AGROECOLOGY: POLYSEMY, PLURALISM AND CONTROVERSIES

LUIZ ANTONIO NORDER[1]
CLAIRE LAMINE[2]
STEPHANE BELLON[3]
ALFIO BRANDENBURG[4]

Introduction

In recent years, the notion of Agroecology has been adopted by an increasing number of actors and institutions in different countries. This has not only generated significant polysemy, but also objections by certain areas of academic and political debate concerning the vagueness and confusion of the notion. This feature, which has persisted for more than a decade, has intensified given the multiplicity of actors and institutions that have adopted this concept in various ways to guide their lines of action.

The spread of Agroecology is largely due, among other things, to the successful persuasion of scholars who sought to expand the scientific basis of agroecological practices carried out by social movements aimed at transforming agriculture, the food system, and society (TOMICH et al., 2011). In addition, the criticism of transgenic research, as well as of their regulation and use in agricultural production, is certainly a major basis of consensus in Agroecology (LACEY, 2007).

However, in the last decades of the twentieth century different meanings for Agroecology emerged. Buttel (2003) identified five "varieties of Agroecology": the Agroecology Ecosystem variety which proposes a comparative analysis between the natural world and the agro-ecosystem aiming to strengthen agricultural resilience and stability; a second variety, also strongly focused on ecological processes in agriculture, but with greater emphasis on population ecology; a third variety defined as agronomy for sustainable agriculture, based on "certain 'agroecologist agronomists' stances regarding organic production, and on the positions of others, particularly weed ecologists and specialists in production systems, focusing on conventional agriculture"; the Ecological Political Economy variety, with a prominent political and socio-environmental perspective; and

1. Luiz Antonio Norder, Federal University of São Carlos (UFSCar), Programa de Pós-Graduação em Agroecologia e Desenvolvimento Rural. E-mail: luiz.norder@cca.ufscar.br
2. Claire Lamine, is researcher at the INRA (Institut National de la Recherche Agronomique), Ecodevelopment Unit (Avignon, France). E-mail: claire.lamine@avignon.inra.fr
3. Stéphane Bellon is researcher at the INRA (Institut National de la Recherche Agronomique), Ecodevelopment Unit (Avignon, France). E-mail: bellon@avignon.inra.fr
4. Alfio Brandenburg, Federal University of Paraná (UFPR), Programas de Pós-Graduação em Sociologia e em Meio Ambiente e Desenvolvimento. E-mail: alfiob@hotmail.com

lastly the multifunctional landscape variety, that shifts the focus of agricultural activity towards the territory.

Wezel et al (2009) emphasized that the concept of Agroecology as a science, a practice and a social movement needed to be well defined in any argument. However, in some countries, especially Brazil, new elements have been added to this process, since Agroecology is frequently regarded not only as a science, a practice and a social movement, but also as a guideline for government policies and as part of the formal education system. At the same time, there are concepts that associate Agroecology to a way of life, ethics, ideology and utopia. A new set of issues has arisen and, along with it, the need to expand the interpretive debate regarding the current meanings of Agroecology.

This paper analyzes the conceptual diversity of Agroecology by discussing the main meanings and specificities identified in various social fields. It also seeks to raise issues for discussion regarding this process, notably from the cases of Brazil and France – two countries with a strong agricultural sector and which have included Agroecology concepts in their political and scientific agendas in different ways, and at different times[i].

In this regard, we aim to highlight the central role played by the controversies and public debate regarding the social construction of knowledge arising from scientific and technological innovations, as proposed by Callon (CALLON, 1981; CALLON et al., 2001). Similarly, Chateauraynaud (2011) analyzed how controversies change over time and their effects on interactions between stakeholders, scientific institutions, public policies and civil society. This emphasis on controversies and uncertainties is part of the criticism of "rationalist" science, but it also may be regarded as an opportunity for social and collective learning often associated with principles of uncertainty, caution and reversibility in decision-making processes, despite the fact that, in some cases, a continuous and systematic extension of the controversy may be attributed exclusively to the financial interests of large companies (JOLY, 2012).

