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Agor@gri¹: Social media for the agroecological transition

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Abstract

Through the development of an original analytical framework and the use of methods from the human and social sciences, Agor@gri highlighted the diverse ways in which farmers use social media in agroecological transition. The operational resources produced for the users and designers of these tools specify the conditions for optimizing their effectiveness in supporting changes in practices. In Agor@gri, social media are considered not only as digital interfaces but also as a multidimensional service (material media, content, communities) in response to technical needs as well as emotional and symbolic ones.

Keywords: agroecology, social media, knowledges, digital agriculture, transition, communities

1. Introduction

In response to the many challenges facing agriculture (political and societal incentives to take greater account of the environment and animal welfare, climate change, market uncertainties, etc.), farmers² are seeking to design and manage agroecological production systems. To this end, more and more of them are joining or initiating peer groups. The collective helps them not only to make technical progress (discovering new practices, sharing feedback, etc.) but also, on a more emotional level, to boost their

¹ Agor@gri was a research and development project that ran from January 2019 to December 2022. Led by ACTA, it brought together eight partner organisations: Idele, ITAB, the Chambers of Agriculture of Brittany, Normandy and Dordogne, INRAE, UBO, Pôle AB Massif-Central, and three service providers: IDEAS, GRAB and the MFR Sèvreurope Bressuire. Agor@gri received funding from the special agricultural and rural development allocation account (CASDAR – *Compte d'affectation special développement agricole et rural*).

² Although we use the masculine form throughout this article to refer to profiles and professions, we have taken into account the fact that the people mentioned can be both men and women.



confidence and motivation, and feel less alone in the face of difficulties. These collectives can take a variety of forms, for example GIEE (*Groupement d'Intérêt Economique et Environnemental*), that is, interest groupings, and DEPHY Fermes groups³, and we are increasingly seeing communities structured around social media.

Social media⁴ are digital platforms accessible via internet (web, mobile applications). They enable their members to establish or join networks of friends or professional acquaintances and to participate in the life of these networks by sharing and making available content, or by expressing reactions (e.g. thumbs up, emojis). The term social media includes not only social digital networks for which it is necessary to register and create a user profile, but also other formats such as forums, blogs and wikis. Agor@gri is interested in general social media (e.g. Facebook, WhatsApp, X (formerly Twitter), YouTube, etc.) used by farmers in a professional context, as well as those developed specifically by institutional players in agricultural research and development or by digital start-ups.

The aim of Agor@gri was not to promote social media, but to identify the needs they could meet in order to interest and then support farmers in their agroecological transition. It was also to identify the limitations of these tools and the risks associated with unfamiliarity with them or inappropriate use of them. Agor@gri was therefore designed to explore the interaction between the agroecological transition and social media in a specific way, depending on the target audience:

For farmers: What can social media contribute to an agroecological transition at farm level? How can we overcome the obstacles and fears that limit their use?

For community leaders (closed groups of farmers who meet outside online exchanges or large communities of people who don't know each other 'in real life'): How should they choose the social media best suited to the needs and characteristics of the group? How does one run the group and maintain the momentum? How can the use and capitalisation of shared and co-constructed information and knowledge be optimised?

For designers of social media specifically for the agricultural sector: How can a social media-based support service for farmers be designed and made sustainable? And from a more forward-looking perspective: what could tomorrow's social media be like to meet the expectations of farmers undergoing the agroecological transition?

This article is not intended to be an exhaustive presentation of the entirety of the work carried out. All the results and resources produced by the project are available on the dedicated website: <https://agoragri.acta.asso.fr/>. The aim here is to highlight the originality of the project in two respects, corresponding to the first two parts of the article:

The way in which agroecology and social media are understood, and the conceptual framework built to analyse their interactions;

The methodology, drawn from the human and social sciences, used to design creative processes, tools and methods for running workshops during the project.

The final section presents some of the main results obtained during the project and discusses their contribution to thinking about social media in the service of the agroecological transition.

³ The aim of the DEPHY scheme is to test, develop and deploy farming techniques and systems that reduce the use of plant protection products, while promoting high-performance economic, environmental and social techniques. The scheme is based on a national network covering all production sectors and involving research, development and transfer partners (<https://agriculture.gouv.fr/les-fermes-dephy-partout-en-france-des-systemes-de-production-performants-et-economes-en-0>).

⁴ In the remainder of this article, for the sake of concision, we refer to social media without specifying digital media.



2. A conceptual framework for studying the relationship between social media and agroecology

2.1 The agroecology transition: a 5-stage iterative process

Working to support farmers in their agroecological transition means clarifying what is meant by 'agroecology' and the purpose of the support, *i.e.* the activities and stages that we want to facilitate.

