

Analyzing research-training practices for agriculture and territory development: issues for research and education

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Abstract:

Researchers and teachers forming an INRA working group implied in education and training on agriculture and territory development highlight their practices and the new skills and competences they developed. They analyze their research-education-action experiences and give a first typology differentiating the degree and modalities of participation of the researchers, teachers, students, training persons and the institutional actors, in a shared partnership for the emergence and the governance of innovative processes. New skills and competences have to be improved by all the participants of these collective knowledge processes. The Research-Education-Action framework they apply consists of five concepts - interdisciplinarity, connection to the field, spatio-temporal relationships, context dependence adaptation and reflexivity. It could become a common platform for land management and territorial development.

1. Researches ON and FOR education skills

An INRA working group of researchers and teachers involved in education and training on agriculture and territory development have analyzed in 2010-2011 their research-education-action experiences. Through the multiplicity of carrying out research-education-action in the group, the aim is to show its multifaceted methodologies and theories as well as its practical relevance. These comparisons allow to illustrate the different methods and ways researchers can apply in education and training or in involving local actors when complex issues such as agricultural land use change and territory development are at stake.

1.1 Researches on Agriculture and Territory Development

The research experiences in question all took place at INRA-SAD¹ and refer to those related to agricultural development and territorial development. Agricultural development refers to processes and procedures regarding agricultural activities transformations. It meets production issues with respect to environment, multifunctionality and sustainability of these activities. Territorial development comprises all activities that contribute to territorial dynamics, including agriculture, and involves the associated stakeholders. Territorial restructuring thus involves new skills and research has to help express these skills.

Therefore, the SAD department of INRA put on his research agenda the need to be involved in education and territorial design. The recognition of this issue originates from a reflexive analysis made by teachers and researchers'. Those who are involved in agriculture and territorial development are asking themselves how it changes their research practices (Auricoste *et al.*, 2008, 2009a; 2009b). Thus, this involvement is really consistent with action objectives because

¹ INRA-SAD: Institut National de la Recherche Agronomique, Département Sciences pour l'Action et le Développement (http://www.inra.fr/sciences_action_developpement)

issues tackled fit into partnership approaches (Beguin & Cerf, 2009).

1.2 To combine research, education and action

Formalization of research-education-action framework have been built (fig.1), where education is seen as an interface between researchers and local actors operating in territorial development, and as a driving force of interactions (Lardon, 2009). One of the original features of the research-education-action framework is that education is at the centre of the interactions.

Analysis of research-education-action experiences shows that education is a link between research and action. Indeed, education takes place in action when local actors request competences and skills. It also takes place in research when tackling individual and collective learning and more generally skills development for action issues. Then, education is a way to test the combination of actors' skills in designing, fulfilling and assessing development plans. Therefore, education has not only to satisfy actors' requests but also be able to foresee changes in progress and to help actors to tackle the issues at stake.

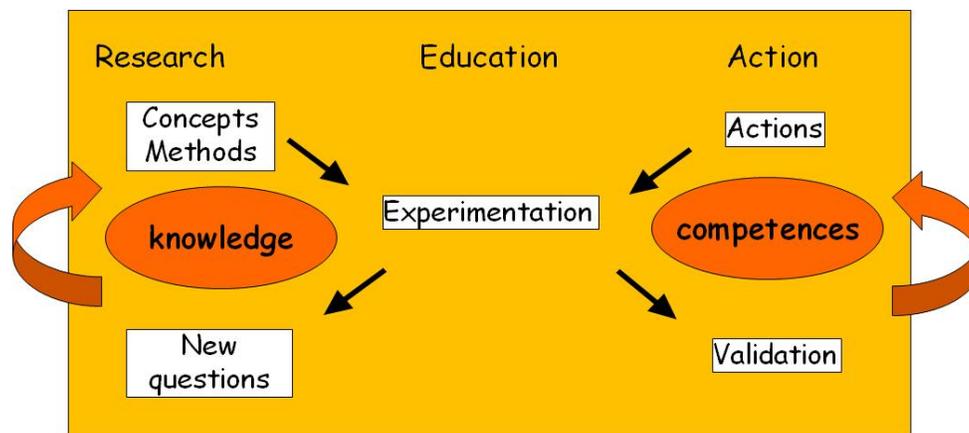


Figure 1: A Research-Education-Action framework (Lardon, 2009)

The reasons to operate through education are manifold. Education is often time-limited and answers to prior and clear agreements with stakeholders. It gives a frame circumscribing a step within the current process and makes education observable and analysable. Repeating education sessions with different students makes a comparison (similar conceptual and methodological inputs to different situations) and generalisation (progressive improvement) possible. They produce new results which are valorized and validated by the actors. Knowledge and skills mutually interact and produce learning.

