

SAGITER

Transmitting agro-ecological knowledge



Theoretical basis

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Foreword

Sagiter is the result of a "study action" led over three years by [ten partners](#) stemming from seven countries of Europe. This program was the object of a support by the European Commission within the framework of the program Léonardo Da Vinci.

It joins in a dynamics of valuation of agroecological knowledges and ingenious systems developed over time on territories.

In this context, the device of training finds all its place in the evolution of the representations, the transmission or the development of techniques and knowleges, the consolidation of networks and social links.

To favor a better consideration of these knowledges, their mode of acquisition and transmission, **Sagiter developed educational resources aimed at the trainers, the teachers and the agricultural advisers**



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Transmitting agroecological knowledge

The notion of knowledge is multi-faceted and it is not easy to define in an unequivocal manner.

The French language makes a distinction between “savoir” and “connaissance”, which in English can often be translated by the single word knowledge.

Knowledge basically means the condition of knowing or awareness of a fact.

How can one characterise agroecological knowledge?

In other words, knowledge is intimately linked to the subject carrying such. When knowledge becomes a skill, it is professionally or scientifically validated. The positivist (1) and empirico-inductivist ¹conception of sciences, in compliance with an absolutist versions of the truth, invites one to envisage skills as universal, objective, neutral, de-contextualised and certain.

This leads to the justification of a teaching method on a training mode which does not significantly call upon students' ideas or their active participation (Pope & Gilbert, 1983). The construction of a skill is founded on a principle of neutrality, knowledge merely being the reflection of a reality made objective by science.

Epistemologists such as Thomas Kuhn or Bruno Latour demonstrate the bonds between science and social organisation. Skills are not exempt from strategies by scientists to ensure their recognition, or from pressure by lobbies to invalidate certain elements in favour of others which better meet their objectives.

In such cases, the said skill loses its neutrality. We therefore start to consider certain skills as uncertain, biased, contextualised and solely related to the subject which enabled their development. The frontier between knowledge and skill is consequently being broken down. A skill could be resumed as knowledge which has been analysed by a professional and/or scientific community.

One of the key characteristics of agroecological knowledge is that it evolves within **complex** systems, and in relation to living organisms.

It has therefore been developed in close cooperation with living organisms and is related, at least in part, to an “*ecotraining*” process ². It is consequently associated with an element of **uncertainty** as related to living things.

These skills are carried by implicit or explicit values associated to a model of agriculture, to a given concept of relationships with living things or to the societal change that the said skills may represent. With regards to the levels of uncertainty, **committed**, they are potentially a source of controversy between citizens (including scientists), and questioned not only with regards to their validity but also with regards to the changes they induce.

1 **Positivism** is a group of movements which consider that only knowledge and study of facts, verified by scientific experiments may describe (and not explain) global phenomena.

2 **Eco-training** is learning through direct contact with the environment, in complement to self-training and training with a third party. Cf. The tri-polar theory of training: Gaston Pineau (1991).



For example, where the partners of Sagiter made the choice to exclude artificial agro-ecosystems (such as hydroponic cultivation in greenhouses) as potential vectors of agroecological knowledge, disagreements arose with regards to the necessity of having soil as a mother substrate, to the risk of automatically excluding a mode of agroecology which is developing in the urban world.

Agroecological knowledge is also based on **contextualised** skills. In other words, based on an empirical ³verification in a defined situation. It is therefore less based on a demonstration justifying its validity than a procedure of repeated confrontation to a real situation, with attempts to establish universal skills sets consequently becoming suspect.

We can finally consider agroecological knowledge in terms of **transdisciplinary** skills. These are both related to a discipline and are interdisciplinary but are also outside the said disciplines (Nicolescu, 1996). These are skills which cannot claim any form of objectivity. Science alone cannot define reality; the related skills are associated with sensorial, sensitive, imaginary, affective, spiritual or ethical dimensions and are therefore intimately linked to the person holding such.

This doesn't mean that the knowledge is not prone to any form of objectivisation but that the objectivity is not considered as a dogma.

Agroecological knowledge is differentiated from an unequivocal subject to object relationship in order to enable consideration of a relationship of subject to subject. It may therefore be apprehended through different realities enabling unified identification of the subjective and objective dimension of our relationships with living things.

So, agroecological knowledge is complex, uncertain, committed, contextualised and transdisciplinary, and the method of 'training' therefore requires in depth analysis and implementation of adapted procedures.

3 **Empiricism** designates a group of philosophical theories which consider that experience is at the origin of all knowledge and all aesthetic pleasure. **Inductivism** is a normative epistemological conception according to which one cannot and must not build knowledge solely on the basis of observation, without a preconceived idea of the real situation.