The stakeholders (farmers, advisors, R&D agents, etc.) all have a different vision of the farming practices that can be considered agroecological. They associate it with various production systems (organic farming, soil conservation, regenerative farming, permaculture, etc.) that are more or less at odds with what they describe as 'conventional' forms of agriculture. The approach adopted by Agor@gri has been to recognise and deal with this diversity of viewpoints, which means not trying to establish a single definition. The challenge, then, has been to identify the specific features inherent in the implementation of agroecological practices, whatever their form, in terms of the knowledge and skills required by farmers and the players who support and/or train them, in order to successfully implement an agroecological project.

Farmers committed to an agroecological transition adapt their practices to their situation and to changes in their production system. To do so, they mobilise and create scientific and technical knowledge and acquire new skills, both:

- on a day-to-day basis, to make operational choices that are consistent with the objectives set and that are sometimes destabilising when faced with situations that had never been encountered before;
- in the medium and long term, to think strategically and tactically about their system.

The uncertainty inherent in the development of agroecological systems and the biological processes on which they are based has radically altered the relationship between farmers and farm advisers. The latter are no longer prescribers, but 'coaches' in this process of constantly building solutions in a given situation, and of continuous learning.

Agroecology is more than a state, it is a dynamic, more or less continuous process of change. The aim of the support provided is therefore to facilitate the transition from an initial state that is considered problematic or unsuitable in terms of the farmer's objectives and aspirations, to a final state that is constantly evolving. While each agroecological transition is unique, five common stages can nevertheless be identified (Figure 1). These stages do not succeed one another linearly and unidirectionally; they follow on from one another and are interwoven in feedback loops, at different levels and timescales, depending on whether they apply to tactical or strategic choices. The needs in terms of knowledge, interaction, advice, and the potential contribution of social media differ according to the stage.