The conceptual framework that we proposed is based on two education experiences (initial education): Master PLIDER (Argentina²) and Mastère DLAT-ACTERRA (France³). We have focussed the analysis on the relationship between research and education (Albaladejo *et al.*, 2012) or the relation between education and development (Angeon *et al.*, 2012).

1.3 Collective knowledge practices

During a first collective analysis session, the comparison of our training practices brought forward different ways to anchor learning processes. Five innovative research themes are at stake:

² PLIDER «Procesos Locales de Innovación y Desarrollo Rural»

³ DLAT «Développement local et aménagement des territoires», becoming ACTERRA «Action Publique pour le développement durable des territoires et de l'agriculture» d'AgroParisTech Clermont-Ferrand (<http://www.agroparistech.fr/Mastere-specialise-Action-publique,2711.html>)

- Interdisciplinarity: Education for development (or action) leads to mobilisation of different disciplines and links them in order to reach action. In addition, students in our programs are coming from different disciplines. Within the master PLIDER there is a majority of agronomy engineers as well as veterinaries, sociologists, geographers and social workers. Research-education-action framework then become a fruitful frame to pursue studies on interdisciplinarity. Confronting and hybridizing knowledge are both important ways to obtain interdisciplinarity in the education programmes.
- To take knowledge in/out of professional context: this is an essential question in science. During research-formation-action sequences, researchers usually bring theoretical and generic tools that students have to adapt and apply in their professional context. This is particularly the case for training. Knowledge is tested and put in context. When coming back to training sessions, again students take knowledge out of context to share their experiences with other students. This movement of taking knowledge in/out of context is constant within research-education-action devises (tackling territorial development) and has to be accompanied by a strong formalization and use of a conceptual framework. It is based on trainee experiences.
- Connection to the field: it is a perpetual construction happening through interactions with students. The point is how to get from this connection some valuable experiences for further situations. Our experiences are nonetheless particularly well-adapted to study the role of connection to the field in constructing and adapting knowledge.
- To lead a double questioning: about research and action. This double questioning is fundamental in our experiences and contributes to develop collective knowledge. It allows co-construction between researchers and actors.
- Education as animation tool for research: today as managing research teams becomes more and more difficult, in regard with the multiple activities of researchers and trainers education can be seen as moments to make people work together on the field

This conceptual framework gives us a system of references allowing us to deepen our practices.

2. Typology of research-intervention practices

Research-intervention practices are based on real-life experiences of participants whatever the education programs are (permanent education, training or attending local actors). Some of them are international experiences. We try here to formalize different types of education processes through our own and specific practices. Thus, practices typology state new skills to be developed by researchers to intervene in territorial and agricultural development.

2.1 Analytical grid

Results presented here are stemming from exchanges of views and comparison of experiences. The analytical grid built beforehand describes different ways of doing research and education and linking them. The analytical grid presents issues about action and partnership, education objectives and skills to be developed, assessment methods, researcher's attitudes (or perspectives), and knowledge valuation.

- Action: What are the territorial dynamics involved? Who are the stakeholders? How do they bring new forms of knowledge? How to evaluate the impact of research and education on the territorial processes?

- Education: How to conceive innovative education and training programs in order to develop new skills? Who is concerned? How to evaluate the educational properties of such collective experiments?
- Research: What are the researcher's conceptual frameworks? What disciplines are combined? How to interact in a participatory process with all the actors concerned? How to enhance the value of the produced knowledge?

2.2 Typology

The analysis of ten experiences gives a first typology differentiating the degree and modalities of participation of the researchers, teachers, students and training persons and the institutional actors (Fig. 2). It gives a shared partnership for the emergence and the governance of innovative processes.

The first axis of the typology (Fig. 2) expresses the degree of actors' participation to define education program contents. It differs from permanent education where teachers define programs and students are targeted for knowledge learning, to training where the programs' contents have to adapt to job needs. Some learning processes can occur through acting with moments dedicated to education but included in the action processes. Thus, knowledge seems to be less formalized and experiences and know-how of the actors are taken in consideration. Presented degrees are only indicative because new forms of teaching in permanent education include more and more knowledge and experiences hybridization. Before, it was restricted to training. While training includes more and more formalized scientific knowledge, once reserved to permanent education (Cayre, 2012).

