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AGROECOLOGICAL EXPERIENCES AND INTERSECTIONS WITH THE HUMAN RIGHT TO WATER: A SYSTEMATIC REVIEW OF LITERATURE IN APPLIED SOCIAL SCIENCES¹

¹Guilherme Weiss Niedermayer and ²Luciana Turatti

¹Law student, and affiliated Environmental Justice Research Group ASAS: Food, Knowledge and Sustainability (CNPq) at University of Vale do Taquari – UNIVATES, Lajeado, Rio Grande do Sul, Brazil; ²Post-doctorate in Law at the University of Seville, Spain (2019), adjunct professor at the University of Vale do Taquari - Univates; Permanent professor at the Graduate Program in Environment and Development - PPGAD and at the Graduate Program in Sustainable Environmental Systems - PPGSAS, both at UNIVATES. Coordinator of the Environmental Justice Research Group ASAS: Food, Knowledge and Sustainability (CNPq); University of Vale do Taquari – UNIVATES, Lajeado, Rio Grande do Sul, Brazil

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*Corresponding author:

Maria da Conceição Rodrigues da Silva

ABSTRACT

This research presents the results of a systemic literature review—establishing several inclusion and exclusion criteria based on the proposal of Tranfield, Denyer and Smart (2003)—which analyzed the state of the art regarding agroecological experiences and their intersections with the human right to water, starting with a question: The texts included fell into categories that emerged from the analysis: articles on practical experiences in agroecology; articles on the uses of water; articles on perceptions of the need for water management. From this analysis we conclude that agroecology is much more than a set of agricultural techniques—rather, it is a tool of social, environmental, and economic transformation and of resistance to conflicts and predatory political programs; that water, as well as agroecological transition, is also a powerful instrument for social transformation; and that top-down decisions are already ineffective, which renders the implementation of public policies for adaptation to climate change, as well as a joint effort, based on the participation of everyone in decision processes and action plans, a *sine qua non* condition for the effectiveness of different programs.

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INTRODUCTION

There are growing alerts about the need for new collective practices consistent with a more sustainable proposal. As ironic as it may be, when humanity seeks its desires and needs, it also traces its ultimate path. Words, however, have not been enough to create the necessary commotion, which is why we bring data to the debate: 2.2 billion people lack access to securely managed drinking water services; droughts affect more than 1.1 billion people a year; 22,000 people die annually due to lack of access to water; the agricultural industry is

responsible for 50% to 70% of the consumption of water resources worldwide (ONU, 2019a; 2019b; LE MONDE DIPLOMATIQUE, 2018). Without minimizing variables (which are beyond the scope of this paper), we see that conventional agriculture—practiced in a monoculture system, unrestrictedly employing pesticides and consuming voluptuous amounts of water—contributes to environmental imbalance and affects human access to water. In a counter-hegemonic tendency, given that conventional agriculture is still the main form of food production, more sustainable forms of agricultural production are already viable—among which agroecology stands out. Agroecology serves as technical support for the agroecological transition, and its practice develops productive processes that are in harmony with nature and act holistically in the

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environmental, economic, and social spheres. Despite its direct connection with the right to life, the human right to water still lacks formal recognition. Several international documents, however, already recognize it as such, and in this sense the following stand out: General Comment No. 15 by the UN Committee on Economic, Social and Cultural Rights; and Sustainable Development Goal 6, a part of the UN 2030 Agenda. The realization of this right, on the other hand, faces natural and anthropogenic barriers, the latter of which only aggravate the first. Considering the above, this systemic bibliographical review seeks to analyze the state of the art regarding existing approaches between agroecology and the human right to water, based on this question: What are the relationships between agroecology and the various nuances of the Human Right to access water, such as uses, meanings, and needs? As a method for including and excluding reviewed articles, we used the system created by Tranfield, Denyer and Smart (2003). The first chapter briefly conceptualizes themes inherent to the field—such as conventional agriculture, agroecology, and the human right to water—without, however, using the selected bibliography exclusively. The second chapter discusses in detail the methodology we used, so the study can be replicated. In the third chapter, we elaborate on the categories that emerged from selected articles: a) practical experiences in agroecology; b) social importance of water uses; and c) perceptions of the need for water management. Finally, we present the results and possibilities for further exploring the theme.

Defining concepts: conventional agriculture, agroecology, and the human right to Water: Although this study essentially contemplates a systemic review, it is important to understand the horizons of terms and expressions central to research.

