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Diverging and Converging Pathways

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Workshop 1.4: From farmer to "eco-preneur" in multifunctional agricultural knowledge and sustainable regional development: participatory curricula development and implementation of educational measures

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Farmers and other rural entrepreneurs will increasingly need to build up skills and gather knowledge in "Eco-Preneurship" in the future, namely to design, develop, implement, manage and/or innovate individual concepts of multifunctional agriculture, like social farming and other Green Care activities. A key to sustainable systems development is the exchange of knowledge between the actors of an innovation system (researchers, advisers and other educational experts, policy and administrative stakeholders, etc.) and the users. There is still a lot of discussion as to whether knowledge transfer can follow the line from research via dissemination to the end-user ("transfer of technology") or whether it must be done in the form of bi-directional communication as a "dialogue of all stakeholders". Maybe it depends on the situation and the actors, as well as the learning styles of the so-called "target groups". Moreover, on the innovation itself: for the transfer of "simple" technology packages, a linear transfer might be suitable which might not be sufficient when it comes to changing a farming system. Furthermore, learning is an ongoing process. Formal learning starts at elementary level, continues in higher education and/or vocational training, and does not end with extension. In other words: such "learning chains" must be developed which enable life-long learning in formal, non-formal and informal learning. Competencies are needed beyond classical technological and economic skills. The management of knowledge transfer is a tricky thing, firstly because it exists in various forms, such as theoretical, scientific and experience-based knowledge. From a research perspective, the main issue might be how to transfer scientific knowledge, which is usually more or less abstract and has often no clear distinctions between book knowledge, hypotheses, and more or less testified theories. Practitioners usually need practical knowledge. Knowledge exchange has to be organised in different settings. It seems as if participation in the curricula development, the implementation of the educational measure and in evaluation plays a key role in success and learning effectiveness and efficiency. This workshop aimed at an exchange of experiences in the creation of various educational measures in different settings. The purpose was to further develop ideas and possibilities for international training options in the field of social farming. We therefore invited papers on case studies as well as papers which reflected learning situations on a meta level. Key questions were: How to organize the learning process? What is the role of the educator? What are good practices and successful learning arrangements? How to fit education units to the needs of the learners? How to organise participation in planning and implementation? How to jointly evaluate the educational unit or the extension programme? How far does participation influence learning effects?

PerfEA: ongoing counselling towards strategic planning processes to implement the agro-ecological transition

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Abstract: Since 2012 the French Ministry of Agriculture has launched an ambitious programme called "Agro-Ecological Project for France". This programme aims to facilitate and support the agro-ecological farming system's transition. To support the agro-ecological transition school farms in the French educational system have to propose an agro-ecological strategy. In addition, teachers have to use didactic processes that help learners to understand and manage agro-ecological systems. For one year, six farms within agricultural high schools have implemented a strategic accompaniment method called PerfEA[1] to help them to build and manage a sustainable project for the school farm. On each farm a group comprising teachers, school director, farm manager and farm technicians, has implemented the PerfEA methodology with the support of a facilitator. At the end of the exercise, the participating school farms have defined the values of the organisation (e.g. *innovation, sustainability, transmission and sharing of knowledge*), its missions (e.g. "*the farm is a support to the learning process and site of technical demonstration for students and local farmers*") and its vision of farm development (e.g. "*being an organic farm open to a territory and its actors").* A balanced scorecard comprising some strategic indicators (e.g."*protein autonomy"; "number of projects involving farm workers, students and teachers*") was constructed in order to assess and pilot the performance of the school farm. Thinking and designing the strategy and its management tools has to be seen as a learning process. This article discusses how the ongoing counselling methodology as offered by PerfEA, to implement management strategy, and its tools, are learning supports which facilitate the agro-ecological transition. These learnings are both individual and organisational. According to loop learning theories they address to different extents: improvement of practice; revisiting assumption; and reconsideration of underlying values and beliefs.

Keywords: Strategic ongoing counselling, management, learning process, farming system, school farms, agro-ecological transition.

The agro-ecological transition context in school farms

In 2012 the French Ministry of Agriculture launched an ambitious programme called "Agro-ecological project for France". This programme aims to facilitate and support the transition of conventional farming systems to agro-ecological ones. Based on seven action plans[2] and the

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[1] *PerfEA means global performance of the farm*
[2] *Plan Ecophyto (aims to decrease the use of pesticides); Plan Ecoantibio (aims to decrease the use of antibiotics); Plan Apiculture durable (aims to preserve and enhance bee production); Programme Ambition bio 2017 (aims to develop organic production); Plan Azote/méthanisation (aims to have a better use of organic manure and to*

support of collective action[3] this policy is designed to support the innovation and facilitate the agro-ecological transition.

In the educational system, this programme is translated by the phrase "learn to produce differently". This programme aims to improve the capacity of the agricultural educational system to integrate agro-ecology into programmes and didactic process. Teachers are invited to enhance the capacity of students to adopt an attitude of problem finding versus problem solving (Mayen, 2013). School farms related to agricultural high schools are also invited to propose agro-ecological farming systems. These farms have three main missions: i) they should be supportive of diverse objectives of learning (experiment with agricultural practice, learn to manage a project and learn to cope with complexity); ii) they should produce agriculture products and/or services to sustain their activities; and iii) they should be a place for experimentation and should contribute to territorial development by taking part in local development projects.

We think that agro-ecological transition in the French educational system asks people to reflect on their practices (didactic or farming practices) and accordingly their relation to knowledge and to other actors. It also articulates different levels of change from field to territory. Obviously these changes are not always easy for actors. School farms are special places where the articulation between production, pedagogy, experimentation and local development can be discussed and built. The implementation of a strategic reflection about the project of the farm, in a participatory way, can thus provide a support for accompanied transition.

In this article we present the ongoing counselling process of six school farms which have chosen to implement PerfEA (Capitaine et. Al., 2012, 2013). PerfEA is a method to help farmers to build and to manage the strategic project of their farm. After asking how agro-ecological transition questions the educational system, the PerfEA methodology - its principles and some methodological aspects - are presented. Then we ask how this strategic accompaniment is a support to the learning process and how these learnings could facilitate the agro-ecological transition in agricultural high schools.

School farms: the core of the agro-ecological transition in the educational system
In France, public agricultural high schools are mostly related to school farms or technical processing plants (cheese production, meat transformation, etc.). There are 190 public school farms and 33 technical processing plants in France. These farms are very diverse and production systems are representative of local agricultural systems: it could be horticulture, wine production, cropping systems, dairy production etc. These farms or processing plants must meet the three main missions discussed above and their governance is specific.

Main missions of the school farm in secondary schools

Schools farms have to be a learning support for the students. Teachers can use the school farm support to organise practical works where students can experiment with agricultural practices. Students learn how to milk a cow, how to feed, how to use specific material, how to recognise weeds, etc. It's a place where students can learn how to use diverse diagnostic

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develop methanisation); Plan Semences et agriculture durable (aims to develop the use of farm seeds); Plan Protéines végétales (aims to develop protein crops); Plan "Enseigner à produire autrement" ("teach to produce differently").
[3] *The GIEE (groups of farmers and non farmers who are associated in order to collectively develop agro-ecological systems), could pretend to better financial support.*

tools for producing useful information for farm management. It provides a support for managing collective projects such as organising participation of the farm to agricultural manifestation. The school farm is also a support for economic or global studies which aim to understand the farming system in a specific environment; it's a way to learn how to think as a farmer.

School farms have to produce and sell agricultural products or services to sustain their activities. They must achieve economic viability with their own production; not easy it could be said for this kind of farm which has employees (just the manager is a civil servant). Except for the investments that are decided on and paid for by the regional public authority, these farms have the same economic considerations as other private farms.

School farms have to offer an environment for experimentation and local development. They are invited to take part in national or local research networks. Additionally, they serve as a place for experimentation, innovation and extension in collaboration with local farmers. They can also take part in local development projects in relation with other actors in the territory (local institutions, farmers, etc.), e.g. they might collaborate with other farmers in a collective renewable energy facility (e.g. an anaerobic digester). In an urban context they can help to create links between rural and urban areas; a place where people can have easier contact with agricultural production.

Governance, organisation and links with other actors of the local territory
The decision processes on school farms are quite different to those on commercial farms. The manager is a civil servant; he has to implement the national policy decided on by the French Ministry of Agriculture. The investments, as in all other high schools, are decided on at regional level. Investment decisions take time and are dependent on the regional policy. Consequently the transition dynamic can be noticeably different in these farms. Moreover, due to their mission to define and implement the strategy, school farm managers need to take into account many stakeholders. When an investment or technical decision is taken it has to follow a consideration of the pedagogical effects within the teaching community, the required approach with technicians and workers, and must consider the expectations of other farmers and/or the local community. For instance, in a context of agro-ecological transition, school farms' managers tell us that they have to take a measured approach to innovation if they want to be in coherence with agriculture reality in the local farming systems.

As a place of pedagogy, experimentation and extension, school farms could play a very specific role in local agriculture and non agriculture development. They are more or less linked with local and regional education and extension institutions. Similar to most commercial farms, they are stakeholders in diverse collective projects (GIEE[4]) or cooperative organisations (CUMA[5], etc). They have in consequence a very specific place in the local rural network. In the context of transition, this diversity of potential or existing relations with other actors could be seen as a major resource for collective innovation.

Agro-ecological transition at agricultural school level: an articulation of cognitive, technical, pedagogical and organisational change

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[4] *The GIEE is a group of farmers and non-farmers who are associated in order to develop agro-ecological systems.*
[5] *A CUMA is a co-operative which gathers farmers together to buy agricultural equipment, to obtain specific subsidies, to improve their competitiveness and to organise their work for higher efficiency*

Agro-ecology could be seen as a scientific discipline, as practice and as a social movement (Wezel et al., 2009). As a scientific object or discipline, agro-ecology could be defined as "the application of ecological concepts and principles to the design and management of sustainable agro-ecosystems" (Gliessman, 1998). As a political project, agro-ecology emerges in a different context with the common objective of proposing alternative agricultural systems to conventional agriculture and its socio-ecological negative impacts. As a practice agro-ecology is composed of great diversity in the production system. Nevertheless agro-ecologic systems have common objectives: reduce the use of chemical products, maximise ecosystems' services and protect biodiversity, insure food security and enhance resilience of systems. Biggs et al (2012) and Duru et al. (2015) identify three proprieties of socio-ecological systems: i) the diversity of biological and social entities; ii) connectivity between biophysical entities as well as social entities: and iii) the state of slow variable (e.g. soil organic matter, water resources, management agencies, social values) determined dynamics of fast variable values (e.g. field management, water withdrawals, income, etc). Duru et al. (2015) also identified four governance principles for agro-ecological systems management: i) understand the social-ecological system as a "complex adaptive system"; ii) encourage learning and experimentation as a process for acquiring new knowledge, behavior, skills, values or preference; iii) develop participation of stakeholders in governance and management process; and iv) promote polycentric subsystems of governance that structure debate and decision-making among different types of stakeholders. We think that these principles could be relevant for agro-ecological transition at agricultural school level and discuss this further in following sections.

Teaching how to produce in an agro-ecologic way is a major objective of the agro-ecological project for France[6]. Accordingly, curricula have evolved in order to have a better coherence with agro-ecologic principles. New curricula aim to adapt teaching and pedagogic practice to the complexity of farming systems and decisions about farming system management[7]. These new curricula underline the necessity to show the diversity of agricultural systems, to understand their link with social, ecological and economic environments and to work in a multidisciplinary way.

Changing the way of teaching in order to integrate agro-ecology can be difficult for teachers. Actors we worked with identified several barriers or difficulties to change: the need to develop technical competence for teachers who in some cases have a theory based curricula; the difficulty of changing pedagogic practices and habits; the distance between professional practices and students; the difficulty with a multidisciplinary approach; or a lack of recognition of the legitimacy of change by teachers themselves or by students. Moreover, changing the way of teaching could be seen as uncomfortable for the teacher because it introduces a risk for students and for their success in final exams. For Mayen (2013), teaching to learn to produce differently is not only teaching well-identified ways of thinking and actions pre-adapted to situations which are well defined, well categorised and therefore easily identifiable, but also learn to identify and define problematic situations, and to find and to adjust ways of thinking and acting which are not always even listed.

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[6] *"Teach how to produce differently" is a national action plan composed of four axes: i) renovate curricula; ii) mobilise school farm; iii) enhance regional governance of local actions; and iv) train and support staff and organisation in their transition.*
[7] *Website of Ministry of Agriculture*

At the farm level, agro-ecological transition is quite a complex transformation process; it involves technical, social and cognitive change. Coquil (2014) shows that during transition: "autonomous mixed-crop farmers manage new entities, which vary according to farmers: food autonomy of the herd, straw autonomy, animal health, food balance of the herd... They work by mobilising new knowledge, new indicators are acquired step by step during the transition". Thus, farmers re-discovered on their farm resources for managing the transition (Coquil, 2014). Interested in the learning of the farmers engaged in inputs reduction in crop-culture Chantre (2011) supports the same conclusion and highlights that the pragmatic judgments and the development of criteria performance evolved during transition. These examples highlight that agro-ecological transition is not only a technical concern; actors transformed their farming system representation and learned step by step during transition. Mayen (2013) notices that beyond knowledge and skills, the management of agro-ecological systems needs to invest in a special attitude or state of mind characterised by a set way of feeling, thinking, appreciating or acting. For Mayen (2013), this state of mind cannot be taught but can appear, evolve and transform. Additionally, it is felt that it is possible to create a ground in favour of the development of a favourable state of mind for agro-ecology.

Based on these considerations, we hypothesise that agro-ecological transition in agricultural school is based on several learnings of educators (farm managers, workers, teachers, etc.). We propose that this learning may have different levels of intensity and scope (Argyris & Schön, 1978; Pahl-Wostl, 2009) and we propose to address this different level of learning in the triple-loop learning conception (Pahl-Wostl, 2009). The single- loop learning refers to an incremental improvement of action strategies without questioning the underlying assumption. In single-learning loops, actors question if they do things right, with a strategic point of view, the aim of actions is not re-questioning. The double-loop learning refers to a revisiting of assumptions (e.g. about cause and effect relationships) within a value-normative framework. In double-loop learning, actors question if they do the right thing; from a strategic point of view the representation of performance is evolving. In triple-loop learning one starts to reconsider underlying values and beliefs and take a world view (reconsidering the way that knowledge and innovation is building, reconsidering the relation to others and to nature, etc.), what we propose to assimilate to state of mind.

We hypothesise that an effective and sustainable transition requires mobilisation of double- or triple-loop learning where actors reconsider and transform their representation, objectives or values. We also think that this loop learning could be realised in dialogic reflection between actors of the agricultural school. The school farm, given its hybrid aspects, seems to be a good place to support dialogue and reflexivity.

Strategic accompaniment as a learning process, a way to facilitate the agro-ecological transition?

PerfEA: an accompaniment method to build and design sustainable strategy in a participative way
PerfEA is a method for helping an organisation to have a participatory reflection about its strategy and for helping the formalisation and the implementation of a sustainable strategy. This is a counselling method which aims at developing actors' autonomy and enhancing the empowerment of actors' organisations. From an epistemological point of view, this method has its roots in a socio-constructivism paradigm (Vygotsky, 1978). Interactions between actors

and tools used for helping to design a collective representation of the behavior of the system are also articulated in order to support individual and collective learning.