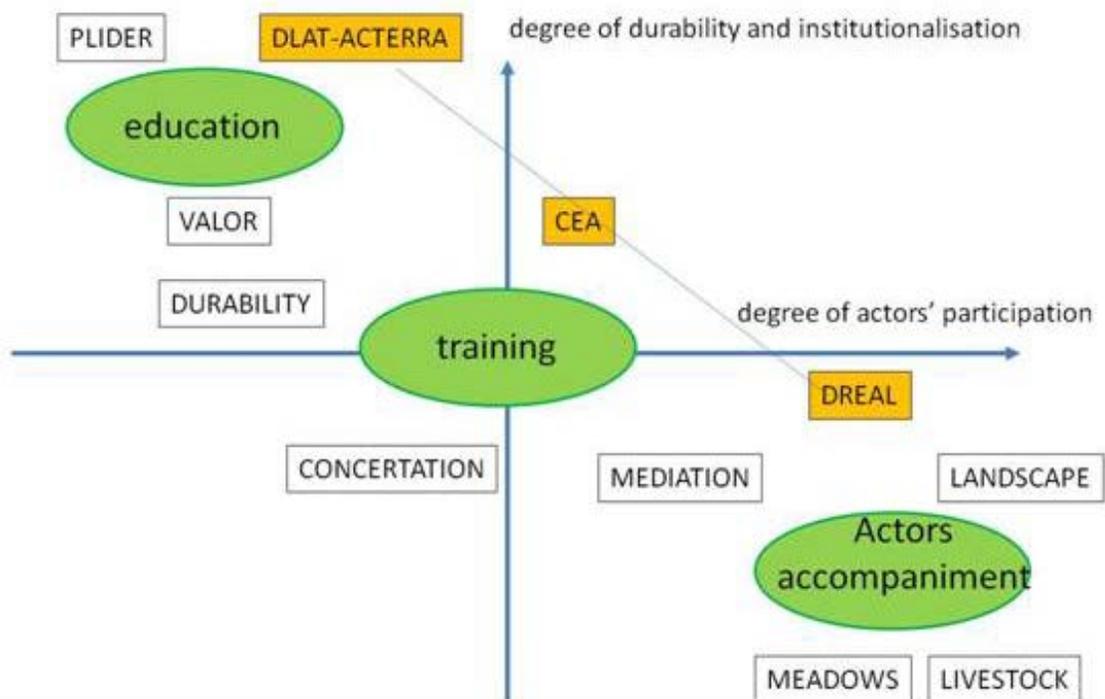


Figure 2. Position of the ten experiences analysed into the two axis of the typology.

ACTERRA: initial education for engineering students with professional perspectives; CEA: adaptation to training; DREAL: adaptation to actors' accompaniment (*see example below*); PLIDER: initial education by research for vulgarization agents on agricultural development; VALOR: initial education on quality production; DURABILITY: initial education on durability of farms; CONCERTATION: training for public actors

on concertation processes; MEDIATION: training for agriculture teachers on mediation processes; LANSCAPE: accompaniment of actors on landscape practices; MEADOWS: accompaniment of actors on meadows quality evaluation; LIVESTOCK: accompaniment of actors on livestock milk farming

The second axis (Fig. 2) expresses the degree of durability and institutionalisation of education experiences. It calls for analysing beforehand the political context of education. Durability degree is very important because transformations and knowledge we are seeking to produce requires time. Indeed, knowledge about skills that such experiences aims to produce can not be possible without different students, multiple demands, varied points of view and related to deep transformations occurring in development realm. Otherwise, consequences of research-education-action experiences can be seen only after many years of educating or training actors (first workers or trainees after a period of work). The ability to maintain education programs is therefore very important. It depends of the degree of freedom teachers have in relation to politics, especially in education design, and of the kind of relationships between trainers and trainees. Therefore, within an academic and institutionalised training course, once education programs are accepted, room for manoeuvre toward political actors can be important. Of course, education has to perform and be suitable to excellence criteria as well as attract trainees or students. As a result, strong efforts should be made to get institutional recognition and simultaneously great efforts of advertisements toward potential students. On the other hand, when building training courses in partnership, creativeness is bigger and durability smaller. This is in relation to various hazards associated to stakeholders and power struggles. Time can be shortened but results can sometimes be more innovative, but need to be secured.

We can then put in place different experiences by crossing both axes. Researchers are differently engaged in education and action. Different forms of education are used. Then, needs for specific skills exist and we have to better understand it.

2.3 Examples

We aim to characterise different modalities carried out by the members of the group rather than present an exhaustive list of experiences. In order to illustrate typologies and modalities of collective learning, we take an example of territorial development education programs, described through two distinguished axes.

Education programs of Mastère ACTERRA are intended for engineering students of AgroParisTech. It is a vocational training and includes different features of permanent education. Diplomas are recognised by a specific commission. Theoretical and methodological backgrounds (related to research realm) are dominant. It allows us to test for example, participative and prospective diagnosis (Lardon et al, 2007). The co-construction of the participative process has been essential to obtain consequences on action (Lardon et al, 2010).