Conventional Agriculture: More specifically, after World War II, conventional agriculture has been disseminated as a formula for underdeveloped countries to free themselves from “backward” conditions. In developmental ideology, which proposed formulas for a “modern” agriculture, the Economic Dualism Theory stands out, proposing that backward societies were rooted in traditional techniques, while high-consumption societies were the prism of the future. Alongside this theory, and more directly concerning agricultural development, theories such as the Technological Change Theory¹, the High-Yield Inputs Theory², and the Diffusion of Innovation Theory³ also proposed a break with so-called traditional agriculture (CAPORAL; COSTABEBER, 2002). Among the main propellers of the agricultural developmental ideals synthesized by the Green Revolution, the World Bank had a notorious participation. Through financing of irrigation projects, credit lines, and rural extension programs, the World Bank has promoted the standardization of a worldwide agricultural model (CAPORAL; COSTABEBER, 2002, PEREIRA, 2016). We can see that conventional agriculture was guided by the unrestricted pursuit of profit and of production maximization. Six premises were established to achieve its goals: intensive soil cultivation; monoculture regime; irrigation; application of inorganic fertilizers; use of chemical pesticides and herbicides; and genetic manipulation of cultivated plants. Even if considered in isolation, each of these practices compose a system of dependence and need, in which the ecological dynamic is neglected, and food production is treated as an industrial process (GLIESSMAN, 2005). The result shows that conventional agriculture, adopted as the basic model, is formed by processes asynchronous to nature and which generate food at the expense of the ecosystem—therefore, an unsustainable process because, overall, it

degrades the conditions of production itself⁴ (GLIESSMAN, 2005). Furthermore, despite this increase in production rates, it did nothing to improve the conditions of the poor in the countryside; rather, it increased social inequality (CAPORAL; COSTABEBER, 2002). Conventional agriculture is developed within laboratories, permeated by the interests of capital and industry, at the cost of harsh socio-environmental consequences and rejecting traditional practices such as grain storage.

Agroecology: We recognize the social and historical function of agriculture and, precisely because of it, we seek to preserve the conditions that allow for agricultural production. We do not intend to make agriculture into a Pandora’s Box⁵, but to truly rationalize the agricultural process harmonically to both the environment and social needs. The only option is to preserve productivity and change consumption patterns, in order to make production and consumption more equitable and respectful of ecological cycles⁶. In this field lies Agroecology, defined as a multilateral science of a holistic character, focused on the study of agroecosystems and nourished by the most diverse spheres of knowledge—including traditional knowledge—to establish a new agricultural and cultural paradigm (CAPORAL; COSTABEBER, 2002; EHLERS, 2017; FEIDEN, 2005). Agroecological practice has three objectives: the development of an environmentally harmonious and highly productive agricultural practice, which is socially just and economically viable (EHLERS, 2017; GLIESSMAN, 2005). When agroecological principles are considered, dependence on inputs is drastically reduced—eliminating the use of inorganic products—, the management of water resources is improved, as well as of other resources in the property, and social (particularly gender-related) and economic inequalities are reduced (DUVAL, FERRANTE, VALENCIO, 2008)⁷. Finally, we highlight the equitable role of all parties in the development of agroecological knowledge and its socio-environmental interactions: “The parts cannot be understood separately from the whole and the whole is different from the sum of its parts.” (NORGAARD; SIKOR, 2002, p. 57). In line with the 2030 Agenda’s matrix⁸, agroecological transition and sustainable agriculture are credited with the possibility of the effectiveness of a new agricultural paradigm (FAO, 2017). Therefore, from the institutional incentive represented by the 2030 Agenda, as well as the collective awakening to the need for agricultural production and consumption in a respectful and equitable manner, agroecology demonstrates the ability to deal with current socio-environmental and economic problems and also with guaranteeing the future.

The Human Right to Water: From reading the previous sections and the data already presented in the introduction, we can see that

⁴Since the 1980s, the availability of arable land in the world has decreased annually, as well as the levels of organic matter in the soil and its capacity to retain water (GLIESSMAN, 2005, GARCÍA, 2015). In Latin and Central America, forest areas decrease while conventional agriculture is intensified (BETANCOURT, 2020).

⁵Part of the Greek myth of Pandora. A box that contained all the evils so far unknown to humankind.

⁶The violation of nature and human civilization go hand in hand. Both face the elements. One, venturing into nature and subduing its creatures; the other, building in the refuge of the city and its laws an enclave against them (JONAS, 2006, p. 32). Suggested reading: GARCÍA, 2015.

