

Looking at Education in Agroecology in different Levels of Teaching: A Systematic Mapping

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Abstract—The growth of Agroecology courses at different levels is a reality in Brazil. This work presents a systematic mapping of the literature on the occurrence of Education in Agroecology at different levels of education in the country. For that it investigates the methodologies, the challenges, the contributions and where it has occurred. 228 papers were identified and after applying inclusion and exclusion criteria defined in the study, 12 papers were analyzed. Among the results, it can be seen that the methodologies applied range from the implementation of technical, higher and postgraduate courses to extension projects involving the agroecological theme. Such courses are present in all five Brazilian regions and one of the challenges is to change the concept in the field, from agribusiness to agroecological.

Keywords—Education in Agroecology, implementation methods, challenges, contributions.

I. INTRODUCTION

This work aims to present a systematic mapping of the state of art in Agroecology Education within the levels of education provided by in Law 9.394/96 – Law of Guidelines and Bases for National Education (Brazil, 1996). According to this law, Brazilian education is presented in two levels: Basic Education that comprises the stages of Early Childhood Education, Elementary and High School; and Higher Education that is presented in sequential courses: graduation, postgraduate and extension. Thus, although the focus of this work was not teaching modalities, professional, indigenous, special and field education, also offered in current legislation, are inherent to discussions, perceived in the works identified in the mapping process.

Initially, in a study that has agroecological education at different levels as its central theme, it is important to understand Brazilian historical scenario that marks the relationship between man and nature, based on the assumption that "nature is in man and man is in nature, because man is the product of natural history and nature is a concrete condition, then, of human existentiality" (MOREIRA, 1995, apud OLIVEIRA, 2002, p.1). In this context, the relationship between man and nature is

necessary to identify the prevailing economic system adopted in Brazil, because according to it, the vision and conception of this relationship between man/nature changes. In Brazil, the economic system is the capitalism, which has a view of this relationship of man/nature as of domination of man before nature, nature is seen as one of "the means of production from which capital benefits" (OLIVEIRA, 2002, p.5).

Therefore, in Brazil, the development of capitalist relations in the field has its origins in the Green Revolution and in the exploitation of natural resources in a predatory way (SOUZA, 2017). The said Green Revolution sought to achieve high productivity based on intensive use of chemical inputs (fertilizers and pesticides), without concern with socio-environmental impacts arising from this proposal called conservative modernization. Currently, this development perspective has been identified with the sector and its perspective called "Agribusiness" that has been constituted as a capitalist proposal for the development of the field and it is configured as a junction of agricultural and livestock production chains.

According to Souza (2017) for implementation and dissemination of agribusiness ideas in Brazil, agricultural education and rural extension were used, selling the image

of modernization from technology, whether in production, in the use of chemicals and pesticides for expansion of crops, among other instruments that caused the change in peasant relationship with agroecosystems, artificializing nature. It stands out that these changes in dynamics and technological aspects did not take into account the impacts on the lives of rural populations, much less the consequences for human and animal health and environmental degradation (ALMEIDA et al, 2001).

In their studies, Caporal and Costabeber (2004), highlight that rural extension actions proposed at the time of the implementation of The Green Revolution, and it lasted for many years, were based on development for the field limited to an economic perspective, besides being incompatible with the way of life and relations between environment and society established by traditional communities and those inherent to the diversity of Brazilian family farming. So, aspects related to the perspective of sustainable rural development and the demands of these populations regarding education, health, agrobiodiversity, food security, exchange relations, culture and identity of the populations and aspects of life of the families in the countryside were not considered in the context of the proposal of conservative modernization of rural Brazilian.

In opposition to this process, the redemocratization of the 1980s and the expansion of movements and technical advisory organizations to rural communities intensified in the 1990s led to the construction of proposals and expansion of initiatives in the field of Agroecology for the promotion of Sustainable Rural Development (CAPORAL and COSTABEBER, 2001). This process intensified with the arrival of Lula Government in 2004 so that various actions in the field of Sustainable Rural Development in dialogue with the needs of families began to come on the agenda in the context of public policies and development actions in the field. One of the main actions proposed already in 2004 was the expansion of technical assistance and rural extension (ATER) actions based on the agroecology perspective and articulated this with numerous other actions to promote Sustainable Rural Development. In this rural extension action, then called "Nova ATER" (BRASIL, 2004), the various demands of the populations of the field and participatory processes were considered, presenting as its purpose: "participate in promotion and animation of processes capable of contributing to the construction and execution of sustainable rural development strategies, centered on the expansion and strengthening of family agriculture and its organizations, through educational and participatory methodologies, integrated to local dynamics, seeking to

enable as conditions for the exercise of citizenship and the improvement of society quality of life" (BRAZIL, 2004).

Thus, the extensionist action based on agroecology in the context of ATER is brought to the status of promoter of non-formal educational actions essential for sustainable rural development from the proposition of the Nova ATER (MARINHO et al, 2015). For this, it was also necessary a process of training technical extension agents through free courses and also began to require the creation of agroecology courses at different levels of education to account for the actions in the field of sociotechnical intervention of extension professionals, as well as training for the populations of the field for the agroecological transition (BALLA et al, 2014; SOUZA, 2017).

