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

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



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Brasília, 2023

Liza Maria Souza de Andrade | Ricardo Toledo Neder
Simone Parrela Tostes | Livia Barros Wiesinieski
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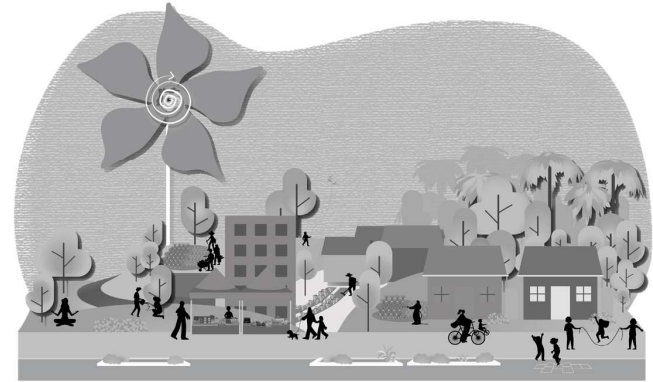


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BRASÍLIA-DF
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This book aims to present the fundamentals and the basis of the multi professional course in CTS - Science, Technology, and Society in residency (Lato Sensu Graduation + Extension), characterized 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/BR¹) 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

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Sociotechnical Adequacy For Agroecology and Agroubania



Chapter 05

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SOCIOTECHNICAL ADEQUACY FOR AGROECOLOGY AND AGROURBANIA

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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.

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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 styles¹³ 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

¹³According 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.

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

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

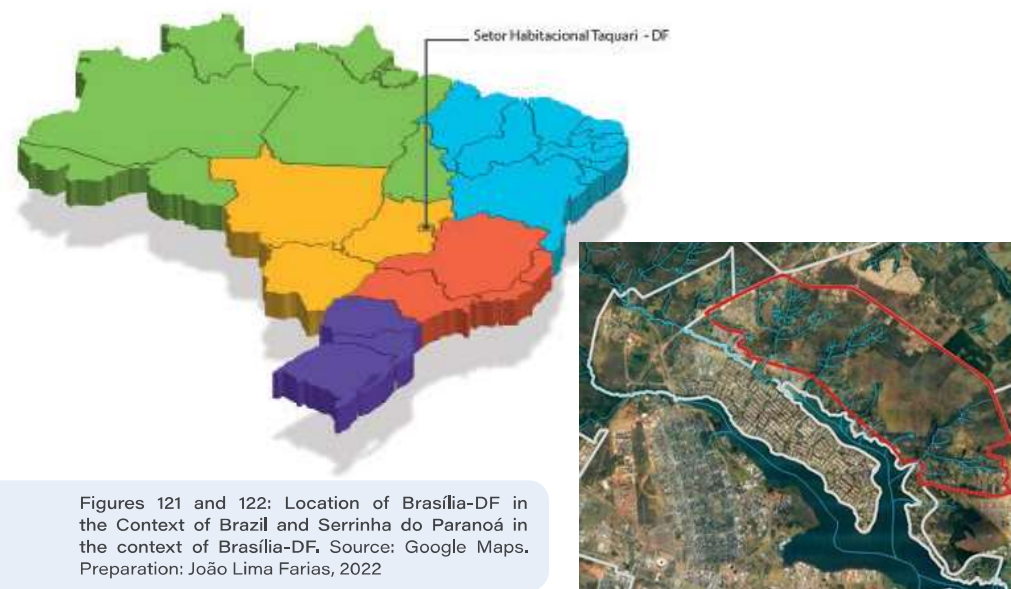
Description and contextualization of the territory

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 Brasília. It was considered by Lucio Costa as the bucolic landscape that embraces the Cultural Heritage Brasília, 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 Jervá, 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.

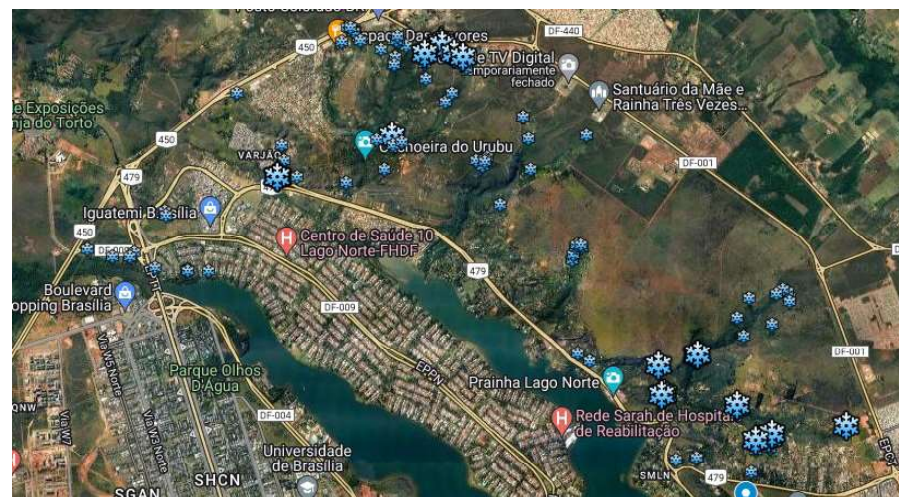
Presentation of good practices

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 agroubania, 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 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.



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.

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.

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