

## **Organics in 3D: Diversity, dynamics and design of organic agriculture**

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### **Abstract:**

Together with its growing recognition, organic agriculture continues to develop. In this paper, we address this development with two paradigms - decomposition and identity –in the perspective of organic redesign. Our viewpoint combines research in the agronomic and social sciences. The proposed approach is threefold. First, we show that the tension between the diversity and identity of organics is resolved by the adaptation of its frameworks. Then, we account for the main recent dynamics in the organic sector and translate them into research and development challenges, while specifying the roles of institutions in such orientations. Finally, we address two related issues: the redesign of organic systems and the redefinition of the expected performances for an organic agriculture in keeping with societal expectations. A challenge is to maintain innovative capacities while preserving organic identity.

This research paper reviews the literature on organic food and farming (OF&F) from various disciplinary viewpoints to question the institutionalization and the development of OF&F. OF&F constitutes a sector with strong market, institutional and cultural identities. However, organic labels refer to a diverse world and the organic movement has several dimensions. It is threatened both by its own institutionalization and by the extension of alternatives to conventional agriculture—a threat that constitutes part of its identity. The organic *design* is shaped by the reflexive *dynamics* of its critical and continuous reinvention of *diversity*. The paper successively addresses these three topics, based on the following standpoint.

The issue of organic farming (OF) “conventionalization” can be addressed with convention theory in terms of the plurality of quality conventions (Sylvander 1997; Lamine and Bellon 2009; Rosin and Campbell 2009). Consistent with Allaire and Wolf (2004), we address this issue by distinguishing two analytical or cognitive paradigms, “decomposition” and “identity”. The first refers to the ability to decompose and recombine resources. The second refers to “transcendent resources” such as the organic “principles” that activate a form of knowledge alternative to the logic of decomposition. These cognitive paradigms are “rational myths”; each finds its limitation in the other. A combination of these logics is a general asset for institutional development.

### **Defining and Classifying Organics in its Diversity**

In Europe, the EC Council Regulation 834/2007 defined organic production by describing its objectives, and provided specifications for establishing national codes of practices. IFOAM (International Federation of Organic Movements, an NGO) adopted four core principles, health, ecology, fairness and care to express a vision to improve agriculture worldwide (IFOAM 2007). Rules and principles embedded in a holistic framework inspire multiple “organic” designs and specifications inscribed in codes of practices. However, neither principles nor codes of practices define a unique pathway to organic farming or a unique pattern of practices. We can observe a distance between principles and practices, e.g. between ecology and agronomy-based production methods. OF&F internal diversity should be acknowledged, especially when addressing performances. Moreover, diversity also enables dynamics and innovation, in line with adaptation to both site-specific environmental conditions and societal concerns.

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Accounting for diversity in OF&F can be done through: production practices (individual and collective), marketing strategies, marketing schemes, motivations, attitudes (“tradition” vs. “modernity”), public perceptions, public support, consumption styles, etc. Studies extend from local to international scales, including regional focuses, and deliver (inter)disciplinary viewpoints on transition issues and their consequences (Lamine and Bellon 2009).

Pioneer studies predate the first European regulation in OF&F. They shed light on the visions of organic farmers (Cadiou et al. 1975) and biographic factors involved in the conversion to OF, and stress the great diversity of the productive structures and orientations of organic farms, as well as the unity of the farmer's discourse expressing a "breakthrough" with the professional and local framework, resulting from the traumas of modernization (Le Pape and Rémy 1988). A recurrent debate on OF modernity has led to new insights. A Danish study identifies three types of farmers on the basis of what they say about environmental issues and their attitudes towards the sciences: (i) "pre-moderns" who use traditional technologies; (ii) "moderns" who see OF&F as a technical means to solve environmental problems; and (iii) "post-moderns" or "reflexive moderns" (Kaltoft 2001). Classifications often obscure the issues of intermediate positions (trajectories) and relationships (balance) among farming categories.

