Informed participatory research, a methodological approach for investigating the potential of organic farming in the transition of food systems

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Abstract

A study on the prospects for organic agriculture in 2025 suggested four possible evolution scenarios, from the most optimistic, where organic farming would be the main agricultural model, to the most pessimistic, where organic farming would have been diluted into a new form of sustainable conventional agriculture.

Two main elements could lead to the most pessimistic scenario. The first element is the heterogeneity of organic farming (e.g., different scales, various levels of mechanization, varying degrees of adherence to agroecological principles). This diversity complicates organization among farmers and is potentially confusing for consumers. The second element is the development of short food marketing channels that give priority to local products regardless of their organic farming status.

The role of research is not to decide on the best pathway in the transition of farming systems, but to provide the tools for investigating the possible pathways and for supporting decision-making. In this regard, we developed a series of 'informed participatory research' (IPR) steps designed for use by research centres. IPR combines the classic elements of participatory research and a specific, comprehensive and multi-dimensional assessment of the diversity of farming systems. The method has been implemented in Wallonia, Belgium, where public institutions are supporting a strategic plan for the development of organic farming. The IPR approach provides a way of integrating technical and social tools within a dynamic framework of analysis and action.

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1. Introduction: Organic farming at the crossroads

Recent meta-analyses comparing conventional and organic farming systems have provided scientific evidence on the positive impact of organic agriculture (OA) on the environment, employment, food quality and the reduced use of antibiotics for livestock (Tuomisto et al. 2012; Tuck et al. 2014, Baret 2015). Nevertheless, key indicators such as profit and yield are still higher in conventional agricultural systems (Crowder and Reganold 2015). A recent meta-analysis (Ponisio et al. 2014) showed that appropriate investment in agroecological research aimed at improving OA management systems could greatly reduce or eliminate the yield gap between organic and conventional farming systems for some crops and regions. A fair comparison between organic and conventional options is difficult because it depends on the farming systems (De Ponti et al. 2012; Baret 2016) and because one of the principles of OA is the management of contextual resources at the farm and regional scales (e.g., climate, landscape topography). OA approaches are therefore highly site-specific (Rigby and Cáceres 2001; Lamine and Bellon 2009).

Despite the limited investment in research on OA, this sector's share of the market is increasing in most European countries. This could be related to consumer awareness of the importance of their food choices (impact on health and environment), but also to a change of mind among farmers, who see in OA both an economic opportunity and a benefit for their own health and for the sustainability of their farms. In Wallonia, in the southern part of Belgium, OA has enjoyed strong growth since 2005. In 2014, the threshold of 10% of Walloon farmers in OA was passed. The consumption of organic products in Belgium has been consistently increasing since 2008 ('Les Chiffres Du Bio 2014 | Biowallonie' 2016). About 7% of Belgian families consume organic products on a weekly basis and, in 2014, nearly nine out of 10 Belgians consumed organic products. In Europe, the land under OA increased by 78% between 2004 and 2014, and in eight European countries more than 10% of agricultural land is now under OA (Willer and Lernoud 2016).

The focus on OA by consumers, farmers, researchers and public authorities is clearly increasing. A study on the prospects for OA in 2025 suggested four possible scenarios for this agricultural model ('4 Scénarios Pour Le Bio à L'horizon 2025', 2016). One scenario, labelled 'Bio-based', shows that, in the context of a serious food and environmental crisis, OA would be an obvious choice and would be the main model for French agriculture. Conversely, the 'Bio-suspect' scenario envisages the dilution of organic farming into a sustainable local agricultural system because OA would be discredited by such problems as traceability (e.g., suspected fraud) and serious medical crises (e.g., *Escherichia coli*). The conventional sector, with greater media and PR capacity than the organic sector, could send stronger messages to the consumer.

Zanoli et al. (2012) suggested that the drivers of the future development of OA are, first, support policies and, second, consumer demand. Whatever the drivers, OA remains a potential solution to the main ecological and economic challenges facing food systems (De Schutter and Vanloqueren 2011) and is a key option for farming systems in a resource-constrained world (Freibauer et al. 2011). Further development of OA approaches will require considerable investment in research and the development of OA-specific methodologies.