⁷In Brazil, as of Decree No. 7,794 dated August 2012, the National Policy on Agroecology and Organic Production (PNAPO) was established. Pursuant to article 3, the following guidelines are highlighted: I) promotion of food sovereignty and security through organic foods; II) promotion of the sustainable use of natural resources; III) conservation and recovery of ecosystems through practices that reduce polluting waste applied to production; IV) promotion of fair and sustainable production systems; V) appreciation of agrobiodiversity and of socio-biodiversity products, and encouragement of local experiences; VI) participation of the rural youth in organic production; VII) reduction of gender inequalities in the countryside (BRASIL, 2020).

⁸The 2030 Agenda is an action plan for people, planet and prosperity that seeks to strengthen universal peace. The plan indicates 17 Sustainable Development Goals, the SDGs, and 169 targets, to eradicate poverty and promote a decent life for all, within the planet’s limits. (PLATAFORMA AGENDA 2030, [2021?], digital text).

²Technological Change theorists affirmed that efforts should be directed towards efficiency and greater yield of productive input units (CAPORAL; COSTABEBER, 2002).

³Within the High-Yield Input Theory, the search was for new inputs that would provide immediate results in terms of productivity (CAPORAL; COSTABEBER, 2002).

³The Diffusion of Innovation Theory was multidisciplinary and based on the process of transmitting information top to bottom, i.e., it excluded traditional knowledge from the relationship (CAPORAL; COSTABEBER, 2002).

demographic pressures, especially agricultural use, require more water resources than can be naturally renewed. Considered a basic requirement for the existence of complex life⁹, water also represents several social, cultural, and religious manifestations. For D'Isep (2006) the human being is, in itself, the manifestation of water cycles, and the right to water is present throughout the legal system as a right to water-life. Annually, the consumption of water resources grows in the order of 1% and it is projected that this will continue until 2050¹⁰. The increase in demand only enlarges another well-known problem: the unequal distribution of fresh water between regions (LE MONDE DIPLOMATIQUE, 2018). Hence the even greater importance of formally acknowledging that water is a human right. Despite the lack of formal acknowledgment, several documents, conferences, and assemblies give account of this recognition: the 1977 United Nations Conference on Water; the 1992 International Conference on Water and the Environment; the 1992 United Nations Conference on Environment and Development – ECO 92; the 2000 United Nations Millennium Declaration; and, finally, the General Comment No. 15 by the UN Committee on Economic, Social and Cultural Rights; and Sustainable Development Goal 6, a part of the UN 2030 Agenda. Thusly, guaranteeing access to water for all must go beyond formalities and speeches; thirst does not wait. Truly rationalizing the agricultural production process, i.e., making it compatible with the unrestricted perpetuation of human life on earth, establishing the agroecological paradigm, is fundamental for realizing the Human Right of Access to Water.

METHODOLOGICAL PROCEDURES

Both in Google Scholar (research conducted in Portuguese) and in the *Science Direct* database (in English), there were no exact matches for articles or book chapters that related agroecology with water. In Google Scholar, the following search terms were used: *agroecologia*; *água*; *revisão sistemática*. In *Science Direct*, the search was conducted with the following terms: agroecology; water; systematic review. This research aimed to conduct a systemic literature review—establishing several inclusion and exclusion criteria based on the proposal by Tranfield, Denyer and Smart (2003)—to verify possible answers to the question: What are the relationships between agroecology and the various nuances of the Human Right to access water, such as uses, meanings, and needs?. This search included the *Science Direct* database given its expressive importance for the academic community, its heterogeneous character, and its worldwide coverage, enabling different views and studies on the researched topic. We selected articles exclusively in English. The search terms we used were “water” and “agroecology,” applying the following filters: i) Years 2020 and 2021; ii) Article type: Research articles; and iii) Subject areas: Social Science.

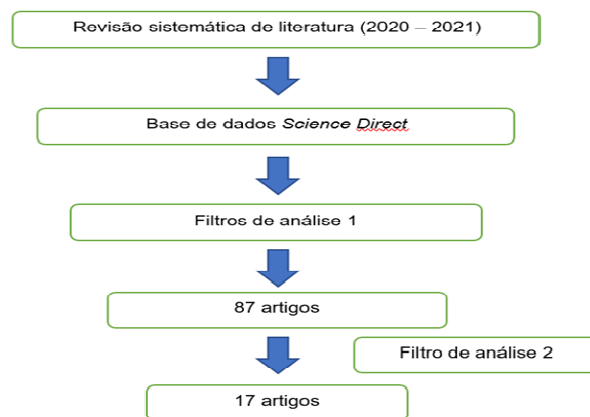
Materials were collected on March 4, 2021—a total of 87 articles, between published and accepted for publication. From these 87 results, we selected the articles that dealt with their respective research issues on: a) practical experiences in agroecology; b) social importance of water uses; c) perceptions of the need for water management. Therefore, we sought in the bibliography practical aspects of both agroecology and the Human Right to access water, as well as perceptions of the need for change and adaptation in water management. The second selection was carried out by first evaluating the titles and abstracts of each article. Seventeen articles remained, which were distributed in the following groups: 9 articles on practical experiences in agroecology; 3 articles on the social importance of water uses; and 5 articles on perceptions of the need for water