Social, scientific and technological controversies may thus represent a strategic element in the production of knowledge in formal/official educational systems, especially with regard to the teaching of science, non-formal education, continuing education initiatives in research institutions, and other situations (GALVÃO; REIS, 2008; NAVAS, A. M.; CONTIER, D.; MARANDINO, M., 2008; BARBIER, 2012). However, this does not imply that this controversy over agroecology has to be considered an end in itself or even as an expression of an endless conflict, but that it has be regarded as part of the social construction of knowledge in scientific and educational institutions, in journalism, in public policy making, and in other institutions involved in knowledge construction processes.

The analysis we develop here regarding the various perspectives of Agroecology also highlights the importance of Pierre Bourdieu's view of the diverse "social fields", such as the academic and scientific, educational, artistic, legal, religious, literary fields, and others, each with its particular logic, objective structures, forms of legitimacy, political strategies, power relations, resources, rules, and interests (BOURDIEU 1983; 1984; 1997). This perspective, also present in Almeida (2003), will help outline the specificities of Agroecology in scientific institutions, in social movements, in government, and in

educational institutions, as will be discussed below. Further research may lead to a deeper and more detailed understanding of the interpretations of Agroecology in each of these fields (and eventually others), as well as of the nature of their interaction.

1. Diversity and Polysemy

Agroecology arose and was institutionalized in a context of criticism of conventional production systems and of consensus regarding the technical and social feasibility of agricultural activities being redesigned on ecological bases. However, the multiplicity of initiatives, in view of the different institutions and actors involved in environmental innovations and transitions – and in different regions – contributed to diversify its meanings (BRANDENBURG, 2002; MENDEZ et al, 2013.).

In Brazil, Agroecology has been the subject of debates and interpretations by different authors and institutions. Over 10 years ago Caporal and Costabeber (2002: 71) warned of the risk of considering Agroecology an ecological farming model supposedly opposed to agricultural modernization, instead of regarding Agroecology as a "science that lays the foundation for developing styles of sustainable agriculture and sustainable rural development strategies".

Similarly, Emater/RS (The Technical Assistance and Rural Extension Company of the state of Rio Grande do Sul) held that "Agroecology is not a synonym of ecological farming or of any other production style opposed to the conventional technological model", but "a field of multidisciplinary knowledge that sets forth ecological principles and concepts for the management and design of sustainable agro-ecosystems" (EMATER, 2000: 1). In 2006, this description was adopted by the Landless Rural Workers Movement (MST) and by Embrapa (the Brazilian Agricultural Research Corporation). Embrapa, in its *Conceptual Framework for Agroecology*, recognized "certain conceptual confusion between Agroecology and Ecological Agriculture" (Embrapa, 2006: 21) and suggested the following definition:

> Agroecology is a transdisciplinary field of knowledge that contains the basic theoretical and methodological principles to enable the design and management of sustainable agro-ecosystems and, in addition, contribute to the conservation of agro-biodiversity and biodiversity in general, as well as other natural resources and livelihoods (EMBRAPA, 2006: 26).

Although regarded as "trans-disciplinary" in one case and as "multi-disciplinary" in another, agroecology is identified in both definitions as a process of knowledge. A few years later however, Caporal (2009) once again highlighted that Agroecology should not be regarded as a set of agricultural practices or technologies, nor as a public policy or a social movement.

In France, the process of development of the notion of Agroecology has been largely heterogeneous, involving both civil society and research agencies. In 2010, the

INRA (Institut National de la Recherche Agronomique), the leading French Institute of Agronomic Research, included Agroecology among its priorities and, in December 2012, the Ministry of Agriculture announced the *Produire Autrement* Program, whose main objective was "to promote agro-ecological transition", as will be seen below. Nevertheless, Jacques Caplat, one of the historical militants of organic agriculture, claimed that "the term has become ambiguous and a source of confusion - if not a tool for manipulation" (CAPLAT, 2012: 86).

Noteworthy is that Agroecology was adopted in Brazil and France by institutions with different characteristics, objectives and prerogatives: research institutes, social movements, governmental agencies, non-governmental organizations, foundations, universities and high schools, technical assistance and rural extension agencies, and journalists, as well as at the international level, by the UN Food and Agriculture Organization, among others.