An articulation of different tools for supporting dialogue, learning, decision and formalisation of a strategy

The PerfEA methodology is composed of four main stages.

The first step is based on an analysis - by the members of the reflection group - of the environment and the objectives of the group. Separate workshops consider a review of past successes and failures, the expression of a vision by projection into the future (3-4 years' time), the expression of values that drive the organisation, and consideration of the school farm missions, and are used to collect data from the stakeholders. This stage helps the members of the groups to exchange thoughts about the aims of the organisation and to find ways of improvement. A specific workshop is dedicated to identifying the factors that improved or threatened the sustainability of the farm (see next section).

Using the elements identified by the group during the first step, the second step uses the data collected during the first stage to realise a causal mapping in order to help the group to define strategic objectives which are used to build a balanced scorecard as a primary tool (Chabin, 2008). This scorecard can be multi-dimensional, integrating criteria that are financial and non-financial, short and long term, qualitative and quantitative, retrospective and prospective. Using the measurements produced, the scorecard reflects the degree of success of the strategy. It also aims to integrate non-financial indicators that are expected to provide a prospective overview of the company and its environment, which explains why we talk about a balanced scorecard (Kaplan & Norton, 2004). Building the balanced scorecard with actors provides an occasion to discuss the objectives and their level of performance. It's a strong learning process helping them to build a shared representation of the global performance of the school farm.

The third step is dedicated to defining an action plan (or a scenario of change) which defines the means (financial, technical, human, knowledge...) necessary to implement the strategy. We know that action planning has its limits and that action planning in a highly uncertain context is difficult (such as in agro-ecological transition), but this exercise is still relevant because even if actors couldn't plan the whole road they could discuss what the next stage should be or how to organise to define it.

The fourth and last step is the implementation of the strategy. During this step the actors put into the strategy into practice. They organise implementation of actions and use balanced scorecards as assessment tools of the farm performance. The realisation of objectives is discussed periodically by the actors. Thus, they can discuss action or experimentation efficiency or reconsider assumptions about objectives.

*Specific tools for helping to build a systemic and complex representation of the farm*

Bossel framework for helping the construction of a systemic view of the sustainability of the farm. The Bossel framework (1999) is used during the first step of the method in order to analyse the situation of the farm within its environment and to identify which processes enhance sustainability of the farm and which factors are vulnerable. Based on a systemic approach to sustainability, Bossel's framework postulates that sustainable systems

necessarily meet certain conditions as determined by the relationship between the system and its environment. In this perspective, the framework defines a set of six basic attributes characterising the various types of relationships defining the sustainability of a system in its environment: the existence; effectiveness; security;, adaptability; freedom of action and co-existence. For human systems Bossel (1999) completes his analysis framework with the following attributes: reproduction (or reproducibility); satisfaction of psychological needs; and responsibility. During the first step, the group is invited to identify for each basic attribute the positive or negative aspects of the farm. Then the group discusses if the organisation is or is not in control of the identified elements. Thus they can produce a synthetic tool that shows the opportunity/threat and strengths/weaknesses of the farm. This collective inquiry is a way to exchange different representation and to discuss about performance processes.

Causal mapping: synthetic, analytic and reflective tool. Causal mapping is the second tool used to help the members of the groups to have a systemic vision of the farm and to cope with complexity. This tool is used to ensure the link between the strategic analysis and the formalisation of the strategy. In practical terms, causal maps are elaborated by the facilitator of the strategic reflection from notes or recordings of the discourses of actors during the workshops. It is a graphical representation which shows ideas or concepts expressed by actors and the causal link between them. The representation of elements in a map helps to clarify their meaning. It shows the causal relationships and the reasoning behind decisions taken. The causal map is both a tool for communication with others and an analysis tool (Cossette, 2003). Therefore, the causal map is a mediation support tool that clarifies thinking and decision making and facilitates agreement on a strategy and the creation of a vision. The use of a causal map to explore the cognitive structures of an organisation is now widespread in management research (Huff, 1990; Laukkanen, 1998). Particularly suitable for strategic approaches (Eden, 1988; Cossette, 2003), the causal map helps to formalise individual and collective representations.

In the accompaniment method, the causal mapping is uses to synthesise the diversity of ideas and representations expressed by the different members of the group during the first stage of the strategic reflection.
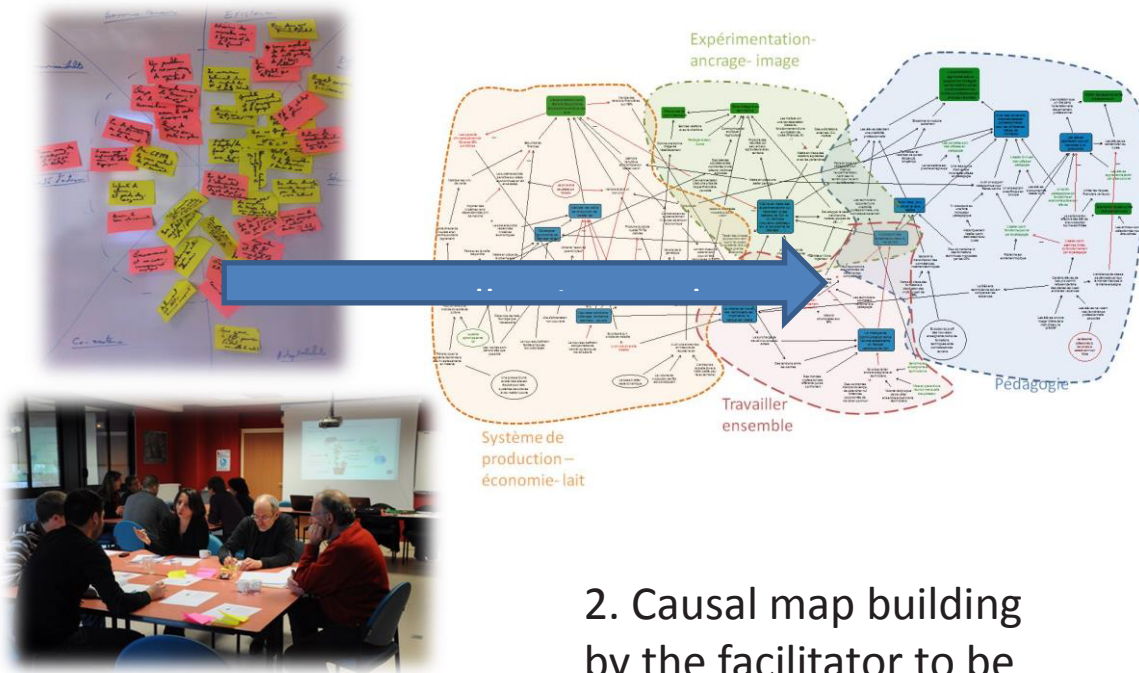
1. Workshops of strategic reflection

2. Causal map building by the facilitator to be discussed with the group in order to formalise the strategy

Figure 1. Place of causal mapping in the accompaniment methodology

The structure of the map serves as an analytical support. It identifies causal links between different entities (ideas, concepts, objectives) and thus facilitates the identification of the processes involved in the structure. It is possible to identify multiple links (more or less interdependent, more or less competitive, more or less contradictory, more or less important) that lead to the achievement of the same objective. These links are part of different coherent sets on the basis of which the strategy will be developed. On farms owned by agricultural education institutions, coherent sets of goals emerge. They are focused on economic, educational and local commitment challenges. These links can also identify the strategic areas that form the basis for the implementation of the farm management project. In addition, the causal map provides multiple analyses that can be used as part of a strategic approach. Therefore, it is possible to perform statistical analysis based on the map. One possible analysis highlights the entities that are essential to the strategy. This analysis provides indicators that will be used to build the balanced scorecard. Causal mapping takes a central place in the PerfEA method because it is:

- a support tool that acts as an intermediary (Vinck, 2000), facilitating the cognitive process;
- an aid that provides a representation of the processes implemented in a structure and facilitates the identification of the core elements of the strategy;
- a tool that takes complexity into account without removing it (Axelrod, 1976);

- a mediation tool that helps to ensure that a group has a shared vision of a given strategy (Eden, 1988).

Collective strategic reflection

In order to help agricultural high schools to build and manage a strategic project for their farm, the local Agricultural Agency in the Rhône-Alpes region supported the implementation of the strategic ongoing counselling method PerfEA. Six farms from agricultural high schools chose to take part in the project from September 2014 to March 2016. On each farm a group composed of teachers, school director, farm manager and farm technicians implemented the PerfEA methodology with the support of an external facilitator[8]. In charge of the implementation of the different workshops with actors, the facilitator is neutral. He/she organises and regulates the discussion between actors and helps the explanation of ideas. He/she also produces some intermediary tools for helping actors' thinking and helps them to formalise the project.

Table 1. Type of farms and collective engaged in the collective reflection

School farms	A	B	C	D	E	F
Type of production	Dairy production Crop Sheep Kennels	Dairy production Beef production Crops Poultry	Goat production Beef production	Dairy production Crops Poultry	Dairy production	Riding center
Description of participants and average numbers in workshop	School director Farm manager Teachers (4) Farm worker (1)	School director Farm manager Teachers (7) Farm workers (4)	School director Farm manager Teachers (3) Farm worker (1)	School director Farm manager Teachers (4) Farm worker (2) Student (1)	School director Farm manager Teachers (3) Farm worker (1)	School director Farm manager Teachers (2) Riding animator

Moreover, for maximising feedback about the implementation of the accompaniment methodology a peer group composed of representatives of the six farms was also created. Five workshops were organised to gather the peer group together during the project. These workshops were dedicated to debate about decision making and management difficulties, and used to elaborate synergies between school farms. The first workshop discussed what participants expect from the project and defined the way to implement the method on each

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[8] *The facilitator was the first author of the article*.

farm. During the second workshop, each representative explained and discussed the main strategic option identified by the group. The groups also discussed how the causal mapping could be used for designing the strategy. During the third workshop each farm manager explained its strategy with the support of their balanced scorecard. The fourth workshop provided an opportunity to discuss the different action plans. The fifth workshop gave a global feedback about the strategies of implementation.

Learning and changes during the process

In order to have an overview about learning process during the implementation of the PerfEA methodology, we used different sources of information: i) the elements produced by the organisations during the strategic reflection (intermediary tools such as causal mapping) and the project formalised at the end of the process; ii) the elements produced by the peer groups during reflexive workshops where farm managers and school directors involved in experimentation have feedback discussion; and iii) an online survey sent to every actor at the end of the process whereby they can express what they think about the process in which they took part.

Formalisation of tools for strategic management

Each school farm engaged in the experiment has produced intermediary tools (Bossel's framework analysis, strategic causal maps, etc.) to help them to formalise their project. At the end of the process each school farm has defined the values of the organisation (e.g. *innovation, sustainability, transmission and sharing of knowledge*), its missions (e.g. "*farm is a support of learning process and technical demonstration for students and local farmers*"), and its vision of farm development (e.g. "*being an organic farm open to territory and its actors").* A balanced scorecard, composed of a few strategic indicators (e.g."*protein autonomy", "number of projects involving farm workers, students and teachers*"), was constructed in order to assess the performance of the school farm (cf. Figure 2 for an example). Those documents are seen by the farm manager as tools of assessment of the farm performance which can be used to discuss the results and exchange about the efficiency of the farm management process. They are also a communication tool used by managers to explain the farm project development to a diversity of stakeholders.

Table 2. Example of balanced scorecard of a school farm

Strategic objectives	Strategic Indicators	State of indicators	Desired state for indicator
Improving economic situation	*safety margin=GOP-annuity*	- 50 000 euros	*-25 000 euros before 5 ans*
Securing the sale of organic products	*% Reservation before slaughter by cow*	40%	100% in 2020
	Net margin/product type sold	To calulate	Define step by step
Improving alimentary autonomy	*Amount of concentratre / Liter of goat milk*	~ 170g/ L of goat milk	To define step by step
Being an certified organic farm	*Be recertify as organic farm*	Certify	Certify
Participate in the development of the territory	*Number of day with demonstration activities or thematic workshops for local stakeholders*	7 days	Maintain existing actions and develop actions for agricultural professionals
Maintain and develop the network	*Number of external action in which the farm is involved*	**3 :** one research program on organic farming, a pedagogic program on organic teaching, a comity about local development	
Strengthen the educational role of farm for all educative sector	*Number of hour/student/year of utilisation of farm support for educational activity in i) doing agricultuarl task ii) technical pedagogie iii) economic and global analyse*	To calulate	Enhance the economic and global analyse
Being in a project dynamic (technical and educational) widely shared internally and externally	*Number of project involving farm workers, students and teachers*	4 projects	At least 3 per year
Promote technical, educational and organizational innovation	*Number of innovative action per year*	2 actions	At least an innovative action per year

Learning process

Methodological details:

Various learnings emerged from the collective workshops organised with the *ad hoc* groups on school farms. According to loop learning theories (Argyris & Schön, 1978; Pahl-Wostl, 2009) we propose to have a special focus on double-loop learning (reconsidering objectives) and triple-loop learning (paradigm, world view, values, in a word: state of mind) because we hypothesise that these levels of learning are necessary to agro-ecological transition in the educational system. Moreover, we propose to distinguish two types of learning. The first is individual; it could be single- double- or triple-loop. The second is collective or organizational; it corresponds to an evolution of the dynamic interaction between actors (new working group, better relation between actors, change of the boundaries of the social-system considering, etc.). Based on the survey we administered, and material products by the peer groups and groups of reflection, we try to highlight what participants have learned.

If the ongoing counselling process has produced a balanced scorecard to manage the farm for the next 4 or 5 years, it also is a learning process.

For most of the participants the main appeal of the process is that it allowed them to exchange ideas and knowledge with other actors. They[9] also highlighted that they have developed better knowledge of the overall operation of the farm from a technical, but also organisational and human point of view (e.g. a school director: "*I realised the importance of human relations between farm technician and teacher").* They have a better view and understanding of the key points for farm performance and strategic options for the farm development. Teachers notice that this proximity to the farm allows them to better support students' work on the farm. Teachers in economics who contributed to the strategic thinking notice that the collective and the formalised strategy of the farm can support their work with students about farm management. Hence, actors' representation in farm management or educational activities have changed.

Each farm has therefore produced their new management tools used for performance assessment: the balanced scorecard and an action plan. The use of this new management tool is itself an organisational change. It can help the organisation to manage the global performance of the farm. We also think that the representation of the performance changed during the strategic thinking: indeed, objectives evolved and were redefined. For example a school farm planned to change from a "*maize/herb system*" to a "*herb/maize system*" in order to enhance the proteins autonomy of the farm rather than milk production. From the initial judgment of "*a lack of exchange between entities*" and "*a lack of internal and external communication about farm projects"* the "*number of inter-entities projects in which the farm is a stakeholder per year"* become a farm performance indicator. In other words, this farm should be a place that helps to mix up activities. Finally, we can argue that the balanced scorecard is a strong lever to ease the double-loop learning process.

Many actions or changes planned[10] by the groups are actions related to organisational aspects and information or knowledge management: establish steering group or multi-stakeholder focus group to cultivate a theme; implementations of analytic accounting or of software to manage information about animal systems; recording and sharing the level of educational activities etc.