This education program has been adapted to a vocational training in 2011 (CEA)⁴ intended to executives working in public councils who have to tackle territorial issues. It was easy to adapt methodological and theoretical background. Yet it was more difficult to get partnership because of game plays between actors and trainees. For example, strong confrontation appears between state councils and local actors. Trainees' experiences have been a great help to the education program and their skills are used to develop new ones: for example, we have mobilized institutional data bases enriched by the local actor's knowledge. However, the durability of this

⁴ CEA en diagnostic et prospective territoriale (<http://www.agroparistech.fr/CEA-en-Diagnostic-territorial-et,2131.html>)

course is not certain because it depends on French Ministries of Agriculture and Environment funding.

By attending DREAL Poitou-Charentes⁵, a partnership has been set up since 2010. It has been possible thanks to DREAL executives' participation in a vocational training and to the integration of a student within the state council. In this case study, features are reversed. The ability of trainees to put knowledge in/out of their professional context and co-construction are core issues. Interdisciplinarity is only a tool for research. Connection to the field is a support for internal learning of the state council. This kind of co-operation depends of relationships built between researches and institution. It produces innovations, for example in analysing and communicating about environmental stakes. It also contributes to the transformation of the practices of the council staff. Yet, it requests important involvement of researchers to maintain confidence and commitment with associated people.

At last, these experiences are based on a single methodological path (participative and prospective diagnosis) (Lardon & Piveteau, 2005) but have different translations. It constitutes different ways to lead research and answer to new questions that emerge.

Both dimension durability degree and actors' participation, are important criteria for the conception of training courses and especially for their ability to produce innovative knowledge and to transform realities.

3. Discussion on the five concepts constituting the Research-Education-Action platform for land management and territorial development'

To formalize the contribution of education and training to these research-interventions and multi-stakeholders approaches, we use the five concepts -interdisciplinarity, connection to the field, spatio-temporal relationship, context dependence adaptation and reflexivity- of the Research-Education-Action platform for land management and territorial development proposed by Lardon *et al.* (2012).

3.1 Interdisciplinarity

It is a component of subject matter of education and action. Researchers share their points of view on complex objects and adapt their own concepts and methods (related to their disciplines) in order to reply to interdisciplinary issues. "Intermediate objects" (Vinck, 1999), for example territory representations or collective actions, are media to interact between researchers.

3.2 Connection to the field

Actors' participation at all steps of constructing a project is fundamental to making them fully involved. Yet, it compels researchers to confront themselves to field reality. Theory and practices are interconnected. It consists in establishing translation between two realms: research and action in order to carry out synergies (Beguín, 2007).

3.3 Spatio-temporal relationships

Taking into account the spatial and temporal scales of organisation levels are important because they are components of territorial development. It allows integrated planning (Benoît *et al.*, 2006), by arranging different spatial analysis methods (landscape, collaborative mapping, ...) and going from one scale to another (i.e. farm scale to territory scale)

⁵ DREAL : Direction Régionale de l'Environnement, de l'Aménagement et du Logement

3.4 Context dependence adaptation

Different development models exist and then it is necessary to adapt methodological paths to specific situations. The ability to offer generic methods and to preserve specificities of every declination is a property of governance tools (Rey-Valette, 2008)

3.5 Reflexivity

Reflexive analysis on approaches carried out is possible thanks to production traceability. It is also possible because researchers step back when assessing education programs from a skill perspective. This kind of retroaction on knowledge production processes is a *sine qua non* condition to validate this production and a guarantee to produce knowledge for action (Lièvre, 2007).

4. Further perspectives on territorial engineering

New skills and competences have to be improved by all the participants (researchers, teachers, students and training persons, institutional actors) of these collective knowledge processes. The Research-Education-Action platform could become a collaborative one to guide the change in agriculture and territory development. The lessons are manifold:

- To formalize interaction between research education and action: particularly we have to make more explicit the five research lines identified (Interdisciplinarity, the connection to the ground, the double questioning of research and action, put knowledge in/out professional context, leading research methods).
- To characterize the contribution of researchers to agricultural and territorial development: in particular, we have to clarify how to support and accompany local actors achieving their projects. Most of all, it is necessary to formalize what is behind “territorial engineering” and the functions that researchers have in this context as well as the new skills they have to develop (Lardon, 2009; Lenormand, 2011).
- To suggest a new research agenda in relationship with education sciences: In order to continue exchanges and comparison between the different practices and experiences we hold (Barbier, 2008; Durand, 2009; Pastré, 2006)

The results presented above are based on new visions of collective learning ensued from researchers and actors. It is also based on new educational modalities that seek to develop skills improving the accompaniment of agricultural and territorial development (Angeon *et al.*, 2012; Cayre *et al.*, 2012).

The comparison work of 10 research-education-action projects has clearly demonstrated that education is a good access to some research-action issues, especially territorial development. Education allows having unique point of view on skills and intervention. But all projects are not and do not have to be equivalent: It is important to describe differences between the three cornerstones (research, education and action) to better understand how to improve, to lead and make projects evolve according to changes about the context and the projects in it own.

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