
Accompanying transitions of work in an experimental unit: opening up the projects of the protagonists

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Abstract: This article proposes an approach to support the research teams in charge of carrying out the agro-ecological transition. This approach aims to restore a central place to the work that has been profoundly transformed by the challenge of the agro-ecological transition and the multiple injunctions associated with it. These “external” transformations generate professional transitions that remain largely unthought of. The profound meaning of this approach is that “revolutions” will not be made by opposing and imposing the - institutional - project of some - however praiseworthy it may be - on the project of others. Giving back space and rhythm to the innovative initiative of the teams by equipping them to contribute to their level and in their own way is the position we defend.

Keywords: Work, professional transitions, concrete utopia, project-worksite

Achieving agro-ecological transition: professional transitions for farmers and researchers

The agricultural sector is facing major challenges: “to feed humanity, with an ever-increasing demand from emerging countries for animal and plant proteins; to reduce its environmental footprint; to participate in the fight against climate and to adapt to it by making the agro-ecological transition” (Agriculture Innovation Report 2025, 2015).

But achieving agro-ecological-transition (AET) is a challenge in itself that leads to profound changes. Indeed, “agro-ecology is a new paradigm that aims to enhance the value of biological processes in order to cover both production expectations and all the other ecosystem services provided by agrosystems” (Caquet *et al.*, 2019), which must be developed in line with consumption needs and their organization in the territories (Gliessman, 2006) in opened and shared projects. Therefore, carrying out AET leads to a profound redesign of cropping systems and farm management. It results in professional transitions for the actors, i.e. recompositions of their frameworks of thought and action resulting in transformations of their professional world with major developments in terms of their activity (Béguin, 2010).

It has been said that cropping systems need to be redesigned in depth: their objects change -e.g. plant health, agrobiodiversity (Coquil *et al.*, 2014) -news properties are expected – resilience, autonomy, improvement of living and working conditions -, new performances – environmental and sanitary quality, organoleptic and nutritional quality of products, social, economic and commercial sustainability of the models implemented. This goes far beyond the perimeter of the plot and the farm.

It is also the farm management that is disrupted. Firstly because these cropping systems are complex to manage. They are characterized by the sometimes unpredictable “part taken from the living” which it is no longer a question of mastering but with which “we have to deal with” (Lemery *et al.* 2005; Hubert, 2020). This calls for the development of flexible and adaptative management based on the observation and detection on fine variations in a greater diversity of planned crops, the agrosystem and the surrounding landscape (Duru *et al.*, 2014). Management is also evolving because of the need to think these systems in coherence with the territory. In this way, farming is integrated into cooperative and

participatory dimensions with others, in renewed economic and commercial forms (INRA SAD Strategic Plan 2016-2020).

AET is a challenge in itself, as the number of profound transformations to be achieved is so great for farmers. It is also a challenge in terms of the research responsible for supporting it. New fields of knowledge need to be explored (effects of biodiversity on biological regulations, looping of biogeochemical cycles, functioning of agro-ecosystems, required innovation systems) by developing a systemic approach at the crossroads of several scales, disciplines and approaches, by mobilizing in synergy “local, traditional or expert knowledge and the most advanced scientific knowledge” (Meynard, 2017). A new relationship to knowledge and innovation is emerging in order to think, know, manage and evaluate agroecosystems on new conceptual, methodological and epistemological bases, at the science-society interface (Caquet *et al.*, 2019). This leads to make professional transitions, that are partly unthought-of.