How do we understand the action of training?

The transmission of knowledge leads us to question the learning processes involved and consequently analyse best adapted teaching methods.

What do the educational theories tell us ? Psychology studies carried out over the past 60 years, without considering these as prescriptions to be followed, reveal different ways of thinking which may represent guidelines for the person responsible for training in his or her professional environment. Three key pedagogical movements are generally acknowledged.

The first reflects the model which dominates in school institutions, that of training by giving a lesson, lecturing, advising the student. There is the savant and the non-savant. The concern for the trainer is to define the best method for rendering the knowledge teachable through the quality of what is said, because this will define that which is understood.

Next, training can also aim at the acquisition of professional behaviours, attitudes or gestures. It would therefore involve leading the learner towards producing responses expected for given problems, in other words the person must be capable of....

The trainer will seek to place the learner in situations which may instil new automatisms. This particular mode of training places us in the perspective of behaviourism developed notably by John Broadus Watson and Burrhus Frederic Skinner.

Finally, training may involve enabling the learner to build knowledge. According to Jean Piaget, the subject learns by adapting to an environment and acting on it.

This perspective, called constructivist, involves enabling the learner to build knowledge or skills through learning in action. The socio-constructivist approach developed by Vygotski, placing the accent on social interactions, promotes language in the development of knowledge. The acquisition of skills is based on interaction between the subject, the teaching situation and actors in the situation and above all, exchange between peers.

The idea is not to promote one method of training rather than another but to enable the trainer, in relation to his or her objectives and the knowledge to be communicated, to develop their own style of training through professional contexts and to make such choices in relation to each situation.

The issue therefore is to know which approach is best adapted to the acquisition of agroecological knowledge. The partners in the Sagiter team consider that the Piaget constructivism and Vygotskian socio-constructivism are the best adapted to the characteristics of agroecological knowledge.



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How to 'train' on agroecological knowledge?

The transmission of knowledge is part of a process which finds sources both in formal education and in the framework of non-formal and formal education⁴⁽⁵⁾ (see the 'Knowledge transfer method' file). Although all the Sagiter project partners, through their institutional backgrounds, are more specifically located in the field of formal, voluntary and coordinated education, led by a resource person (i.e. 'classic' situations of tuition or training), such education cannot deny the fact that learning is also approached through non-formal and informal education.

Training on agroecological knowledge within the framework of formal education can have two complementary end points: (i) promoting a wider comprehension of living things and the relationship that individuals build with them and/or (ii) accompanying a change in the learner's activity.

The transmission of agroecological knowledge would therefore have as objectives :

- developing awareness of the affective, ethical and productive relationship with living things,
- developing an epistemological doubt and enabling a critical viewpoint with regards to knowledge in general and that related to agroecology in particular,
- accompanying construction of knowledge which responds in a **just** manner to the change that the person aspires to and to the ethics of the relationship that the person wishes to develop with the living element. Only that person is capable of defining the manner which corresponds to their aspirations and wishes.

The process of training must be removed from any risk of dogmatism in order to focus on the complex relations that the learner builds up with a given field of knowledge.

In the light of these considerations it is a natural step to consider the 'transmission' process within a constructivist and socio-constructivist approach.

We propose three complementary modes of training which enable the learner to work on knowledge development within the sphere of related skills, these being reviewed in relation to the specific characteristics of the learner and his or her territorial context.

In other words, we invite the learner to get to know their environment and develop their knowledge and skills within this environment.

4 **Formal education** : an educational process which takes place in a school environment.

Non-formal education : an educational process which takes place outside a school environment, in other social organisations.

Informal education : an educational process which takes place without explicit educational objectives, in the presence of humans or in the natural environment.