In field, education assumes an important role promoting Agroecology or nature of this field as a base for knowledge construction necessary for transition and social intervention processes of agroecological basis, by the educational processes under development with different teaching initiatives in agroecology. Then, as a foundation education as a science, it articulates with a set of other fields of scientific knowledge such as agrarian sciences, biology, ecology, economics, sociology, history, geography, anthropology, communication, physics, among others, in an integrative way, to make up what Caporal calls the "disciplinary matrix" of Agroecology as a new paradigm. (CAPORAL et al, 2006)

Education interconnects with Agroecology throughout its trajectory, initially basing actions in the field of informal education such as Extension and Rural Development actions. Over time, especially after the 2000s, these initiatives are articulated and even identified with other education proposals such as Alternation Pedagogy and popular school networks (PEREIRA et al., 2019), Education of/in the Field (FERRARI et al, 2019) and the intensification in the process of institutionalization and creation of regular and formal courses of agroecology (PAIXÃO, 2017) according to established levels of education established in Law of Guidelines and Bases of National Education.

It is in this context that several agroecology courses are offered in the field of professional performance, which are medium technical and higher level, such as bachelors and technological, as well as in the level of specializations, master's and doctorate. After more than two decades of creation and expansion of experiences in formal education in Agroecology in Brazil, analyses are needed on the process of constitution and operation of these courses, regarding the aspects that underlie Agroecology Education, the functioning of the pedagogical proposals,

insertion of these professionals in society, as well as the main achievements and challenges.

II. AGROECOLOGY EDUCATION

It is correct to affirm that to break the whole view of agribusiness implemented over the years in educational institutions, agroecology education has been presented as an appropriate alternative for this rupture, manifesting itself in the agreement with the formation of the "Omnilateral" citizen and not unilateral formation. The educator Gaudêncio Frigotto (2012, p.267), clarifies that "Omnilateral" is a term that comes from Latin and whose literal translation means "all sides or dimensions". "Omnilateral" education thus means the conception of education and human formation that seeks to take into account all the dimensions that constitute the specificity of the human being and objective and subjective conditions in its full historical development" while unilateral education "forms for work and productive market" (Frigotto, 2012, p. 269).

In this context, it seeks that the individual emanates in all senses and dimensions, since thinking about Education in Agroecology permeates the knowledge of the populations of the field and the educational process of this type of teaching, enabling a new field and society project from agroecological principles, reconstructing the world based on a new relation of man with nature. So, at the 1st National Seminar on Agroecology Education in 2013, discussions were presented on the themes involved in insertion of agroecology in formal and informal teaching environments, culminating in the creation of the principles and guidelines of Agroecology Education: "a set of comprehensive, fundamental, guiding and defining guidelines and values of the way forward to put a certain end into practice. Here we understand that principles and guidelines are orientations for decision-making on which way to follow in order to carry out an Education with an agroecological focus committed to the construction of a more sustainable future". (AGUIAR, 2016, p.5)

We believe that these were created and designed to affirm and reaffirm the paths to be trodden for Agroecology Education in Brazil. As well as basing together those who have not yet entered this journey that it is plausible, has significant foundations and results throughout the process. Thus, four integrative axis were described to guide the work with Agroecology Education: Principle of Life, Principle of Diversity, Principle of Complexity and Principle of Transformation.

The principle of life assumes that nature must be respected, it is from nature that it is possible to keep alive

all forms of life. It is important to "learn from nature observing the interrelationships of the diversity of living beings in various ecosystems and to overcome the anthropocentric view towards a planetary consciousness." (AGUIAR, 2016, p. 7) . That is, from nature it is important to respect, care, know, observe, value, be supportive and enable sustainability in economic, cultural, ecological, ethical and political aspects searching for a life on a planet viable to all beings.

The principle of diversity infers about the multiplicity and possibilities of building knowledge in various spaces. In this way, it is recognized that "the different ecosystems, agroecosystems and landscapes, the wealth of natural goods, the different social practices, knowledge (local and academic), values, culture and forms of social and productive organization, which determine the relationship of human beings with nature". (AGUIAR, 2016, p.8)

In this principle, it relates to the territory as a diverse good, whether in the countryside or in the city, where the fundamental is to know, recognize and value the diversity of peoples.

The principle of complexity is based on "multidisciplinary, interdisciplinary and transdisciplinary actions and attitudes, but fundamentally in the dialogue of the various knowledge and areas of knowledge, considering their socio-historical contexts" (AGUIAR, 2016, p.10). This principle aims to break this reductionist and fragmented view of knowledge, visible in educational institutions, for example, in course projects that discipline knowledge, each one takes care of the contents related to a given discipline, one does not engage with the other. It is important to know "the whole", each element that "composes" it and from this perform an analysis based on the various holistic, social, cultural, economic dimensions, among others.

Last but not least, the principle of transformation, which believes that through education the individual is able to "understand and act with autonomy for promotion of life and sustainability of the planet" (AGUIAR, 2016, p. 12). However, it is necessary for this individual to recognize himself as belonging to society, breaking the ties imposed by hegemonic society, that is, it can be transformed, not only for the individual good, but for the collective starting to have a differentiated formation, based on the recognition of its role as knowledgeable of how the relation between man and nature should happen.