In this historical process, Agroecology has been defined not only as a process of knowledge, but also as a production and organizational process, a synonym of ecological agriculture, a true 'umbrella concept': "Agroecology designates the set of alternative agricultures in relation to the dominant agriculture" (TARDIEU, 2012: 433). As a result, the concept of Agroecology as a knowledge process began to coexist with programmatic and/or normative conceptualizations. This interaction between "cognitive" and "emancipatory" definitions of Agroecology was analyzed by Abramovay (2000: 172-173) as follows:

No matter how strong an organic link there may be between the emancipatory and cognitive nature of agroecological research, from a methodological point of view it should be regarded as distinct: it is not the farmer who grants scientific legitimacy to the discoveries and innovations that Agroecology is able to propose.

In certain cases, the discursive continuum that characterized Agroecology as a science (or a set of principles arising from the scientific field) gradually assumed a more programmatic approach, suggesting that the set of propositions arose, directly or indirectly, from scientific bases. In addition, some of these discourses assumed a type of normative bias, according to which certain production processes, practices, programmatic approaches, concepts or methodologies were accepted or refused depending on what was considered Agroecology.

2. The fields of Agroecology

The conceptual diversity in Agroecology will be analyzed here, initially as the result of its adaptation and use by diverse actors in various social fields, each with specific characteristics. Also addressed in this section are the different approaches that have been generally adopted in four social fields: scientific, social movements, governmental and educational.

2.1. *The fields of Agroecology*

In the field of scientific institutions, Agroecology is characterized in different ways: as a discipline, an interdiscipline, a paradigm, a science, cross-disciplinary knowledge,

multi-perspective knowledge, among others. However, in addition to this and to several other epistemological debates, Agroecology has been undergoing a scientific institutionalization process in several countries, reflected by conferences, events, specialized publications, drafting of documents, creation of official funding lines, undergraduate courses, MSc and PhD programs, research groups and projects, among other initiatives. This institutionalization illustrates the expressive potential of bringing together researchers from different academic and political backgrounds, which does not necessarily mean that theoretical and methodological differences are totally set aside.

It is also important to highlight that the institutionalization of Agroecology has brought about a number of debates in Philosophy and Sociology of Science. The identification of the potential of traditional knowledge as part of a strategy aimed at reducing dependency on external resources and non-renewable energy sources in agriculture, coupled with the development of methodological tools allowing the participation of rural communities in setting development objectives and practices, are considered distinctive features of the scientific methodology of Agroecology (ALTIERI, 2004).

Although strongly associated in Brazil to the proposal of change in the design and organization of science, researches in Agroecology, according to Gomes and Rosenstein (2000), recognize the plurality as well as the need for technical rigor, but question the lack of debate regarding their motivations and their interactions with certain social practices and impacts on local systems of knowledge. According to Lacey (2007), this criticism refers to a "decontextualized approach" of science, emblematically expressed by research on GMOs, which focuses on biotechnological components and processes, disregarding historical and ecological contexts, and the risks and impacts of appropriation by certain sectors of society.

An important aspect to be noted is that in France, unlike Brazil, Agroecology was until recently seldom mentioned in the scientific field; researchers rarely participate in events organized by the social movements that follow its programmatic guidelines. In other countries, such as Denmark, for example, Agroecology is discussed exclusively in the scientific field, an example being a recent analysis of multiple perspectives of a diverse organic food market (THORSOE; NOE, 2014).

On the other hand, certain researchers and environmental actors have recently built their academic and political identities on other denominations, concepts, terminology and theoretical frameworks, an example of which is ethnoconservation that addresses situations in which there is strong interaction between the community and tropical forests (DIEGUES, 1999).

Also to be highlighted, according to Stassart et. al. (2012: 33), is that the "basic principles" of Agroecology are being continuously discussed, updated and expanded, allowing to "distinguish and qualify what can and what should be the object of Agroecology (research - development - capacity building) ". It can be argued that the recognition of the diversity, pluralism and the controversies regarding Agroecology in the scientific field can lead to a continuous multiplication, diversification and re-evaluation of its principles/concepts – and its subject matter; or even promote, from a sociological perspective, an analysis of how Agroecology concepts and principles are adopted in the scientific field

by the various actors, in different contexts, to guide and qualify their lines of action (LAMINE, ABREU, 2009).