⁹ In the words of AntónioGuterres, UN Secretary General: “Water is life. Progress in nutrition, health, education, labor, equity, environmental protection and international cooperation are all related to the availability and sustainable management of water and universal access to effective systems for disposing of our waste (UN, 2018)”.

¹⁰ At the same time, it is projected that by 2050 the world population will reach 9 billion; thus, it will be necessary to increase food production, which will require even more water if new paradigms are not drawn (LE MONDE DIPLOMATIQUE, 2018).

management. The remaining articles were then submitted to full analysis of their contents and noted down according to the methodology of JucineideLessa de Carvalho (2020): i) careful, full reading of the text; ii) rereading of each topic, highlighting the main ideas; and iii) analysis of the selected excerpts. The use of this methodology allowed the authors a more complete and reflective understanding of each remaining article. Below, we have Table 1 detailing all the steps in protocol development. In Image 1, we explain the process, and, in Table 2, we display the selected articles, the factual context of each research, the number of participants¹¹, how the data was obtained, and, finally, the category in which the article was included, to compose the bibliographical scope of this research. With this, we believe to have reached the necessary clarity regarding applied methods, also allowing the reader to evaluate and replicate this methodology in further works.

Among the 17 remaining articles, 4 were published in 2021, 9 in 2020, and 4 are undergoing publication. A wide range of contexts is observed, from the necessary discussion of development through agroecology, preservation of water resources and adaptation to climate change, to the conflictual relationship with agrobiodiversity, permeating social issues such as female empowerment and the evaluation of public policies. This variety of conjectures denotes the complex relationships between sustainability, social relations, water conservation, and the agroecological transition, which were briefly explored in the previous section. Both agroecology and the Human Right to Water are current issues and are directly connected to complex social relations. As seen, both presuppose the direct action of social actors—although, in agroecology, this factor is presented in a more developed and clear way. Therefore, twelve research projects sought to understand their issue directly with local actors, through interviews and questionnaires.



Source: the authors (2021).

Image 1. Systematic review development scheme

RESULTS

In this section, we will present results obtained from the 17 selected articles. Each text was grouped into one of the three emerging categories described in the methodology.

Practical Experiences in Agroecology: As highlighted in the first theoretical chapter of this work, agroecology has recently gained greater visibility on the international political agenda. Contrary to the productive logic of the market rooted in conventional agriculture, agroecological science addresses social issues such as gender inequality, and, in a holistic way, makes use of all knowledge—including traditional—to create production and consumption systems in harmony with natural cycles.

¹¹ In surveys where there were no interviews or questionnaires, this column was filled in with the symbol –.