Strategies also underline the importance of innovation networks and external partnerships (e.g. with local farmers or with public collectives) for the global performance of the school farms. Actors underline that participating in these networks is a way to develop innovative projects (e.g. on conservation agriculture, organic farming, etc.) or to develop experimentation which can help the transition from a technical or pedagogical perspective. It's also a way to show the dynamic of the farm and the school and to improve its image.

At the end of the process the peer groups underlined that "*participative reflection enhances the collective mobilisation of the actors of the organisation*". However, the mobilisation effect was more or less important in the different situations. They also highlighted that the strategic reflection *"was a way to drive interdisciplinary work"* and a way *"to organise dialogue between*

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[9] *Most of the farm managers said that had already had a good global overview of the farm. This point is highlighted by other actors.*
[10] *Of course, some of these actions were revealed by the reflection and others were new*

actors who have not worked together on many occasions". They noticed that actors have a better understanding of the different missions of the farm and a better understanding of the role of different actors. Actors also argued that *"having a shared project, a shared course of action, gave reassurance and helped them to step back"*. The farm managers and school directors think that the participatory building of the strategy enhances the legitimacy of the management function.

Finally, during the third peer group workshop, some actors[11] had a reflection about the coherence between agro-ecological transition of the farm and the pedagogic transition to teaching how to produce in an agro-ecologic way. The two transitions are linked and feed on each other. But for actors they are both based on a common ground: "the producer at the heart of production and learners at the heart of his learning." For actors, both transitions mobilise the same principles which are "accepted uncertainty, accepted that solutions are not always known, accepted risk and the necessity to experiment, the right to error but the need for reflexivity, the necessity to work with multi-disciplinary groups and with networks, etc." According to these principles, we think that strategic thinking with PerfEA (whilst acknowledging that other tools could be as efficient) is a way to facilitate adoption of this state of mind. But we are conscious that a discourse about principles is different from the adoption of these principles and it is difficult for us to have a view about this level of learning.

Conclusion
In the context of agro-ecological transition, school farms are at the heart of the transition. We show that PerfEA methodology, by supporting inter-personal dialogue and by helping to cope with complexity, can facilitate individual and collective learning. Actors of the organisation have a better comprehension of school farm missions and of its projects. Teachers can easily identify some issues on the farm that they can use with their students. From an organisational point of view the implementation of participatory strategic thinking, supported by an external facilitator, is seen by actors as a way to facilitate the exchange of knowledge between themselves and to increase their empowerment.

The agro-ecological transition mobilises technical changes but has its roots in actors' representation, world view and beliefs. Agro-ecological transition is questioning farmers as well as educational and extension systems. In each case (farmers, teachers, advisers) the transition requires different levels of learning. We think that there is a common ground, a common state of mind, which is in part the change from a command and control paradigm to a complexity paradigm (Morin, 1990). Actors need to accept uncertainty, complexity, ambiguity and unpredictability.

To conclude we propose to consider advisory activity from a pedagogical perspective. We think that an ongoing counselling process as praxis is a useful state of mind for helping actors and organisations to evolve. In the context of transition, where knowledge, governance and world view evolved, the advisory activity is transformed. In this context, advisors who facilitate individual and collective learning in organisations seem to be very useful.

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[11] *4 school directors, 2 teachers, 5 farm managers, a civil servant from the Ministry of Agriculture and the facilitator*

Acknowledgements

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Farmer mentoring in Norway– how do different mentoring approaches improve entrepreneurial skills?

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Abstract: Running a small business such as a farm can be a complicated and challenging task, and there is a growing body of evidence on entrepreneurial competences needed to run and develop a farm. Mentoring can support entrepreneurial competences, but how this influences entrepreneurial learning has been explored only to a limited extent. Therefore, two farmer-mentoring programmes aimed at supporting farmers' learning and development were studied to identify how the concept of mentoring is incorporated, what kinds of learning are stimulated, and what effects on entrepreneurial learning are found. An analytical model was elaborated based on the functions of mentoring - psychosocial and career-related - complemented with the concept of entrepreneurial mentoring and entrepreneurial skills, to identify outcomes on entrepreneurial learning related to entrepreneurial identity, recognition and acting upon opportunities and growth of the business. Findings indicate that the matching process and the qualities of the mentors differ between the two programmes, and they do not fully incorporate the concept of mentoring because they have little focus on helping the mentees to explore options and ideas that they can use to solve their own business issues. In both programmes, the production-oriented knowledge and experience are important. In only one of the programmes is there development of entrepreneurial identity.

Keywords: Mentoring, entrepreneurial learning, entrepreneurial mentoring, entrepreneurial skills

Introduction

There is a growing awareness of the entrepreneurial skills needed to run and develop a farm (Seuneke et al., 2013), i.e. exploit market opportunities and innovate. Professional and management skills are basic requirements for farmers while entrepreneurial skills are essential to create and develop new business activities (Wolf & Schoorlemmer, 2007). Some farmers are more entrepreneurial than others but this is not necessarily due to a lack of certain personality traits but rather due to (the lack of) specific competence and experience (Lans et al., 2013). Farmers develop entrepreneurial skills predominantly through a process of learning-by-doing and less through formal education (Vesala & Pyysiäinen, 2008). Lans et al. (2013) indicate that to acquire entrepreneurship and business management skills, entrepreneurial learning is important. Entrepreneurial learning recognises and acts upon opportunities through initiating, organising and managing the firm in social and behavioural

ways (Rae, 2006). The social approach to entrepreneurial learning relates to a context of interacting with other persons, businesses and others outside the firm. The behavioural part of entrepreneurial learning reflects a manifestation of the learning in the behavior of both the farmer and the farm business. Following ideas from small business-supporting systems from non-agricultural sectors, different kinds of mentoring programmes for farmers have been initiated to support farmers and strengthen their entrepreneurship and farm management skills. While there are some papers that report on experiences with mentoring programmes aimed at farmers (Klerkx & Leeuwis, 2009; Lans et al., 2013), this earlier work is more dedicated to explaining the set-up of these programmes. It is not explicit on the positive and negative effects of such programmes. Overall, few in-depth studies have been conducted of the effects on entrepreneurial learning through mentoring programmes. This is where the paper aims to contribute. Therefore, we investigate here the effects of entrepreneurial learning from two mentoring programmes in Norway. These programmes support farmers in developing and exploiting entrepreneurial and farm management skills. The purpose of the study is to explore how these two mentoring programmes support farmers' entrepreneurial learning in terms of positive and negative effects.

The research questions are:

i) How do two Norwegian farmer-mentoring programmes incorporate the concept of mentoring?

ii) What kinds of learning are stimulated through these mentoring programmes?

iii) How do mentors and farmers perceive effects on farmers' entrepreneurial learning?

Theoretical framework

Mentoring has increased in scope and is used in various areas of society (e.g. for enhancing general psychosocial wellbeing and assertiveness in different situations of life) as well as for professional situations. As farmers are urged to become more entrepreneurial, the term of entrepreneurial mentoring (St-Jean & Audet, 2009) suits farmers' situation.

Defining mentoring in the context of entrepreneurial orientations of farmers

Mentoring is explained as supporting people to manage their own learning to maximise their potential, develop their skills, improve their performance and become the person they want to be (Deans & Oakley, 2006). Workplace mentoring involves a relationship between a less experienced individual and a more experienced person. The purpose is the personal and professional growth of the mentee—the less experienced person (Kram, 1983). Mentoring involves transferring personal experiences of doing business and solving specific problems (Klofsten & Öberg, 2008) from the mentor to the mentee. The mentor should not provide business advice or propose solutions to business issues. Instead, the mentor should help their mentee to explore options and ideas that they can use to solve their own business issues (Kent et al., 2003). Mentoring thus is a dynamic process between a mentor and a mentee. The mentor and the mentee form a reciprocal yet asymmetrical learning partnership (Eby et al., 2007). Pawson (2004) found that the nature of the interaction between mentor and mentee affects the success of the relationship. This calls for a description of the characteristics of the mentoring programmes. Elements that describe mentoring include the duration of the mentoring, frequency of interaction, formality of the relationship, matching process, and the qualities of the mentor (Barrett, 2006).

Effects of mentoring on entrepreneurial learning

It is universally held that mentoring results in substantial rewards for mentees (Allen et al., 2004). Kram (1983) identified two types of mentor functions. One is career-related and one is psychosocial. The career-related support enhances the mentees advancement in the organisation and includes the mentor functions of sponsorship, exposure and visibility, coaching, protection, and challenging assignments. The psychosocial support addresses interpersonal aspects of the relationship and refers to aspects of a relationship that enhance an individual's sense of competence, identity, and effectiveness in a professional role. Specific psychosocial functions include role modelling, acceptance and confirmation, counselling and friendship (Allen et al., 2004).

Farmers are often self-employed, and career advancement in their own organisation is not a topic of concern, but is more likely related to the overall development and advancement of the farm business as a whole. This can be the role of the mentoring programme - to help the mentee to explore options and ideas that they can use to solve their own business issues (Kent et al., 2003). Wolf and Schoorlemmer (2007) relate entrepreneurial skills to the development and advancement of the farm business by identifying three essential entrepreneurial skills: i) recognition and realising business opportunities; ii) developing and evaluating a business strategy; and iii) networking and utilising contacts. These entrepreneurial skills can be a result of the career-related function of the mentoring programme as stated by Kram (1983).

The psychosocial effects are related to the development of the mentee's competence, identity and effectiveness in a professional role (Kram, 1985). St-Jean and Audet (2009) introduce the concept of entrepreneurial mentoring involving a supportive relationship between an experienced entrepreneur and a novice entrepreneur to foster the latter's personal development. Taking an entrepreneurial learning approach offers sensible insights into the learning effects of the entrepreneur as a mentee.

Both the psychosocial and the business development functions stated by Kram (1983) are found in Rae's (2006) framework of entrepreneurial learning, which consists of three major themes related to the outcome of the entrepreneurial learning process.

1. Entrepreneurial identity
2. Recognition and enacting of opportunities
3. Growth of business

The psychosocial function of mentoring can stimulate a personal and social emergence of entrepreneurial identity. Rae (2006) states that acquiring entrepreneurial skills and knowledge is not sufficient. The person who begins to act as an entrepreneur is assuming the identity of an entrepreneur.

Recognition and enacting of opportunities are a result of contextual learning in relation to others, which in this case can be a mentor. During these relational activities, individual experiences are related and compared, and shared meaning is constructed.

Fortifying and growing the business is an outcome of the relationship between the farmer and actors in the working environment. The ideas and aspirations of farmers are realised through interactive processes of exchange with others within and around the farm.

In Figure 1 these theoretical relations are illustrated together with Rae's (2006) suggested outcomes on entrepreneurial learning.
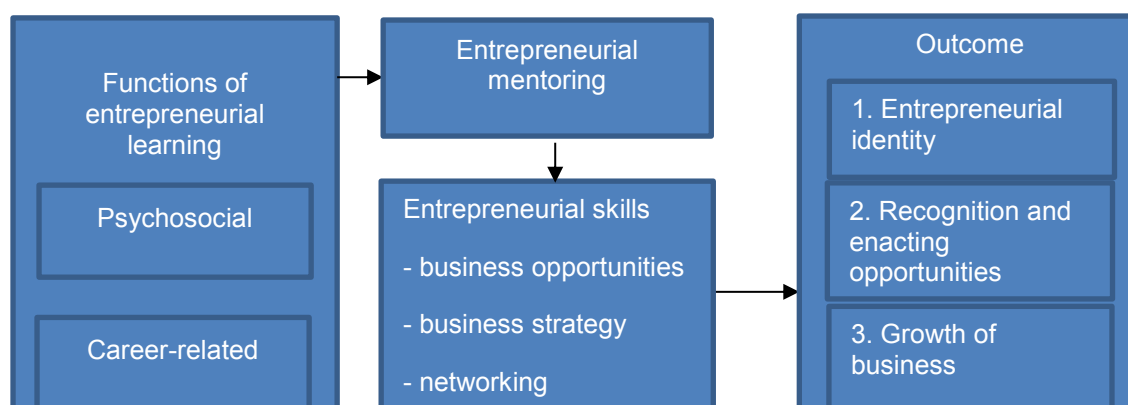
Figure 1. Analytical model

We are interested in the effects of entrepreneurial competence development. This is highly associated with entrepreneurial learning (Seuneke et al., 2013; Lans et al., 2013). Thus, we explore the effects on entrepreneurial learning using the concept of entrepreneurial mentoring (St-Jean & Audet, 2009) and entrepreneurial skills (Wolf & Schoorlemmer, 2007). These are related to the outcome of the learning process based on Rae's (2006) framework to explore how the two mentoring programmes fit into these taxonomies of entrepreneurial learning.

Case selection and methods

Case selection

We use a case-study approach, which is preferred when the aim is to understand complex processes and relationships (Yin, 1994). We studied two cases or mentoring programmes. The research questions compare these programmes according to how they have incorporated the concept of mentoring, which learning is stimulated and the effect on entrepreneurial learning. These two mentoring programmes are newly established and they seem to be quite different at first glance.

A partnership of private agricultural companies, public actors and a farmers' union in the Mid-Norway region initiated the mentorship programme called Competence Boost. A procurement cooperative, Felleskjøpet, operates the other mentoring programme, Young Farmer. Further presentation of the mentoring programme is a part of the results and describes how these two mentoring programmes incorporate the concept of mentoring.

Methods

We collected data from five mentor–mentee pairs in Young Farmer. We joined three meetings between a Young Farmer and a mentor. We first interviewed the mentor and observed the meeting between the actors. Afterwards we interviewed the mentor and the farmers separately. We also interviewed two other farmers in the programme separately. Both these mentees had mentors who were interviewed earlier. One of the mentees had a mentor for swine production (interviewed earlier) and another mentor for the dairy production, who was also interviewed. As a basis for interviewing, we developed interview guides - one for mentors and one for

mentees. The guides covered different topics. We were interested in the programme's goals and design as well the interaction and communication between the mentor and the mentee, and also how this facilitates learning. We also developed an observational scheme to assist with mentorship evaluation. Interviews and extensions were tape-recorded and the interviews were transcribed. The two interviews with mentors lasted about 1.5 hours and the one with mentees about 30 to 45 minutes. When choosing mentees and mentors, we tried to achieve a variation along dimensions such as geography, producer environment, mentors and mentees and investment. All farmers have swine production, and one of them has dairy production in addition.

In the other mentoring programme, Competence Boost, we selected four of the 16 mentor–mentee pairs for interviews. The farmers had different productions—sheep, diary and eggs. These interviews were conducted as telephone interviews lasting 20 to 40 minutes. We developed separate interview guides for the mentors and the mentees to cover the mentoring programme, the matching process, the need for competence, sharing experiences and how they practically conducted the mentoring.

In analysing the data, we used both the interviews of the mentors and the mentees. A qualitative content analysis (Patton, 2005) is a suitable method for data analysis.

Findings

The mentoring programmes
Here, the two Norwegian farmer-mentoring programmes are presented in terms of their use of mentoring. Core characteristics of the mentoring programmes are summarised in Table 1. The characteristics are based on Barrett (2006) and are supplemented with a description of the ownership and goal of the programme.