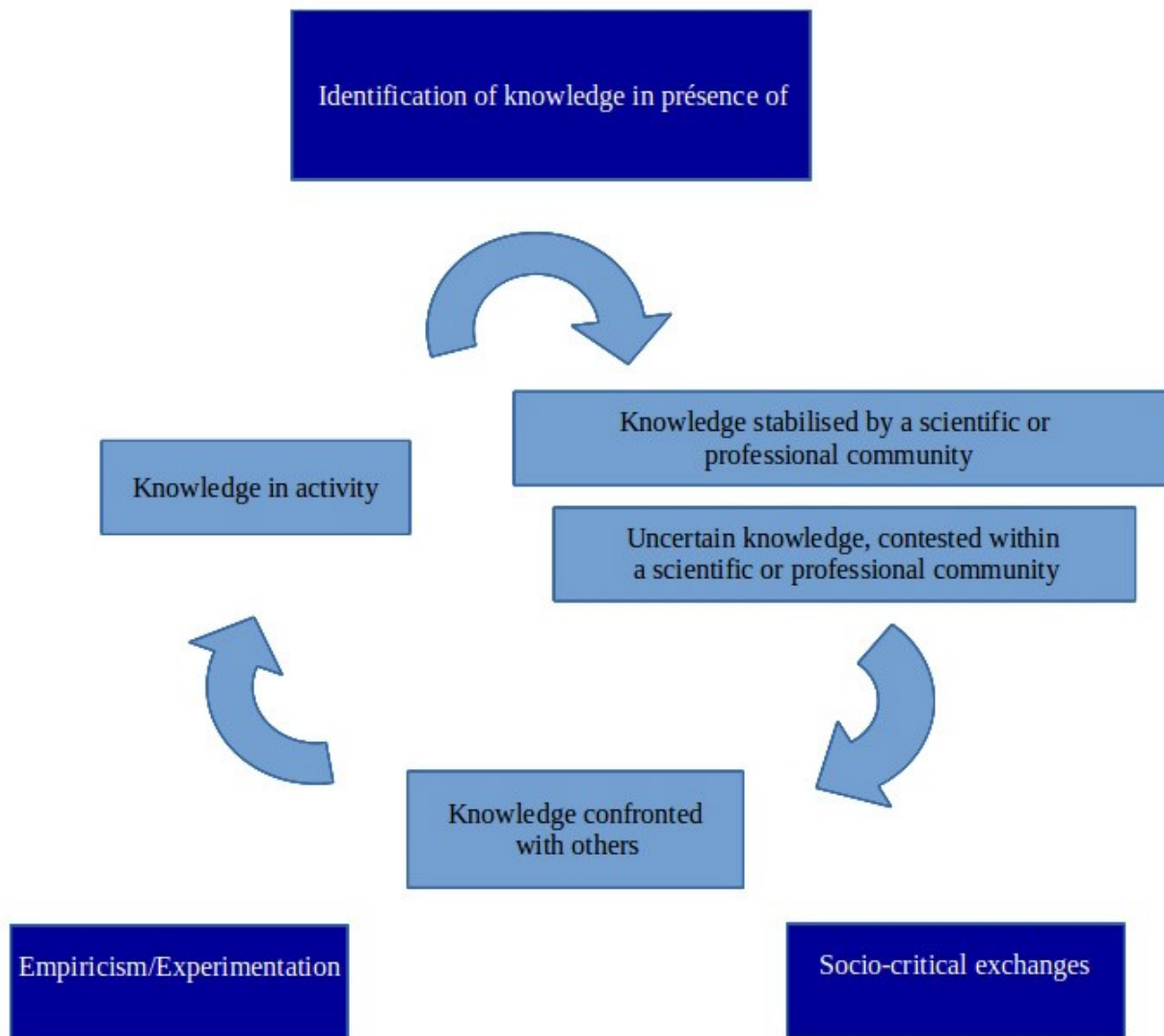


Diagram : Dynamic of training on agroecological knowledge according to the Sagiter partners

It is therefore the transactions between knowledge and skill which are questioned herein. We propose an exchange between training processes which promote three dimensions of knowledge : subjective, inter subjective and objective.

This involves questioning the objective dimension of knowledge, validated by empirical or scientific processes. Its subjective dimension corresponds to the learner's motivations, conceptions and ethic.

These are very complex as they call into question the learner's relationship with him/herself, third parties and the environment. Knowledge and skill are also based on an inter subjective construction which is the object of a procedure of concertation and negotiation within a community of stakeholders.



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Whichever training process is chosen, it supposes the development of a reflexive approach enabling the learner to analyse his or her experience and build knowledge that carries new meanings.

We suggest that the training process can combine all or part of the following objectives, none of which prevail over the others :

- I. Access forms of agroecological knowledge and/or his/her own agroecological knowledge
- II. Promote, exchange and debate on the skills in question
- III. Confront these skills with the real environment

I. Accessing forms of knowledge

I.1. This may involve highlighting the complexity of agroecological knowledge as being transdisciplinary and anchored in values, a mindset, an affectivity and individual experiences.

I.2. It may also involve questioning the relational modes developed by Man with living things and consequently reviewing the types of skills previously developed and promoted. The methods for such reviews can be wide reaching: bibliographic research, reading landscapes, observation of agrosystemic dynamics, questionnaires and interviews, observation and/or viewing existing practices favouring a situation change.⁵

But the simple knowledge of the practice or skill and the simple observation or repetition of the activity is not sufficient, under penalty of incorrect interpretation or identifying 'good' or 'bad' practices and falling into pure dogmatism.