A major challenge for Experimental Units

How can we support the professional transitions of teams to face these challenges without suffering, but by including them in their projects? This is what we propose to address by reporting on a research intervention carried out for an INRAE Experimental Unit specialized in market gardening systems (EU X). Much could be said about the roles of experimental structures in the agricultural sector (Cornu, 2017; Fiorelli *et al.*, 2014). They have been massively mobilized to contribute to the modernization of a desired intensive agriculture. Their mission: to be places of technological innovation, production of references and dissemination of knowledge and techniques in an expert and linear approach, while participating in the local development of their integration environment by responding “*to the dual need to support research units and to have places of synthesis on production systems.../...*” (Auger *et al.*, 2009). And since INRA’s 2010-2020 orientation document, these structures have also been tasked with developing a coherent and exhaustive approach to sustainable agriculture “*through the design, experimentation and evaluation of new agricultural systems*”. “*The Institute’s experimental system is (then) called upon to renew its themes and operating methods: investment in practices inspired by agro-ecology, opening up to a broader scientific and socio-economic partnership, increased contribution to the development and demonstration of prototypes of innovative production systems*” (Fiorelli *et al.*, 2014).

This mosaic history can be found in EU X. Fiorelli *et al.* (2014) recall its trajectory from the development and demonstration of technical innovations in the 60’s, to the implementation of “*factorial experiments on the conduct of above-ground crops, heating and carbon dioxide enrichment of greenhouses with a view to developing intensive market gardening since the 80’s*” then shifting to “*open ground and unheated shelter crops, with a view to developing practices to reduce the leakage of mineral elements into groundwater*” in the 90’s. Until the EU is devoted to the design and experimentation of innovative cropping systems. A place that is “*living and contributing to accompanying the change from market gardening systems to agroecology*” (idem) with a focus on their design, characterization, experimentation and evaluation in a diversity of contexts.

But on the other hand, the unique EU for the sector is expected to be equal to the challenges facing the sector. Consumers and citizens expect healthy, tasty and inexpensive products, but the sector presents a number of weaknesses in order to achieve AET: segmentation, economic fragility, low tolerance for deviation from the standard, diversity (farm sizes, products, technical systems and production methods, processing and marketing circuits, economic models), difficulty in designing agricultural equipment,

questions about working conditions and complexities. A landscape that multiplies the problems to be understood, posed and solved.

Discovering this trajectory, one could conclude that UE X has always been in the grip of transformations. However, their rhythms and depths are out of all proportion to the previous ones: there are urgent challenges to be taken up through a AET exploding the frameworks of action and thought, the scales and temporalities, the disciplines and actors. Challenges increased by the diversities and fragilities of the sector in an unprecedented situation: these transformations do not exclude previous missions of the EU.

In the plethora of challenges, orientations, injunctions, expectations and solicitations, present simultaneously, what can be done? What professional transitions should be made between expertise and support, between dissemination and open innovation in partnership? For which project, with which perspective and in which organization? By making what choices based on the work to be done? Because that is what it is all about. In this context, there is a concrete difficulty in organizing, directing and prioritizing the research and exploitation work. And even more so to think about and take charge of its evolution. Thus, the unthought work becomes a revealer and a potential lock that questions the evolutions in progress.

This is why the intervention carried out, within the field of ergonomics, has restored a central place to work- an essential resource to be taken care of, from which choices can be made. This paper gives insights on what means “addressing a central place to work to negotiate deep changes”.

Normative dimensions for a work-centred support approach

In addition to the centrality of a work that acts as a resource, three normative backgrounds guide the proposed approach.

The first concern the “to work”¹ understood as an authentic action that i) allows one to do things that are considered to be one’s own doing, by marking the possibility of doing things and making them happen, ii) allows one to build up an experience of the environment that contributes to be establishment of an intelligibility between things, that is coherent and that is a source of satisfaction, iii) makes sense from the point of view of values, iv) is part of a heritage shared with others that one can make one’s own, v) allows one to have a place among others, vi) is thoughts of in a history and an environment.

The second is that we must think of work transformations not in terms of imposed heterodeterminations, but in terms of opportunities. This means that in order to respond to the challenges mentioned, the actors must be allowed to make a proposal. We then accompany the occurrence of an “internal” mutation, *i.e.* i) relating to the protagonists’ wishes, ii) bringing about changes that open up desirable futures from the point of view of work. This proposal is based on a *project-worksite* that organizes the for what, the towards what and the how in the long run (Pueyo, 2020).