With the dissemination of these principles and guidelines that were collectively constructed, educators, researchers, technicians and other scholars in the area

began to have a direction in the activities of teaching, research and extension that may involve the theme Education in Agroecology beyond the guiding documents of the government. An example of applicability of these principles and guidelines is the reformulation of technical, technological and undergraduate course projects that were created prior to this document and that often do not express the importance of a professional who will have a differentiated view of nature, territory, diversity, culturality, interdisciplinarity, among other principles.

Anyway, as Arroyo describes: We need to educate for an agriculture model that includes the excluded, that expands jobs, increases opportunities for the development of people and communities, and that moves towards directing production and productivity towards ensuring a more dignified life for all, respecting the limits of nature. (ARROYO, 2004, p.13)

That is, we need to think, rethink, reflect, reconstruct, resignify, restructure, know the knowledge beyond the minimalist vision of the field disseminated by hegemonic society over the years and to do so, Education in Agroecology can and should be a path.

III. SYSTEMATIC MAPPING OF LITERATURE (MSL)

To define the state of art with a reliable and solid basis for work, we opted for systematic mapping of the literature. Systematic Mapping is designed to provide a broad view of a research area to establish whether there is research evidence in a topic and provide an indication of the amount of evidence (KITCHENHAM et al,2007). It allows mapping the evidence of a domain at a high level of granularity and identifying groups and voids of evidence, in order to direct the focus to future systematic reviews and to identify areas for conducting new primary studies (KITCHENHAM et al,2007).

The systematic mapping process is done in stages. In the first, the planning is carried out, in which the research questions are defined. In the second, the search for primary studies, using research tools. In the third stage, the identification of studies relevant to the research is performed from the application of inclusion and exclusion criteria.

Definition of Research Questions

Some research questions (QP) were proposed, the most relevant was: how has Agroecology Education occurred at different levels of education? To answer this question, some Secondary Questions were defined: Q1– What methodologies, techniques, resources and strategies have

been adopted in the implementation of agroecology education?; Q2 - What are the challenges of implementing agroecology education?; Q3 - What are the contributions of agroecology education?; and Q4 - Where have the actions of education in agroecology occurred? Therefore, proposing this determined the possibility of seeing the behavior of Agroecology Education at different levels of education, and with the analyses build bases for future work in this area.

Searching process

To outline the scope of the research, criteria were established to ensure, in a balanced way, the feasibility of execution (cost, effort and time), accessibility to the data and scope of the study. According to Kitchenham (2007), research of primary studies can be carried out in digital libraries indexed through their respective search engines. To ensure the inclusion of important studies for this study, manual searches were carried out in the field of important events and journals related to the theme. For this survey, results from: (1) Google Scholar were accessed; (2) Anais of the Latin American Congress of Agroecology; and (3) Anais of the National Seminar of Education in Agroecology - SNEA, these last two through the Brazilian Journal of Agroecology.

The next step was to define the search arguments that would return related works on agroecology education at different levels of education. This was a time-consuming process, which consisted of several tests in the academic search engines. In addition, there was a need to adapt the search arguments in Portuguese differently by the returns that in many situations were null or returned articles of great scope and amplitude and little relevance. Thus, by suiting the keywords and connectors to refine the search returns, the results presented in Chart 1 were reached.

Table.1: Search arguments

Search arguments
MAIN QUESTION: "education in agroecology" AND "levels of education" AND "methodology" OR "intervention" OR "practices" OR "models" OR "teaching degree" OR "types of teaching" AND "challenges" OR "difficulties" OR "obstacles" AND "contributions" OR "benefits" OR "advantages".
QUESTION 1: "education in agroecology" AND "levels of education" OR "types of teaching" OR "teaching degrees".
QUESTION 2: "education in agroecology" AND "levels of education" OR "types of education" OR "teaching degrees" AND "challenges" OR "difficulties" OR "obstacles"
QUESTION 3: "education in agroecology" AND "levels of education" OR "types of education" OR "teaching degrees" AND "advantages" OR "contributions OR "benefits" OR "impacts"

In this process, 228 papers returned among articles, dissertations and theses in search engines were obtained, which are shown in Chart 3 in the primary survey column. Next, the primary studies were submitted to the inclusion¹ and exclusion criteria, in order to identify the most relevant aspects that propose to respond to this mapping.

Inclusion and exclusion criteria

Inclusion and exclusion criteria, shown in Table 2, are used to direct the chosen subject and exclude non-relevant papers to answer questions from the research were based on the indications of Kitchenham (2007).

Table.2: Inclusion and exclusion criteria

Inclusion	Exclusion
CI1. Studies dealing with the teaching of agroecology at different levels.	Ce1. Studies clearly irrelevant to the research, according to the research issues raised.
CI2. Studies that present strategies for the implementation of agroecology education.	CE2. Studies that do not answer any of the research questions.
CI3. Studies that present advantages, contributions and benefits of agroecology education.	Ce3. Studies that are outside the reality proposed by the research.
CI4. Studies that present challenges, difficulties, obstacles, barriers in performing education in agroecology in the country.	Ce4. Studies that are in English will not be accepted.
CI5. Studies published from 2014 to the present date, and which are in Portuguese.	Ce5. Studies that do not treat agroecology education at least one level of education in the country.

