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Reflections and perspective for research from the GIRAF¹ community

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Introduction

A team of 13 researchers, members of the FNRS contact group « GIRAF (www.agroecologie.be) », visited the Bec Hellouin Organic Farm (hereafter BHOF) for one day and a half on the 4th and 5th November 2016. The visit consisted in an exchange with François Léger and Charles Hervé-Gruyer around the final report « Maraîchage biologique permaculture et performance économique », coordinated by Sacha Guégan and François Léger (Institut Sylva and AgroParisTech – UMR SADAPT, INRA), followed by a guided visit of the farm with Charles Hervé-Gruyer, briefly in the afternoon of the 4th of November, but mainly on the morning of the 5th of November. Informal discussions also occurred outside these planned activities. This paper synthesizes the reflections of the GIRAF members that emerged during and after this visit. It represents a collective opinion, hence reporting both shared and diverging viewpoints of all attending GIRAF members.

Indeed, members of GIRAF have academic roots in a variety of disciplinary backgrounds (agronomy, sociology, ecology, geography, anthropology, agro-economy) and have different levels of familiarity with the BHOF: most members of GIRAF visited the farm for

¹ This paper is published under the responsibility of the members of GIRAF – www.agroecologie.be - who participated to the Bec Hellouin field visit on the 4th and 5th November 2016 and contributed to this paper: Dendoncker, N. and Reheul D (Editors) Chapelle, G., Hautier, L., Hermesse, J. Hulhoven, X., Louah, L., Stassart, P.M, Van Dam, D., Vanwindekens, F., Vereecken, N., and Visser, M. (co-authors). The order of the co-authors is an alphabetic convention. It does not relate to the respective importance of co-authors contributions. The following co-authors are scientists involved in the development of the Bec Hellouin project: Chapelle, G. & Vereecken, N.

the first time, while others had visited it before, or even conducted (and still conduct) research on the farm. This text therefore reflects this heterogeneity.

In order to compile this text, the 13 researchers were asked to reflect upon their visit independently in a one-page document. Reflections cover different aspects: the INRA report, the BHOF either restricted to its farming activities, or covering its wider project, including its training, demonstration and actual/potential opportunities for research². As there was no clear preliminary agreement on this, these various aspects are discussed below. However, some of us argue that it is the entire farming socio-ecosystem, including its actors, that truly deserves attention.

The BHOF or how to make small-scale market gardening attractive again

Several researchers highlight that the BHOF visit was an inspiring experience for them, a breath of fresh air. They report a feeling of harmony, beauty, sincerity and care; highlighting a strong sense of commitment and dedication, immediately inducing an experience of sympathy for the project and its initiators. The sense of pride that transpired from the farmers' discourse and attitude together with the high biodiversity, directly visible on the farm (birds singing, bumblebees flying...) enhanced the positive feeling. In sum, the farm project is clearly rooted into an aesthetic and emotional reality. With this in mind, some of us find negative criticism towards the personal project hardly acceptable, whereas a different case can be made with regard to the scientific report(s) addressing some of its aspects (see below).

The BHOF is an experiment with small-scale market gardening, a source of inspiration and a school for learning by experience. On a more pragmatic note, the BHOF acts as a proof of concept and intends to demonstrate the viability of micro-farms. The farm seems to have reconciled food production with the delivery of numerous ecosystem services and other positive societal impacts.

Assets of the BHOF

The above-mentioned emotional and tangible aspects seem key to the success and the strong visibility of the project. Broadly speaking, the BHOF mobilizes various forms of capital (human, financial, socio-cultural and natural).

Initially, the human capital of the farmers seemed a determining factor. Having no agricultural background, in their pre-BHOF-life the founders travelled around the world and experienced different ways of life. Highly educated as they are, their excellent knowledge of the English language allowed them to retrieve and interpret knowledge from different canals and to turn it into useful formats. Indeed, the BHOF relies on reconciling traditional and modern knowledge, drawing (experience-based) inspiration from global traditional and novel practices.