The third is that project-worksite is the expression of a *concrete, practicable utopia* (Bloch, 1976). It is not an atopy but a movement that defatalizes the existing order by examining what is missing, what should be given the issues identified, the values and the actors. Its aim: to imagine and realize other desirable paths by stating a maybe that can be.

A shared orientation

In fact, the approach is based on a shared orientation resulting from an initial understanding and dialogue with the actors. The INRAE Division’s concern about the future of the Experimental Unit is at the root of this approach. For UE X, the observation is that the management team has a heavy workload

¹ We make the distinction between Work as historical, social and economic regime and “to work” *i.e.* activity.

and that is difficult to organize the activity at the crossroads of “*agricultural seasonality, research program schedules, in connection with institutional and scientific missions and the mobilization of partnerships*”. It is an observation of “*overheating.../... these activities are intermingled and involve individuals and groups in a way that is not always optimal.../... There is a need for a look at organizations and for tools to provide avenues for improvement*”.²

In dialogue with EU actors, a three-pronged orientation is being formed.

- First an interpretation. There is a disorder of which overheating is only a symptom. It must be qualified and educated. But from the outset it is hypothesized that i) this disorder is linked to developments at multiple levels, in various modes and temporalities, and that ii) what they mean in terms of work and professional transitions required are unthinkable.
- Then an “attitude”: it’s not a fatality. We must not resign ourselves to adapting to the external will to change, but we must give ourselves the possibility to reform by having a supported position in relation to the institutions, by founding a programmatic vision and by proposing a form -a fable- that can make sense for the actors and the institutions.
- At last, an approach. What guides this fable is a project that will mark choices. Founding it goes through three stages: 1) formulating an informed critique, 2) examining resources, 3) building a project-worksite, the term indicating that it is constantly at work.

Step 1- formulating an informed critique

It starts by giving a place to the experience the actors have of it, what they can say about it and its concrete traces. The agents speak of burden, uncertainty in relation to the institution, time constraints in a whirlwind of transformations, complexity, disorientation, difficulties in bringing coherence. They do not see the way out. But, in this context, the team believes it has something specific to bring to the institution, to the sector and that something needs to be built with the actors of the region. The factual traces of the trouble appear in the meetings (there are tensions regarding the organization), but also in the EU presentation documents. There are the projects, issues, networks, national and international dynamics, services, approaches that the team holds in response to the challenges, demands and solicitations.

What are the origins of the disorder? How can transitions be qualified: are they the result of intentional projects or heterogeneous movements (Pueyo, 2020)? An analysis of documents coupled with individual and collective interviews focused on significant evolutions from the point of view of the agents and their activity identifies three levels that are driving forces behind evolutions.

The first is State (Report 2015). It expects structures such as the EU to support agricultural development and the competitiveness of the sector by participating in two projects; i) the creation of territorial agro-ecology living-labs (LL) promoting open innovation; ii) the evolution of experimentation and observation networks conceived as Demonstrators – in a strictly technological research scheme. Two orientations are mixed simultaneously. However, they are incompatible: one assumes a positivist tradition of secure data production based on models for laboratories, the other is based on participatory sciences and societal and technical innovation.

The second is the establishment. INRAE, in accordance with the second State project, is setting up a process for the labelling of EUs that are to become Collective Scientific Infrastructures (CSIs). CSIs are designed as support structures for scientific and technological innovations (TRL³ from 1 to 6 – demonstration of a

² Verbatims

³ Technology Readiness Levels. This tool developed by NASA in 70s aims to assess the maturity between different types of technologies and defines 9 stages of development (EARTO, 2014).

technological brick/technology in a relevant environment) offering services and products for researchers in a provider-client relationship invoiced for a sustainable economic model. This approach, started in 2016, is cumbersome and the EU will see its resources stagnate if it does not commit to it.