IV. RESULTS AND DISCUSSIONS

This section presents the results obtained from the systematic mapping through execution of the protocol. The results are structured in five sections described below, according to the data obtained and research questions¹.

Results of the execution of the search protocol

The search arguments were executed in the search sites returning a total of 228 papers between articles, dissertations and theses (see table 3). A complete frame with all works returned in execution can be checked on the protocol metadata collection form².

Table 3: Statement of the articles raised in the repositories

Machines	Primary survey	Selected by website
Google Scholar	68	5
Journal Cadernos de Agroecologia	160	7
Total	228	12

After the primary survey, inclusion and exclusion criteria defined in the protocol were applied. The criteria were applied in three rounds. First, the title, keywords and

¹Disponível em: <<https://bit.ly/33FEtlf>>. Acesso em 29 de nov. de 2019.

²Disponível em: <<https://bit.ly/2OA8ZZn>>. Acesso em 29 de nov. de 2019

abstract were read. Second, in addition to the metadata of the previous round, the reading of the introduction and conclusion was included. In the last selection round, the previous procedures plus the methodology were used, to then reach the 12 papers selected for extracting evidence as described in Figure 1.

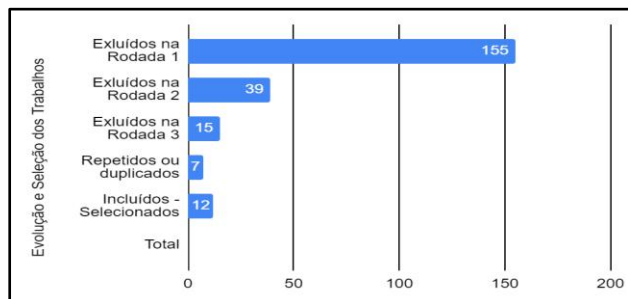


Fig.1: Selection process evolution for selected papers.

The period in which the selected papers were published is shown in Figure 2. We note a high frequency of publications in the years 2014 and 2017, we believe that this result is due to the realization of the first and second National Seminar of Education in Agroecology (SNEA), which took place respectively in 2013 and 2017. Thus, it is possible to highlight the importance of the event for the publication and scientific dissemination of practices, initiatives and research in Agroecology Education. In addition, eight of the twelve works were returned from this device under this mapping.

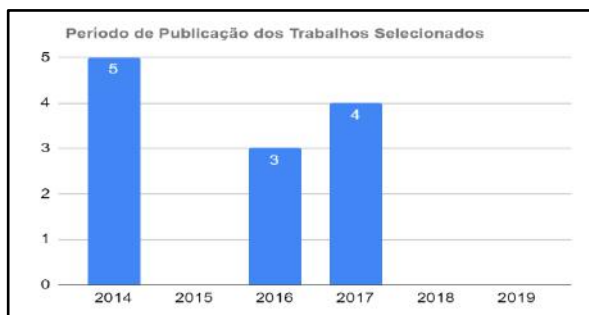


Fig.2: Publication period of selected papers

From the Primary Studies, it was possible to extract the necessary evidence to answer the secondary questions of this research. Table 4 presents the twelve articles that served as the basis for answering the four questions proposed in this study after the proposed systematic survey.

Table 4: Primary Studies Selected to answer questions

Primary Study	Articles	
	Title	Authors
EP01	Overview of agroecology courses in Brazil.	João Vitor Quintas Balla et al.
EP02	Agroecology from the perspective of Professional Education of the Field: the experience of the technical course in Agroecology of IFPR in Ortigueira-PR	Ezekiel Antonio de Moura et al.
EP03	Technology in Agroecology: advances and challenges	Edmilson Cezar Paglia et al.
EP04	The teaching of agroecology in formal courses: brief considerations for the Midwest region.	Lucia Tereza Ribeiro do Rosário
EP05	Agroecological environmental education: in the rescue of the natural being	Fernanda Oliveira de Lima et al.
EP06	The Masters and Masters Griôs in Agroecological Education	Tadzia by Oliva Maya et al.
EP07	Reading tree project at Flor da Serra Resettlement, in Porto Nacional - TO	Jaqueline Ferreira et al.
EP08	Reflections on Agroecology in Country Schools in the City of Goiás	Rejane Medeiros et al.
EP09	Reflections on Higher Education in Agroecology	Manoel Baltasar Baptista da Costa
EP10	Postgraduate in Agroecology: the experience of the specialization course in Agroecology at IFPR - EAD modality	Ana Paula Cavalheiro de Andrade et al.
EP11	Experience report of agroecological principles	Jeovani de Jesus Couto & et al.

	developed in the Alternation Pedagogy of the Rural Family House of Breves	
EP12	In High School, Technical or Higher Education, Agroecology: Present!	Irene Maria Cardoso

Q1– What methodologies, techniques, resources and strategies have been adopted in the implementation of agroecology education?