Based on the 'varieties' highlighted by Buttel (2003), we identified three not necessarily contradictory approaches to the object of study of Agroecology:

a. Ethno-ecology: focusing on the ecological transition of rural, indigenous and other traditional communities through localized solidarity, autonomy and social equity; in which participatory research is the main method of study;

b. Eclectic: focusing on the proposals and practices regarding the transition to sustainable agriculture: organic farming, biodynamic agriculture, agroforestry, natural agriculture, ecologically intensive agriculture, conservation agriculture and integrated agriculture, among others;

c. Universalist: focusing on any type of agro-ecosystem, including those addressed in the two categories above, and also the possibilities and limitations regarding sustainability in conventional, agro-industrial, and large-scale agricultural production.

This diversity in relation to the thematic, conceptual and methodological scope of Agroecology in the field of science (and also in education, as we shall see) is reflected by its relation to technological propositions such as conservation agriculture, ecological intensification and integrated agriculture which have been strongly contested in academic and political debates for being linked mainly to large-scale production and characterized by the use of agro-industrial inputs and genetically modified seeds. Social movements in general categorically reject these technologies and underscore their ecological limitations and social contradictions, while reaffirming the centrality of the approach regarding the quality constraints in the conventional food system, the importance of building new relationships between farmers and consumers, and the valuing of proximity, solidarity and equity.

Concerning this debate, Stassart et al (2012: 40) state that "conservation agriculture", whose relations with Agroecology "need to be clarified", is a transitional model to be analyzed and discussed, especially in the area of organic farming, in contexts of large mechanized crops. This can be illustrated by the Agroecology platform created by CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement), where "attractive, cost-effective, environmentally protective and sustainable farming systems have been created and disseminated on a large-scale based on direct seeding on a permanent vegetation cover" (CIRAD, 2009).

However, conservation agriculture and, more specifically, no-till practices ["sans labour" in the original], was a major focus of the challenge by social movements: "Only a small group of French farmers currently practice no-till agriculture without herbicides... but the publicity associated with phytosanitary products and agricultural research totally ignore these experiences", reaffirms the Open Letter published in 2013 by the Nature & Progress Foundation.

There are therefore different interpretations in the scientific field regarding the "principles" of Agroecology and its object of research, among other aspects. However,

apart from these debates and their implications, the inclusion of Agroecology both in science and in civil society organizations has contributed to the definition of common themes and the creation of new mechanisms of interaction and communication, either through disputes and controversies or through the construction of identities between science and society.

2.2. The field of social movements

In civil society organizations, Agroecology is conceived as a type of farming to be developed or as principles/concepts to be applied in practice, in order to provide a type of agriculture considered sustainable. These organizations generally reaffirm the need to take into account ethical and social aspects as well as the importance of interaction between farmers, consumers and other stakeholders, pointing towards a novel concept not only for agriculture, but also for the food system (DALGAARD et al. 2003; FRANCIS et al, 2011), often from a perspective of relocalization (LAMINE, 2012).

In this sense, Agroecology is an important part of a social and political mobilization strategy. Via Campesina, which congregates over 150 grassroots organizations in 70 countries, has proposed a strategy for rural development and food sovereignty centered on Agroecology, taken as a both a science and social movement. In Brazil, relevant initiatives have aimed at creating agro-ecological organization networks, notably through the ANA (National Articulation of Agroecology) and AS-PTA (Consultancy and Services for Projects in Alternative Agriculture).

For Almeida (2003), between 1999 and 2002 there were strong interactions between the Rio Grande do Sul state government and a group of non-governmental organizations and social movements linked to family agriculture and agrarian reform, which led to the inclusion of Agroecology in the political and ideological debate of that period: "this historical and explicit link with its political and ideological aspects created problems for the agroecological proposition" for it came to be "…identified with political parties or ideologies or with specific political groups" (ALMEIDA, 2003: 508). It must be pointed out, however, that since 2003 the federal government, based on the Rio Grande do Sul experience, adopted Agroecology as the official guideline for agricultural extension and other public policies addressing family agriculture, a process in which Ridolfe and Oliveira (2013) highlight significant participation of social movements and NGOs.