The achievement of the BHOF was possible because of the initial financial back up of its owners, linked to strong perseverance in building an innovative farming system. As such the BHOF initially benefited from the energy characterizing an installation phase, preceding a much harder routine phase. Both this human and financial capital are uncommon in new initiatives of agriculture/horticulture.

The social capital also proved part of the success of BHOF. The visibility of the BHOF was predominantly driven by the skills of the founders to communicate. Indeed, by using a broad variety of communication channels, the BHOF caught the attention of a multitude

² A list of the grey literature made available to the researchers prior to the visit is given at the end of the document

of experts that supported, legitimized and improved the set-up and persistency of the BHOF.

Among important drivers, we further highlight curiosity, creativity, care and organization, and continuous questioning of the relevance of the farming activities. A three-fold business model also seems to ensure persistence and profitability, as the BHOF neatly intertwines a farm, a training centre, and a centre supporting research and specific actions on the farm.

A major concept linked to the BHOF is that of "innovation through withdrawal" (Goulet and Vinck 2012, 2017)³, i.e. getting rid of the motorization linked to oil-based agriculture as a key element of the dominant farming system. This mechanism of "innovation through withdrawal" of motorization induces a more intimate contact with the soil and vegetation. This resonates with the conceptions and practices of permaculture.

Engaging in such a post-oil agriculture can be linked to the unlocked minds of the founders of the BHOF lacking the "green allergy" that is often found among farmers' families having undergone and internalised the post-war modernisation paradigm.

Challenges and Controversies

Scientists visiting the BHOF are challenged at various levels to "think out of the box". The visit is a mind-opener and a stimulus for lateral thinking. Nevertheless, specific observations, questions and remarks do pop up in relation to (i) the demotorized system, and (ii) crop rotations. Indeed, the logic of a "demotorized"⁴ ecosystem reaches its limits when confronted with its boundaries and with its motorized surroundings both on the input and the output side: motorized vehicles transport manure from the neighbouring horse riding-stable and the marketing of the vegetables involves motorized transport. (ii) Regarding crop rotations, the BHOF grows a wide variety of crops. While root crops (e.g. carrots, potatoes...) and legumes are present, the farmers tend to favor crops that fit with their manual cultivation system.

Owing to its unique context, the demotorized BHOF system seems to be able to survive economically. In other initiatives embarking on demotorized systems (e.g. in Belgium⁵)

³ Goulet, F., & Vinck, D. (2012). Innovation through Withdrawal: Contribution to a sociology of detachment. *Revue française de sociologie*, 2(53), 117–146.

Goulet, F., & Vinck D. (2017, in press). Moving towards innovation through withdrawal: the neglect of destruction, In : Godin B., Vinck D. (eds.) *Critical studies of innovation: Alternative approaches to the pro-innovation bias*, Northampton, MA, Edward Elgar, p. 97-114.

⁴ We purposefully use the term "demotorization" instead of "un-motorization". By this, we want to point out the gradual transformation process of this innovation. Rather than switching to a "new state", leaving aside motorization is a continuous process. Indeed it starts with the withdrawal of « motorization of soil work, it initiates a learning process that allows the BHOF to test, adapt, and improve new tools, new practices... Moreover, the demotorization process is not restricted to technical innovations. Rather, it is a social process of withdrawing from the mainstream model of "motomécanisation" that sustains since the beginning of the XXth century the intensification process of agriculture, paving the way for the modernization of agriculture (Mazoyer and Roudart, 2006). The radical decision of farming without motorization systematically opens the door to a new pathway of innovation by closing the door of intensification through scale increase. Once this door is open, the gradual development of demotorization involves a constant trying out of substitution techniques and tools.

⁵ Dumont, Antoinette M., and Philippe V. Baret (year??). What are the differences in quality of work between vegetable growers in agroecological and in conventional systems? In *International Symposium on work in agriculture*. State University of Maringa, Brazil.

the pressure to be profitable proved that it is difficult to stick radically to the demotorized principle and gradually some remotorization sneaks in. Some of us argue that the profitability of demotorized systems is conditioned by the farmers' capacity to access different types of knowledge, and to turn it into economically viable practices. In the case of the BHOFF, the development and use of efficient tools for manual farming seems key to this success.