Concerning the creation of new courses, regardless the level of education it is necessary to follow the guidelines from Ministry of Education, as well as the current legislation, even as the organs and councils of the category. However, institutions have autonomy to define which methodology, technique and strategies will be used in the process of creating and executing the courses. The resources used for the creation and maintenance of the courses vary in the form of funding, for example, if the institution is public or private, if it is Federal, State, Municipal, as well, they can receive investments from institutions or funding agencies through partnerships.

Thus, through the survey conducted, it was possible to perceive diversities of methods, techniques and strategies for implementation of courses in the area of Agroecology. It was perceived, for example, in Santa Catarina, the Technical course in Agroecology of Vintee Cinco de Maio School in Fraiburgo began in 2005 with 51 students using the methodology of Alternation Pedagogy. Several actors participated in the structuring of the course, such as the Landless Rural Workers Movement (MST), the Federal University of Santa Catarina (UFSC) and other institutions [...] In Amapá, the Technical course in Agroecology is offered by Escola Família Agroextrativista do Maracá, one of the 5 Agricultural Family Schools of Amapá. An Agricultural Family School (EFA) has as a model of teaching and learning methodology the Rural Family Houses of France, which emerged in 1930. One of the most important pillars of this model is the Alternation Pedagogy. (BALLA et al,2014, p.5).

Like these institutions, others in the country also make use of the Alternation Pedagogy. It is assumed to divide pedagogical work with the student in two moments: school time and community time. At the moment they are at school the students work the technical-scientific knowledge related to the courses according to the national curriculum guidelines for the courses that are inserted and at the moment they are in the community, from activities

involving teaching, research and extension, proposed by teachers in classes, students experience the practice (BALLA, et al,2014). It is noteworthy that this methodology allows students to be doing the process of reflection of theory with practice, either when they are in the school space, or at the moment they are inserted in the community, their experiences are always used in pedagogical teaching processes.

In addition to the presence of Alternation Pedagogy in the work with Agroecology, it is possible to find the use of participatory methodology, not only in formal education proposals, but in extension projects. They seek to apply the principles of agroecology and education throughout the practices that normally develop through workshops, such as the "Reading Tree" Project, at the Carmencita Matos Maia Municipal School, in Flor da Serra Resettlement, in Porto Nacional - TO. In this project, the workshops worked on themes such as socio-environmental identity, resettlement, culture, ecology, indigenous peoples, memories and school space, not only involving the students of the school, but the whole community. The highlight of this project is the constant search of the school for a "school identity of the field, starting with the curriculum with significant contents, as well as a pedagogical practice consistent with the students' life project" (DE SOUSA et al, 2017, p.8).

Another experience identified happens with elementary school students who attend a Public School in the countryside in Rio de Janeiro. This school, due to the initiative of local youth, embraced the idea of working with the theme of agroecology through Griô Pedagogy. This provides an invitation to a recognized person in the community for their knowledge and doing, who is named Mestre Griô and through orality shares with the students stories, experiences and knowledge, highlighting the role of agroecology as a driver of respect for agricultural communities (MAYA et al,2017). At the same time, the presence of this professional allowed the debate at school about the importance of farmers bringing the experiences of their knowledge to school, questions about public policies for agroecology in the region and social transformations from this dialogue with the other.

Finally, we also identify the use of school vegetable gardens whether in rural or urban spaces as an instrument to work on agroecological principles in communities, through extension projects developed by educational institutions and institutions in the third sector.

Q2 - What are the challenges of implementing agroecology education?

The challenges of implementing a policy aimed at the education of the populations of the field are one of the main challenges of education in Agroecology and primarily of the struggle for autonomy as a new science involving knowledge and experiences of farmers, indigenous peoples, forest peoples, fishermen, quilombola communities as well as subjects involved in rural development processes. Any plan to consider this diversity in educational proposals.

Two aspects are fundamental for understanding this construction: the guiding principles of family agriculture and capitalist agriculture (agribusiness) that dimetrically exist in their forms of experiences. However, this incompatibility has a consensual element which is the *Mançano Agrarian Question itself* (2004) which is based on food sovereignty; on the democratization of the land and territories of traditional peoples and communities; on the recognition of local knowledge; on economic logic grounded in cooperation that supports Agroecology itself.

The courses, at any level or modality of teaching, aiming academic training in Agroecology must break with copies of curricula of related areas such as Agronomy or Agriculture seeking for, preferably meet the requirements of field education policies, methodological principles of the Alternation Pedagogy, considering popular knowledge and the diversity inherent to peasant populations. Caporal (2005) understands Agroecology as an integrative disciplinary matrix formed by contributions from various areas of knowledge. For Sevilla & González (1993) agroecology is essentially peasant, and human history has its roots in peasants, so we can say that it is the means by which we cover all human and environmental elements.

