experiences and the realities of vulnerabilities of the regions. It reconciles the knowledge of a community and its reality with the need of actions to change habits, implemented in future generations (children) and that will directly influence environmental reeducation. It forms sensitive children from the challenges of environmental and socioeconomic preservation of the region in which they live. It is believed that small changes in daily habits are extremely important, and the school is the instrument and best means of this process of reeducation.

The experience in Local Community Management for Sanitation in the Community of Santa Luzia presents possibilities of agency between the university, organized community and the public sector. It is perceived that the construction in which there is an exchange of knowledge, without hierarchizing or valuing a specific agent, generates possibilities of management and planning of the territory where there is a possibility of continuity in the actions, once the involvement of the territorial agents is established.

REFERENCES

ALVES, Marta Raquel da Silva; SANTOS JUNIOR, Erivan de Jesus. Struggles and Resistances in the Territory of Baixo Sul Identity/BA: rediscoveries. 2020

ANDRADE, L. M. S. (2014). Connections of spatial patterns of urban ecosystems: The construction of a method with a transdisciplinary focus for the process of water-sensitive urban design at the community and landscape level. Doctoral thesis (PhD in Architecture and Urbanism). University of Brasília (UnB), Brasília, Brazil.

ANDRADE, Liza M. S; LACERDA, G. N. Technical Notebooks: Cyclical Territory - Ecological sanitation, solidarity economy and territorial governance from eco affectivities of the community of Santa Luzia/DF. Final Course Work. Faculty of Architecture and Urbanism. UnB, 2020.

ANDRADE, Liza M. S; PERUCCHI, Gabriel; REZENDE, Vinícius S. Santa Luzia sensitive to water: leapfrogging approach with spatial patterns of ecological infrastructure for informal occupations in the Distrito Federal. VI Enanparq. 2020.

ANDRADE, L. M.; LOUREIRO, V.; LENOIR, J.; LEMOS, N. S. Extension and solidarity technoscience: Peripheral in the Distrito Federal and its surroundings. Cadernos de Arquitetura e Urbanismo. v. 26, n. 38, 1, 2019 p p. 189-234. Available at: https://www.perifericounb.com/_files/ugd/410e0b_8756960f436643939a2d874cc7a2673e.pdf. Access in: 04 may. 2021.

AGUSTINHO, D. p. Complexity in water governance in the Distrito Federal: challenges for the Paranoá River Basin Committee. Master's Thesis. CDS/ University of Brasilia. 2012. 170 p.

AVILA, C. F. D; DANTAS, A; DUARTE, A. G. «Public management, collective health and the environment in Brazil: an interpretation essay. Hegemony.» In: Electronic Journal of the Master's Program in Human Rights, Citizenship and Violence/Political Science of the Unieuro ISSN University Center: 1809 - 1261 UNIEURO, Brasília, number 26, January to June 2019, p. 66-94. Available at: https://revista hegemonia.emnuvens.com.br/hegemonia/article/view/271/217. Access in: 31 may. 2021.

BRAZIL. Distrito Federal. Complementary Law No. 827/2010. Establishes the District System of Nature Conservation Units – SNUC. Available at: http://www.sinj.df.gov.br/sinj/Norma/67284/Lei_Complementar_827_22_07_2010.html. Accessed: 1st Jun. 2021.

BRAZIL. Distrito Federal. Distrito Federal Planning Company (CODEPLAN). Evolution of the HDI of the Distrito Federal and the Municipalities of the Metropolitan Area of Brasília compared to the other Federation Units and Municipalities of Brazil. 2013. Available in http://www.codeplan.df.gov.br/wp-content/uploads/2018/03/Evolu%C3%A7%C3%A3o-do-IDH-do-DF-e-dos-Munic%C3%ADpios-da-AMB-Comparativamente-%C3%A0s-demais-Unidades.pdf. Accessed: 1st Jun. 2021.

BRAZIL. Distrito Federal. District Household Sample Survey – Brasília/Plano Piloto – PDAD/2014. Brasilia, 2015. Available at: http://www.codeplan.df.gov.br/wp-content/uploads/2018/02/PDAD-Distrito-Federal-1.pdf. Accessed: 1st Jun. 2021.

_____. Secretariat of Urban Development and Housing – SEDUH. Urban Guidelines of the South/Southeast Region (DIUR 07/2018), 2018.

_____. Master Plan for Basic Sanitation of the Distrito Federal. Brasilia. 2017. 495 p.

BRAZIL. State of Bahia. Law No. 9,069/2016. It provides for the Master Plan for Urban Development of the Municipality of Salvador - PDDU 2016 and provides other measures. Available at: https://leismunicipais.com.br/plano-diretor-salvador-ba. 2016. Accessed: 24 mar. 2021.

BRAZIL. Brazilian Institute of Geography and Statistics (IBGE). Cities. 2020. Available at: https://cidades.ibge.gov.br/brasil/ba/itubera. Accessed: 29 Apr. 2021.

_____. Brazilian Institute of Geography and Statistics (IBGE). 2020. Available at: https://cidades.ibge.gov.br/brasil/ba/panorama. Accessed: 29 Apr. 2021.

_____. Brazilian Institute of Geography and Statistics (IBGE). 2020. Available at: https://cidades.ibge.gov.br/brasil/sintese/ba?indicadores=25207,29765,60036,60045,78187,78192). Accessed: 29 Apr. 2021.