In France, Agroecology began to appear, especially as of 2008, as a programmatic guideline in social movements defending the importance of peasant, agro-biodiverse, and equitable agriculture, geared towards short marketing channels, and organized on participatory quality assurance mechanisms, usually in opposition to both the dominant food system as well as the organic agriculture certification system. This perspective has been observed in organizations such as the Nature & Progrès and the Confédération Paysanne, among others. Various social movements that express opposition to the agro-industrial model of food production reiterated, in the Open Letter of the Federation Nature & Progress (issued on January 22, 2013), the following definition in response to the above-mentioned government program *Produire Autrement*:

> "Agroecology is a synonymous to proximity agriculture, job creation, a social and solidary economy, a territorial vitality factor, essential to supply the urban population with fresh and diverse foods".

The Letter was endorsed by several environmental, peasant and organic agriculture groups: Amis de la Terre, Artisans du Monde, Confédération Paysanne, Demeter France, Fédération Nature & Progrès, Fondation Citoyennes Sciences, Générations Futures, La Ligue pour la Protection des Oiseaux, Miramap, Mouvement d'Agriculture Biodynamique, Slow Food France, Terre et Humanisme etc.. On the other hand, the alleged polysemy, vagueness and confusion regarding Agroecology were used to justify the distancing of farmers' organizations and simultaneously to strengthen social and environmental identities based on other concepts, especially organic agriculture.

Among the French conventional agriculture organizations, notably those linked to large-scale grain production, the notion of Agroecology has been practically nonexistent until 2012; what predominated was the construction of a political, environmental and scientific identity around the notions of «conservation agriculture» and especially «ecological intensification of agriculture» (GOULET, 2012: 19-29). The Ecologically Intensive Agriculture and Ecological Intensification aim to strengthen the use of biological and ecological processes, replacing the intensive use of agro-industrial raw materials and fossil fuels. To a certain extent, this coincides with Conservation Agriculture, for which the sustainability of agricultural production involves the lowest possible soil disturbance, maintenance of the surface vegetation cover, and crop succession or rotation (HOBBS, 2007).

In recent years, however, Agroecology has been advocated in France not only by social movements linked to peasant and proximity agriculture, but also by conventional agro-food business organizations (BELLON and OLLIVIER, 2011), described in some cases as something halfway between conventional farming and organic farming. This scenario contrasts with the Brazilian case, where Agroecology figures solely as a conceptual reference in social movements and public policies linked to family or peasant, popular, traditional, and indigenous farming. However, agricultural business organizations, historically associated with the consumption of agro-inputs and large-scale single crop production, make no mention of Agroecology.

2.3 *The governmental field*

In Brazil there are important experiences that illustrate how Agroecology has been inserted in rural development policies adopted by the federal government, as is the case of the Pronaf (National Credit Program for Family Agriculture) Agroecology line of credit, the National Technical Assistance and Rural Extension Policy (PNATER), and the creation of the National Policy for Agroecology and Organic Production (PNAPO). In the latter, «agroecological based production» is defined as «aimed at optimizing the integration of productive capacity, use and conservation of biodiversity and other natural resources, ecological balance, economic efficiency, and social justice» (Decree No. 7794

of August 20, 2012). Agroecology programs have also been announced by state governments in different Brazilian regions.

The official rural extension agencies in Brazil have adopted Agroecology as a guideline in their strategic projects and lines of action (DA ROS, 2012; PETTAN, 2010). In France, by contrast, there is a clear distancing of similar agencies from Agroecology. It must be noted that rural extension actions may be interpreted as a subfield of government policies, or as a field in its own right, given the degree of autonomy of the agencies, the privatization processes, and the growing participation of non-governmental organizations in their planning and development.

In France, the Ministry of Agriculture launched, in December 2012, the *Produire Autrement* program which stated, according to Minister Stéphane Le Foll, that "ecology and agriculture issues must not be addressed in a segmented or separate way, but must be part of the logic of the system. This is the novelty of the Agroecology project". The proposal, however, generated criticism by the social movements, which fueled discussions regarding the theme. It was argued that although the government program had reaffirmed the need to shift agriculture toward a systemic perspective, certain ethical and social aspects, repeatedly presented by social movements, particularly regarding interaction between farmers and consumers and the defense of family/peasant agriculture, were not being addressed.