Another indispensable element to be considered is the understanding of the meaning of peasant territory as a place where agroecological knowledge is produced (LIMA, 2016), and political-pedagogical contributions should be considered in educational actions. Among the principles that are based on we can highlight: [...] the diversity of the field in its social, cultural, environmental, political, economic, gender, generational and race and ethnic aspects; encouraging the formulation of specific political-pedagogical projects for field schools; valuing the identity of field school through pedagogical projects with curricular contents and methodologies appropriate to the real needs of students [...] of the field, as well as flexibility in school organization, [...] adequacy of the school calendar to the phases of the agricultural cycle and

climatic conditions; [...] social control of the quality of school education, through the participation of the community and social movements of the field (BRASIL, 2010, p.1).

Before the agroecological theme was considered as a curricular component in peasant schools, culture, knowledge, experience, field peoples daily lives were rarely referred to the organization of pedagogical work, education systems, teacher training or production of teaching materials (LIMA, 2016; DE SOUSA et al, 2017; ROSARIO,). Therefore, building curricular matrices for courses aiming teaching agroecology, whether in rural or urban schools, is a key and challenging element in knowledge construction for the change of formative sense, having as its central element the subject and its territory. The curricular components and their menus should be based on an approach that prioritizes the exercise of reflection on the contradictions of the current technological model in addition to reformulating the technical model that has been consolidated in recent times (PAGLIA et al, 2016).

It was also verified that in the process of implementation of agroecology courses throughout the country, some were created to meet the demand of the social movements of the field, identified through partnerships between higher education institutions and communities. In some of these cases, the courses faced infrastructure difficulties, lack of professionals prepared to work with agroecology and to understand the interdisciplinary view of knowledge application, the construction of the political pedagogical project, among others as the reported experience of implementing agroecology courses at Federal Institute of Paraná (MOURA, 2016).

Q3 - What are the contributions of agroecology education?

From the articles studied in this systematic review process, it was possible to realize that implementation of agroecology in Brazil allows a look at traditional communities, on countryside population, valuing life story, culture and enabling the recognition of who they are, from their roots, their fight against the hegemony and imposition of agribusiness. However, as these are new courses, they face many challenges, such as the teachers who teach the classes in these courses were formed within a conception of agribusiness, monoculture. Balla, Massukado and Pimentel highlight: the courses are contributing to the expansion of the agroecological debate in Brazil. Because they are in the field against hegemonic Brazilian agriculture, the courses are facing many

challenges, obstacles and still make mistakes. With the time and learning provided by the exchange of experiences, agroecology courses are strengthening and seeking for consolidation and recognition towards academia, organs and society in general. (BALLA, MASSUKADO, PIMENTEL, 2014, p.6).

The debates caused by the study and dissemination of agroecology throughout Brazil also contributed to broaden the conversations and concerns about the meaning of territory, failing to see only the physical space, to reflect on the set of representations that permeate the site, as highlighted in the 1st National Seminar on Education in Agroecology:[...] considering all its complexity and ecosystem and social diversity and as a space in dispute and conflict among different socioeconomic sectors; values and knowledge of traditional peoples and communities as a source of ecological and cultural teachings essential for the conservation of biodiversity and the construction of sustainability; Recognition and appreciation of traditional peoples and communities in the countryside and the city, especially the farmer, a family and peasant (maroons, artisanal fishermen, riverside, extractivists, background dwellers of pastures, cleaners, seafood, babassu coconut breakers, indigenous and others) and the different movements and social organizations, considering the issues of gender, sexual diversity, ethnic and generational and reaffirming the territory as a space of identities and cultures; (I SNEA, 2013, p. 09, apud MEDEIROS et al, 2017, p.2).

It is thought that working with agroecology messes with the roots of communities, peoples, culture, identity, the "i" and the way I relate to the other and to nature, so it will mess with the conception of space and where "I" recognize myself as a person. Thus, the understanding of education in agroecology goes beyond simply teaching new alternatives for the maintenance, preservation, conservation of nature, provokes questions about the existing society and its applicability in collective well-being.

Another contribution of agroecology education to society is the "resignification, through participatory methodologies, of sociocultural and historical context in which the students of School are inserted, so that the subjects feel protagonists of their stories" (DE SOUSA et al, 2017, p.2). That is, by using the context of students' lives, applying interdisciplinarity in everyday situations, promoting dialogue, reflection, appreciation, recognition of who they are, they learn to preserve not only where they come from, but the history of the place, the conquest of space, of the territory.

Q4 - Where have the actions of education in agroecology occurred?

The actions of Agroecology Education have taken place throughout Brazil, in all regions, at the various levels of Education. The rise of these courses began from the year 2000 and as highlighted by Balla, Massukado and Pimentel (2014) there were 136 agroecology courses spread throughout all five Brazilian regions, offering technical, graduation and postgraduate courses. "The 136 identified courses are offered by 84 institutions. Of these institutions, 7 are private and 77 are public. Among public institutions, 48 are state and 29 are federal." (BALLA, MASSUKADO, PIMENTEL, 2014, p.8). As well as, from this offer it was identified by the authors that the highest concentration of technical courses is in the Northeast Region, with the presence of 47 courses, equivalent to 30% of the total quantity. However, the authors have not investigated the reasons that intensified the presence of technical courses in agroecology in this region.