Initial (scientific) analyses of the (financial) results of the farm continue to provoke controversies². According to the farm's owner, these seem to have eased since the publication of Kevin Morel's PhD thesis⁶, but some of us argue otherwise⁷. Beyond what appears as non-careful communication of information, which may lead to false interpretations, we hypothesize a deeper controversy: i.e. that the controversial interpretation of the results of BHOFF experiment rests on the different ways actors build knowledge and give value to these results and their transferability. What is at stake is the status of the results, or what social scientists call the "epistemological status". The argument is not only about the robustness of produced data and their interpretation but also about the significance and scope of the results. If actors were clearer about the status of their production and how the results should be interpreted it could help to understand the (non-)transferability of results (see Box 1 for more detail).

Box 1: Controversy grounded in difference of epistemology: the importance of knowledge status.

The divergent interpretation of the BHOFF results rests on two epistemologically opposite logics: the epistemology of possession and the epistemology of practice (Cook 1999)⁸. Several critical papers are situated within the logic of possession without explicitly mentioning it. They attempt to evaluate the BHOFF experience and its scientificity by assuming that its outcomes are codifiable and transferable, hence potentially disconnected from action - the BHOFF project - without losing their meaning. This epistemology is dominant in the western culture. It tends to oppose empirical knowledge to scientific knowledge. By contrast, the epistemology of practice accepts and assumes that knowledge production and action are intrinsically linked. This epistemology is in line with that of American pragmatists: knowledge is not abstract data isolated from the rest of the world. Epistemology of practice asks the following question: what can any experience teach us?

Ignoring this distinction between epistemology of possession and epistemology of practice generates controversies. These are not about data robustness, but rather rooted in the misunderstanding about the nature of the knowledge produced, and about the value of what can be learned from any given experience. Clarification about this epistemological difference, in the present case, the status of the BHOFF experience, and the scope of the results, would also help outside actors to understand how they could transfer the results to other contexts.

A result that could be interpreted as a paradox, but well known in sociology of controversies, is that the controversies fed by the media's attention and the involvement of the BHOFF stakeholders have fed the interest in the project and in the learning process itself (opening new questions, refining results, defining the status of those results...). Finally, we want to point out that the methodological and communication choices engage all concerned actors and expose them to a situation of criticism they are not used to or did not expect, *a fortiori* when the case is likely to reach the media's attention. Hence, the responsibility of a researcher extends beyond the research activities *per se*.

⁶ Morel, K. (2016). Viabilité des microfermes maraichères biologiques, Une étude inductive combinant méthodes qualitatives et modélisation. PhD, AgroParisTech.

⁷ This is a subject of controversy among the authors : a minority of the authors mention that even if the Phd thesis of Kevin Morel published in December 2016 may answer some element of the controversies, they do not agree that the controversy is closed and rather think that such controversy plays an important role in the learning process.

⁸ Cook (1999). Bridging epistemologies: the Generative Dance Between Organizational Knowledge and Organizational Knowing. *Organization Science*, Vol. 10, N°4, July-August 1999. 381-400.

In the particular case of the INRA report, this reminds us that proper qualification must precede quantification, and *a fortiori*, monetization, if the latter is needed. Qualifying the quantities implies careful unveiling of contextual issues of time, place, and biophysical realities.

Quantifying may prove a difficult task, as many agricultural unknowns remain. E.g. the maintenance of soil fertility (in particular the nitrogen and phosphorous cycling) deserves attention. Some of us also call for a better insight in (i) the farms' output in terms of biomass production per unit cultivated area, (ii) how the farm deals with pest control, (iii) how the non-cultivated areas effectively influence the cultivated ones, and (iv) how the dynamic evolution of the whole system (trees that grow larger and larger, new plantings of berries...) affects the farming system, its ES and economic output.