Stage I: Research planning	Phase 0 – Identification of the need for a review	In a search conducted on March 3, 2021 both in Google Scholar (in Portuguese) and in the Science Direct database (in English), there were no exact matches for articles or book chapters that related agroecology with water.
	Phase 1 – Preparation of the review proposal	What are the relationships between agroecology and the various nuances of the Human Right to access water, such as uses, meanings, and needs?
	Phase 2 – Development of the review protocol	The search was conducted in the <i>Science Direct</i> database. The search terms used were “water” and “agroecology,” applying the following filters: i) Years 2020 and 2021; ii) Article type: Research articles; and iii) Social Science.
Stage II: Review	Phase 3 – Research identification	“Water” and “agroecology” were searched on March 4, 2021, yielding 87 articles, among published and accepted for publication (Analysis Filter 1).
	Phase 4 – Study selection	From the 87 results, upon reading of titles and abstracts, we selected the articles that dealt with their respective research issues on: a) practical experiences in agroecology; b) social importance of water uses; c) perceptions of the need for water management (Analysis Filter 2).
	Phase 5 – Study quality assessment	After running “analysis filter 2”, we arrived at 17 articles, which were analyzed in full.
	Phase 6 – Data extraction and process monitoring	We employed the methodology of JucineideLessa de Carvalho (2020): i) careful, full reading of the text; ii) rereading of each topic, highlighting the main ideas; and iii) analysis of the selected excerpts.
	Phase 7 – Data synthesis	I) We inferred that agroecology is much more than a set of agricultural techniques—rather, it is a tool of social, environmental, and economic transformation and of resistance to conflicts and predatory political programs. II) Water, as well as agroecological transition, is also a powerful instrument for social transformation. III) Top-down decisions are already ineffective; we do need the implementation of public policies for adaptation to climate change, but we also need a joint effort for the change to be effective. Once more we confirm the need for effective participation of everyone in decisions and action plans.
Stage III: Knowledge dissemination	Phase 8 – Report and recommendations	Although different contexts have been covered by the selected research, we can see that there is ample scope for future research, exploring, in particular, the connections between agroecology and the Human Right to Water. As they are comprehensive and complex themes, there are possibilities for developing research with different methodologies and under equally varied perspectives, even extrapolating the social sciences.
	Phase 9 – Searching practical evidence	The search yielded no explicit practical evidence of the relationship between agroecology and the Human Right to Water. However, conceptually, we may infer that, when agroecological principles are met, local environmental conditions will invariably be improved. Therefore, local water conditions tend to be favored, as well as the efficient management—not only, but also—of water resources. We recommend watching the documentary “Sementes de Vida” [Life Seeds], produced by the CEAMI Research Group, in partnership with the University of Vale do Taquari and the Forqueta Ecological Farmers Group, available on <i>YouTube</i> . ¹²

¹² Available at <https://www.youtube.com/watch?v=qMiHOBey7jU>. Proposed by the Communication, Environmental Education and Interventions Research Group – CEAMI, through participatory methodologies, both of script authoring and recording and presentation, the Forqueta Ecological Farmers Group, located in Arroio do Meio, Rio Grande do Sul, Brazil, tells its story. Covering themes such as the transition from the conventional agricultural model to agroecology, the relationship with the environment and society, the achievements and the strength of women farmers, the documentary exposes the reality of this inspiring group.

Table 2. Categorization of selected articles

No.	Authors (year)	Context	Participants	Data Collection Method	Category
1	BAUMANN, Megan Dwyer (in the press)	Environmental governance in Colombia	60 families answered the questionnaire; 42 interviews	Semi-structured questionnaires and interviews	Practical experiences in agroecology
2	OLLINAHO, Ossi I.; KRÖGER, Markus (2021)	Agro forestry development	30 interviews	Interviews and Bibliographical Review	Practical experiences in agroecology
3	BOERAEVE, Fanny; <i>et al.</i> (2020)	Development of agro ecological systems in socio-ecological contexts	–	Soil sample collection	Practical experiences in agroecology
4	AKURUGU, Constance, A; <i>et al.</i> (2021)	Women's empowerment through agro ecology in Ghana	52 interviews.	Interviews and group discussions	Social importance of water uses
5	ZIMMERER, Karl S; <i>et al.</i> (in the press)	Traditional communities' development in Bolivia	251 questionnaires; 135 interviews	Questionnaires and interviews	Practical experiences in agroecology
6	PIEMONTESE, Luigi; <i>et al.</i> (2020)	Water Collection for Sustainable Agriculture Development	–	Database	Perceptions of the need for water management
7	ADEM, Anwar A.; <i>et al.</i> (2020)	Public policy for creation of protected areas in the water basin of FerenjWuha, Ethiopia	21 semi-structured interviews	Database; sample collection; semi-structured interviews	Perceptions of the need for water management
8	TALANOW, Katharina; <i>et al.</i> (2021)	Perceptions of farmers on climate change in South Africa	16 semi-structured interviews	Semi-structured interviews	Perceptions of the need for water management
9	MILLS-NOVOA, Megan; <i>et al.</i> (2020)	Development of recognition policies for adaptation to climate change in Ecuador	54 semi-structured interviews	Semi-structured interviews; systematic review of documents	Social importance of water uses
10	RAHMAN, Sanzidhur; ANIK, Asif R. (2020)	Impact of climate change and agroecology in Bangladesh	–	Database	Practical experiences in agroecology
11	VALLEJO CABRERA, Franco A.; <i>et al.</i> (2020)	Sustainability of agroecosystems in Vale del Cuca, Colombia	Semi-structured interviews with families	Semi-structured interviews; field research and questionnaires	Practical experiences in agroecology
12	BETANCOURT, Mauricio (2020)	Agroecological transition in Cuba	–	Database	Practical experiences in agroecology
13	LAFORGE, Julia, M.L.; <i>et al.</i> (2021)	Agroecological development and food sovereignty in Canada	Group works during the <i>Agroecology Field School and Research Summit</i> event	Group discussions	Practical experiences in agroecology
14	CARO-BORRERO, Angela; <i>et al.</i> (2020)	Water conservation in protected areas in Mexico	Dichotomous or open questionnaires	Questionnaires and sample collection	Social importance of water uses
15	MAO, Dehua; <i>et al.</i> (in the press)	Wetland conservation in the Amur water basin, China and Russia	–	Database	Perceptions of the need for water management
16	XIANG, Hengxing; <i>et al.</i> (2020)	Analysis of results from the national wetland protection program in China	–	Database	Perceptions of the need for water management
17	HERNÁNDEZ, Carol; <i>et al.</i> (in the press)	The Zapatista conflict and its impact on agrobiodiversity and seed sovereignty in Mexico	63 interviews	Semi-structured interviews; observation of participants and non-participants; document analysis	Practical experiences in agroecology