Regarding to Basic Education, it was not identified the performance of activities in early childhood education for this axis in the texts investigated in this mapping, even as, in Elementary School, the same happens through extension projects. Finally, "Brazil is probably the country with the highest number of agroecology courses or with an agroecological focus in operation today, both at middle and higher education" Caporal (2009, P.4). This reinforces the interest of the population in studying this theme and modifying the proposition of agribusiness.

V. CONCLUSION

It is observed through the carried readings in this thematic mapping that in many institutions (public, private or third sector) Education in Agroecology only happens through the creation of extension projects carried out by researchers and students involved in the community and/or by the actors of social movements, technicians of third sector organizations..

The Basic Education Schools do not have in their curriculum the discipline of Agroecology, not even a discipline of Education in Agroecology, being visible such disciplines in some teaching modalities such as Field Education and Professional Education. This situation happens as a result of this science to propose an appreciation of the roots of populations subjugated by society such as peasants, quilombolas, indigenous, among other traditional communities that normally advocate the implementation of agroecology. It is worth mentioning that the implementation of agroecology education breaks with the view of agribusiness and the perspective that nature is

aproduct for man to generate results, so even agroecology is not a discipline, or a content provided for in the curriculum matrix of basic education, it must be worked in schools, urban, rural and in the field.

REFERENCES

- [1] AGUIAR, Maria Virginia Almeida et al. Princípios e diretrizes da educação em agroecologia. Cadernos de Agroecologia. v. 11, n. 1, 2016.
- [2] ARROYO, M. G.; CALDART, R. S.; MOLINA, M. C. Por uma Educação do Campo. Editora Vozes. Petrópolis, RJ. 2004.
- [3] BALLA, João Vitor Quintas; MASSUKADO, Luciana Miyoko; PIMENTEL, Vania Costa. Panorama dos cursos de agroecologia no Brasil. Revista Brasileira de Agroecologia Rev. Bras. de Agroecologia. 9(2): 3-14 (2014) ISSN: 1980-9735
- [4] BRASIL. Lei Nº9.394. Lei de Diretrizes e Bases da Educação Nacional, de 19 de dezembro de 1996. Disponível em: < http://www.planalto.gov.br/ccivil_03/leis/19394.htm > Acesso em: 19 nov. de 2019.
- [5] BRASIL. Política De Educação do Campo e o Programa Nacional de Educação Agrária – PRONERA, de 25 maio de 2004. Disponível em: <http://www.planalto.gov.br/ccivil_03/_Ato2007-2010/2010/Decreto/D7352.htm> Acesso em: 12 de ago de 2020
- [6] BRASIL. Política Nacional de Assistência Técnica e Extensão Rural, de 11 de janeiro de 2010. Disponível em: https://www.ipea.gov.br/participacao/images/pdfs/conferencias/2CNDRSS/2cndrss%20politica_nacional.pdf> Acesso em: 10 de ago de 2020
- [7] CAPORAL, F. R. Agroecologia: uma nova ciência para apoiar a transição a agriculturas mais sustentáveis. 1.ed. Brasília: MDA/SAF, 2009. v.1. p.30
- [8] CAPORAL, Francisco Roberto.; COSTABEBER, José Antônio. Agroecologia: alguns conceitos e princípios. Brasília, DF: MADA: SAF: DATER-IICA, 2004.
- [9] Agroecologia e segurança alimentar. Revista Ação Ambiental, Viçosa, MG, ano 7, n. 31, p. 8-11, maio/junho 2005.
- [10] CAPORAL, Francisco Roberto.; COSTABEBER, José Antônio. PAULUS, Gervásio. Agroecologia: matriz disciplinar ou novo paradigma para o desenvolvimento rural sustentável. Brasília, DF: [s.n.], 2006. Disponível em: < <http://biblioteca.emater.tche.br:8080/pergamumweb/vinculos/000005/000005f5.pdf>>. Acesso em: 28 jul. 2020.
- [11] CARDOSO, Irene Maria. No Ensino Médio, Técnico ou Superior, Agroecologia: Presente! Síntese dos artigos submetidos ao I SNEA–Grupo de Trabalho 6. Cadernos de Agroecologia, v. 11, n. 1, 2016.
- [12] DA COSTA, Manoel Baltasar Baptista. Reflexões sobre o Ensino Superior em Agroecologia. Cadernos de Agroecologia, v. 11, n. 1, 2016.
- [13] DE ANDRADE, Ana Paula Cavalheiro; PACHECO, Helton. Pós-graduação em Agroecologia: a experiência do curso de especialização em Agroecologia do IFPR–modalidade EAD. Cadernos de Agroecologia, v. 11, n. 1, 2016.
- [14] DE JESUS COUTO, Jeovani; BARBOSA, Mário Médice. Relato de experiência de princípios agroecológicos desenvolvidos na Pedagogia da Alternância da Casa Familiar Rural de Breves. Cadernos de Agroecologia, v. 11, n. 1, 2016.
- [15] DE MOURA, Ezequiel Antonio et al. Agroecologia na perspectiva da Educação Profissional do Campo: a experiência do curso técnico em Agroecologia do IFPR em Ortigueira - PR. Cadernos de Agroecologia, [S.l.], v. 11, n. 1, june 2016. ISSN 2236-7934. Disponível em: < <http://revistas.aba-agroecologia.org.br/index.php/cad/article/view/20849>>. Acesso em: 28 nov. 2019.
- [16] DE SOUSA, Jaqueline Ferreira; JAPIASSÚ, Andréia Santos. Projeto árvore da leitura no Reassentamento Flor da Serra, em Porto Nacional – TO. Cadernos de Agroecologia, [S.l.], v. 12, n. 1, july 2017. ISSN 2236-7934. Disponível em: < <http://revistas.aba-agroecologia.org.br/index.php/cad/article/view/22348> >. Acesso em: 28 nov. 2019.
- [17] FRIGOTTO, Gaudêncio. Teoria e práxis e o antagonismo entre a formação politécnica e as relações sociais capitalistas. Trabalho, Educação e Saúde (Impresso), v. 7, p. 67-82, 2009. Disponível em: < <http://www.scielo.br/pdf/tes/v7s1/04.pdf>> Acesso em: 28 nov. 2019.
- [18] FRIGOTTO, Gaudêncio. Trabalho como princípio educativo. In: CALDART, R.; PEREIRA, I. ALENTEJANO, P.; FRIGOTTO, G. (Orgs.). Dicionário da Educação do Campo. Rio de Janeiro, São Paulo: Escola Politécnica de Saúde Joaquim Venâncio, Expressão Popular, 2012.
- [19] LIMA, Fernanda Olivieri de et al. Educação ambiental agroecológica: no resgate do ser natural. 2016. Disponível em: < <https://tede.ufrj.br/handle/jspui/1528>> Acesso em: 28 nov. 2019.
- [20] MARTÍN-BARBERO, J. Jóvenes: Comunicación e Identidad. Pensar Iberoamérica – Revista de Cultura. Organización de Estados Iberoamericanos para la Educación, la Ciencia y la Cultura e Educación. 2002
- [21] MAYA, Tadzia de Oliva; SOARES, Tainá Miê Seto. Os Mestres e Mestras Griôs na Educação Agroecológica. Cadernos de Agroecologia, [S.l.], v. 12, n. 1, july 2017. ISSN 2236-7934. Disponível em: < <http://revistas.aba-agroecologia.org.br/index.php/cad/article/view/22326>>. Acesso em: 28 nov. 2019.
- [22] MEDEIROS, Rejane; DE OLIVEIRA, Eduardo B.; MELO, Gleida G. da Silva. Reflexões sobre Agroecologia em Escolas do Campo no Município de Goiás. Cadernos de Agroecologia, [S.l.], v. 12, n. 1, july 2017. ISSN 2236-7934. Disponível em: < <http://revistas.aba-agroecologia.org.br/index.php/cad/article/view/22354>>. Acesso em: 28 nov. 2019.
- [23] OLIVEIRA, Ana Maria Soares de. Relação