Governments that mention Agroecology do not do so in a uniform manner, nor do they guarantee that it will be regarded in a similar fashion. In the area of government policy, as well as in the scientific field and social movements, the combining of scientific knowledge with the various other principles and objectives pertaining to the area of Agroecology end up producing diverse specific historical settings. Nevertheless, the launching of government programs aimed at Agroecology has generated both in Brazil and later in France, a wide range of reactions, criticism and public debate.

The insertion of Agroecology in the universe of government actions gained new impetus with the publication in December 2010 of the Oliver de Schutter report for the FAO (UN Food and Agriculture Organization) regarding the right to food. This document, in which Agroecology is conceived as "both a science and a set of practices", presents the following recommendation: "As part of its obligation to devote the maximum of their available resources to the progressive realization of the right nutrition, countries should implement public policies to support the adoption of agro-ecological practices" (SCHUTTER, 2011: 6, 20). Agroecology thus became an official guideline recommended by the UN to ensure the human right to food, environmental preservation, and economic development as called for by several international treaties.

2.4 *The field of education*

In several countries, Agroecology has been included in political training courses, in technical training programs and other forms of non-formal education. Part of these activities has been carried out by social movements, trade unions, associations, cooperatives and, NGOs. In Brazil, there are environmental education initiatives in primary

schools that adopt Agroecology as transversal educational content (FIGUEIREDO, 2012) and there is a wide range of experiences where Agroecology is included as a course of study or emphasized in university Agricultural Science majors (SARANDON, 2002; FRANCIS et al, 2011).

In France, the interaction between agronomy and ecology has been discussed for several decades in certain schools of Agronomy, but only recently have curricula been defined that include a systemic approach in which Agroecology is mentioned. French researchers attending the IV Brazilian Congress of Agroecology (Curitiba, 2009) decided to introduce annual one-week sessions of the International Summer School in Agroecology (ISSAE), which are aimed at gathering researchers and graduate students from a wide range of institutions.

Formal courses in high schools and colleges may resort, just as in any other field of science, to broader and more generic terminology related to sustainability, pertaining particularly to Agronomy; or work with other theoretical frameworks, such as Landscape Ecology, which provides an integrated territorial analysis of natural, socio-cultural, and rural aspects (HARBER, 2004).

On the other hand, courses under the name of Agroecology have been included in the official and formal network of secondary and higher education. In many countries, undergraduate courses of study in Agroecology have been created, namely Canada, Colombia, El Salvador, United States, Guatemala, Mexico, Paraguay, and the Czech Republic. In Brazil, in 2014 there were hundreds of mid-level technical courses, 21 higher education technological programs (lasting three years) and six undergraduate programs in Agroecology (lasting five years), in addition to some specialized courses and *lato sensu* graduate programs.

The identity of these higher learning programs *vis a vis* Agronomy education is an important point of discussion – and varies according to the university's tradition and the professional regulations of each country. The bachelor degree programs in Agroecology can be interpreted as "anti-agronomy" or alternatively as "a type of agronomy", i.e., as a paradigm of Agronomy, resembling "Ecological Agronomy", similar to the "variety of Agroecology" that Buttel (2003: 5) called "agronomy for sustainable agriculture."

The professional future of formal graduates in Agroecology is another important point of discussion. On the one hand, it regards the formal exercise of a new profession and, on the other, its position with regard to agronomic engineering (NORDER, 2010). In Brazil, there are serious obstacles to the creation of new professions. The offering of over 300 different undergraduate engineering courses reinforces the concern of graduates in these new programs of being regarded as graduates in professions that have already been regulated and supervised.

The adoption of a particular concept of Agroecology has a direct impact on the educational dimension and on the definition of the professional practice of its graduates, in terms of technical competencies, regulation, and supervision. Moreover, it raises issues regarding which farmers these future professionals will cater to, and which productive processes their qualifications allow them to work with. Some Agroecology undergraduate

programs in Brazil are required to follow the National Agronomic Education guidelines, so as to allow graduates to find work as agronomic engineers.

It can be argued that a broad, pluralist and universalist conception of Agroecology in formal educational institutions would be the most suitable way to allow students and future professionals to develop their professional skills by ecologically transiting in different social, political and technical production contexts. This approach follows the variety of Agroecology that Buttel (2003: 5) called the *agronomic analysis of sustainable agriculture*, namely the pursuit of scientific and technical innovations to address the ecological and productive challenges of conventional and organic farming.