Source: the authors (2021).

We can denote that the agroecological transition is built by constant exchanges between praxis and academia—and this section is built precisely on the empirical standpoint. One would believe that, due to the appreciation of traditional knowledge and its sense of resistance, agroecology finds fertile ground in South and Central America, when compared to other continents (BETANCOURT, 2020; LAFORGE, *et al.*, 2021; ZIMMERER, *et al.*, 2021). On the other hand, in the southern hemisphere, there is also the incidence of various conflicts in regions of abundant biodiversity (HERNÁNDEZ, *in the press*). Conflicts can be triggered by factors such as claims for access to land, or external factors such as political dispute (HERNÁNDEZ, *in the press*; CABRERA, *et al.*, 2020). The impacts of conflict on agrobiodiversity are variable, depending on the moment of interruption of the production cycle, the period of interruption, and the ability of communities to articulate and adapt (HERNÁNDEZ, *in the press*). Agroecology and agrobiodiversity are not only affected by conflict, but, by virtue of their sociocultural characteristics, they also serve as a mechanism for the expression of identity of traditional groups (HERNÁNDEZ, *in the press*; ZIMMERER, *et al.*, 2021). The practice of agrobiodiversity also involves social, economic, cultural, and environmental relationships. Thus, seeds are imbued with traits that go beyond their biological representation, also comprising sociocultural characteristics.¹³ In addition to conflicts—as already demonstrated in different occasions, such as the announcement of the 2030 Agenda and, more recently, the Paris Agreement—it is urgently necessary to act and minimize damage to the environment. Therefore, the collective must move towards sustainability, which includes agricultural sustainability and also debates on environmental governance—which is commonly defined as ordering human relations with the environment through the management of natural resources. The production of environmental governance is contoured from political and economic factors, as well as social, cultural, knowledge, and subjective interpersonal relationships. Decisions can be made hierarchically or through participatory instruments, and although the latter may have more feasible results, the former is usually implemented (BAUMANN, *in press*). In the context of changes rooted in agriculture, the farmer is expected to be a kind of superhero, perhaps, because radical changes are needed in the agricultural production process. However, we need to bear in mind the notion that both consumers and public authorities exert influence over this production. Consumers are expected to develop a conscience of sustainable development and fair-trade practices, in addition to favoring local trade. Public authorities are expected to provide means to foster the farmer-consumer relationship, in addition to providing adequate technical training and credit, for example, for accessing land, or even favor labor relations, in particular by mitigating social, ethnic, and gender inequalities (LAFORGE, *et al.*, 2021).

At first, the quantity of products capable of being offered by agroecological systems may lead to some concern, since conventional systems have always delivered more products. However, when evaluating only the delivery of products, we incur in gross error, as high production is obtained at the cost of ecological destruction (BORAÈVE, *et al.* 2021; RAHMAN, ANIK, 2020). We must keep in mind that the benefits tend to add up as well as the techniques used. Therefore, these are transitions that take time and effort. Results such as the improvement of the biosphere, of soil quality and, consequently, of production—both in quality and in quantity—tend to be as large as the period of time it takes to establish agroecological principles (OLLINAHO; KRÖGER, 2021). Cuba found in agroecology a food production model with the potential to bring the country to food security, especially after the economic limitations imposed following the dissolution of the Soviet Union. However, as a result of various public policies—including educational public policies—the country is achieving another transformation, going

from an agroecological country out of necessity to an agroecological country out of conviction (BETANCOURT, 2020). Therefore, we can infer that agroecology is much more than a set of agricultural techniques—rather, it is a tool of social, environmental, and economic transformation and of resistance to conflicts and predatory political programs. It is evident that, for a full agroecological transition to occur, a joint effort by academics, farmers, consumers, and politicians is necessary.