We need to understand what motivates the practice and development of a skill in relation to past experience or a given context and the ethics of the person exercising the said skill.

In other words, observing or carrying out an activity alone is not sufficient, in our opinion, to generate transmission. We consider it necessary to highlight the modes of reasoning of a person who acts in order to try to understand the motivations, objectives and principles upon which his or her action is based.

Indeed, an efficient action is guided by a set of organising concepts (the operational invariants which are representative of a given type of situation). A person at work develops strategies to be efficient in their activity.

These strategies depend on the level of conceptualisation of the situation developed by the persons at work. Pierre Pastré (2002) indicates that this conceptualisation corresponds to the elaboration of an organising concept which is the veritable 'corner stone' that guides and directs the activity.

There are organising concepts in the immense majority of work activities. They enable actors to establish a diagnosis of a situation with a view to rendering an action efficient.

They are not aimed at objectively describing the working environment. A person at work uses indicators to evaluate the pertinence of his or her action in relation to the perceived and targeted efficacy.

The worker builds relations of meaning between these indicators that are entirely personal and

5 A **procedure** inviting one to, temporarily or over a longer period, step aside from the explanatory system in which we are used to projecting the analysis of our relations with our environments (social, physical).



also develops implicit functional variables to enable a diagnosis of a situation. Pragmatic concepts are not generally defined or verbalised. They are mainly implicit and automatic, meaning that the persons concerned are not conscious of these actions, all the more so if they are practised regularly...

They can be objects of exchanges, transmitted by experts to novices by a mix of verbalisation and demonstration. However, training alone only enables an exchange of representations which is not sufficient for enabling construction of the concept. This must be (re)developed through activity by the individual.

Consequently, the organising concepts are only specific to a work situation or an activity for which they ensure efficient organisation. They are therefore highly contextualised to a well-defined class of situations.

An example of organising concepts is proposed by Fanny Chrétien (2015) in the form of a 'right time' in the context of analysing the choice of indicators by farmers to decide on when to start haymaking. This researcher showed the complexity of the signs taken into account by a farmer to decide upon the best moment to cut grass in a field.

The right or ideal moment is defined via a wide variety of indicators leading to the construction of an organising concept (the 'right time'). Understanding how this concept is transformed into an act provides precious indications on how to 'transmit' it through training.

[II. Promote exchange and debate on the skills in question](#)

The same critical distance is expected from exchange and debate with third parties. Generating a discussion, confronting values, questioning skills and enabling each participant to develop arguments aims to transform emerging desires and interests into reasoned desires and interests that take into account the conditions in which the end result is achieved (Dewey, 2011).

This type of training involves a personal search for a truth but one which is shareable through the objectivisation of different situations. It is therefore not universal but individual, relying on a co-constructive approach.

Habermas (1999) claims that socio-critical exchange should be the fruit of contextualised questions in order to avoid the risk of only obtaining demotivated responses with a practical deficit. The question may call upon a project or a problem. It would appear difficult to formally dissociate one from the other.

In order to ensure that they stimulate learning with regards to a critical ethical rationality, we propose that the chosen situations correspond to problems that hold contradictory interests and desires. There are two main points of interest for this: on one hand they may generate a cognitive and ethical conflict which is favourable to problematisation, and on the other they invite creativity.

Dewey (2011) considers that estimating the possibilities of a situation is a practical task which requires not only reason but also imagination and emotion. Imagination is conceived here as a capacity to examine the existing reality, to form desires and interests adapted to the said reality and to develop ideals to identify and place into context other desired situations or outcomes.

The value of the ideals is related to the experience that are behind them. Imagination contributes to



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helping an individual to build responses in contexts which contain, in principle, contradictory values and which suppose a certain dialogue (Morin, 2004) and creativity (Von Foerster, 2006).

For there to be a construction of skills within the socio-critical exchange which respects the person in their motivations, ethic and context, it is necessary to take the vulnerability of the participants into account. The person who steps forward, who asserts a point of view, is also a person in a situation of vulnerability (Habermas, 2006). The ethical framework of the exchange is therefore based on a principle of goodwill and caring.

III. Confronting skills with a real situation

The discussion must not only lead to construction of skills through review and exchange on the agrosystem but it must also raise the question of how skills or practices influence the agrosystem. John Dewey (2011) invites us to analyse how choices are made in the light of experience.