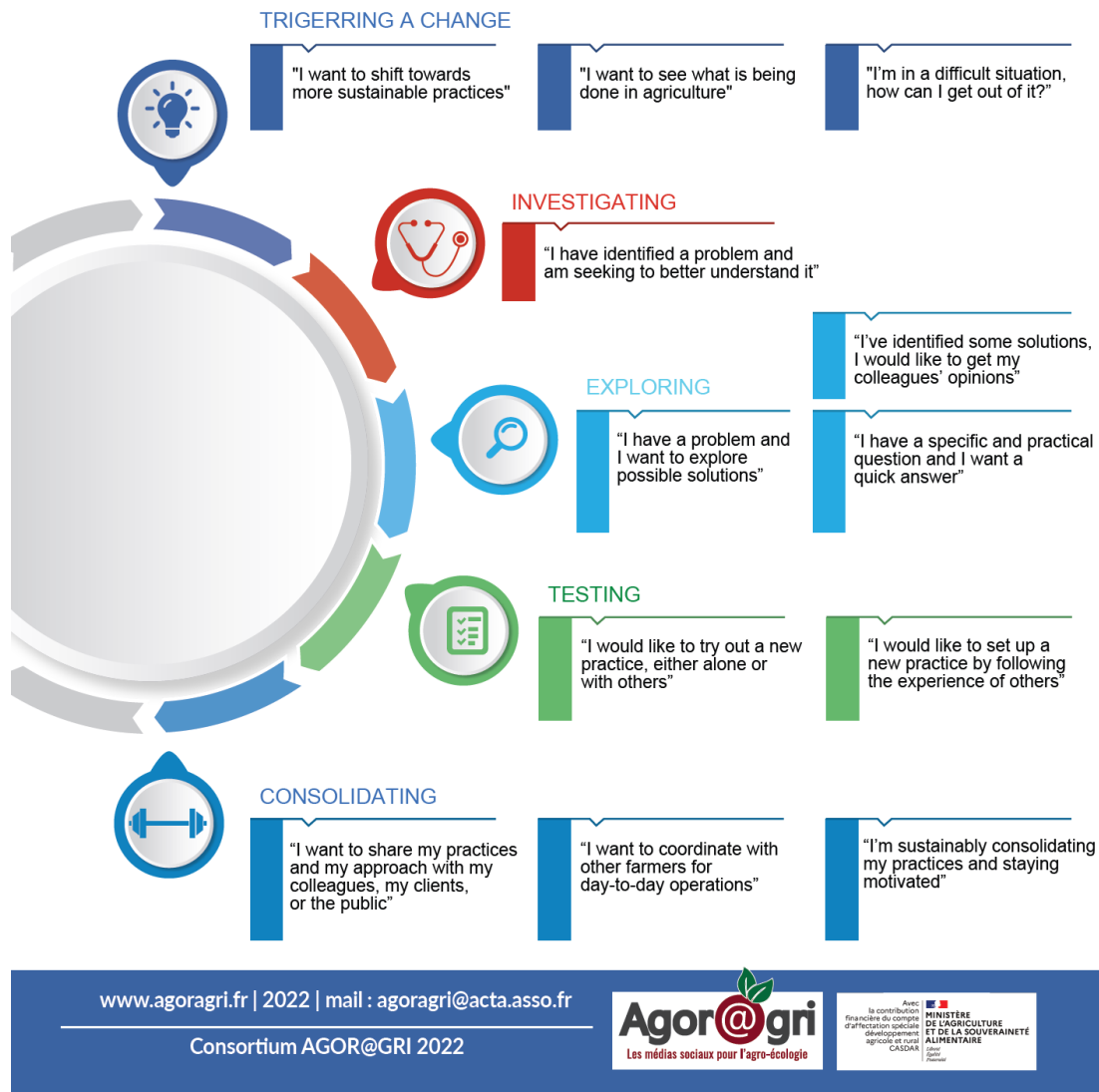


Figure 1: The 5 stages of agroecological transition identified in Agor@gri. For each stage, verbatims from interviews with farmers illustrate what social media can contribute (Agor@gri adaptation of results produced by Celina Slimi in her thesis (Slimi, 2022)).

2.2 A systemic vision of support for farmers in the agroecological transition

This Agor@gri study was not limited to the computer interface of social media and their functionalities. It was about the services that support farmers in their agroecological transition, built around the IT support.

The operation of a service using social media is based on various interacting components. The dimensions studied in Agor@gri are those of the activity system, represented by a triangle (Engeström, 1987) (Figure 2).

A video explaining the use of the activity triangle is available on the project's deliverable website: https://agoragri.acta.asso.fr/blog/2022/09/01/triangle_activite/. The aim is to analyse the support given to farmers in their agroecological transition, and then to identify the changes that could be made to improve it, particularly by considering whether or not it would be useful to use social media.