Social Importance of Water Uses: As we mentioned earlier, man is himself a manifestation of the water cycle. In this way, humanity is both aggressor and victim of the interference with water resources. Water represents not only the formative element of life—as if that weren't enough—but it also permeates human sociocultural elements and manifestations. Just as the Sustainable Development Goals (SDGs) are indivisible, the social importance of water resources is linked to other socially relevant themes. In this sense, the *Water for Resilience* project is developed in one of the poorest regions in Ghana. Through easy access to water and agroecological practices, it seeks to improve the quality of life of the region's residents and the local ecological resilience. The project also treats with special care the improvement of the quality of life of women in the region, which is marked by a sexist culture that exposes women to even greater difficulties. Thusly, the project is related to SDGs 1, 2, 3, 5, 10 and 13 (AKURUGU, 2020). Through access to water in community vegetable gardens, women in northwestern Ghana experience a growing awareness of female empowerment. In addition to finding income opportunities, they strengthen social ties, share experiences, and build community resilience. However, there is still a long way to go. Despite the *Water for Resilience* project providing water and serving as a tool for women in the region, little has been done to raise critical awareness about the issue—and it is only from critical awareness that empowerment can be spread (AKURUGU, 2020). Another problem related to the establishment of public policies for the management of water resources is the distance between the instituting power and the communities directly affected by public policy. In terms of public policies, this distance should only exist in geographic maps; distancing should be shortened through effective public participation in the process of formulating and implementing public policy, under penalty of illegitimacy and low effectiveness. The preservation of water resources in both Mexico and Ecuador is also exercised by public policies which, although of different character, share similar problems. Through hierarchical decisions, techno-political criteria, and merely formal popular participation, water management and protection became an instrument of social control and perpetuation of political views. Therefore, communities, local ecology, and water became objects for extra-community subjects (MILLS-NOVOA, *et al.* 2020; CARO-BORRERO, *et al.* 2020). Thusly, we are shown that water, as well as agroecological transition, is also a powerful instrument for transformation. However, as demonstrated in the previous section, we need the participation of all social sectors, and the needs must be appreciated in each case. This similarity, it is believed, is due to the possibility of intersection between the theme of agroecology and the Human Right to Water, in addition to demonstrating the social relevance of both subjects.

Perceptions of the Need for Water Management: The climate and environmental crisis is at hand; however, it is possible that it has not yet reached its peak. Thusly, the possibility of avoiding major disasters is directly linked to the collectivity's ability to adapt. In turn, for this adaptation to take place, it is necessary to consider the risks presented by omission. The perception of the disastrous effects of climate change may lead to adaptation to a more sustainable lifestyle and work by farmers. However, there are more factors which can influence or impede the development of sustainable behavior—social, political, and economic factors, as well as the community in which the farmers live (TALANOW, *et al.* 2021; PIEMONTESE, *et al.* 2020). In addition, adaptation should not be attributed to just one group; it should be a collective effort, in which the different spheres of knowledge are aggregated, such as the dimensions of a right being added around the normative heritage of the dignity of the human person.

¹³ Through practices such as the milpa—a traditional technique developed mainly by Mexican and Guatemalan peasants based on the polyculture of seeds and wheat, which represents an important cultural trait—and through networks for exchanging Creole seeds, agrobiodiversity contributes to local identity, fundamentally to the social, cultural relationship, and as a political project (BAUMANN, *in the press*).

The adaptive process takes place in two distinct and complementary steps. The first step is copying, which seeks immediate answers to the problems, based on actions already developed elsewhere. The second step would be the adaptation itself, which occurs in the medium and long terms. Adaptation is more complex; it depends on the analysis of results obtained in the previous step (TALANOW, *et al.* 2021). When the assessment of adaptive techniques is not done correctly, it may even meet immediate needs; however, in the medium and long terms, it will result in several consequences that can put the entire local ecosystem at risk (PIEMONTESE, *et al.* 2020). Thusly, evaluating the effect of public policies is also of paramount importance to adaptation. In this sense, three research projects evaluated political actions for the protection of hydrographic basins: one on the FerenjWuha hydrographic basin, located in Ethiopia; one on human interference in the Amur River hydrographic basin; and one which evaluated China's National Wetland Conservation Program – NWCP. According to recent research, degraded land accounts for over a quarter of Ethiopia's area, and it affects about a third of the population.