At the European level, OA research funding is low and declining (Baret et al. 2015). In this context, research should focus on the efficient use of available resources. OA is highly knowledge intensive and dependent on context, which suggests that a participatory research approach building on farmers' knowledge would be more efficient than a conventional top-down approach (MacMillan and Benton 2014). Gibbon (2002) defined participatory research as an active partnership of farmers and other key stakeholders in the research process from design to evaluation. Participatory research is often associated with the issue of technology adoption in developing countries. In the context of OA in Europe, the main attraction of participatory research is that it offers better integration of farmers' expectations, knowledge and constraints (Eksvärd and Rydberg 2010). The challenge of participatory

research is to bridge the gap between the conventional knowledge of farmers and the abstract knowledge of scientists.

The contextualized nature of OA practices and systems also means that organic systems are diverse.

The rationale of this paper is that prior knowledge of the diversity of farming practices and systems should be the starting point of the participatory research process. Data collected from farmers should be shared with participants in the participatory research process if the research is to be relevant and grounded in reality. We have called this approach 'informed participatory research' (IPR).

In this paper, we focus on the specific context of OA in Wallonia, where the government is supporting OA research. The challenge is to develop new avenues of research. Given the diversity of OA systems (Section 2), we propose a participatory approach based on integrating the information about these diverse practices and systems (Section 3).

2. Diversity of organic agriculture models

2.1. Diverse practices in organic farming

Unlike non-organic farming, OA is controlled by its own regulations, specifications and labelling. Organic production relies on a diversity of techniques and socio-economic models, from the most agroecological systems of production to quasi-industrial systems. Given this diversity of OA systems, different options can be considered and research on OA should take this range of options into account.

The production system used by an organic producer depends on several factors, including the history and suitability of the land, the influence of the family and the level of mechanization. Opportunities and obstacles, level of education, professional experience off the farm and farming experience itself are all part of a personal history that affects a farmer's perspective, which is a major driver of the technical choices made (Vanwindekens et al. 2013). Factors such as socio-cultural background, farming background of the family, presence of old and/or young generations also have an impact on choice of production practices and marketing channels. For example, market gardening is attracting young producers, many of whom are not from farming families and are therefore not constrained by socio-cultural history. They have a strong ecological vision of farming and most of them are developing small-scale agroecological organic systems (Dumont and Baret, 2016).

2.2 Diversity of systems of organic vegetable production

With regard to vegetable production in the Walloon region, we identified four main models, ranging from market gardeners working on a few hectares to cereal farmers who included some vegetables in their crop rotation (more details on this study are available in Dumont and Baret, 2016). In each model the producers had similar histories, socio-cultural backgrounds and work orientations. The first group comprises market gardeners with a small area (less than 2.5 ha) who try to prioritize ecological values, as well as paying attention to profitability. Producers with larger areas (2.5-7 ha) and a higher level of mechanization are also very concerned with environmental issues, but they take more account of the current socio-economic context. They prioritize certain social issues for their workers, particularly in terms of training and welfare at work. Both these groups want to participate in building an agroecological paradigm. The third group of vegetable producers is the most mechanized one. They put more emphasis on economic criteria, even though they have chosen OA for ecological and health reasons. Some of them, alongside the producers in the fourth group (growing vegetables in field crops) produce organic vegetables purely for economic reasons. As time goes by, many of them feel increasingly concerned about environmental issues, but they still implement new practices only when they consider these practices to be at least as cost-effective as conventional practices. They use conventional practices for some of their fields and often see organic practices in terms of input substitution. This observation could be specific to the Walloon region context, where there are very few vegetable farmers.

2.3. Organic, local or sustainable conventional farming?

The multiplicity of production systems leads to confusion among consumers. For example, producers seen as participating in the promotion of OA (Bellon and Lamine 2009) (i.e., in the third and fourth groups described earlier) are sometimes criticized for selling their products abroad or to supermarkets (Dumont et al., 2016) and/or for not applying agroecological production practices.

New elements are also blurring the distinction between organic and sustainable conventional agriculture. These include: (1) conventional producers who claim to use organic practices; (2) organic producers who do not want to pay for OA certification (for various reasons, e.g., they are in a precarious financial situation, lack assured land ownership, consider certification more suited to industrial OA, cannot cope with the administrative load); and (3) farmers who simultaneously use both conventional and organic farming practices.

In addition, consumers lack a clear vision of the heterogeneity of production models in the OA sector and therefore do not understand why the same vegetable product with the same origin can be sold at very different prices. For example, vegetable boxes from local producers are often sold via cyber-commerce at very different prices across the Walloon region. Boxes sold directly by producers who are market gardeners on small acreages tend to be more expensive because each producer personally produces a diversity of vegetables and therefore has a high workload. Consumers usually cannot choose the vegetables contained in these boxes. Boxes that are cheaper and contain a combination of vegetables chosen by the consumer tend to be those produced by the third and fourth groups described earlier, as well as foreign producers and wholesalers.