### **Dynamics and Trajectories**

Literature has contributed insights into the trends of institutionalization, specialization, commodification, and intensification, culminating in a related debate on the conventionalization of OF&F. The core of these debates is the issue of mandatory third-party certification. Another trend towards the specialization of organic farms is also to be considered, with consequences on autonomy and, subsequently, the need for the invention of organic systems that differ from the crop-livestock model prevalent in the 1970s.

Through market growth and mainstreaming, the OF&F movement participates in a general organization of guarantees within exchanges described as a “Tripartite Standard Regime (TSR)” by Loconto and Busch (2012). This regime brings together standard setting organizations, certification bodies and accreditation authorities. Public policies and mutual international recognition of OF&F standards have made certification rules mandatory. Movements within IFOAM have supported the institutionalization and standardization of OF&F and guarantee systems. Today, unity also lies in standards and certification systems. However, with the European logo, it is possible to add specific involvements and collective marks that are generally controlled by third-party certification and rarely by participatory guarantee systems. Thus, alternatives to OF&F “official” standards have developed in situations of proximity and as a result of policy criticism. Building public organics also necessitated the construction of a normative framework, which was translated into regulations. Criticism is part of the move and contributes to the enhancement of the value of organics.

The moment always occurs when market extension raises the issue of accountability. The evaluation issue of OF&F, considering the claims of its advocates, which began to be a public issue with the significant development of the consumption of organic products at the end of the 1990s, found a new relevance in relation to public policy. Accountability separately concerns quality discourses and allegations, and thus addresses the holistic identity of the organic movement. The same type of tension can be found between an ecological conception of organic farming and an agronomic one, which separates functions (fertility, pest and crop management, water management, etc.), and which is linked to a decomposition of the environment into compartments: soil, biodiversity, air, etc. This cognitive tension concerns technical training in relation to organics or agroecology. It can also be found in the norms that combine general principles that inspire codes of practice with codification of prescriptive lists and control criteria; all quality market standards present such a duality (Allaire 2010).

Gibbon (2005) argues against the conventionalization and bifurcation and focuses on the roles of “experts, including the political process of conferring expert status. Rather than moving toward conventionalization, standards and regulations have increased the gap between organic and conventional farming. At the same time, regulation has extended from farmers and traders to the infrastructures of

farming and trade. Standard setting mobilizes forums where researchers and professionals play key roles. Nevertheless, the framing of codes of practices on scientific bases (referring to the decomposability paradigm) neither determines a unique farming model nor addresses the criticism based on identity statements”.

Public policies (EU agri-environmental schemes and national rural development plans) function on knowledge reduction. It is not based on the formalization of identity principles, but on the expected provision of identified public goods, limited, in fact, to environmental goods. Advocates have failed to obtain the recognition of other social benefits of OF&F, except through local policies in specific situations.

Long-term trajectories reveal several tensions: between the will of autonomy (identity paradigm) and the specialization of farms and cropping systems, between redesign perspectives and short-term adaptations to solve technical bottlenecks, between collective and individual capacity building. It is an internal contradiction between the adoption of a prudent incremental strategy and the aim of a global management system. Global management is an ideal-type, well expressed by the model of complementarity offered by mixed crop-livestock farming.

The institutionalization of organics goes hand-in-hand with its integration into research programs (Lockeretz 2002). Collective scientific expertise projects related to the stakes of OF&F R&D have multiplied (Niggli et al. 2008), taking global stakes linked to changes in agriculture and society into account. R&D addresses organics as a "prototype" or immature model (Bellon and Penvern 2014).