After a period of severe drought in the 1980s, the Ethiopian government introduced the LWM (land and water management) program for soil and water protection. Among other actions, areas where herds would not have access were fenced off, allowing vegetation to develop, in addition to improving soil quality and carbon absorption and benefiting the region's microclimate. The study demonstrated that the establishment of herd exclusion areas restored vegetation, improved soil fertility, increased carbon and nutrient stocks and, in areas where agroecological techniques were also applied, an increase in annual precipitation was noted. Although 85% of respondents considered land degradation as a socio-environmental threat, only 20% of the local population perceived LWM practices positively (ADEM, *et al.* 2020). In this sense, we reinforce the need of the local population, research centers, and public administration to work in conjunction, as previously mentioned, since adaptation also entails a paradigm shift—which, in turn, requires that everyone internalize the need and benefits of change. It is estimated that, since 1970, 35% of wetlands around the world have been lost. In particular, within the study area, water disasters became more frequent. The Amur River basin is one of the largest in the world, covering areas west of China and east of Russia. On the Chinese side, anthropogenic interference resulted in a loss of 72% of wetlands. Agricultural and construction expansion were the main actors responsible for the opportunity for large crops (see article 18) and population growth. On the Russian side, the main cause of damage was climate change. With the average increase in temperatures, the tundra thaws, which affects the maintenance of wetlands. To a lesser extent, human action is also noted (MAO, *et al.* 2021).

The National Wetland Conservation Program (NWCP) is the largest project of its kind around the world, both in terms of geography and the number of people affected. Its goal is to demarcate 713 protected areas by 2030, restore 1.4 million hectares of wetland, and establish 53 national areas for protection and conscientious use. It is noteworthy that agricultural production reached 57% of the area, forests covered 30.6%, buildings used 3%, and less than 1% was undergrowth. The study demonstrates the effectiveness of programs such as the NWCP, in the first place by reducing the loss of wetlands, and also for restoring 490 km². Another highlight is the improvement in the environmental quality of the location, given its importance for migratory routes, water flow, and biodiversity. Among problems encountered is the low percentage of restored agricultural land, little protective capacity, and lack of a legal apparatus¹⁴ (XIANG, *et al.* 2020). Therefore, we can see that the appeals and damages already caused had some effect, whether in proposing public policies or in

¹⁴ Wetlands have a high concentration of biological matter (hence, carbon), so the first harvests tend to be voluminous; however, the degradation of this biome releases an enormous amount of carbon into the atmosphere and impoverishes the local soil, not to mention the contamination of water by agrochemicals. Its preservation is established in SDGs 15.1 and 6.6. (XIANG, *et al.* 2020; MAO, *et al.* 2021).

raising awareness of the existence of a climate crisis. However, there is a long way to go when adapting to climate change. Top-down decisions are already ineffective; we do need the implementation of public policies for adaptation to climate change, but we also need a joint effort for the change to be effective. Once more we confirm the need for effective participation of everyone in decisions and action plans.

CONCLUSION

This research, through systemic bibliographical review, sought to analyze possible answers to the question: What are the relationships between agroecology and the various nuances of the Human Right to access water, such as uses, meanings, and needs?. Based on the results, we can conclude that agriculture seen as conventional, oriented towards the unrestricted and irresponsible pursuit of profit, contributes to environmental imbalance—especially with regard to water resources—and affects social relations. As a counterpoint, we highlighted agroecology, which, through processes that are harmonious with nature, seeks to generate income, strengthen social equality, and preserve the environment. Finally, even though it lacks formal recognition, access to water must be understood as a human right. From our methodological application, the main results demonstrate, in general, the importance of effective collective involvement for changing the agricultural paradigm, climate adaptation, and the effectiveness of the Human Right to Water. This could not be different, since such themes, to some extent, will affect everyone. However, the same errors are insisted upon, such as: lack of an adequate technical approach, hierarchical decisions, and little transmission of knowledge. Now, specifically: I) We inferred that agroecology is much more than a set of agricultural techniques—rather, it is a tool of social, environmental, and economic transformation and of resistance to conflicts and predatory political programs. II) Water, as well as agroecological transition, is also a powerful instrument for social transformation. III) Top-down decisions are already ineffective; we do need the implementation of public policies for adaptation to climate change, but we also need a joint effort for the change to be effective. Once more we confirm the need for effective participation of everyone in decisions and action plans. Finally, when dealing with the state of the art, the intersection between agroecology and the various nuances of the Human Right to Water needs to be studied. It must be considered that these are themes of growing international relevance; therefore, they offer the possibility of different writings and multiple approaches, especially in the field of Applied Social Sciences.

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