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Farming Systems Unit

Lighthouse farms and living labs to explore wicked problem, an example

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A diversity of challenges to overcome

- Conversion to organic farming, between organic rules and agro-food chain referential : how to fit out the organic fattening referential ?
- How to valorise grasslands of high natural value through grazing ?
- **Reduce tillage level and pesticides use in stockless cropping systems – a shared challenges between organic and low-till farmers ?**

Reduce tillage level and pesticides use in stockless cropping systems

Initiation of the dynamic : A visit of lighthouse organic farms aiming to reduce tillage level highlighted a great interest of a group of farmers; organic and/or low-till farmers; to the possibilities to reduce both tillage level and pesticides use in order to develop more sustainable cropping systems

The barriers to overcome:

- 1. The lack of knowledge adapted to the local context → can be worsened by unvalidated theories and discussions on social media networks;
- 2. The technical and agronomical complexity of challenges, as well as social and financial risks linked to the implementation of systemic innovations at farm level;
- 3. The difficulty of assessing the long-term impacts of the new system of practices on soil, crops and sustainability;
- 4. The time and perseverance necessary to achieve a new profitable systemic equilibrium despite the setbacks and failures encountered.

Together we go further...

To face these barriers :

Take advantage and share the diversity of knowledges available through a multiactor – intervention (participatory) research dynamic involving :

- 12 farmers in low till and/or organic systems;
- Advisors specialised in low till management;
- Researchers (social and agronomical)



They shared a common vision and mission (DiverIMPACTS – H2020 project) :

“An agriculture without pesticides and without soil tillage”

A collaborative agreement

- Through a collaborative agreement, every actor of the group is engaged for a minimum of 3 years to progress towards their “common vision”

- Each farmer engages himself to experiment, on one of his parcel (EP); chosen from within a larger field acting as a control (CP); a transition scheme toward the shared vision, this allows :

- To be representative of real conditions,
 - To test these innovations under his own context and with his own objectives while comparing to his own control;
 - To feed the group knowledge;
 - To work on a multi-years / rotation scale;
- ➔ Long term is necessary to support systemic, multi-years approaches, and reach new equilibrium
- ➔ Researchers record the relative performances (agronomic, environmental, ...) of the innovative cropping system
- ➔ Risk and works are shared between farmers, researchers and advisors

Interactions schemes

- Interaction of the pilot with pilots of other participative dynamics to support the reflexivity on the ongoing process (H-2020 DiverIMPACTS project);
- Regular interactions on each farm, on the EP, as daily cropping management are co-defined with the different actors (INTERREG – TRANSAE project);
- Cross fertilisation in meetings mobilising the whole groups (two times per year) in order to have reflexive exchanges on (1) the proposed solutions and (2) the ongoing social interaction;
- Meeting with the actors and external experts, once a year, to feed the group with innovative approaches

Challenges and advises

Initiation of the dynamic :

- Do not under-estimate the time needed to set up a group with shared vision → All participants have to share a common issue and have to be convinced that they cannot progress without each other !
- Start with a limited nbr of farms but mobilise a diversity of point of view and context
- The involvement of a sociologist experienced in intervention research methodology is essential because actors' interactions are at the core of the approach.

Support of the dynamic :

- The challenge is to keep the farmers involved in the group and in the experiment → intensive and diversified interactions schemes between the actors: study trips, conferences, large group meetings, local sub-group fields visits and on farm meetings at critical moments of the crop cycle.
- Annual individual on-farm meetings → share agronomic and scientific results, build a shared comprehension of what has happened with possible improvements
- Shared and debated these observations and proposals with the group.
- Reactivity and flexibility are needed from all of the actors to face unpredictable events.
- Set up mechanisms to share the transition risks

Challenges and advises

Other learnings from DiverIMPACTS project to produce actionable knowledge :

- Build meaningful alliances between scientific and practitioner knowledge before the start of a project or during an initial phase;
- Research in action : time of the actors and time of the research;
- Build process monitoring frameworks for social learning, in addition to sustainability indicators;
- Long-term multidisciplinary relationship with reciprocal commitment of actors → need to ensure minimum funding schemes, in the long term, to support the transition;
- Adapt the consortium when the project and institutional goals no longer align;
- Have more flexibility (Seed Money) in responding to emerging developments that are characteristic of innovation;

See Rossing et al., 2022.

<https://zenodo.org/record/6353589#.YpmbvITP1PZ>

For more informations :

DiverIMPACTS practices abstracts on ZENODO

<https://zenodo.org/communities/diverimpacts/search?page=1&size=20&q=DiverIMPACTSPA>

with keywords 'learning' or 'actors' and more especially :

<https://zenodo.org/record/6488766#.YpmkaFTP1PY>

DiverIMPACTS Policy Brief on Producing Actionable Knowledge

<https://zenodo.org/record/6353589#.YpmvbI1PZ>

Thanks for your attention



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Innovative practices tested and parameters recorded

Practices tested under a cropping system perspective:

- Strip-till;
- Direct sowing under living mulch;
- Relay cropping of perennial legumes (clover,...) in winter crop;
- Mechanical weeding with development of machinery prototype to work under low till conditions;
- Species and varieties mixtures;
- Early sowing of wheat controlled through sheep grazing;
- Double density service crops;

Recorded parameters and their analysis:

- The scientific institution monitors the crop (seedling emergence, pest and disease occurrence, weed pressure, biomass production, yield, nitrate leaching risk) and soil (chemical, structural and biological (earthworms, carabidae, biological activity, OM degradation....) fertility) parameters on both EP and CP;
- Each farm = a specific action plan → adopt a Before After Control Impact design statistical analysis where performances of the impacted site (EP) can be compared to the performances of the control site (CP) (Gyselynck et al., 2022).