He considers that procedures must be reasoned in relation to their context, where things that are experienced in an activity where there can be conflicts of approaches and incompatible desires, can only be actually expressed through the context of action.

It is necessary not to separate the means and the ends, given that the means become constituent elements of the ends. Inviting an empirical approach does not enable ideals and skills from outside situations to be taken into account but does establish knowledge through examination of real and potential consequences.

The confrontation of knowledge with real situations must not be an exercise of demonstration. It is repeated confrontation which contributes to an education of dealing with doubt and uncertainty.



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Exploring agroecological knowledge

Transmitting agroecological knowledge supposes that the trainer is in a position to focus on skills that are the object of training and on the conceptions of learners in terms of agroecology and agroecological knowledge.

Certain agroecological skills are acknowledged from a scientific point of view and are the object of abundant literature, many of these are skills based on experience or hybrid knowledge combining scientific knowledge with skills related to observation and experience.

This latter category is often 'intimate', non-conscientised and more delicate to define. In answer to the question 'how do you do that ?' or 'how do you know about that ?' the person holding the knowledge could well reply: 'I've always known' or 'it's obvious' without being able to give more details. Focusing on these skills therefore requires special investigation methods.

Agroecology, like certain related skills, may also be the object of controversy or at least some divergence of points of view. It would therefore appear all the more justifiable to promote the expression of conceptions carried by the learners.

Here we take an interest in two pedagogical approaches:

(1) approaches enabling a focus on learners' conceptions on notions of agroecology and agroecological knowledge. These approaches can be deployed at the start of a training course and/or at the end in order to evaluate the level of acquisition and evolution that the training has enabled.

(2) approaches enabling identification of the agroecological knowledge to be transmitted. These approaches may be deployed by the trainer before a course but may also represent a block of the training process in their own right, when the identification is carried out with the learners.

See the pedagogical tools [here](#)



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Promoting integration of agroecological knowledge

The training on and learning of agroecological skills is based on approaches which are preferably constructivist and socio-constructivist (see Theory).

The pedagogical methods or tools that we recommend for real appropriation of agroecological skills with respect for the learner correspond to three paradigms which are partly inspired by the typology put forward by Ian Morris Robottom and Paul Hart (1993) but for which we propose an adaptation as follows :

1. an objectivist paradigm where the trainer takes a position of expert, notably when this concerns promoting the learning of stabilised and recognised scientific which is not the object of controversy,
2. a subjectivist paradigm where the trainer chooses a position of accompaniment; it leads the learner to envisage the relation with his/her environment as an intrinsic part of his/her being, to appreciate the personal values at play in the construction of agroecological skills,
3. a socio-critical paradigm where the social pressures that influence our choices are taken into account; the trainer seeks the emancipation of the person through approaches that encourage a critical thought process.

In our conception of the interactions / transactions between knowledge and the real context, we choose not to refer to 'teacher' or 'trainer' but rather that of leader of the transmission, as a person capable of juggling between different positions: the position of expert, accompanying person or facilitator.

We don't wish to question the position of expert, which is justified when the learning of agroecological skills or practices is recognised by the scientific world and agricultural professionals. Through the procedures of showing, demonstrating or experimenting, the expert adds to these by introducing reasoning or ad hoc observations.

However, the subjective, controversial and contextualised dimensions of a wide number of agroecological skills requires us to add two further positions to the position of expert: accompanying person and facilitator.

It is delicate to define the notion of accompanying person outside the consensual framework. Counselling, sponsorship, mentoring, companionship, tutoring, coaching... are all similar concepts. Independently of the term chosen, it is based on the principal of providing assistance.

We limit our definition to a position of mediation between a problem and/or controversial, implicit or contextualised skills, and the learner. The accompanying person preferably takes a position that enables development of personal experience and opening of the mind to the various possibilities related to agroecological skills or towards the resolution of complex situation-problems for which



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there is never a simple solution.

The facilitator has a position of mediation between individuals through debates on problems or situations. But unlike the accompanying person, this is less related to solving a problem than authorising, even encouraging, the confrontation of divergent points of view and stimulating argumentation as a lever for learning.

We acknowledge that it may be difficult to distinguish between and therefore adopt the positions of accompanying person and facilitator. However, both exclude a position of authority for the trainer as conveyed by the dogmatic conception of transmission. They are based on approaches that favour the reflexivity⁶ of the learner, which we envisage as one of the major levers for training and learning.

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All the information, the tools, the collections of experiences and educational methods are available on the website of the project : <http://sagiter.eu>

6 By **reflexivity**, we understand the approaches that enable us to use experience in order to distance ourselves from it and draw upon this position to develop new meanings.