Table 1. Elements aimed at describing the mentor programmes

	Competence Boost	Young Farmer
Organisation that manages the project	A project with several contributors.	Input sales and output buying cooperative.
Goal of mentor programme	More competence among farmers. Increased demand for competence. Increased entrepreneurial attitude.	To secure/improve members performance and to recruit more members
The matching process	The mentee initiates the mentoring and chooses a mentor among farmers he/she knows or have heard about. Mentees are motivated by starting a new production or investments.	Felleskjøpet assigns mentors to new, Young Farmers. Employees in Felleskjøpet (sellers and advisors) are in a pool of mentors.

Formality	Mentee receive funding to pay a small fee to the mentor. A formal agreement including a plan and a timetable are formulated. Discussions are largely governed by the mentee and the mentees demand for answers to questions. The mentor assists with advice and is a discussion partner. Mentee perceives that good advice was worth paying for.	Young, new farmers who becomes member of Felleskjøpet are assigned a free mentor and other gifts and offerings. Structured meetings where the mentor keeps the dialogue. Transfer expert-based knowledge to farmers. The data-programme "Ingris" supports communication between mentor and mentee within swine-production.
Quality of the mentor	The mentor is an experienced farmer. Competencies were mostly related to farm production or production orientation. No mentor-training programme. Sharing of experience in professional network.	The mentors in Felleskjøpet are mainly experts in food concentrates and feeding or sellers. Some have higher education and less experience in swine production when others have practical experience but less education. Some of them are experts and partially covering narrow topics. Mentors share their internal network in Felleskjøpet with the mentees.
Duration	One year, may apply for two more years if they show yearly progress.	Three years.
Frequency	Three meetings a year. Additional contact by telephone, mail and visits	Two visits a year. Additional contact by telephone, mail and visits

Competence Boost was a project initiated by a regional partnership in Mid-Norway. The project ran from 2013 until the end of 2015. The project initiated different competence efforts for farmers and advisors in which one of them was a farmer mentor.

Young Farmer is a mentoring programme developed by Felleskjøpet—a big sales and procurement cooperative in Norway. The aim of the cooperative is to strengthen the economy of farmers in the short and long run (www.felleskjopet.no).

The objective of transferring knowledge to the mentees is common in the programmes, but the knowledge is obtained from different sources. Mentors in Young Farmer have a greater focus on disseminating formal knowledge, while in Competence Boost the mentees have the initiative and ask the mentors for both their knowledge and experience. The recruiting and matching routines cause different motivations for the mentees to take part in the programme. Not all mentees in Young Farmer are aware of taking part in a mentor programme and one mentor said that he was very careful using the term "mentor" when facing Young Farmers

because he was afraid of bypassing the mentee. Mentees in Competence Boost are self-recruited, proactive and motivated to take part.

Learning taking place in the programmes

This section presents results regarding the type of learning that results from the different mentoring programmes. Table 2 shows the elements of learning expressed in the two cases, structured according to the functions of entrepreneurial learning as well as psychosocial and career-related learning (Kram, 1983). The psychosocial functions are related to St-Jean and Audet's (2006) term "entrepreneurial mentoring". The career-related functions are related to entrepreneurial skills: business opportunities, business strategy and networking.

Table 2. Elements of learning

	Entrepreneurial mentoring	Entrepreneurial skills
Competence Boost	I have to be active to develop Share network Holistic approach Support each other Enjoy social contact	Sharing formal knowledge and experiences Learning to work smart–logistics in production Learning to avoid failures
Young Farmer	Build trust Mentor must be careful not to be too challenging	Learning how other farmers find solutions Learning how to improve results beyond feeding Gain new knowledge about feed combinations followed by a trial and error process to test new feed Sharing network with other persons in Felleskjøpet

Entrepreneurial mentoring

According to St-Jean and Audet (2006), entrepreneurial mentoring involves a supportive relationship between an experienced entrepreneur (mentor) and a novice entrepreneur (the mentee) to foster the latter's personal development. This is a part of the psychosocial function of mentoring (Kram, 1983). The mentees in Competence Boost experience entrepreneurial mentoring. One mentee stated that to develop he had to actively search for solutions and ask questions. Another pointed to networking in the sense of learning how to use the network of different experts to make his own progress. The mentors have not only shared their networks but also contributed to the mentees' networking skills. One mentee stated that the mentor managed to put together all the advice received from others in a holistic approach. We also found elements of social support including group support and enjoying the social contact. Mentees reported that the mentoring programme is a social event. Mentoring empowered both persons and created fellowship. One mentor stated that when they were only two persons it was possible to be more private indicating that they could go beyond the enterprise and over to the personal area. Taking part in a mentorship programme could stimulate further development of entrepreneurial identity for the mentees.

The mentees in Young Farmer had fewer signs of entrepreneurial mentoring. The main example reported was emerging trust in the mentor-mentee relationship. One mentor stated that as a mentor he had to be careful to not be too challenging.

Entrepreneurial skills

We did not find any examples of learning related to business opportunities. There were several examples of business strategy and some examples of networking (Table 2).

Competence Boost focuses on knowledge related to running a production in accordance with how to organise a smart working flow, and how to avoid costly failures. Mentees who were about to start new productions asked questions like: how do you conduct this function in your production? In this case, both the mentor and the mentee had practical experience and they could share this with each other and reflect together. Such discussions offer learning to both persons. As one mentor said – "*I always learn something from the others*". The knowledge transfer spans from formal knowledge to practical daily work. Some of the mentors took part in the startup of the production by working together with the mentee. Working together is an arena for transferring tacit knowledge.

In Young Farmer, the focus is on better performance during production that rests on knowledge transfer from mentor to mentee. They also learn about Felleskjøpet and what the cooperative can offer. In our example, the farmers contacted the mentor if they had questions. According to farmers, learning is mainly about feeding the animals. The mentors in Young Farmer reported that the mentees behave very differently. Some are very keen on learning and performing, and others are more reluctant to change. The mentor tries to adapt to the farmer's needs and goals but also challenges them in some areas. One of the mentees said that he knew that it was smart to take part in professional meetings, but he had not prioritised going.

The mentors also learn. In Young Farmer one mentor stated, "*I think I learn something every day*", and another *"There are always farmers that find good solutions. If it is functioning well, we bring it further to the other advisors"*. One example is from a farmer that wanted another combination of feed. Because of this request, Felleskjøpet developed a new feed for sows based on a new combination of concentrate and this is now under testing. If this functions well, then Felleskjøpet will develop this feed as a part of their assortment.

The mentors shared their networks with the mentees in both programmes, but it is not clear if this resulted in networking activities among the mentees.

Effects on entrepreneurial learning
Rae's (2006) framework for entrepreneurial learning was used to describe the effects on farmers' entrepreneurial learning. The framework consists of three main themes related to the outcome of the learning process—entrepreneurial identity, recognise and act upon opportunities, and growth of the firm.

Entrepreneurial identity

Entrepreneurial identity is developed when the farmer starts acting like an entrepreneur (Rae, 2006). Farmers can be viewed as entrepreneurs because they are self-employed, but this does not mean that they act like one. In Competence Boost, the mentees' motivation to attend

the mentoring is driven by new production and new investments. This means that prior to the mentoring, they acted in an entrepreneurial way when planning to develop their business. It is not clear if this is an effect of a prior entrepreneurial learning process. In Competence Boost, the mentees reported learning in accordance with entrepreneurial mentoring and effects including opening up to new ideas and the stimulation of networking. Development of networking skills may be a prerequisite for exploiting network opportunities.

The experienced farmer is a role model for developing entrepreneurial identity in Competence Boost. In Young Farmer the mentors have a different background and do not represent a role model for developing entrepreneurial identity.

Development of the entrepreneurial identity in Young Farmer was not obvious. There were no examples that we could identify. We found trust building between mentee and mentor, but it is not clear if this contributes to entrepreneurial identity. Curious mentees ask questions and search for knowledge. Thus, they behave like an entrepreneur. Reluctant and passive mentees do not get involved in discussions and reflections—they are simply instructed on what to do, and this is more common in Young Farmer.

Recognition and acting upon opportunities

Recognition and acting upon opportunities is a result of contextual learning and seems to be at the core of both mentoring programmes. Sharing production-oriented knowledge and experiences are found in different ways, from skill-based learning to more entrepreneurial learning. The mentors in Competence Boost are experienced farmers and contribute with their experiences solving daily tasks. The experienced farmers seem to be a good partner for discussion and reflection. Mentees report that learning from an experienced farmer is more valuable in terms of avoiding failure costs, by doing things right the first time rather than increasing revenues.

Mentors in Young Farmers largely have expert knowledge and can transfer this to the mentee. In most cases, the mentor governed the dialogue. The mentors also brought in news from Felleskjøpet. As an example, the mentor introduced a new feed that may increase performance. The Ingris measuring system guided and framed the dialogue if the mentee did not bring other topics to the discussion. The mentoring is directed at increased performance, but they did not report any concrete examples. The Ingris system - together with knowledge transfer from the mentor - may help the mentees to plan and work more systematically. There seems to be a mix between advice and teaching the mentee to solve his own challenges.

Growth of the business

The effects on business development and growth are a function of the mentees' ideas and aspirations, which can be realised due to an interactive process of exchange with the mentors and others (Rae, 2006). In Competence Boost the mentoring programme has been crucial for starting up a new production and making investments. This may be a result of contextual learning, but we cannot exclude that development of entrepreneurial identity can strengthen the ability to develop the business. The engaged and motivated farmers may be even more motivated and improve entrepreneurial skills while looking for new possibilities, attending new networks and searching for new opportunities. In Young Farmer we did not find any sign of growth of the business. The mentees' focus on cost avoidance instead of increasing the revenues shows little awareness of growing the business.

Discussion

This discussion is structured by the three research questions: how do the mentoring programmes incorporate the concept of mentoring, what kind of learning occurs and what are the effects on entrepreneurial learning?

Different enactments of the concept of mentoring

Our findings reinforce the observation by Bozeman and Feeny (2008) that mentoring programmes vary widely. The differences between the two mentoring programmes create different learning conditions for the mentees. This is for example shown through the different ways of assigning the mentors, by free choice or by designation. The mentors in both programmes appear competent. The matching processes are the main difference between the two programmes, and this results in different conditions for especially entrepreneurial mentoring and development of entrepreneurial identity. The Young Farmer programme in particular lacks the characteristics of supporting people to manage their own learning. Hence, if the purpose of mentoring is supporting people to manage their own learning (Deans & Oakley, 2006), it is easier to succeed if the mentee is motivated as we found the mentees in Competence Boost to be. Our findings underpin that the matching process including the recruitment of mentees influences the condition for supporting farmers to manage their own learning.

In general, mentors help their mentees to explore options and ideas so that they can solve their own business issues (Kent et al., 2003). In Competence Boost, the mentors are experienced farmers. The mentor's behavior will influence the mentee, and the mentor will function as a role model for the mentee because the mentee will identify himself with the mentor. Experienced-based knowledge is valued and combined with formal knowledge in both programmes. Our examples show that the mentors and mentees in Young Farmer have developed trust-based relationships. The farmers do what the mentor tells them to do according to feeding. This knowledge adaptation does not usually represent a big change in routines by farmers, but it is changing until the farmer is satisfied. In the end this can result in developing the mentees ability to explore options. In Competence Boost, we did not find the same trust building focus - perhaps because the trust was taken care of when choosing the mentor. The characteristics of the mentoring programme (e.g. Barrett, 2006) seem to influence the conditions for entrepreneurial learning and should be elaborated as a part of the analytical model.

Hence, as our findings show, the full concept of mentoring is not clearly expressed in any of the programmes. The personal and professional growth of the mentee (Kram, 1983) is not fully taken care of in the programmes. The Competence Boost programme has a larger focus on mentoring than Young Farmer. This can be related to mentors being experienced farmers and obvious role models and that the mentee having the initiative and setting the agenda. The mentoring process will be shaped by how the mentor perceives his role. None of these programmes has any mentor training and they have to figure it out on their own. Without any instructions and training the mentors will rely on their experiences and this will result in different ways of mentoring in accordance with their competence. This illustrates that the term mentoring is introduced without being aware of the crucial purpose of mentoring to encourage others to explore options (Kent et al., 2003) and manage their own learning (Deans & Oakley, 2006), and indicates the need for a mentor-training programme before initiating mentoring programmes.

Effect on entrepreneurial learning and identity

As our findings indicate, the characteristics of the mentoring programme will affect the learning conditions. The foundation of both the mentoring programmes is production-oriented learning. The purpose of Young Farmer is production-oriented knowledge transfer similar to a traditional advisory system (Seuneke et al., 2013). Without any training in mentoring, findings indicate that it is difficult to break out of the advisor role for the mentors from Felleskjøpet. Another obstacle is the mentees vague interests in taking part in the mentor programme, especially when they do not know much about it. However, entrepreneurial learning is not central, but the programmes are related to entrepreneurial skills. This helps mentees to recognise and realise business opportunities in existing production routines. This can hence be seen as contextual learning, where the one-to-one relationship helps disseminate knowledge and share experiences.

In Competence Boost, both the mentors and the mentees report learning mostly related to entrepreneurial skills. Two of the mentees stated that the mentoring was decisive in their investment decisions. This is an example of how entrepreneurial skills can strengthen the entrepreneurial identity and help people act like an entrepreneur. Entrepreneurial skills can then affect self-confidence to develop the entrepreneurial identity. The Competence Boost programme contributes to entrepreneurial identity by empowering the mentee. Here, this can be related to the matching process, where the mentee chose to participate in the programme and selected the mentor.

Following the major themes of entrepreneurial learning according to Rae (2006), it is the purpose of mentoring programmes to nurture development and to help the mentee explore options and ideas (Kent et al., 2003), and develop mentees' entrepreneurial identity. Developing entrepreneurial identity occurs by entrepreneurial learning (St-Jean & Audet, 2009). However, there are few examples from our findings of entrepreneurial mentoring having an effect on entrepreneurial identity. We found the psychosocial functions (Kram, 2003) of mentoring being in the shadows of product orientation. None of the programmes explicitly stated the role of mentoring as helping the mentee to explore options and ideas that they could use to solve their own business issues (Kent et al., 2003), though it did happen (as discussed in the above section on entrepreneurial learning). The best examples of real entrepreneurial mentoring are found in the Competence Boost programme. The self-recruitment of mentees to Competence Boost gives this mentoring programme a better condition for stimulating the entrepreneurial identity. Importantly, these mentees have already started to develop their entrepreneurial identity by taking the initiative to take part in the mentoring programme.

Conclusion

In studying two different mentoring programmes for farmers in Norway within the framework of entrepreneurial learning, we found that the mentoring programmes differed in several characteristics. The main differences were the mentors' background and competence as well as the programmes' design. Mentees in Competence Boost choose their mentors from experienced farmers while mentees in Young Farmers are assigned a mentor from Felleskjøpet employees. The matching process and the quality of the mentor in terms of mentoring competences were different and gave different conditions for learning with subsequent differential effects on entrepreneurial learning.

Our study indicates that it seems to be more challenging to facilitate entrepreneurial identity and entrepreneurial skills when there is a too large a mentoring focus on production

improvement. Without being fully aware of the intention behind mentoring, it is easy to rest on the traditional way of learning focused on production, with entrepreneurial learning as a side effect. The core of mentoring as helping the mentee to solve their own business issues (Kent et al., 2003) must be taken care of when designing the mentoring programme. To further stimulate entrepreneurial learning the mentors need training to understand their role as a mentor.