Consumers lack the information they need to make informed choices when buying organic products. Many of them think it is better to buy local products from conventional small farmers who use some organic practices or work in sustainable agriculture than to buy generic products certified as organic. They try to find the right balance between price, quality and support for local and sustainable agriculture.

3. How research can take account of farming system diversity and support transition pathways

Identifying the diversity of situations is the first element in the IPR process. A given innovation (e.g., a new variety or tool) will not have the same impact or the same relevance in different farming systems (Van Damme et al. 2014). The identification of this diversity of systems highlights the need for a system level approach to complement the plant and plot levels.

3.1. Is a systemic and participatory approach the best option for organic farming?

As OA is based on the agroecological paradigm in agriculture (Vanloqueren and Baret 2009), systemic participatory research is a prerequisite for the methodological approach.

Participatory approaches are based on a new vision of relationships among farmers, other stakeholders and scientists. From a political point of view, they should help to build consensus on intricate issues such as environmental impact and genetically modified (GM) crops. Within the theory of innovation, participatory approaches are often contrasted with the top-down diffusion of innovation. As noted by Landel (2012), participatory methodology is redefining power relationships in the research and development process and this redefinition could lead to new technical options for sustainable development in agriculture. Using participatory methods, both scientific and empirical knowledge are valued and farmers' needs and constraints are taken on board right at the outset of the process of innovation. Participatory methods seem to be more appropriate for producing evidence for action and sustainable development (Cornwall and Jewkes 1995).

Participatory approaches are often presented as positive and relevant for achieving more sustainable food systems, but there are drawbacks. In a comparative study of conservation agriculture in France

and Brazil, Landel (2015) showed that when participation meant collaboration among economic stakeholders to produce evidence and efficient technologies for a particular model of conservation agriculture, the imbalance in terms of information and knowledge between private stakeholders (mainly agricultural suppliers) and farmers favoured a vision of conservation agriculture that relied on using chemical herbicides and neglected other more ecological practices, such as OA. The rules of participatory processes were followed and all the stakeholders had the same level of investment, but the commercial company experts contributed most of the technical knowledge and their influence was therefore critical in determining the technical pathways. Thus, the participatory approach paradoxically reduced the farmers' freedom of choice. The most sustainable option was not promoted and conservation agriculture was restricted to the chemical based version. The significant drawbacks in this situation were the lack of technical knowledge among local stakeholders and the power held by the commercial stakeholders because they had mastered the requisite knowledge.

3.2. The Informed Participatory Research (IPR) approach

The methodology proposed in this paper is being implemented within the context of a new OA research strategy in Wallonia. First, we will describe the overall process, with all the steps (Figure 1), and then we will outline how the process is being implemented in Wallonia. The process has not been fully completed yet, but the first results are promising.

Our concept of IPR comprises both the classic elements of participatory research and a specific, comprehensive and multi-dimensional assessment of farming system diversity that is used as an input in the participatory process.