- Homem/Natureza no modo de produção capitalista. Revista Eletrónica de Geografía Y Ciencias Sociales. Universidad de Barcelona. ISSN: 1138-9788. Depósito Legal: B. 21.741-98 Vol. VI, núm. 119 (18), 1 de agosto de 2002. Disponível em: < <http://www.ub.edu/geocrit/sn/sn119-18.htm>>. Acesso em: 07 ago. 2020.
- [24] PAGLIA, Edmilson Cezar; SILVA, Cristiane Rocha; BICA, Gabriela Schenato. Tecnologia em Agroecologia: avanços e desafios. Cadernos de Agroecologia, v. 11, n. 1, 2016. Disponível em: < <http://revistas.aba-agroecologia.org.br/index.php/cad/article/download/20871/12260>>. Acesso em: 15 nov. 2019.
- [25] ROSÁRIO, Lúcia Tereza Ribeiro do. O ensino da agroecologia nos cursos formais: breves considerações para a região Centro Oeste. 13ª Feira das Sementes Crioulas, 2017. Disponível em: <<http://sementescrioulasjutims.org/wp-content/uploads/2017/07/O-ENSINO-DA-AGROECOLOGIA-NOS-CURSOS-FORMAIS-BREVES-CONSIDERA%C3%87%C3%95ES-PARA-A-REGI%C3%83O-CENTRO-OESTE.pdf>>. Acesso em: 15 nov. 2019.
- [26] SEVILLA GUZMÁN, E.; GONZÁLEZ DE MOLINA, M. (Ed.). Ecología, campesinado e historia. Madrid: La Piqueta, 1993.
- [27] SOUSA, Romier da Paixão. Agroecologia e Educação do Campo: Desafios da institucionalização no Brasil. Revista Educação e Sociedade. Vol. 38 nº 140, Campinas. July/sept.2017. ISSN 0101-7330 On-line version ISSN 1678-4626. Disponível em: <https://www.scielo.br/scielo.php?script=sci_arttext&pid=S0101-73302017000300631>. Acesso em: 08 ago. 2020.
- [28] Marinho, Cristiane Moraes; Freitas, Helder Ribeiro. use of participatory methodologies in the Technical Assistance and Rural Extension processes (ATER): theoretical-practical foundations. EXTRAMUROS - Extension Journal of Univasf, v. 3, n. 2, 2015