### **The (re)design issue: Project, performances, properties**

The two paradigms presented above make it possible to renew the approach to two key issues: (i) the redesign of organic systems, based on a framework proposed 30 years ago (Hill 1985); and (ii) the reassessment of organic performances and their evaluation criteria. The Efficiency-Substitution-Redesign (ESR) framework proposed by Hill (1985) is often referred to as a stepwise progression at three levels: Efficiency, Substitution and Redesign. Beyond the pest management strategies for which it was originally conceived, this framework has been (and can be) applied to diverse food and farming systems. It was also used in agroecology, both to address transitions (Gliessman 2007) and to challenge the organic sector (Rosset & Altieri 1997).

Based on these premises and on our own experience, some clarifications can be made. Firstly, this framework is not necessarily implemented linearly and stepwise, and possible combinations can occur within farms, e.g., depending on crop diversity and field patterns. Secondly, compliance with organic specifications can be achieved with input substitution, often considered as a prerequisite for conversion. Whenever much attention is given to the efficiency of eligible inputs in the organic sector, the resulting framework would be SER instead of ESR. Thirdly, the redesign issue is not settled when focusing on E and S. Its purpose is to alleviate or eliminate the causes of problems, whereas E and S mitigate them. Redesign entails new knowledge, with integrative capabilities and context-based pathways. It also entails interactions among farming or food systems and social processes. It creates a link between the past and future, with a purpose or a project as benchmarks, embedded in social movements. OF&F transitions increasingly entail collective organizations and initiatives.

The ESR framework can be used to analyze and support transitions, including in certified farms or firms. It can guide the actors of the organic movement in terms of the implementation of principles. For example, the recognition of organics as an “*overall system of farm management and food production*” inspired the recent evolution of organic standards towards a higher level of local autonomy in feed supply for livestock operations. More collective forms of organization can also be imagined, enhancing complementarities among farms and creating new spaces. This would enhance the sustainability of the entire system that will increasingly be faced with competing ecologically-based proposals in the future.

The design perspective is closely connected to performances. Beginning with the seminal works (Pimentel et al., 1983), performance has been widely addressed in organics, while referring more to conventional agriculture (its performances or the problems it generates, likely to be solved by OF&F) than to the internal OF&F dynamics. For example, the contribution of organic methods to *the protection of the environment* is usually assessed in terms of externalities, more than interdependencies, or impacts on single environmental compartments, without referring to the principle of ecology (IFOAM) and without considering the environment as a whole or adapting evaluation tools to a specific framework. The relevance of indicators can differ according to the "levels" or "polarities" of the ESR framework (Bellon et al. 2007), and practices or trends can also be confronted with internal organic principles (Darnhofer et al. 2010).

Moreover, the issue of how OF&F influences the evolution of agricultural models is usually not part of current assessment perspectives. Its internal dynamics and the position of farmers within trajectories are also overlooked. For example, the "organic transition effect" has been discussed, namely focusing on soil (Liebhardt et al. 1989; MacRae et al. 1990; Martini et al. 2004). This shows that agronomic performances must be addressed in terms of their dynamics and as multidimensional. The dilemma is between decomposition and a global vision of performances. Redesign involves not only ecological but also social processes and, therefore, delineates the functions of organics, presenting itself as a political challenge. It makes it possible to rethink multiple performances and interdependencies while upscaling organics. However, the territorial patterns of this upscaling are to be defined (Cardona et al. 2014). At this territorial level, redesign entails a social maieutic. Support devices must be thought of in terms of co-innovation and management systems for performance progress at both the individual and collective levels.

In conclusion, the aim of this text was to show interconnections between three dimensions: the *Diversity* of practices and system trajectories, products, markets and expectations; the *Dynamics*, in technical, ecological and social terms, developing uncertainty and the risk of confrontation; and *Design*, articulating a reductionist (technical) vision vs. a holistic one, based on scenarios. The nature of the connections differs according to the paradigms. The internal challenges related to organics are also increasingly in keeping with agricultural evolutions in society (linking agriculture, food, environment and health). We took the dynamics that develop for the whole sector into account, including different types of chains, at the farm level and at various collective and institutional levels.

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