As mentioned before, high levels of human and social capital have been mobilized by the owners of the BHOF and are seen as key to its success. Still, this dimension of the BHOF seems underexplored. Some of us argue that it should be further integrated in the farm's functioning and communication. However, the passion and energy needed for full development and fulfilment can rapidly lead to discouragement and, if one is not strong and careful, to burnout. This risk was clearly communicated during our visit: the fast growth of the farm, the exposition to media, and the multiple requests combined with the lack of a clearly identified governance structure may jeopardize the sustainability of the project and its owners.

In the next section, we expand on how these unknowns may lead to further research around the BHOF experience, which in turn may foster a broader agroecological transition.

Research perspectives

The sustainability of the BHOF system, linked to that of the people who manage it, would arguably benefit from a clear and strong governance structure. In this respect, the tensions between fulfilment and fatigue or even burnout should be unravelled.

Some of us would like to underline that they believe that current research at INRA and BHOF explores aspects of agriculture -such as market gardening- that have been and are still largely overlooked by past and contemporary scientific research. We feel that there is a need for more new forms of collaborative research (and teaching) to support such agricultural transitions. One of the key challenges is to develop transdisciplinary research (Popa, 2015)⁹ involving actors while guaranteeing the "scientificity" of the approach.

However, as we mention above, the notion of knowledge production and its status must be carefully questioned. Transition processes are socio-technical processes that articulate the evaluation of practices within complex networks of experiences. In such dynamics of change where both societal stakes and uncertainties (due to the socio-ecological system's complexity) are high, Funtowicz and Ravetz (1993)¹⁰ suggest that scientists should adopt a post-normal posture in which they engage in dialogue with local stakeholders. In this kind of research, uncertainties and plurality of values are accepted and managed, and knowledge is co-constructed by scientists, citizens and decision-makers. Initiatives as the BHOF are taken by dedicated people, earning our highest esteem and respect. Transdisciplinary research initiatives may help them to specify what

⁹ We purposefully use the term « transdisciplinary » research to describe research that is both interdisciplinary and participatory. Popa, F., Guillermin, M., and Dedeurwaerdere, T. (2015). A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science. *Futures* (65):45–56.

¹⁰ Funtowicz, S.O., Ravetz, J.R. (1993). Science for the Post-Normal Age. *Futures* 25 (7), 735–755.

is socially possible to reduce some risks and/or improve their farming system but should avoid suffocating them with new work overloads and additional stresses.

Several research questions can be addressed adopting such a posture, for example: can such a model be replicated to other types of systems (e.g. cereal cropping, livestock...)? If so, what are the conditions for demotorization to be a success? How can the BHOF be inserted in a broader complementary network of micro-farms? What ecosystem services are delivered by the BHOF to society in general and how do local actors benefit from them? At what scale, place, and time, and how could ecosystem service delivery be improved to increase the wellbeing of local communities? This type of research should typically be envisaged over long time periods, and the researchers bear high responsibility throughout the research process (status of knowledge production and its transferability, good communication, accompanying actors, managing expectations...).

In addition to these questions that require the participation of local actors, complementary research approaches should be addressed by scientists adopting a more classical expert-based posture, at least in the initial steps of qualification and quantification of key underlying biophysical processes. These relate for example to the many agronomical challenges mentioned earlier: how is soil fertility currently maintained? Can it be improved? How can pest control be improved? Which design would create a sustainable forest-garden landscape...?

Other questions asked by different members are: "What is the relationship between demotorization and the type of interaction with the ecosystems? What biodiversity is present on the BHOF farm and surroundings? Does the BHOF act as a refuge area for local biodiversity? Which tools could be designed to help the transition to post-oil farming? How does the BHOF three-fold business model work in detail?"

Conclusion

The members of GIRAF emphasize the passion and perseverance with which the owners of the BHOF and their local team of market gardeners, managers, and scientists have accomplished an inspiring initiative that reflects the owners' dream. The enthusiasm about BHOF originates in the specific connexion with nature, as a source of beauty, wellbeing and inspiration for a broad diversity of actors. It is also clear that the owners of BHOF benefited from an unusual starting situation and that they were able to develop their experience in a specific context.

