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# The relationships between organic farming and agroecology

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Key words: Agroecology – Alternative agriculture – Organic food and farming – Comparative analysis - Interdisciplinarity

## Abstract

*While acknowledging an extension of agroecology in the organic sector and a growing influence of agroecology in the academic world, we explore their relationships. These relationships cannot be reduced to an opposition between a scientific field and a practical domain. A Brazilian case study based on the analysis of researchers and social actors trajectories exemplifies the diversity of existing relations, whether inclusive or exclusive. With a literature review, this allows characterising the specific attributes of both organic agriculture and agroecology. We discuss them in the light of current challenges for organic farming research and development.*

## Introduction

Both organic farming (OF) and agroecology (AE) claim they can contribute to many challenges faced by agriculture today. Among these are the interrelated challenges of providing food security and preserving the environment. Apart from common objectives, both OF and AE also refer to ecology and question the prevalent technological model designed during the XX<sup>th</sup> century. However, albeit AE can be considered as scientifically rooted and equipped for a holistic study of agroecosystems, at least three main interpretations of AE are possible: as a scientific field, as a social movement or as an agricultural practice (Wezel *et al.*, 2009). Likewise, diversity also exists within organic farming, which cannot be summarised into a set of certified practices (Sylvander *et al.*, 2006).

Since there is a continuous confusion about both terms (Francis, 2009), we intend to contribute to clarify the relationships between OF and AE, while opening a debate and suggesting guidelines for research agendas. Our analysis starts with the extension of AE in various arenas, based on literature reviews. The following section addresses the relationships between OF and AE, based on interviews with stakeholders and case studies. The third section intends to generalise the previous analyses. The discussion opens avenues for further research work.

## Materials and methods

Our approach combined 3 methods: (i) scientometric analysis based on Web of Science (WoS); (ii) case studies and comparisons among regions and countries (Wezel *et al.*, 2009); (iii) direct interviews with Brazilian actors involved in research and training in OF and AE (Abreu *et al.*, 2009). The scientometric analysis, developed in Ollivier *et al.* (2011), was done to analyse the dynamics of AE and OF domains as well as the publications co-using both terms.

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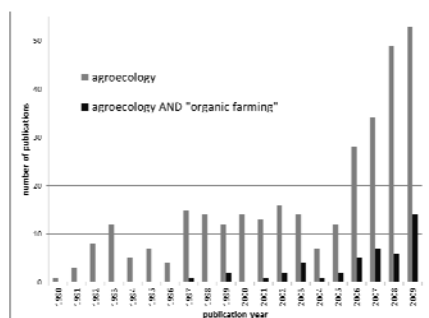
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## Results

### Extension and influence of AE in agricultural sciences

Fig 1. shows a growing number of publications related to AE since 2004, after a rather stable period.



**Figure 1: Dynamics in AE and their crossing over with OF (Source: Web of Science)**

In spite of this recent extension, the corpus is still limited in AE (around 370 references), as compared with OF (Ollivier *et al.*, 2011). WoS notices mentioning both OF and AE represent 15% of the AE literature and 1% of the OF one. Document co-citation analysis point out the variety of addressed topics. They can be aggregated in 4 main categories: (i) definitions of AE, (ii) enhancing biodiversity, (iii) transition studies, (iv) agroecosystems studies. Many reference books are cited documents in AE, reflecting a process of knowledge building.

Main authors in AE are also influential in the field of alternative agricultures, including OF. For instance, Altieri, one of the leading authors in AE, is the 14<sup>th</sup> most cited author in OF after 2003 (Ollivier *et al.*, 2011). Other leading authors in AE consider it as an «umbrella» for alternative agricultures, or view OF as an «area of practice» for AE. Guthman (2000) assessed OF practices in the light of AE principles, arguing that in many cases organic practices fall quite short of agro-ecological ideals. Likewise, Altieri & Nicholls (2003) suggested that AE would rescue OF from an industrialisation model. Such positions reflect the conventionalisation debate in OF, and show the importance of organic values, rules and regulations in shaping organic production (Lutikholt, 2007). However OF is not only questioned but also utilised by AE, e.g. to support conversion issues where OF remains a key-reference (Gliessman, 2007).

### Development of agroecology in Brazil

The Brazilian trajectory of AE can be described through three main phases: (i) emergence of social movements against the industrialisation of agriculture, (ii) structuration of social groups and economic organisations, (iii) institutionalisation of AE (Brandenburg, 2002). The author mentions the same phenomena and phases regarding OF. Indeed, the last phase of institutionalisation links AE and OF with a law (n° 10.831/2003) acknowledging AE under the umbrella of organic production. In this law, participatory guarantee systems and the political dimension of AE were considered as important to support small farmers and foster rural communities.