Further research is needed to completely elaborate the understanding of entrepreneurial learning - especially to understand the need to design a mentor programme to cover both the psychosocial and career-related parts of entrepreneurial learning in balance with more production related mentoring.

Acknowledgements

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From action research to action learning – ecosystem services assessment as a learning platform for students, local land users and researchers

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Abstract: The Spring School in "Landscape and Territory Agronomy" has been organised by an international team of teachers since 2007. The target of landscape agronomy is to address the spatially explicit interactions between farming practices and natural resources at territorial level. It requires an action research approach that we have conducted on different topics all applied to the same region in Pisa (Italy).The case-study based Spring School is a good platform for action learning. So far, we focused on environmental and water management (2007, 2009), peri-urban agriculture (2013) and the ecosystem services provided by agricultural and semi-natural habitat management (2015). These case studies enabled us to elicit the relationship between stakes that are often treated separately. The course was designed for PhD students of various disciplinary backgrounds but all interested in action research related to agricultural land management. In this learning platform, local stakeholders are involved through round table discussions, interviews and the territory game, a participatory territorial foresight. Students can experience the effectiveness of action research by interacting with local stakeholders and they become aware of the complexity of information gathering and analysis in a real situation. Through the interactions with the students, local stakeholders have the opportunity to widen their view on stakes they are concerned with in their every-day life. Compared to pure action research, our learning platform creates a collaborative environment facilitating interactions between stakeholders and therefore it creates a learning device for them as well. In this specific case, the action research methods proposed to the students and used in their interactions with the stakeholders allowed the group to prepare spatially explicit maps indicating where various ecosystem services are produced and where their benefits are delivered according to the stakeholders. These maps were eye-openers for the stakeholders but also for the researchers involved, because it allowed them to bridge the gap towards transdisciplinary approaches to address land management in an agricultural context. Moreover, it highlighted that the main challenge regards land use management and its coordination at territorial level, regardless of the specific ecosystem services stakeholders expect to receive or think they deliver through their activities. In particular, the participatory territorial foresight resulted in innovative land management proposals capable of overcoming more traditional and sectorial perspectives.

Keywords: Landscape agronomy, territory game, transdisciplinary education, provisioning services, regulating services, stakeholder knowledge mapping

The course structure

The various promoters of territorial development – namely farmers and other land managers such as water management consortia, nature reserve managers, and local communities, researchers, technical advisers, policy and administrative stakeholders – have few arenas in which to exchange knowledge. Training courses and educational programmes can provide a 'platform' (Lardon et al., 2012) to gather some of these actors and facilitate communication between people with different perceptions about the territory through comparison of hard data and more subjective information based on people's experiences (cf. Scherr, 2016; Raymond et al., 2010). As far as agriculture is concerned, a specific challenge is to upscale local actions to a territorial level in order to understand how innovation of farming practices is both conditioned and affected by overall landscape management (Benoît et al., 2012). To this end, an international and interdisciplinary team of researchers has organised the Spring School in "Landscape and Territory Agronomy" since 2007.

The structure and aims of the Spring School were presented during previous IFSA Symposia (Moonen et al., 2010; Rapey et al., 2008) and have been maintained in time. Each year, this solid frame of the courses is applied to a specific core theme that is suitable to be explored by a landscape agronomy approach (see Benoît et al., 2012). In particular, the themes are selected for their power to address the relationships between land management issues that are often kept separate at the territorial level. During past editions in 2007, 2009 and 2013, the courses focused respectively on environmental and water management and peri-urban agriculture. The course generally lasts 1 week and addresses PhD students. It usually takes place in spring and the key feature is to combine lectures and activities belonging to the domain of action research, so as to constitute the above mentioned learning platform that provides new experiences, knowledge and information for the students but also for the local stakeholders and researchers organising the course.

There are three types of lectures: i) theoretical lectures to introduce the background of landscape agronomy and of the theme chosen for the Spring School; ii) some applied lectures provide a toolbox grouping information on general action research techniques and case study specific tools; and iii) the final type addresses a characterisation of the study area in terms of land use, agro-pedo-climatic information, economic activities and any piece of data that is relevant to relate the case study with the specific theme of the year.

An action research structure underpins the lectures following five steps: i) a round table with local stakeholders to identify the issues at stake;, ii) the assessment of land use management through the interpretation of available maps and databases; iii) field trips to observe the landscape and for open-ended interviews with some key actors involved in land use management; iv) classroom work to prepare a territorial participatory foresight following the method called "territory game" (Lardon, 2013); and v) performing the territory game with local decision-makers, land use managers and other relevant stakeholders.

On the one hand, the five action research-steps are meant to stimulate students to interact at different levels with stakeholders. On the other hand, the lectures provide them with the concepts and the tools to analyse and integrate all the available information provided in the form of maps or databases. Altogether, the integration of lectures and action research builds an action learning platform that fosters three goals:

i)   it familiarises the students with theory and practice of action research. In this way, the students can test the method reliability by interacting with local stakeholders and experience the complexity of information gathering and analysis in a real situation;

ii)   it has proven to be fruitful also for local stakeholders, who are challenged to observe the stakes they are concerned with in their every-day life from different perspectives;

iii)   it helps the researchers to improve the reliability and saliency of their local data elaborations by checking it with the stakeholders and eventually integrating the local information.

For both students and stakeholders, the action learning platform allows widening of individual viewpoints thanks to exchanges between stakeholders who do not meet regularly, and by breaking down the silos between methods and disciplines like agronomy and geography.

In this paper we will focus on the course structure and the main results from the 2015 edition that dealt with the management of ecosystem services (ESs). In the discussion we will provide an overview of the opportunities the four Spring School courses have offered students, local stakeholders and the involved researchers.

Action research on ecosystem services as a learning platform

Study area

The case study for the 2015 course edition was the urban region near Pisa (Tuscany, Italy). The area covers approximately 49 000 ha (49% of which are agricultural areas) and stretches from the coastal plain to the inland hills with the typical climate and land management conflicts of a Mediterranean landscape (Marraccini et al., 2013). From a geo-morphological point of view the region can be divided in two contrasting areas, the Pisa Plain along the coast and the north-eastern hill system called *Monte Pisano* (i.e., Pisa Mountain). These two areas are connected by the movement and activities of land users and local inhabitants and from previous studies it emerged clearly that the perception of local land users about these areas are very different.

The Pisa Plain is mainly a production area dominated by arable crops and forage. Semi-natural habitats (SNH) are concentrated in the Regional Natural Park (Parco di Migliarino, San Rossore, Massaciuccoli) that is dominated by woodland and covers most of the coastline near Pisa. In the cropped area SNH consist of drainage channels and small, mostly herbaceous, field margins. Water discharge is a great challenge in order to allow farmers to cultivate their fields in a timely manner and avoid water stagnation.

The Monte Pisano is a hilly landscape composed of olive groves on the foot- and mid-hill, and by mixed forest and Mediterranean garrigue, pinewood and abandoned chestnut plantations on the top-hill. Nowadays, most of the olive groves are managed by hobby farmers (Gennai-Schott et al., 2014). About 50% are organic growers and the understory consists of spontaneous vegetation managed through cutting. Dry stone wall terraces characteristic of these olive groves are only partially maintained and collapsed walls are frequently observed (Rizzo et al., 2007). Abandonment is increasing in the area due to the high costs of maintaining the olive groves while harvest is at risk from olive fly attack. Furthermore, the Monte Pisano is at high risk of wild fire during the dry summer period. The patches of olive groves create many SNH connected through the understories and the elements of the terraces system.

The Ecosystem Services as an example to address territorial development

Daily (1997) defined ESs as "the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life". According to the Millennium Ecosystem Assessment (2005), these ESs can be classified into four main categories: provisioning, supporting, cultural (non-marketed) and regulating services. Agro-ecosystems are composed of cropped and SNH and are therefore at the same time providers and consumers of ESs (Power, 2010). Management practices influence the potential for 'disservices' from agriculture, including loss of habitat for conserving biodiversity, nutrient runoff, sedimentation of waterways and pesticide poisoning of humans and non-target species (Zhang et al., 2007). At the same time, good management practices of both the cropped and SNH will reduce the disservices from agriculture while increasing the services from SNH to agriculture and from agriculture to society. From this short description of complex interactions, it becomes clear that land management for ES is an interesting theme to be approached through action research. Due to the multiple spatial and functional relations between the various territorial parts, it is almost impossible to draw clear conclusions about the services an area delivers and receives from neighbouring areas or local land use activities.

The theme of the 2015 course focussed on the relation between ESs and land management and the contribution of ESs to territorial development. Interactions between stakeholders and researchers in a running research project on ESs provisioning by SNH (QuESSA; www.quessa.eu) revealed a gap between ESs expected by farmers and the ones actually provided, or even the problems they perceived as originating from SNH. The causes for lack of ESs provision by the SNH could in most cases be brought back to lack of management or mismanagement of the semi-natural areas. From this mismatch came the idea to organise the Spring School around this theme in order to determine the context for future research in a participatory way. Students and relevant actors were guided to assess the local land use typologies and the services these systems deliver both to agriculture and to society. At the same time, the students were required to find out how stakeholders from the two areas (i.e. the plain and the hills) perceived possible services provided to them from the other area or, vice versa, if they felt their area was providing services to the other area. In this regard, it was clear that talking about ESs facilitated the local land managers to formulate an opinion because in one way or another, everyone receives some services from the territory he/she lives in, and consciously or not, may provide a service to the territory through his/her activities. Hence, the choice of ESs appeared as a relevant and salient example to address the territorial development, though remaining a very complex object to deal with. In an action-research context this means that the students performed only the planning phase by analysing the current situation and identifying the possible openings for innovative territorial management aimed at increasing delivery of ESs desired by farmers while having some consensus on alternative management options for the SNH that should deliver these services to farmers and the society as a whole.

Contents and tool presented in the course

The lecture modules of the Spring School 2015 covered the following theoretical lectures: 'Overview of ESs to and from agriculture', 'Overview of SNH typology and management in northern and southern Europe', 'How do policies affect land use management', 'Farmers' typologies: understanding behaviour and attitude, conflicts and synergies especially in relation to multi-functionality', 'Background concepts of landscape and territory agronomy' and 'Governance aspects of ESs'. The applied module (toolbox) consisted of lectures on 'Spatial

Models' (*Choremes* in French (Lardon, 2006)), 'Mapping Local Spatial Knowledge', 'Methods to perform local stakeholder surveys', 'The territory game' and 'Methods for analysing ecosystem services to and from agriculture'. Finally, the case study area was presented by showing and discussing maps, pictures and statistical data about the land use, economic activities and the population.

This information was deemed sufficient to initiate action research by listening to local stakeholders in the round table discussion. Based on the first impressions emerging after the round table discussion (Figure 1a), students formulated the objectives for the field visit and individual interviews with stakeholders (Figure 1b and 1c). This information was processed fostering spatially explicit outputs that highlighted the location and direction of ESs provisioning within and between the two areas, the hills and the plain. These spatially explicit elaborations were combined with the available thematic maps of the study area.

All the elaborations were targeted to prepare the cards and the maps used for the territory game. The cards join spatially explicit analyses of available data and information with a short explanation of the key findings; they are kept as simple as possible, each focused on a single topic (e.g. drainage channels in the Pisa Plain; demography dynamics in the whole area). The maps are blank mute supports for the first two stages of the game. These maps require the students to identify the limits of the study area related to the spatial extent of the selected theme; in addition, they have to select and represent the relevant infrastructure and spatial objects helping the actors to orient on the map without conditioning their expression (Debolini et al., 2013).

The game was played by selected stakeholders and the students, with the latter covering either the role of players or of game managers (Figure 1d). The territory game was guided by a researcher and two students acted as observers taking notes about the interactions between the players. This is very important for the analyses of the results by the researchers afterwards.

We split the class into two groups, dealing with the hill or the plain area respectively. The groups played on separate tables, each with five players. Each player was given a set of three cards and was asked to select the most relevant one according to his/her viewpoint in relation to ESs' provisioning. The set of cards is given by the game managers fostering the mix across stakeholders. For instance, farmers received cards about water management or demography, whereas local administrators received cards about farming practices. In the first stage of the game, each player presented the chosen card to the other players and together the players had to draw a diagnostic map representing all of the issues they discussed. In the second stage, a new empty map is provided and the game managers guided the players to define a foresight scenario for the local landscape. The players were asked which actions would be needed to develop a shared territorial management of the ESs in the following 20 years. The scenarios need to be exaggerated in a positive or negative sense (paradise or disaster), so as to break the possible locks of the 'business as usual' scenario. In both stages, the diagnosis and the scenario, the crucial aspect is that maps pushed the participants to discuss around a spatially explicit representation of their discussion, eventually highlighting agreements and conflicts. In addition, each group must elect a representative to present the scenario to the other group. Finally, the third stage is the formalisation of realistic actions inspired by the scenario and answering the initial diagnosis. These actions draw upon the intense interactions of the first two stages, thus helping to capitalise the crossing of viewpoints.

Figure 1. Representation of the three forms of direct interactions between students and local stakeholders: a) round table; b and c) individual interviews during the field trip; d) the territory game (*pictures by A.C. Moonen and D. Rizzo*).

Results from the 2015 course

The action learning platform gathered results both on the educational and the research sides. In this section we present the main results that emerged from the five action research steps (defined in the first section) that represented the various interactions between students and local actors.