This does not exclude the possibility of offering Agroecology courses more in tune with the variety of Agroecology influenced by Ecological Political Economy (BUTTEL, 2003: 5-6), that adopts a more ethno-ecological approach, such as the Agroecological Engineering program in Paraguay, organized by the *Coordinadora Latinoamericana de Organizaciones del Campo* (CLOC) and *Via Campesina* to provide training to members of indigenous and peasant organizations in Paraguay, Chile, Bolivia, Ecuador and Brazil.

Educational institutions and their respective national regulatory frameworks are characteristics of this field, but are also the reason why there are diverse Agroecology study programs. Furthermore, decisions taken by formal educational institutions also have repercussions in another area: the entities that regulate and formalize the professional activities of graduates.

In the field of formal education however, there are serious educational and professional implications when certain proposals and processes are abandoned as object of study. From this arises the discussion whether professional activities can be carried out in a heterogeneous and contradictory universe of conceptions and contexts by Agroecology graduates. Agroecology studies, if critical, ethical and humanistic, include respecting individual political and professional choices and freedoms, even those of Agroecology students and graduates of the Brazilian public education system.

3. Pluralism and controversies

Given this context, it is possible to dig deeper into the theoretical and political diversity of Agroecology. One issue regards the coexistence and interaction of different meanings (production process or knowledge process), discourses (analytical, programmatic and regulatory), and boundaries regarding the subject (ethnological, eclectic and universalist). A "universalist" approach, which includes analyzing transition processes in large-scale production (including Conservation Agriculture, Ecologically Intensive Agriculture and Integrated Agriculture, among other models), considers Agroecology as a science that studies productive practices in different and antagonistic social and political contexts.

This diversity, when delimiting the focus of Agroecology, is particularly relevant in the field of education, for it allows teachers, students and graduates to choose social, professional and political themes, approaches and linkages which are important in dealing with pluralism in education: "Education is faced with a wealth of cultural

expressions of the various groups that make up society, and the Commission [UNESCO] elected as one of the fundamental principles of its reflection, respect for pluralism" (UNESCO, 1998).

Thus, from a formal education perspective, Agroecology is also able to address multiple social and political identities and their specificities, just as other areas of formal study such as Economics, Social Sciences, Biology, Philosophy, and Geography, where students are continually faced with the challenge of making choices among the various theoretical perspectives, interpretations and policies. If Agroecology proposes to provide interdisciplinary education, these issues need to be discussed further.

Another relevant set of issues regards the specificities of each country and how they interact with each other. This means promoting, with Agroecology as a reference, the social and technical networking of farmers, extension workers, researchers, policy makers, students, consumers, activists, etc., thereby creating interactions that may modify, but not necessarily dismantle, the peculiarities of each social field.

So, from a scientific and especially educational perspective, Agroecology must engage and maintain a critical dialogue with other fields, and focus on examining, discussing and interpreting issues, including: practices aimed at making agriculture and food systems more green and sustainable; diversity and pluralism as fundamental principles; the different social uses and policy choices related to Agroecology; the creation of inter-institutional partnerships according to historically constructed common interests involving a wide and heterogeneous range of social and governmental organizations; the establishment of a critical dialogue regarding governmental policies and the proposals of civil society organizations; the definition of themes, concepts and research issues that do not necessarily coincide with those submitted by the State, by social movements or other fields, and; the construction of multiple socio-political and scientific identities aimed at ecologizing agriculture, the agro-food system, and rural areas.

The ample scope of Agroecology in the fields of science and education should be given due consideration for addressing the complexity of, and contradictions in, all agricultural and food systems, without neglecting the ethnoecological aspects nor the involvement of social movements through participatory research. This more eclectic and universalist approach may also help reduce specialization in educational training.

The discussion of the various fields of Agroecology, of the different meanings and discursive conceptualizations, and of the importance of controversies in the relationship between science and society must also address positions such as the one held by Sevilla-Guzman and Woodgate (2013: 42), who defend the "indivisibility of science, social movements and practice", without which, according to these authors, Agroecology would be an instrument at the service of capitalism. In this context, what we have tried to emphasize here is that the insertion of Agroecology in various social fields, especially in formal education, as in the case of Brazil, requires recognition of its theoretical pluralism and of the roles played by public debate and controversyies in the social construction of knowledge.