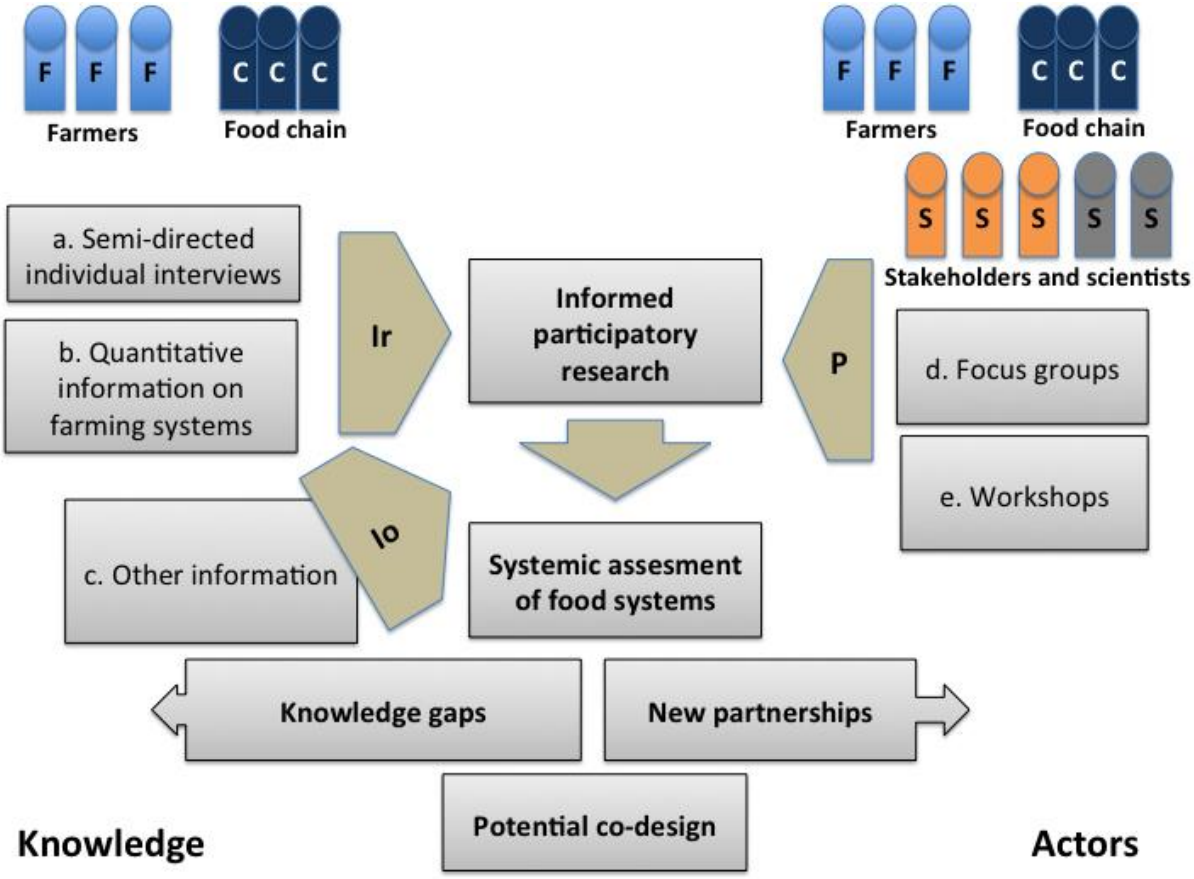

Figure 1 - Scheme of the Informed Participatory Research process

IPR is based on two pillars. One is the collection of data on the diversity of food systems from farmers and other stakeholders in the food chain. The data, based on (a) interviews with individual actors and (b) quantitative information, is called 'reflexive information' (Ir) because it is based mainly on

information collected directly from with actors. These actors include those involved in the transition to OA as well as conventional producers in the mainstream system, Complementary information can be collected from other sources (Io). All this information (Ir and Io) constitutes the initial input into multi-actor discussions.

The second pillar is the use of (d) focus groups and (e) workshops, which extends the set of stakeholders to scientists. The participatory information (P) collected during focus groups comes from small meetings of 6-12 farmers in which a researcher (or facilitator) uses some inputs (in our case TresoGest, see below) to initiate an exchange of information among the farmers. During the workshops, Ir, Io and P information is brought to the participants (multi-actors in the scheme) for sharing and elaboration. The overall process results in a systemic assessment of food systems. Knowledge gaps are discussed with the stakeholders in the information process (scientists and experts, as well as farmers and others involved in the food chain). With the stakeholder dimension, the participatory process gives rise to new partnerships in overcoming obstacles. In some cases, it leads to the co-design of innovations.

IPR is rooted in a comprehensive and objective description of reality. The aim is to identify: (1) types of agriculture; (2) visions of agriculture; and (3) the tensions and synergies among these types and visions that favour or hinder transition, in addition to the classic elements of participatory research.

In order to address these issues we suggest using approaches such as comparative agriculture (Cochet 2011) with comprehensive sociological tools. This type of approach allows room for understanding the complexity of reality, including all relevant actors affected by transition, and it highlights the multiple links among the diverse types of agriculture.

The present study has shown the importance of research on knowledge gaps. Producers, like consumers, do not always have enough information on the different production types in order to make important decisions. For example, some market gardeners with small acreages who want to participate in an agroecological paradigm will use tools with lower fuel efficiency (e.g., a rototiller replacing a tractor) in an effort to reduce the impact of mechanization on the environment, although there is no evidence of lower fuel consumption. Others might move to a system based on using a small tractor to reduce their work burden, but this requires an acreage increase.

3.3 Tentative implementation of IPR in organic farming in Wallonia

In the development of an OA Research Plan for Wallonia, we have tried to apply these principles.