The round-table discussion with the stakeholders and the interviews performed during the field visit were processed and summarised by the students into four maps about ESs' provisioning. These maps were incorporated into some of the cards played during the territory game. Figure 2 shows the summary of the key ESs and where their service is received. Figure 3 shows the services or disservices agriculture receives from SMH surrounding cropped fields. This issue was mostly highlighted by the farmers. Figure 4 shows the relations between ESs from the Pisa Plain to the Monte Pisano and vice versa, as perceived by the interviewees. A fourth map was created in relation to vegetation management on the Pisa Mountain, because in this area lack of adequate management was frequently indicated as the cause of suboptimal ESs delivery and socio-economic problems in the study area.
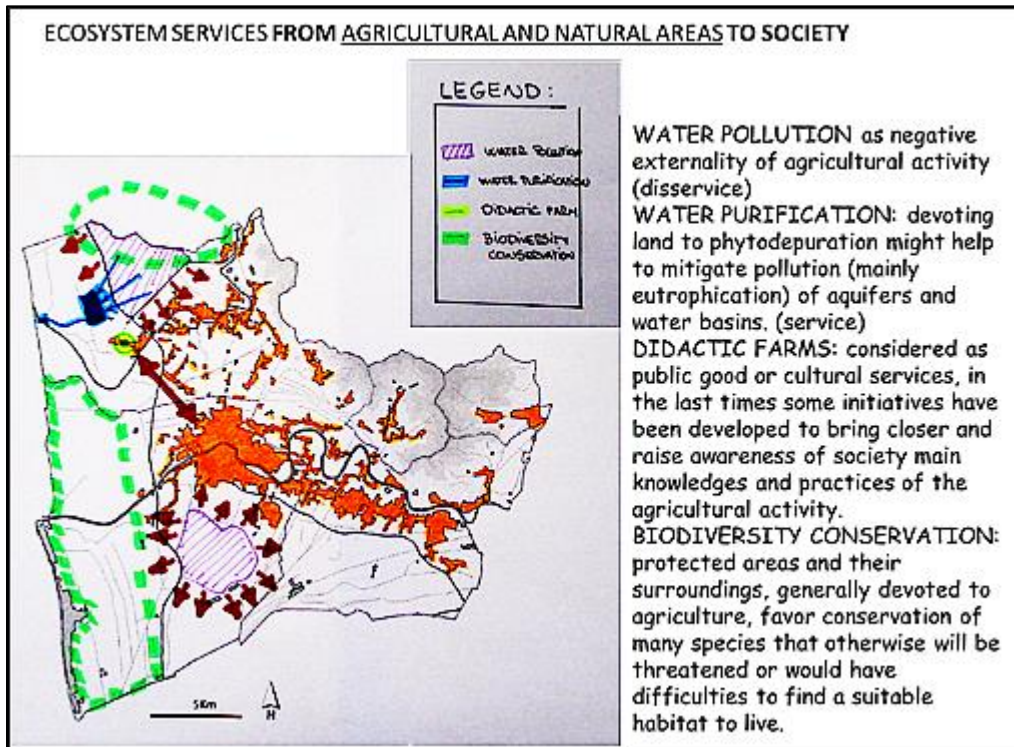
Figure 2. Ecosystem services from agricultural and natural areas to society. The north-eastern grey areas indicate the Monte Pisano and the remaining part the Pisa Plain.
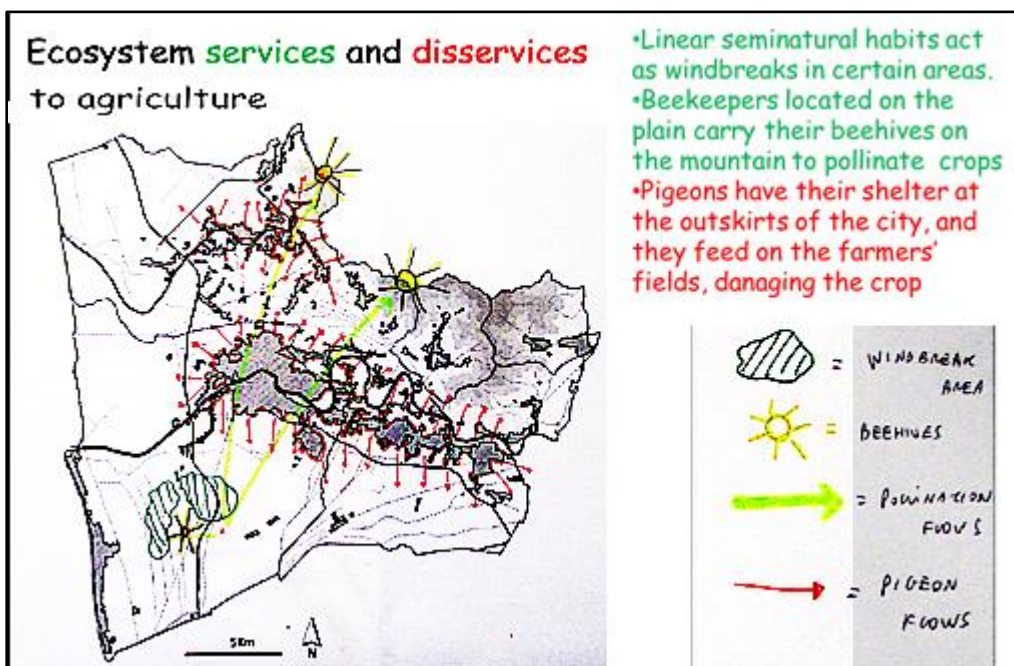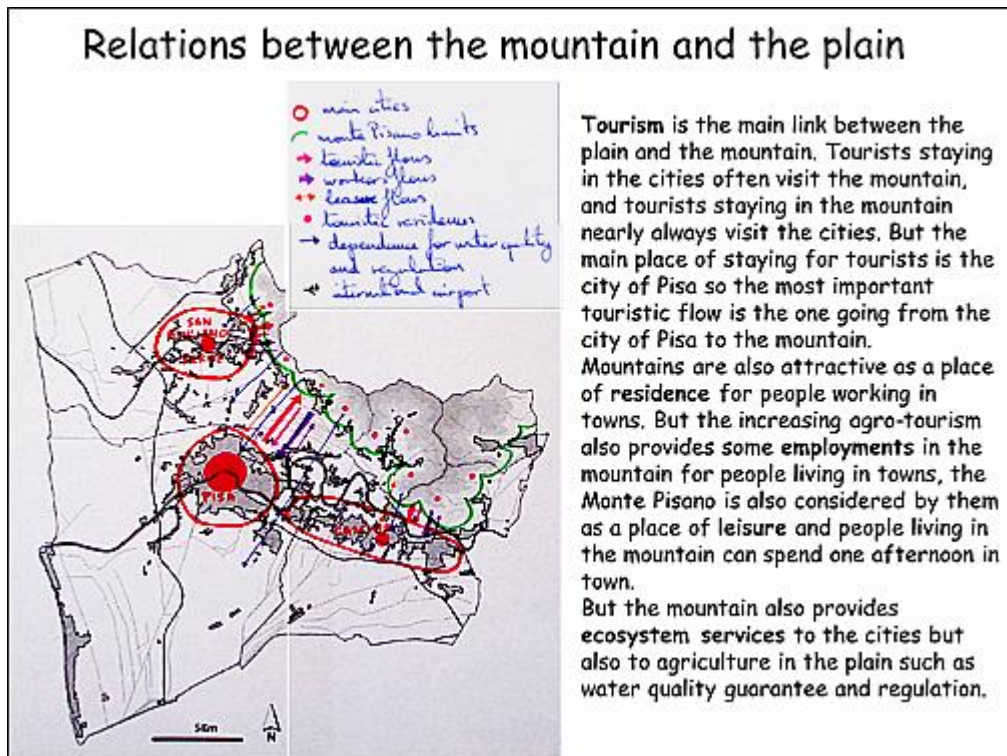

Figure 3. Ecosystem services and disservices to agriculture. The north-eastern grey areas indicate the Monte Pisano and the remaining part the Pisa Plain.

Figure 4. Economic, social and environmental relations between the Monte Pisano (grey area) and the Pisa Plain (white polygons).

From their viewpoint, the stakeholders of Monte Pisano regarded the lack of policy support to sustain olive production as the key issue for land management. In fact they consider that olive groves play a central role in some ESs e.g. erosion control and leisure provision (as manifested by attracting tourists from the region but also from abroad). The abandonment of correct management of pinewoods was pointed out as the main cause of large fires, possibly initiated by the uncontrolled practice of burning pruning residues by olive growers. Overall, a well-managed mountain agroecosystem provides clean water, water regulation and leisure areas to the Pisa Plain. Stakeholders in the Pisa Plain perceived lack of correct management of the drainage system as a key problem for successful agricultural production. Most SNH in the Pisa Plain are woodland areas of a nature park, and are perceived as the origin of wildlife (e.g. wild boars) that damage their crops. Beekeepers value SNH, especially on the Monte Pisano, for the provision of non-polluted flower resources.

Altogether, the action learning platform was successful at providing the students with concepts and tools to elicit and analyse differences in the perception of stakeholders from the plain and hill areas, although these areas are close and within a range of 10 km from Pisa. A common perception was that both areas have a below optimal ESs delivery due to lack of landscape-based management of SNH and infrastructures.

The territory game resulted in a diagnostic map and a foresight scenario both for the Monte Pisano and for the Pisa Plain area. In each scenario the players explicitly addressed the relation they fostered with the other area, respectively the plain with the hills and vice versa, in a 20-year future (Figure 5). As an example, we present the results obtained for the Monte Pisano.
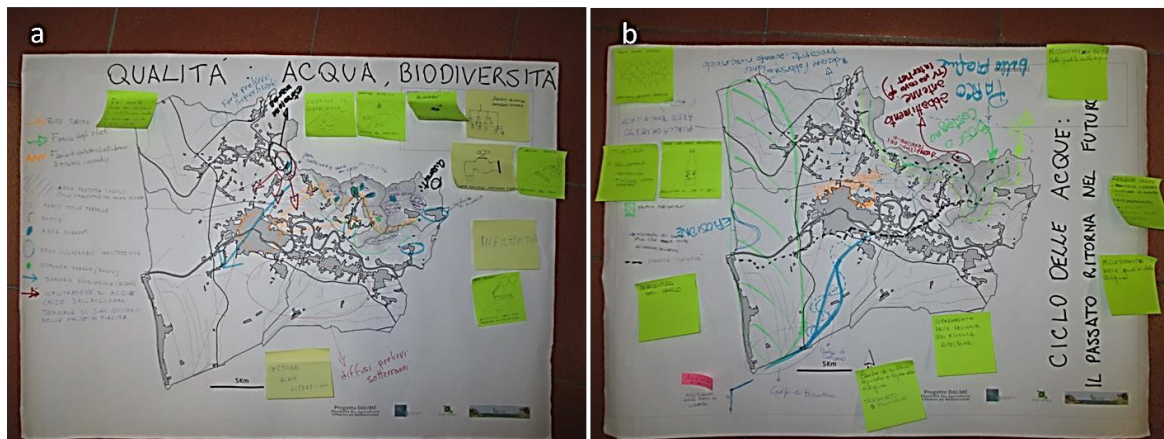
Figure 5. The diagnostic (a) and foresight (b) study of the Pisa Mountain area as a result of the foresight territory game. The diagnostic map is entitled 'Quality: water and biodiversity' while the foresight map is entitled 'Water cycle: the past returns to the future'.

The ESs selected by the various players were biodiversity conservation, water regulation, landscape aesthetics and recreation. Water regulation emerged as the key service of the Monte Pisano, both in terms of production of clean water through infiltration of rainwater and regulation of the water arriving on the Pisa Plain from the mountain area. Correct vegetation management and maintenance of the terraced olive groves, the main agricultural activity, were identified as key actions to be improved. Players unanimously indicated the Monte Pisano as a service provider to the Pisa Plain, especially in terms of water provisioning and run-off regulation. Tourist fluxes was the only ESs they indicated from the plain to the hills. These fluxes indicate further services of the Monte Pisano to the Pisa Plain: the provision of food (olive oil and products from the woods) and recreational space for walking, biking and holiday destinations. In the second stage of the game, the main question was about the future for the services linking agriculture and natural resources of the territory. A revolutionary foresight was presented where participants envisaged giving part of the Pisa Plain back to the water and naturalising the area south of the main river (i.e. the river Arno). This scenario emerged as an extreme workaround for the insufficient drainage capacity of the plain, subject to several reclamations, and also suffering from subsidence near the coast. From the players' perspective such a scenario would increase the attractiveness of the foothills as a residential area and would therefore increase the management of the related landscape. Traditional knowledge would be used to govern the area and to maintain traditional agricultural systems that would be sponsored by agro-tourism. In this scenario, the upper part of the Monte Pisano would be managed for the conservation of species-rich ecosystems where planted pinewoods would be replaced by native chestnut and oak woods (which are also resistant to fires), all in all contributing to increased carbon storage. Energy production for the local settlements could be secured by exploitation of hot groundwater sources and this would contribute to the reduction of the local carbon footprint. In the newly created alluvial plain, rice production was envisaged as the most sustainable cropping system because instead of fighting against the water, which has a high energy cost and contributes to the mineralisation of the soil, it would make use of the water while conserving soil organic matter.

Meta-analysis of the learning process
Building on the learning arrangements presented in the previous paragraph, we analysed the learning process. First, we addressed the contribution of the action learning platform to the topic of territorial development. Then we focused on the viewpoint of the three major participants to this platform: the students, the local actors and the researchers. At the end of the course both students and researchers discussed the strengths, weaknesses and possible improvements for the Spring School.

Knowledge and experience sharing in landscape agronomy
Classical learning and knowledge transfer arrangements like lectures are well-established methods for PhD courses. Also, within the action learning platform, the lectures confirmed their usefulness to provide all participants with a minimum amount of technical information and lexis needed to grasp the content of some of the issues they encountered during the action research activities. As with the previous editions, the participants of the 2015 course had very diverse educational backgrounds; hence some lectures might have been partly redundant for some but very informative for others. Using the landscape and territory agronomy approach and the ALaDyn framework (Benoît et al., 2012) helped the students to locate the various lectures inside the complete picture (cf. Marraccini et al., 2012). Beforehand, this framework helped the teachers to define the issues that needed to be presented to the students. The goal was to provide them with the necessary knowledge and tools for the action research approach to the case study. After this necessary alignment of knowledge, the course was mainly based on experience sharing between the researchers, students and stakeholders.

In the course, we paid attention to referring to shared terms and definitions. Yet the students faced the lack of this harmonisation in the interactions with the stakeholders. In a real action research situation there would probably be a first phase where all participants would agree on commonly used terminology and definitions and professionals would have the opportunity to explain to other participants which are the technical issues related to their activities. For example, it is difficult for a farmer to understand why beekeepers are upset about the use of herbicides. For the farmer herbicides kill a plant, not the bees. However, there are side effects of herbicides on bee colony health and this technical knowledge needs to be shared by all participants of the action research group otherwise it will cause miscommunication. On the course the stakeholders do not contribute to the alignment and this sometimes causes misunderstandings during the interactions with the students. On some occasions the researchers, who are always present during the interviews and discussions, needed to intervene to provide clarification. This type of gap was also identified in discussions between various stakeholders, for example farmers discussing with policy makers. The same terminology may have completely different meanings for these two groups and they are hardly aware of this. A solution would be to invite the stakeholders to participate in the entire course session and take this as a life-long-learning event also for their own professional development. However, for these professionals it may be difficult to leave their job for an entire week.

Students' viewpoint
Students appreciated the territory game although they felt it was not easy to prepare and to manage. The first problem in an international learning context is the language barrier. Often the stakeholders do not speak English, therefore the game needs to be played in the local language. Foreign students have difficulty in following all interactions even though teachers translate. Connected to the language problem, there is also a cultural discrepancy. Sometimes to understand the dynamics in a group of stakeholders with opposing viewpoints, you need to

know their background and life style. Of course, in a one-week course this cannot be expected from foreign students. However, they grasp the principle and they can interpret the results. This year's students also regretted that the course programme skipped the conclusive analysis of the territory game. In fact, from the researcher point of view, that would be the conclusive step in the action research process, before re-iterating interaction with the stakeholders about the findings and the consequence. However, to be able to include that aspect in the Spring School, more days would need to be added and that would result in objections about the length and intensity of the Spring School (which in fact happened in the year we decided to have a 7-day long Spring School). Since it is not the objective of the Spring School to provide a full course on action research, we think that in the end a 5-day course is long enough to give students the possibility to grasp what action research is about and where the difficulties lie. Experience with action research will have to be acquired in the real world, in a real action research project, but we think this course is a good first step for getting acquainted with some benefits and difficulties of this participatory approach to research on territory management.