Their initiative is not only a timely signal in a world where the farmers and consumers are looking for new pathways, but also proves that action off the beaten path can have a precious outcome in a world of conservative analysts. Conversely the broad public interest for the BHOF initiative shows that it addresses relevant questions and attractive solutions to current problems. The openness of the founders to the (scientific) world deserves respect because it exposes them to the outside world's critique but at the same time it legitimizes their experience. Simultaneously, as we could hear and perceive, this openness creates extra emotional loading, which may jeopardize the project in the long run. Therefore any position of scientists regarding the BHOF should be a humble one.

No matter the perceived current imperfections of the BHOF farming system, it is clear for us that the BHOF acts as an unavoidable textbook case. Precisely because of the perceived controversy, it also has the potential to act as a lever to foster broader agroecological transitions. In order to do so, transdisciplinary research can be combined with expert-based research to unravel some of the many unknown relationships of such a complex socio-ecological system. This should be done bearing in mind that the sustainability of a system depends on that of its actors. Transdisciplinary research can only be guided by a constructive and cooperative attitude and by awareness of the status and transferability of the produced knowledge.

Grey literature made available to the researchers prior to their visit:

Bec Hellouin: Technical and scientific reports: <http://www.fermedubec.com/Institut-Sylva.aspx> .

Dumont, A (2015). Discussion de l'article « Agriculture post-carbone : passer à la vitesse supérieure » (P. Servigne & G. Chapelle), 2ème Congrès Interdisciplinaire Développement Durable, Louvain La Neuve 21-22 mai 2015.

Hervé-Gruyer C & P (2014). Permaculture – Guérir la terre, nourrir les hommes, Actes Sud, 2014.

INRA (2015). Rapport final "Etude maraîchage biologique permaculturel et performance économique, 63 p. <https://inra-dam-front-resources-cdn.brainsonic.com/ressources/afile/362783-745d0-resource-rapport-final-bec-hellouin.pdf>

Léger, F. (2016). Réponse à la publication de Catherine Stevens :

http://www.barricade.be/sites/default/files/publications/pdf/reponse_de_francois_leger.pdf

Morel, K. & Léger, F. (2015). Une ferme maraîchère biologique viable sans motorization? Le cas d'une approche holistique inspirée par la permaculture : <https://hal.archives-ouvertes.fr/hal-01200636v1/document>

Morel, K. & Léger, F. (2015). Comment aborder les choix stratégiques des paysans alternatifs? Le cas des microfermes maraîchères biologiques en France: <https://hal.archives-ouvertes.fr/hal-01165181v2/document>

Morel K. & Léger, F. (2016). Microferme, un regard de chercheur, document de travail:

[http://www.fermedubec.com/sylva/Document travail diffusion these morel microfermes.pdf](http://www.fermedubec.com/sylva/Document%20travail%20diffusion%20these%20morel%20microfermes.pdf)

Reporterre (2016). Entretien avec François Léger, en agriculture, les microfermes ont un très grand avenir
<https://reporterre.net/En-agriculture-les-micro-fermes-ont-un-tres-grand-avenir>

Sallet , P. (2015). Dernière nouvelles en maraîchage, Itinéraires Bio, 20, p. 4-5.

Stevens, C. (2015a). Permaculture et maraîchage biologique un choix économiquement intéressant ? Analyse et critique de l'étude menée par la ferme biologique Bec Hellouin. le nouveau graal agricole ou la permaculture peut-elle nourrir l'humanité? Barricade 2, 38 p. [http://www.barricade.be/sites/default/files/publications/pdf/2015 - _permaculture et maraichage biologique.pdf](http://www.barricade.be/sites/default/files/publications/pdf/2015_-_permaculture_et_maraichage_biologique.pdf)

Stevens, C. (2015b). La permaculture le nouveau Graal agricole? Maraîchage biologique un choix économiquement intéressant ? Barricade 2, 17 p. [http://www.barricade.be/sites/default/files/publications/pdf/2015 - la permaculture le nouveau graal agricole.pdf](http://www.barricade.be/sites/default/files/publications/pdf/2015_-_la_permaculture_le_nouveau_graal_agricole.pdf)