On the scientific side, AE is gaining in importance. AE was officially recognised in 2006 as a scientific framework by the Brazilian Agricultural Research Corporation (EMBRAPA). In 2009 the VIth congress of AE gathered close to 4000 participants; it was organised by the Brazilian Association of Agroecology (ABA), created in 2004. On the civil society side, the National Articulation of Agroecology (ANA) appeared in 2002 as a space for convergence of social movements, networks and organisations.

The case of Brazil shows the complexity of relationships between AE and OF and the diversity of visions they encompass.

Interviews with Brazilian scientists and actors of the civil society enabled to distinguish three trajectories corresponding to specific visions: (i) actors coming from NGOs and social movements who got involved in policy making and maintained or developed strong links with scientific communities, (ii) research or extension workers involved in social movements and policy making through participatory research projects mostly anchored in AE, (iii) scientists interested in OF and AE as research fields and much less involved in social movements and policy making. The two first types of actors claim a political vision of AE which is considered far beyond OF ("OF is at best a stage along the way to AE in the process of transition", as said an interviewee). The third category of actors claim a scientific and "objective" version of AE which is seen as close to OF. The types of farms (family farms vs. all farms), the relationships to markets and consumers (short food chains vs. all types of food chains), the key scholars and the research methods (participatory approach vs more classical research projects) can also be distinguished in these competing visions of AE.

#### General relationships between OF and AE

Some commonalities appear between OF and AE. Both promote a "closed system" approach, use multiple and diverse crops or animals, rely on biological processes for building soil fertility and controlling pests and diseases, support transition pathways towards ecologically-based agricultural systems (Abreu et al., 2009). They are also both a suited way to introduce practical systems research into academia. Some differences can however be identified (Table 1).

**Table 1 : Comparative analysis of central attributes in OF and AE**

	<b>Organic Farming</b>	<b>Agroecology</b>
Definition	System of farm management and food production	Various e.g. Interdisciplinary study and design of agricultural and food systems (Gliessman, 2007)
Initial paradigms	Soil fertility (and soil sciences)	Ecology (and entomology)
Key concepts	Farming system ; Value chain	Agroecosystem; Food sovereignty
Reference models	Mixed livestock-cropping	Traditional multistratified systems
Agricultural forms associated	Biological, Biodynamic, Organic	Alternative, Sustainable agriculture, Integrated Pest Management
Key actors	Farmers, processors, consumers	Diversified small farmers
Technologies	Use of natural substances and processes; no GMOs	Nutrient cycling; biological crop protection; possibly chemical inputs
Food	Quality, content, health	Agri-food systems, sovereignty
Biodiversity	Impact oriented (effect of practices on biodiversity)	Resource oriented, enhancing agrobiodiversity
Regulations	Historical recognition, IFOAM principles, and national rules	No international standards acknowledged
Certification	Mostly third-party	Participatory guarantee systems

#### Discussion

The case of Brazil showed a combined movement of institutionalisation of both OF and AE, which also occurs in other latin-american countries (Nelson *et al.*, 2009). In most European countries, AE is not yet as institutionalised as OF, despite a growing influence of AE on agricultural sciences. However, in many countries, various scholars extended their research from OF to AE, both in research or in education. In the case of France, the Institute for Agricultural Research (INRA) recently mentioned AE as one

of its main priorities. However, it is mainly in some professional or in civil society organisations that AE is mobilized as a way to express an opposition to mainstream agriculture, and sometimes to organic movements and definitions. This phenomenon is rather recent, while in Brazil AE has been for long an available frame for alternative agricultures' networks. Further comparative analyses would probably confirm the fluidity which exists between OF and AE, since their frontiers and contents are evolving, despite the specificity of conceptual attributes which we assessed.

More generally and beyond the academic arenas (see Fig.1), AE becomes a catchword in many public and private organisations. In some civil society organisations, the reference to AE allows enhancing the importance of key values (such as quality of life and work; social justice) which are *de facto* also present in the organic movements (but not in the organic legal rules) as well as the notion of food system (producers/consumers links and relocalization of food production and consumption) which is considered by many as neglected in OF.

## Conclusions

OF is still a reference, due to its history (almost a century), its principles for action (set of rules) and codified practices (regulations), its controls and certification, its growing economic importance and its identification by consumers. AE which is gaining importance in the academic world and in many social movements has to strengthen its identity as an action-oriented interdisciplinary project. This entails (i) deepening relationships between AE and OF as built in literature, in social movements and in individual curricula and (ii) developing beneficial convergences through cross-fertilisation. In this respect, research efforts should contribute to the design of dynamic agricultural models embedded in social-ecological systems.

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