Stakeholders' viewpoint

Stakeholders are involved in the course as a learning aid for students. Indeed they are normally very motivated to participate. Some of the actors involved in 2015 also participated in past courses. Their enthusiasm is a clear indicator of their interest in the course, but so far we have never interviewed them to formalise their feedback on the learning process. Since they are invited as contributors to the course, they are more relaxed than they would have been in a real life case study on the subject. This may facilitate interactions and discussions amongst them. We have the impression that the analyses presented by the students of the territorial issues were received by the actors as relevant issues and not as criticisms. We have already discussed the possibility of inviting the stakeholders to participate full-time in the course in order to make it a learning experience for them as well; although time and language clearly appear as the main obstacles to making this a success. Alternatively, we could organise these Spring Schools in local languages, with only local students and stakeholders. That would however make it a different type of event.

Researchers' viewpoint

The outcomes of the territory game are unpredictable and are always real eye-openers for researchers. For the example, we developed the ESs theme questioning the services provided by agriculture and by SNH. However, the action learning platform, and specifically the territory game, clearly highlighted that stakeholders perceived a lack of ESs provision eventually determined by the incoherent land management. In the end the researchers were also led to widen their perspective and break the silos. The interesting aspect of the 'ESs' theme is that it is wide enough to comprise various stakes at territory level and has the power to identify relationships between stakes that are often treated separately. Focussing on the results, the dissymmetry emerged between the hills and the plain in the provision of ESs, with the Monte Pisano providing more services to the plain. The spatially explicit and integrative methods thus helped to highlight the relevance of the landscape morphology to design innovative landscape management. The goal would be to account for this disparity in the ESs provision and put it in the balance to, for instance, compensate for some dependencies of the hill from the plain (e.g., job opportunities)

Conclusions

'Ecosystem service' is a new term for a variety of benefits that are often not recognised by farmers as special features, but seem intrinsic in agriculture and landscape management. It is a new word for something that has always existed, but in this way policy makers at the EU level (in the CAP) have found a way to stress it and assign a value. By selecting the ESs as an example issue for our action learning platform we realised that it is a very wide concept including a lot of diverse aspects, as both ecosystems and society are affected. More generally the course programme that alternated lectures and action research methods proved to be formative for the actors and the researchers as much as it was for the students. For a future course, the analysis of the territory game could be done by students who are interested in this activity as part of a final examination to obtain the full amount of study credits which nowadays are obtained after submitting a final report on the Spring School. However, it needs to be stressed that the territory game can also simply be used as a tool to set the scene and get acquainted with the territorial studies, thus stressing the use of this method for cross-checking research results with the stakeholders and hybridising academic and local knowledge, without performing an in-depth foresight study.

Hybridisation of available hard data from previous research projects with local knowledge helped students to become aware of the complexity of the territorial system and all social and ecological interactions. Altogether, the various approaches and tools that were mobilised during the course highlighted the need to capitalise on the existing knowledge and to operationalise it by crossing different points of view and academic silos. When it is well prepared, the cross fertilisation between an education programme and an action research approach can provide far more results than a single-discipline research project, mainly thanks to the outbreeding between student, researcher and actors' viewpoints.

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Participation in extension programme planning for an improvement of smallholders' livelihoods in the MENA region

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Abstract : Farming systems all over the MENA (Middle East and North Africa) region are formed by 'resource-poor' smallholdings. These are often subsistence-oriented family farms with limited land availability, few capital (including animals) and limited access to inputs. Farmers usually are not well-educated or are illiterate. Despite their importance for the region and an urgent need for system development, these farmers are often neglected - particularly by extension. Even if extension programmes exist, they all too often neither cover the knowledge demand of smallholders nor fit to their learning abilities. In other words: extension curricula are inappropriately designed with respect to training content and methodology. Reasons might lie in a centralisation of planning processes and a lack of communication between extension staff, programme planners and their target groups. However, we assume that there is a crucial need to increase smallholder farmers' participation in agricultural extension programme planning. This paper aims at developing some general strategies to improve participation in extension programmes considering the specific circumstances and resources availability in the region. Part of this is an analytical framework of the possible effects of participation in extension on the livelihood of smallholder farmers. The latter might be useful for valuation of specific cases and thus for integration of situational analysis into regular programming. In-so-far the paper serves two purposes: it provides the basis for an empirical analysis; and in the long run for institutionalisation of participatory curricula development in the extension systems.

Keywords: Participation, MENA region, extension, sustainable livelihood

Introduction

All over the MENA (Middle East and North Africa) region, extension is regularly implemented in the form of governmental extension. It is seen as an important development factor, but often both farmers and extension personnel themselves express dissatisfaction with the quality and frequency of their interactions. Services provided by the governmental agricultural extension have no significant influence mainly because they are not directly related to the needs of farmers (Al Shafi'i, 1996). A reorientation of the extension programmes is necessary to improve the congruence of technical messages and communication strategies (Saito & Spurling, 1992).

This paper aims at developing some general strategies to improve participation in extension programmes considering the specific circumstances and resources-availability in the region. This includes an analytical framework of the possible effects of participation in extension on the livelihood of smallholder farmers. The paper firstly discusses, on a more general level, possible effects of extension on changing livelihood strategies of smallholders, with the extension system in Egypt serving as a case. For this purpose, the Sustainable Livelihoods Framework has been adapted into an analytical framework. The chapter following analyses the role of participation in extension processes, with a focus on programming, i.e. the planning

and re-planning of extension programmes. It then identifies factors which influence participation. We assume that communication plays an important role, and thus have a closer look at communication factors. Finally, we conclude with some general strategies to extension programming. Methodologically the paper is based on a literature review and own experiences of one of the authors (Hassan) in the Egypt extension system.

Extension for sustainable livelihood of smallholder farmers in the MENA Region

Smallholder farmers' livelihood

Box: Typical farmer in Egypt *(a relative of Nagwa Hassan)*

He is 54 years old and married. Both he and his wife are illiterate. They live in an extended family and have two sons and a daughter. The sons help their father with field work, and the daughter helps her mother with housework. They own 0.84 ha and rent another 0.93 ha. They have a cow, a buffalo, a donkey and poultry (hens, duck and goose). Their house has only few pieces of furniture. The only source of income is agriculture. He plants wheat, rice, maize, tomatoes, eggplant and sometimes onions. His wife helps him to cultivate and harvest the crops. She also bears the domestic and household work and is responsible for milk production and selling of poultry. He suffers from anaemia and digestive system problems. They do not have any professional communication network or communication tools such as the internet or fax, and thus depend on relatives for a social net. They get their own seeds from the previous season or as a subsidy from the agricultural office; fertilisers they must buy from traders or the agricultural office; pesticides can be bought only from traders, who must be paid at the latest after the harvest season. He does not know a village extension worker and has never participated in any extension activity or training. He feels neglected and marginalised. He suffers from the high price of equipment, high costs for harvesting, and conflicts on irrigation water.


In the MENA region, the majority of farmers are still smallholders. Thus it is quite difficult to characterise "smallholders" because they are by no means a homogeneous group (Chamberlin, 2007). They have in common that they are *"… a people who seek to best satisfy their priorities from a combination of activities. These activities compete for limited resources. Moreover, they face a set of local economic, institutional, natural, social and cultural circumstances, which they cannot significantly influence. Scarcity dominates all aspects of their life"* (Hoffmann et al., 2009). In other words: they are subsistence rather than market oriented; are short of resources such as land and capital and other assets; they have limited access to inputs and technology; and to formal financial institutions for capital of any sort. Usually they have no insurance against risks and no capital reserve to balance losses and thus are suffering from relatively high degrees of vulnerability (World Bank, 2003; Dixon et al., 2004).

Farming is the principal source of income and the family provides the majority of labour (Berdegué & Fuentealba, 2011; Narayanan & Gulati, 2002). In the MENA region, smallholders often are tenants who own only small and scattered pieces of agricultural land and depend mainly on animal production (cf. Box). Women play a key role. They are involved in field work and domestic and household work, breeding poultry, and they take care of livestock to get milk

and its products. But often they do not have access to key development resources, services and opportunities (Nederlof et al., 2008). Sons regularly look for off-farm work in their village or in a nearby town or even in other countries to improve their life. Daughters help with domestic and household work, breeding poultry etc.

The "means of making a living" in general (Adato & Dick, 2002), and more specifically the different capabilities, assets, and activities of (poor) people to secure the necessities of life, is nowadays often described by the term livelihoods (Ellis 2000; Marisa et al., 2013; Chambers & Conway 1991; Scoones, 1998). Livelihoods are multidimensional and consist of various aspects of living such as the farm income, food security and nutrition as well as access to health services and education for rural children (Swanson & Rajalahti, 2010). The unit of "livelihood" is usually the farmer or the farm household. Poor households' livelihood is usually highly diversified, including farm and non-farm activities (Adato & Dick, 2002; Yaro, 2006). Livelihoods of smallholder farmers in the MENA region include on-farm activities (such as cash crops, fruit, vegetables, tree crops, horticulture, livestock, poultry and farm wages) as well as off-farm activities (such as non-farm wages, micro-enterprises, salary, transfers, remittances, pensions, credit and savings) (Dixon et al., 2001).
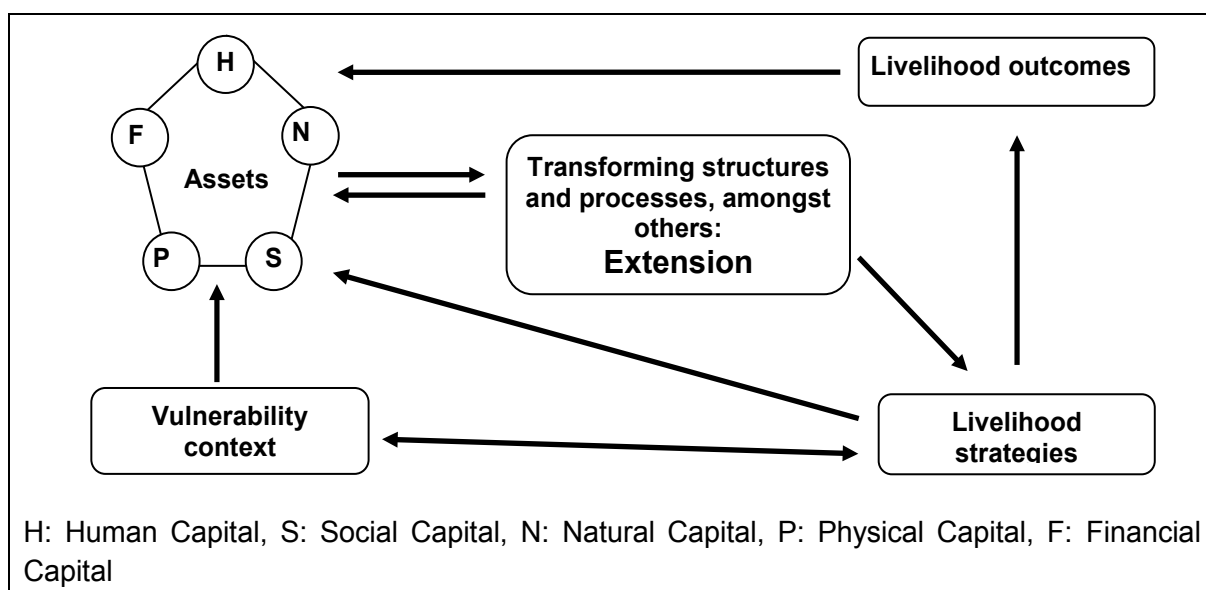
Figure 1. The Sustainable Livelihoods Framework (simplified) and the role of extension
(Source: Chambers & Conway 1991; DFID 1999, modified)

Small farmers' livelihoods are seen as sustainable if they can cope with and recover from stresses and shocks, and maintain or enhance their capabilities and assets while not undermining the natural resource base (Scoones, 1998). Moreover, they should contribute net benefits to other livelihoods at the local and global levels, in the short and long term and provide sustainable livelihood opportunities for the next generation (Krantz, 2001).

Table 1. Selection of items to measure smallholder farmers' livelihood *(Source: Chambers & Conway 1991; DFID 1999, modified)*

Factor	Variable
Farm assets	
Human capital	• Skills, attitudes, education, experience, labour force, health
Social capital	• Networks, groups, relationships (trust and support), access to institutions
Nature capital	• Land, drinking and irrigation water, livestock
Physical capital	• Water, energy, transport facilities, sanitation, equipment for production, communication tools
Financial capital	• Credit, remittances, pensions, wages, savings
Livelihood strategies	
• On-farm	• Crop, vegetables and medical plant production; livestock and poultry
• Off-farm	• Regular and irregular (migratory) work
Livelihoods outcomes	
• Income	• Yield, numbers of livestock and poultry
• Use of natural resources	• Access to land and water, use of pesticides and chemical fertiliser
• Wellbeing	• Getting services of education, health, safety, security and entertainment
• Food security	• Access to enough food for health and an active life

A well-known heuristic model helping to understand - and improve - livelihood "strategies" of rural people is the Sustainable Livelihoods Framework (SLF) (Figure1) of the Department for International Development of the United Kingdom (DFID). Livelihood strategies are combinations of activities that ensure the livelihood goals. They include production, investment and reproduction activities both on-farm and off-farm. The ultimate goal is an increasing capability of farmers to maintain or improve household assets and to sustain their livelihood "outcomes", namely reduce poverty and vulnerability, increase income and food security, and finally improve wellbeing of all household members (de Janvry & Sadoulet, 2000). Livelihood strategies depend on the assets of the household which themselves are strongly affected by the vulnerability context (weather extremes, climate change etc.). Table 1 gives an overview of - measurable - indicators which might be useful to describe and evaluate the livelihood factors of smallholder farmers in the MENA region.

Extension as transformation structure and process
The SLF distinguishes between two mechanisms which "transform" assets into livelihood strategies and vice versa: structures and processes. Structures are *"… the institutions, organisations, policies and legislation that shape livelihoods. ... They operate at all levels, from the household to the international arena, and in all spheres, from the most private to the most public*" (DFID, 1999). DFID describes them as the hardware. Processes in contrast are the software: "*They determine the way in which structures – and individuals – operate and interact*" (ibid.). Processes are multidimensional, overlapping and often bearing conflicts.

Extension is both, part of the transformation structures and the processes (Figure 1). On the one hand it is a set of governmental, non-governmental and private organisations (Anaeto et al., 2012) which form, together with organisations from research and the users, an agricultural knowledge system (Nagel, 1979). Communicative linkages and institutions determine whether the system as a whole or the extension subsystem is working effectively and efficiently (ibid.).

On the other hand there are manifold formal and non-formal processes of bilateral, group and mass communication, of knowledge and information exchange, and of supporting decision making (Leeuwis & Van den Ban, 2004; Tang, 2013). The main goal is to increase farmers' capabilities to solve problems, i.e. to be able to cope with stress and shocks, to respond to adverse changes in conditions, and to gain access to and to use services and information sources (Chambers & Conway, 1991). In other words: to help farmers to sustain their livelihoods. The focus for MENA's small farm households, especially the rural poor, is to increase farm income (Swanson & Rajalahti, 2010), which crucially depends on maintaining or increasing crop yields and livestock production (FAO, 2005). The challenge from a macro perspective is to build capacities to improve the current livelihoods of the poor with respect to their circumstances and a sustainable use of resources, thus reducing their vulnerabilities (McNamara, 2003).