The third is the Division. The latter implements this imposed approach. However, it does so by indicating the specificities of its EUs that are far from CSIs, with own research objects and projects inscribed in systemic approaches of an engineering type⁴ “*where practical testing is central to the production of new knowledge in the framework of a continuous design in use*” relying on systems experimentation coupled with analytical experimentation, farm monitoring, with “*research partnership interactions*” and/or “*socio-professional partnership interactions*” (Dedieu and Mignolet, 2017). In addition, in its strategic plan (2016-2020), the Division asks the EU to make changes in terms of their objects (e.g. moving from the design of the agricultural systems to that of food systems in AE), perimeters, the Science-Society interface (setting up areas for hybridizing knowledge and experience) and modalities (from step-by-step system experimentation to intermediation).

The origin of the agents' disorder is better understood. At several levels, evolutionary injunctions emerge simultaneously without a clear orientation. The EU is expected to be at the same time demonstrator, LL or fab-lab-like structure. There is no dominant order space that would organize frameworks for thought and action, but rather configurations in various trends that exist simultaneously and offer spaces for possible orders. However, these configurations are incompatible in terms of project, aims, organization, etc. and are therefore incompatible with each other. But at the same time, these demands for evolution still leave the field opened. Without one predominating over the others, there is place for proposals that will work. In any case, professional transitions must be made. How can we help to formulate a wish that represents a path for the present and the future by taking advantage of this instruction?

Formulate a practicable utopian wish for its expression

This formulation benefits from this mapping. By identifying various spaces of order, it allows us to analyze them and to consider what is missing, what is needed but also what we value, what defines and brings together. In terms of method, this involves specifying for each configuration-demonstrator, LL, Fab-Lab- significant dimensions essential for agents. Dimensions identified from analysis of the Unit's documents, projects and through interviews with the team and in relation to the perspectives pursued by the institutions. Here is the list: existence of a scientific project in its own right, technical paradigm, position (project manager?), knowledge relating to, relationship with others (users, public, etc.), innovation (exploratory, technological, social), relationship to action, economic model. The marking of these dimensions for the demonstrators, LL and Fab-Lab, allows the agents to identify – mirrored- the shared discriminating dimensions of their own positioning and configuration. Some of these dimensions are already active and others are desired and desirable for the future.

Thus the EU has a scientific project of its own and sees itself as “*a device for the innovative design of experimented sociotechnical systems*”. Its meaning: to allow the exploration of what cannot be tested elsewhere because it is risky, unprecedented because it is inspired by agroecology (AE) in development. The aim is to document and investigate singular extreme situations in foresight. The action is an essential method of instruction that must also be instructed in a long-term perspective. Moreover, the wish is that the design should be opened to others and partly in co-construction, but not just anyhow, on anything and any time. Heterotopia and reflexivity are necessary by assuming an anchorage in agronomy and by wishing to develop i) exchanges with peers ii) a public and an eco-system. This

⁴ I.e. aimed at solving problems between actors and or with a view to innovation.

configuration is neither LL, Fab-Lab nor demonstrators. It will be defined by identifying the interests, needs, desires and desirables of the agents and the team for the Unit and the Institution.

Identify interests, needs, desires and desirables

The work on interests and needs aims to identify what matters to agents in relation to the challenges they wish to address. For example, agents have a strong interest in i) AET (including in the requirements for evaluation, integration and extension of research in economic models) lacking reflective and criterion-based implementation and a technical paradigm with solid technological references bricks, ii) design- what there is to design and the conduct of design projects. They are also keen to continue to reflect on iii) system experimentation (scales, reductions, targeted results, registers of knowledge produced, step by step, etc.) specific to market gardening. They feel the need to have exchanges within agronomic communities that share their questions (e.g. on generality⁵, storytelling, etc.), or to have a favourable public and ecosystem, etc. Finally, they express the need for specific research evaluation and valorisation processes. Beyond the desires carried by individuals, the desirables, products of the augmented situation of others matter. For the EU, the sustainability and qualities of cropping systems, socio-economic and work models are extremely important. In addition the diversities and the precarious or inexperienced situations of the newcomers in the sector are major, etc.

But not all necessary and desirable interests can be pursued: for a strong and workable wish to be stated, existing and potential obstacles must be considered.