_____. Brazilian Institute of Geography and Statistics (IBGE). 2020. Available at: https://cidades.ibge.gov.br/brasil/ba/igrapiuna/panorama. Accessed: 29 Apr. 2021.

_____. Brazilian Institute of Geography and Statistics (IBGE). 2020. Available at: https://cidades.ibge.gov.br/brasil/ba/itubera. Accessed: 29 Apr. 2021.

_____. National Household Sample Survey (PNAD). 2015. Available at: https://biblioteca.ibge.gov.br/visualizacao/livros/liv98887.pdf. Access in: 24 mar. 2021.

_____. Household Budget Survey (POF) 2017-2018. 2018. Available at: https://valor.globo.com/brasil/noticia/2020/09/17/ibge-confirma-que-pas-voltou-ao-mapa-da-fome-em-2018-diz-pesquisador.ghtml. Access in: 30 may. 2021.

OAK, I. M. M.; PEREIRA, G. C. (Orgs.). How is Salvador and its metropolitan area [online]. 2nd. ed. rev. and enl. Salvador: EDUFBA, 228 p. ISBN 85-232-0393-1. 2008. Available at: http://books.scielo.org. Access in: 30 mai. 2021.

DAGNINO, Renato. Solidarity Technoscience: a strategic manual. Marilia. Anti-Capital Struggles. 2019. 161 p.

DAGNINO, R. «Social Technology and Solidarity Economy: building the bridge». In: Social Technology: conceptual and methodological contributions [online]. Campina Grande: EDUEPB, 2014, p p. 207-265. ISBN 978-85-7879-327-2.

FIALHO, Attila. Santa Luzia neighborhood plan. Final undergraduate work in Architecture and Urbanism: Faculty of Architecture and Urbanism of the University of Brasília - FAU-UnB, 2019.

GOMES, C. M; MINAYO, M. C. de Souza. Ecosystem Health Approach: A Transdisciplinary Strategy. Journal of Integrated Management in Occupational Health and Environment - v.1, n.1, Art 1, ago. p p. 1-19. Available at: https://portaldeboaspraticas.iff.fiocruz.br/wp-content/uploads/2020/09/Enfoque-Ecossistmico-em-Saude-transdisciplinar.pdf. Access in: 31 may. 2021.

GUTIÉRREZ, F.; PRADO, C. Ecopedagogy and planetary citizenship. 1a. ed. São Paulo: Cortez, 1999,128 p.

JESUS, M. M. D. de; ROCHA, S. M. C. The HDI of the City of Salvador: a sociological view about some aspects that hurt human rights in the city of Salvador. Annals – 21st SEMOC, Salvador. 2018.

LACERDA, G. N. Cyclical Territory – Ecological sanitation, solidarity economy and territorial governance from eco affectivities of the community of Santa Luzia/DF. Final Course Work. Faculty of Architecture and Urbanism. UnB, 2020.

Lima, p. H. S. The spatial circuit of rubber tree production: Technology and Michelin as the main agent of the circuit. Dissertation (Master's degree) – Federal University of Bahia. Salvador, 2011.

MIRANDA, J. M. Infrastructure and quality of life: the case of Chácara Santa Luzia – Cidade Estrutural/DF. 2016. 72fl. il. Completion of course work (Bachelor in Geography) – University of Brasilia. Brasilia, 2016.

MIRANDA, J. M; ANDRADE, L. M. S. Comparative analysis according to the dimensions of sustainability between the occupation of Santa Luzia farms and the government's proposal for social housing. II SiBOGU, 2018.

GINGA WOMEN. Diagnostic Report on the Grid, 2019.

NEDER, R. Social production of technology, inequality and the new sociology of technology. Journal of Science & Social Technology 2017;1(e6):1-32.

PERUCCHI, Gabriel. Santa Luzia Water Sensitive: Spatial patterns of ecological infrastructure for the more sustainable settlement of the informal settlement of the Estrutural City. Scientific initiation research by the School of Architecture and Urbanism of the University of Brasília, 2020.

PORTUGAL, Sofia. The habitation of powerful women – Sustainable and solidary community Sofia de Freitas Portugal. Final work of graduation in architecture and urbanism by the peripheral group at the University of Brasilia in 2019.

SEBRAE. Sebrae Center for Sustainability. Social Technologies: How business can transform communities. Cuiabá. 2017. Available at: https://www.sebrae.com.br/Sebrae/Portal%20Sebrae/UFs/AP/Anexos/Tecnologias-Sociais-final.pdf. Access in: 28 mai. 2021.

SOARES, A. M. de C. City revealed: urban poverty in Salvador/BA. Geographies Magazine, 83–96. 2009. Available at: https://periodicos.ufmg.br/index.php/geografias/article/view/13265. Access in: 28 mai. 2021.

SOUSA, A. DE; NEVES, D. Solidarity Economy and Work: elements for the analysis of public policies for the generation of work and income. Annals of the I Circuit of Academic Debates. IPEA. 2011. Available at: https://www.ipea.gov.br/code2011/chamada2011/pdf/area2/area2-artigo3.pdf. Access in: 30 mai. 2021.

VARGAS, M. The Integrated Management of Water Resources as a Socio-Environmental Problem. Environment & Society, Year II, No 5, 1999

ZUCOLOTO, G. F.; PEREIRA, L. de S. Social Technologies and Solidarity Economy: Projects Certified by the Banco do Brasil Foundation. Available at: http://repositorio.ipea.gov.br/bitstream/11058/8134/1/bmt_63_tecnologias.pdf. 2017. Accessed: 27 May. 2021.