Extension systems in the MENA region are regularly ministry-based approaches. Only in a few countries such as Jordan, Lebanon, Syria, United Arab Emirates and Yemen, do the private sector, NGOs, and farmers' associations exist (FAO, 2005). The Egypt System as shown in Figure 2 is a good example. Agricultural extension there is a government-operated, ministry-based and thus strongly hierarchic system (Rivera et al., 1997). All extension operates under the Central Administration for Agricultural Extension Services (CAAES) which only recently became a subsidiary of the central Agricultural Research Centre (ARC). The main objectives of CAAES are to increase the production of strategic crops, to improve linkages between extension and research, and to further develop the extension approach through monitoring and evaluation (M&E). Both the efficiency and effectiveness of the whole knowledge system are seen as weak. Linkages with research are poorly institutionalised (Shalaby et al., 2011; Zahran, 2003) and thus extension's contribution to developing research plans is negligible which results in a relatively low user orientation in research (FAO, 2005; Shalaby & Mikhaiel, 2014).
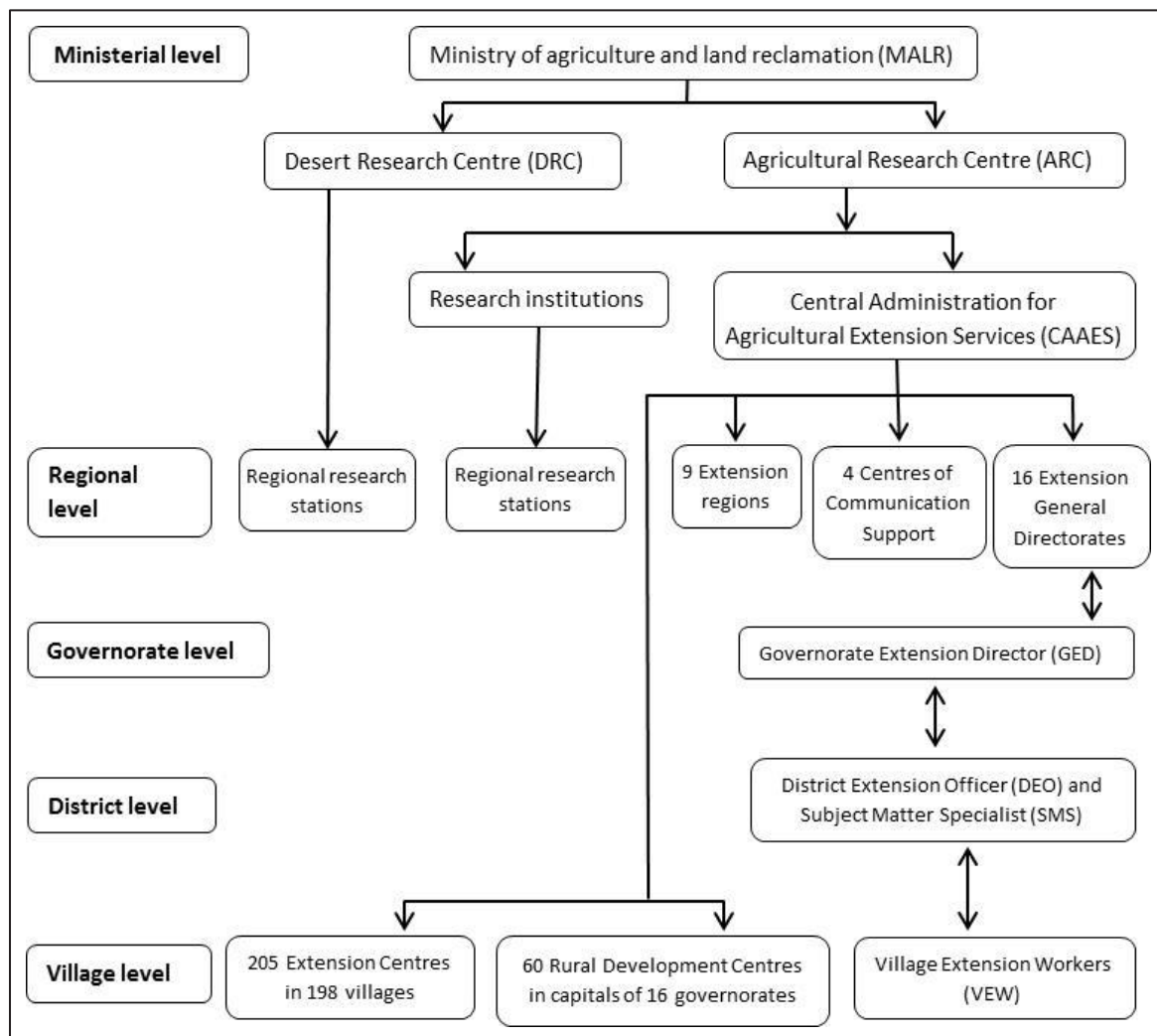
Figure 2. Organisation structure of research and extension in Egypt *(Source: adapted from (McDonough et al., 2015))*

Females are largely underrepresented in the public extension institutions. The percentage of extension workers with university degrees is relatively low and all extension staff on the lower levels are poorly educated. The village extension workers (VEWs) in particular have few technical skills and knowledge. A majority of them have a secondary-level education. Furthermore, their work is made difficult due to a lack of transportation facilities which hinder them from establishing regular contacts with farmers and interaction with higher levels of the extension hierarchies (Abdelhakam, 2005; Shalaby et al., 2011).

Participation in extension programming

In MENA, as in many other developing countries, the main means of extension are personal advice and short to medium term training. We have to distinguish between the extension programmes and practical vocational educational measures under these programmes. Programmes set the framework for the concrete activities of extension. Advisory and other educational measures such as training are organised under these programmes. Therefore, curriculum setting of training is always strongly influenced by the programmes.

Ideally the programmes should serve as an organisational base and, even more importantly, a strategic plan for extension work. As an organisational basis they help the agents to achieve

the goals of extension (Harder, 2009) since the programme provides a robust basis for extension activities which are planned and time scheduled. They also create a basis for anticipating what resources will be needed (Oakley & Garforth, 1985). Human resources development is one of the topics of utmost importance, including training, performance assessment and supervision of extension agents (ibid.). As a strategic planning instrument they should systematically identify and assess the needs of the extension clientele and subsequently determine objectives and guidelines for extension work. It is quite obvious that they should be oriented towards livelihood outcomes, and that they should consider all dimensions including ecological goals (McCaslin & Tibezinda, 1997). The term "programming" here is used for all planning activities for the programmes concerning the strategic planning as well as the organisational settings. Strategic plans assess the needs through situational analysis and set priorities for the extension and training activities including the framework curricula development of vocational education measures. On an organisational level the tasks are developing management plans, marketing and recruiting (Gibson, 2001; McCaslin & Tibezinda, 1997).

But even if extension programmes exist, they all too often neither cover the knowledge demand of smallholders nor fit to their learning abilities. In other words, training curricula are inappropriately designed with respect to content and methodology. There seems to be neither established processes nor approved instruments which allow assessing the knowledge demand and defining the training need in a way that is suitable for the existing extension systems. This often leads to disregard of the real needs of the target groups, particularly to ignorance of the voice of the poorest farmers (Nagel et al., 1992; Akinnagbe & Ajayi, 2010) and in consequence to an inadequate flow of knowledge and information to and from farmers. Training curricula are often poorly defined, without consideration of the specific situation and without paying attention to the quality of the learning and decision making process (Hoffmann et al. 2009).

Much has been written on participation, and meanwhile there is somehow a consensus that participation is a condition *sine qua non* to improve both the effectiveness and efficiency of development approaches; and extension programming is definitely such an approach. Participation in agricultural extension is also a philosophy and an instrument of development (Nagel et al., 1992). As a paradigm, it means a general orientation towards the end users which is expressed by the idea of "farmers first" (Chambers & Conway, 1991). As such, it is "… *an objective in itself to see the success and empowerment of individuals and communities in terms of acquiring skills, knowledge and experience, leading to greater self-reliance*" (Anandajayasekeram et al., 2008). As a process, participation refers to the whole extension cycle of situation analysis, planning and implementation, and, most importantly, the decision making of a programme namely the setting of its objectives and its evaluation. The situation analysis is important as here the need is (or should be) assessed in a systematic way. Information on a farmer's situation is to be collected aiming at an understanding of their problems from their perspectives, of their priorities, their livelihood strategies and their resource constraints (Apantaku, 2006). Such information helps to identify the real need for extension and training, and how to build or adjust extension programmes. Participation in the evaluation process helps to identify strengths and weaknesses and re-adjust the programmes.

In MENA, however, extension systems are organised in a strongly top-down way. Centralisation means always that programming is operationalised at higher levels of the hierarchy and carried out by well-educated staff. Participation of the target groups is not

foreseen. As there is little experience with participation in programming and as involvement of people in rural areas demands resources, the question arises of how target groups can be realistically involved? There exist several levels of participation: from passive participation through information seeking and consultations to more active participation by collaboration or co-action. The highest level is achieved when processes are self-driven by actors (Pretty, 1995). However, we think that these forms are rather a continuum than clearly defined levels. What is obvious is that the "higher" the level of participation is and the more active the target groups are the more resources are needed for direct communication, process moderation etc. As resources are limited, it may be that "*full participation is not always feasible or desirable*"(Kanji & Greenwood, 2001) and that for the situation in MENA even passive forms of participation might be better than non-involvement. The question is on priorities: who can and should participate, how, and in which phase(s) of the programme?

Participation is strongly linked with all kinds of communication. It is widely known that the utmost constraint to participation is a general lack of communication and interaction between and among extension workers and farmers. With respect to Berlo's (1960) fundamental model of interpersonal communication, the most important factors are with the sender and receiver, the message itself and the communication channels. For the relationship between farmers and extension staff, particularly decision-makers in MENA, we think communication factors as shown in Table 2 play an important role.

Regarding the actors, in principle all participants (rural people, extension workers, managers and researchers) should be involved, but particularly those who know best about the situation on site: the smallholders and the village extension workers (VEWs), who are often farmers themselves. Farmers are the end users of extension programmes and finally decide whether programmes are sufficient.

Table 2. Overview on factors influencing communication between farmers and extensionists, and selected indicators for the specific situation in MENA region.

Factor	Indicator
Education level	• Years in educational system • Certificates
Attitudes	• Trust and respect towards smallholders / towards extensionist
Social network	• Membership in organisations • Personal relationships with key persons of community / decision-makers
Health	• Status, diseases
Message	• Does the content meet the needs? • Sources of agricultural information and advice • Access to agricultural information
Channel	• Access to agricultural information • Communication tools (Phone, FAX, radio, TV, internet etc.) • Understandability of message
Intensity	• Persons known or unknown • Quality and quantity of contacts

	• Persistence / change of clients
Gender	• Number and type of work of women
	• Women's' access to extension services
Experience	• Work years in extension / as farmer
	• Attendance in extension or training activities
Time constraints	• Farming activities
	• Non-farming activities
	• Extension activities

(Sources: Berlo, 1960; DFID, 1999; Anandajayasekeram et al., 2008; Teimouri et al., 2014; Chamberlin, 2007; Berdegué & Fuentealba, 2011; Narayanan & Gulati, 2002)

In reality, only a small minority of smallholder farmers have access to training (Arous et al., 2013; Akinnagbe & Ajayi, 2010). This is particularly the case for rural women and youths. Smallholder participation in strategy development is virtually non-existent. If farmers are involved, these are usually prosperous and wealthier farmers or village leaders who are not necessarily familiar with the situation of smallholders. Due to the established top-down planning processes which do not foresee participation in decision-making, farmers are often not even asked about their perspectives. Furthermore, administrative procedures often do not meet the field requirements and realities (Gikunda & Mutegi, 2015). At the farmers' and the VEW's level factors influencing participation are amongst others (Teimouri et al., 2014; Chamberlin, 2007; Berdegué & Fuentealba, 2011; Narayanan & Gulati, 2002):

- Education level: most farmers and VEWs are less educated or even illiterate. They cannot even express their interests or perspectives and feel uncomfortable in relation to (higher) extension staff;
- Health conditions: anaemia and malnutrition are widespread amongst poor people;
- Assets: poor farmers do not even have access to extension services and new information. If they cannot pay extension, they do not participate in programmes, thus they do not demand anything from extensionists;
- Time constraints: many poor people spend a long time searching for off-farm work. VEWs have many tasks other than agricultural extension activities (often they are farmers too);
- Qualification for participation: neither farmers nor VEWs are trained in participation processes as the focus is on technology transfer.

Some general strategies to improve participation in extension programming
It is a bit like a treadmill: because smallholders cannot afford services such as extension they depend largely on their neighbours who also belong to the poor, they do not have access to innovative knowledge and information and techniques, and in consequence remain poor.

Extension programmes, the frameworks for practical advisory work, play in our opinion a crucial role as a framework and orientation for extension and training activities on site. The main reasons for often inefficient programmes in MENA lie in a centralisation of planning processes and a lack of communication between extension staff, programme planners, and their target groups (Zahran, 2003, McDonough et al., 2015). We assume that, in order to meet the needs of the clients, there is a crucial necessity to increase participation of those who

know best about the specific situation in designing and re-designing the programmes: the farmers, and the village extension workers (VEWs). McDonough et al. (2015) for example found positive influences on the performance, production and perception of farmers and VEWs after they were involved in a project in West Noubaria, Egypt.

Due to poor resources, time constraints and social hierarchies in combination with low education levels of farmers and VEWs – which are the main constraints as reported by Shalaby et al. (2011) - they will not actively demand changes to the programmes. Thus it is up to the extension decision makers to involve smallholders. They have to come to the rural areas to analyse the situation and try to involve smallholders as actively as possible - be it through searching for information, giving incentives etc. It might be trivial, but just asking farmers about their needs could be a beginning (Chambers & Conway, 1991; Oakley, 1991; Chambers, 1994).

It should be mentioned that "participation in programming" also requires education of those who participate. Farmers, and maybe also VEWs, need to be educated on how to analyse their production systems with respect to problems, potentials and opportunities, as well as on how to identify their needs. VEWs should be trained on communication skills in general, and in extension planning, implementation and evaluation of extension (and training) activities in particular: "*For VEWs … it would require substantial training in how to strengthen farmers' capacity to assess their business and opportunities and make well planned decisions in farm management, rather than just provide technical advice*" (McDonough et al., 2015). This would also strengthen their position and build capacities to influence programming.

Programmes should assess the needs of the clients i.e. the smallholder farmers in a systematic way (van den Ban & Hawkins, 1996). Ongoing planning processes based on an institutionalised M&E System in which the users (smallholder farmers and VEWs) are involved, must be established within the respective extension system. What then is missing is an assessment tool or a methodology for the (participatory) situation analysis which provides information on both the knowledge needs and training requirements of specific target groups, and "need" on a meta level – who to involve in programming and how. We assume that it is thus important to analyse both the livelihood situation of the smallholders, as well as the communication situation between extension staff and their clients, in order to programme both the extension and training content and the means of communication – including decisions on the levels and tools of participation in programming.

The framework developed in this paper, including factors and indicators with special emphasis on communication, is seen as a first step. It could be useful for valuation of specific cases and thus for integration of such approaches to situational analysis into regular programming. Insofar the paper serves two purposes: it provides the basis for an empirical analysis; and in the long run for institutionalisation of participatory curricula development in the extension systems.

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