Speaking out against obstacles

Thinking about obstacles serves to state the problems for which it will be necessary to invent ways to overcome them in reason and awareness. It is not a question of giving up, but of testing the relative will to the future of the protagonists. *"It is not a problem to be solved if one can, but au project to be realized if one wants to"* (Berger, 1960:169). Many of the obstacles identified by the team are related to the technical paradigm in the construction of AE and the revolutions of AET. A few examples: letting life go on while an experimental system encourages control, accepting the waste of risky experiments, lack of rehearsal tools to ensure the solidity of a result, programming to organize operations vs accepting uncertainty, thinking about the reductions to be cut in complex systemic approaches, dealing with the absence of standards and references, acting outside unsuitable calls for projects, identifying real partners, dealing with geographical isolation, choosing useful services, having the time and means to make the required professional transitions, etc.

Once this stage is completed, the informed critique is enriched by i) a wish – to assume the proper configuration even further in the exploration in the service of AET by remaining anchored in agronomy and in the field of integrative design, ii) a statement of needs, desirables and obstacles. The second stage consists in the examination of resources that will make it possible to found a project that can be thought *in concreto* with the materiality of the world, in a dialectic between praxis and theory.

Step 2 – Examining resources against ideals

The apprehension of resources is inspired by Dewey, who call for consideration of possibilities, and Bloch, who deals with possibles.

⁵ « .../what is useful here (for partners and local actors) and what is transportable elsewhere and therefore justifiable and valuable from the point of view of public research? (Hubert, 2005).

Possibilities and possibles

According to Dewey, we identify the possibilities already there that are not yet activated. These possibilities “*offered to thought and action*” (Dewey, 1934/2011) are means and goods already there, “*interwoven with the texture of reality*” (*idem*). But these possibilities are not yet realized because they acquire meaning, legitimacy and value according to stated wishes. These means and goods are desirable possibilities – not expressed but contained in the situation (Bidet *et al.*, 2011).

For the EU, experimental equipment consisting of space, patrimonial dimensions, the competencies of the agents in exploitation, marketing, reflections on protocol and techniques, are assets which are not yet activated in the prism of AET or risky design. In the same way, the initiatives carried out in other EU based on an LL scheme are gaining meaning and value, as is the exchange program on the EU that is just beginning.

Bloch’s ontology of the possible is mobilized (1976). It integrates into being and reality what can be perhaps, the not yet uncertain but promising. This position considers that reality in a state of fermentation is made up of latencies and that nothing is ever stopped or compacted into intangible data.

This ontology makes it possible to search for resources in several types of possible:

- The possible objectives in terms of facts. These are knowledge available to achieve the stated wish. For the EU there is for example knowledge produced on agronomic mechanisms, ecological processes, interactions, system characteristics, agriculture practices, strategies, decision rules, experiences, etc. that require the team to think about them in terms of their needs and desirables. There are also registers covering observation, narration, measurement, evaluation, etc. articulating “nature, technical, living and social” that are valuable for AE but not yet considered from this angle. Furthermore, this examination of resource knowledge is an opportunity to think about what knowledge to develop, what transitions to think about and what it requires. This is supported by the examination of the possible in accordance with the structure of the object.
- The possibles conforming of the structures of the object are linked both to the will of humans, which confers the power to become otherwise, and to the potentialities linked to the determinities of the time allowing us to do otherwise. The will of the team is present, is the subject of debates (*e.g.* starting from what exists or breaking away from the outset?...) and controversies which is not a question of evading but of educating with regard to shared desirables and needs. As for the determinities, the time is propitious: AE is on the march, third places are multiplying, doing and experience are regaining legitimacy, the Department is in support, the Institution remains opened, the Society is waiting...
- Objectively real possible refer to the capacity to implement a process over time that will allow the project to be expressed. With the support of the Institution and thanks to protective statutes, it seems tenable to keep the wish in the long run. It is understood that the stakes on EA are growing and are becoming established in agricultural policies.