Conclusions

Agroecology has been regarded as a science, a practice, and a social movement. More recently, as government policy, a new area of formal education, a new profession and, for some, a way of life, an ideology and a utopia. In this context, there is a trade-off between scientific, programmatic and normative discourses, and different scientific and educational propositions regarding the object of study of Agroecology, which is defined in various ways by trends, named here as ethnological, eclectic and universalist. Also noteworthy is that the sectors of society that profess Agroecology in France and Brazil were not necessarily the same.

Our discussion of Agroecology identified its presence in four main fields: scientific, social movements, governmental, and educational. This theoretical framework highlights the importance of recognizing the specificities, prerogatives and autonomy (subject to regulations and ethical and political issues) of each field, actor or institution when constructing their own concept of Agroecology, both for analytical as well as political/programmatic purposes, and to establish links and partnerships with actors in other fields.

Pluralism, alterity and elective affinities have become, in this historic process, highly relevant concepts for Agroecology. However, the cloud of confusion and vagueness surrounding Agroecology may be blown away by recognizing not only its diversity and polysemy, as reflected by the roles played by the various actors in the social and political process, but also by recognizing controversies as an element which constitutes scientific knowledge and its relationship with society.

Notes

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AGROECOLOGY: POLYSEMY, PLURALISM AND CONTROVERSIES

LUIZ ANTONIO NORDER
CLAIRE LAMINE
STEPHANE BELLON
ALFIO BRANDENBURG

Abstract: In recent years, a growing number of actors and institutions, in different countries, have begun using the notion of Agroecology, which has led to an expansion of its polysemy and its controversies. Taking this into account, this paper analyzes, based on the Brazilian and French experiences, the peculiarities of Agroecology in four different *fields*: science, social movements, government policies, and education. It also discusses three other issues: the analytical, programmatic and normative discourses; the different definitions, in the fields of science and education, of the object of study of Agroecology; and the different formulations regarding its fundamental principles. It is argued that, in this new context, recognition of this pluralism and the controversies acquires a central role in the construction of knowledge in the various fields linked to Agroecology.

Keywords: Agroecology; Science; Social Movements; Public Policy; Education.

Resumo: Nos últimos anos, um número crescente de atores e instituições, em diferentes países, passou a utilizar a noção de Agroecologia, em um processo que levou a uma ampliação de sua polissemia e de suas controvérsias. Este texto analisa, com base nas experiências brasileira e francesa, as peculiaridades da Agroecologia em quatro diferentes *campos*: ciência, movimentos sociais, políticas governamentais e educação. Discute-se também outros três aspectos: a formulação de discursos analíticos, programáticos e normativos; o delineamento, nos campos da ciência e da educação, de diferentes vertentes sobre o objeto de estudo da Agroecologia; e as diferentes formulações sobre seus princípios fundamentais. Argumenta-se que, neste novo contexto, o reconhecimento do pluralismo e das controvérsias passa a ter uma importância central para a construção do conhecimento nos diferentes campos vinculados à Agroecologia.

Palavras-chave: Agroecologia; Ciência; Movimentos Sociais; Políticas Públicas, Educação.

Resumen: En los últimos años, un creciente número de actores e instituciones, en diferentes países, empezó a utilizar la noción de Agroecología, en un proceso que llevó a una expansión

de su polisemia y de sus controversias. Este trabajo analiza, en base a las experiencias de Brasil y Francia, las peculiaridades de la Agroecología en cuatro diferentes *campos*: ciencia, movimientos sociales, políticas del gobierno y educación. También se hace una discusión de otros tres aspectos: la formulación de discursos analíticos, programáticos y normativos; las diferentes concepciones, en los campos de la ciencia y de la educación, sur el objeto de estudio de la Agroecología; las diferentes formulaciones acerca de sus principios fundamentales. Argumentase que, en este nuevo contexto, el reconocimiento del pluralismo y de las controversias adquiere una importancia central para la construcción del conocimiento en los diferentes campos vinculados a la noción de Agroecología.

Palabras-clave: Agroecología; Ciencia; Movimientos Sociales; Política Pública; Educación.