As a first step, we took account of the diversity of practices for each type of OA (mixed livestock, field crop, pig and poultry, vegetable and fruit). For that, we identified a network of 43 innovative OA farms. On each of these farms, we sought to (1) document the practices and (2) identify the needs with regard to technical advice and related research via 90 semi-directed interviews during a process of network building. The two objectives will be refined during frequent field visits, with quantitative measurements and discussions on practices and constraints with each farmer (Ir in Figure 1). In parallel, the College of Farmers, a new institution officially responsible for consulting farmers, set up a process of consultation with the entire OA sector through focus groups and online surveys. The participation of OA farmers in this process was higher than that of conventional farmers, for which the College also has responsibility in terms of the identification of needs.

Then, we compiled a list of the needs identified through the 90 interviews on the 43 farms, the results of the College of Farmers consultation and the questions raised in interactions with farmers and other stakeholders during various meetings. The resulting file contained 280 items, all with their origin identified.

For the identified issues, the practices and research linked to these needs were documented (Io in Figure 1) and used as a basis for discussions of the different scenarios at participatory thematic

workshops. These workshops with farmers were prepared in consultation with skilled extension, training and consultation stakeholders. The information emerging from the workshops was integrated into the overall review and knowledge base (P in Figure 1).

For example, we conducted a workshop with six farmers engaged in mixed-livestock farming where we used an economic tool, TresoGest, to examine the system of farming practices. TresoGest is based on spreadsheets on which farmers input their income and expenditure so as to obtain an overview of their revenue. The detailed costs for each accounting unit (e.g., feed, veterinary care) are presented in a comparative framework, with the agreement of the farmers. This fostered an exchange of experiences among the farmers about their practices. The use of tools such as TresoGest has various benefits, including: (1) generating interest and confidence among farmers; (2) covering a wide range of topics, from production practices to marketing channels; (3) giving farmers a sense of ownership of their data; and (4) providing a wide range of reliable and detailed quantitative and qualitative data.

The accumulated information and the workshops helped to identify the knowledge gaps that needed to be addressed by research and to define the type of research required, such as techno-oriented trials, experimentation on farms and multi-actor collaboration. For example, in the case of cattle fattening, in addition to the technical skills needed to produce a quality product, with the possible contribution of research, there is the issue of marketing being locked-in. Unlocking the marketing process would involve changing retailers' specifications, among other things. In this respect, scientific evidence, such as taste tests, could be used to lobby retailers more effectively. This would not be enough to unlock the system, however; other actors need to be involved. In the case of pig meat production, this outcome could be achieved by training producers and by making all (e.a. technical, trade-related) information available to encourage them set up producers' organisations that would be strong enough to talk to retailers and access suitable distribution channels. These training workshops would be conducted in cooperation with research, extension and organic farmers' organisations).

The collaboration between research centres and other research institutions, such as universities, is crucial for ensuring a comprehensive description of farming systems, the development of analytical tools and a good balance between qualitative and quantitative dimensions.

4. The added value of applying informed participatory research

Transition pathways need not only funding for developing specific technical research, but also new methodologies and tools for addressing new types of issues. OA is holistic in essence, and when farmers first move into OA they tend to have very limited access to information about it. In many cases, their main adviser is another farmer, and often met by accident. Many farmers have to look for information abroad. Thus, farmers build up their own expertise and knowledge network. All this points to the need for systemic and participatory research methods that are not widely used in research centres. By using reflexive information (Ir) tools, the IPR approach helps to avoid an imbalance in information collected from the actors involved.

We have also shown that in agriculture in general there is a diversity of OA models. OA can contribute to a transition or to a change in the paradigm in an agroecological way. However, there is a real threat to OA. As researchers, our role is not to promote a particular model, but to provide the tools and methodologies that will support stakeholders along their transition pathway. We propose IPR as a suitable approach for documenting the diversity of options and providing the keys to understand the reasons for and consequences of this diversity. We hope that this methodology can be extended to any type of agriculture.

In addition, by highlighting the knowledge gaps, IPR provides researchers with guidelines for the thematic research needed within the context of the reality of the various options.

The emergence of systemic issues documented by the actors stakeholders rooted in the real situation implies the development of new partnerships among actors but the different levels of knowledge could lead to imbalances among these actors. The IPR approach ensures a fair share of information among them.

The IPR approach offers a way of integrating technical and social tools within a dynamic framework of analysis and action.

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