This review allows the actors not to lock themselves into the here and now and to reconsider what is already there in terms of seeds and latencies locally and elsewhere (*e.g.* a review of the inputs on the simulation was carried out) to take the measure of what is in support (in its conceptual, experiential range, etc.) and what needs to be invested and developed in the long run. To take measure, therefore, of what it means in concreto in time for each other. Thus, this examination is inscribed in the materiality of things taken as “*an untapped bosom from which all the world’s surprises emerge*” (Bloch, 1976: 250).

The dialectic of ideal ends and means

The resources are then examined against the ideals that have already emerged along with interests, needs and desirables. The challenge is to form a coherent configuration: the resources are at the service of a perspective and in return the perspective is not off the ground. Moreover, the means in sight in relation to the ideal ends in sight are ideal means in sight towards which one wants to go and by which one wants to go. They feed each other. Doing, experimenting causes surprises that can lead to new needs, interests, etc. So we can designate in fine a perspective, a project-worksite.

For the EU there is a strong agreement on the issues on which to position itself. These are useful ends in view on which the team wants to contribute: climate change, diminished resources, changes in eating habits, reterritorialization, NTICs, new competences needed for AET, exploration of diversities. There are also epistemological positions that constitute ends and means in view, and in particular a paradigm that is not diffusionist, not utilitarian but operational, not hypothetical-deductive, etc. There are also things that are shared in terms of doing and means and we find with force the integrated mobilization of the apparatus and experimentations but we can see from the examination of resources the decision to invest in reflexivity between peers, in the community of the EU and with local actors on the scales, the use of patrimony, the exchanges of knowledge and know-how, the intermediate objects, the rationality of action and the place of doing. This leads to the outline of a project-worksite, *i.e.* one for what, on towards what, on how.

Step 3 – Building a basic contract

The why, the what and the how are broadly drawn, but it is a matter of structuring a basic contract, *i.e.* an industrious experiential device (Pueyo, 2020). Device because from the Foucauldian concept it inherits the functional properties of constituting a form in the background, a systemic complex, orienting, structuring and selecting coherence like an operating table. It also inherits the abundance of its components. And it is experiential because it offers the possibilities of experimenting and elaborating the experience that orientates, organizes and gives meaning collectively and generically. Finally, it is industrious because it has everything to do with what happens in the spheres of work: from the stuff of everyday activity to these political issues (Béguin, Pueyo, 2011).

This contract will support the project-worksite, structuring, ordering and coherently integrating the elements mentioned above. It is made up of principles, precepts, criteria and approaches shared within the team. We have begun to lay the foundations with the team, insisting on the need to define steps, stages and priorities- in terms of crop diversification, the use of solar energy, auxiliary energy, borders, etc. – in order to achieve the project's objectives. This reflection can be found in the EU's scientific project and in a two-stage dynamic engaged with researchers from several disciplines and actors in the sector to continue to reflect among other things, on how to organize the transition from innovative research in continuity to pore disruptive and partnership-based research.

Conclusion

We have presented an approach to support professional transitions accompanying the AET. Apart from the fact that in this respect one has to take care of the work which otherwise becomes a lock and a pain, several reflections can be drawn from it. The first one is that the revolutions we have to face cause a proliferation. These are not serious if we admit that they cannot all be held together and if we give free rein to a diversity of thought that is commensurate with the actors. For secondly, the profound meaning of this approach is that revolutions will not be made by opposing and imposing the project of some-

however praiseworthy it may be- on the project of others. Restoring the place and rhythm to the innovative initiative of teams by equipping them to do so is the position we defend.

As far as the world of research is concerned, however, this cannot be done without institutional integration and innovations (relating to evaluation, the creation of heterotopic and heterochronic bubbles,...) and -this is not unrelated- without an in-depth reflection on the relationship between knowledge and power, or even without an in-depth reflection on the requirements of participatory science, which in part forces to think about the project on scales and in forms that are beyond the control of institutions and the teams themselves. There is no doubt that there is a need to better understand what is at stake in cooperative ecosystems as places of intermediation and development when they have research objectives.

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