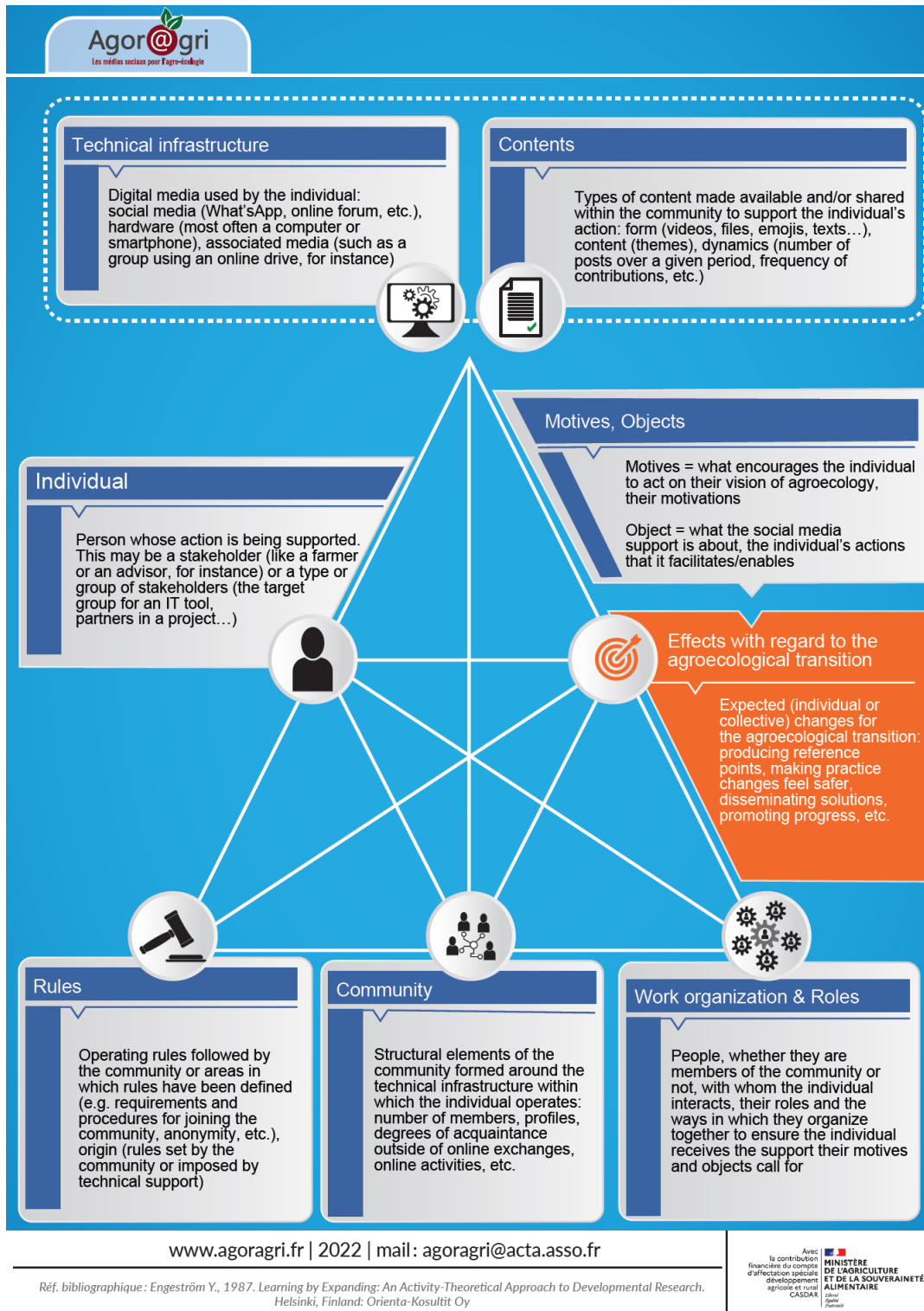


Figure 2: Agor@gri adaptation of Engeström's activity system triangle (1987)

Once the conceptual framework had been defined, i.e. agroecology seen as a transition in different stages and the systemic vision of farmer support services, the Agor@gri partners set about establishing original working methods to successfully implement the project. These methods and the specific features of their implementation are discussed in the following section.



3. Human and social science approaches for a global and systemic view of social media for the agroecological transition

One of the original features of Agor@gri is the development and use of theoretical frameworks from the human and social sciences. This choice guided the working methods used (surveys, interviews, case studies, multi-stakeholder workshops) and led to an original way of articulating and implementing them in an agricultural R&D project.

3.1. A survey and semi-structured interviews with farmers

One of the aims of the project was to gain a better understanding of farmers' current use of social media and their needs in relation to these tools, as part of an agroecological approach. To achieve this, an online survey was constructed and then distributed between mid-September and mid-October 2019. The questionnaire was structured around six themes: 1/ the respondent's identity; 2/ the farming system and farming practices; 3/ the use of digital tools in the workplace; 4/ the use of social media; 5/ integration into physical groups of farmers; and 6/ you and agroecology. The link was distributed widely (*via* the networks of chambers of agriculture, cooperatives for the use of agricultural equipment, DEPHY farms, etc.). This choice of wide, non-targeted distribution was justified by the wish to obtain as many responses as possible. The respondents' profiles were determined *a posteriori* based on their answers to specific questions in the questionnaire (Appendix 1).

Following the online survey, additional semi-structured interviews⁵ were conducted with 15 farmers who had left their contact details in the survey. The discussions provided an opportunity to look in more detail at the agroecological trajectory of the farm and the use (or not) that the farmers interviewed made of social media in a professional context.

3.2 Case studies of groups of farmers who know each other "in real life"

Discussions within the project quickly brought to light a major use of social media in the context of agroecological transition, namely that of groups of farmers who know each other and meet face-to-face (GIEE, DEPHY groups, etc.) and who use social media to exchange ideas outside of their physical meetings. Case studies were then carried out to gain a better understanding of this situation and capitalise on feedback. Three case studies were carried out:

- an Ecophyto 30,000 group of mixed farming-breeders in Brittany;
- a GIEE group of organic milk producers in Normandy;
- an Ecophyto 30,000 group of crop farmers in the Dordogne.

Interviews were conducted with the group leaders, as well as with several farmers with different profiles in terms of farm type, stage of progress in the agroecological transition, and activity on the group's social media. Each case was the subject of a specific study based on a common analytical framework, built around the triangle of activity in order to highlight the interactions between all the elements of the system (individuals, community, work rules, etc.) (Figure 2).

⁵ The semi-structured interview is a data collection technique that contributes to the development of knowledge, favouring qualitative and interpretative approaches. The aim is to grasp the meaning of a complex phenomenon as perceived by the interviewees. The interviewer guides part of the interviewee's discourse (semi-structured) around a set of pre-defined themes, but can adapt or even add to it according to the discussion.



3.3 Workshops with social media designers to support the agroecological transition

The project afforded an opportunity to create a 'community' of social media designers specifically to support farmers. These designers⁶ were identified on the basis of the knowledge of Agor@gri's partners, supplemented by internet research. The aim was not to draw up an exhaustive catalogue of existing offers, but to ensure diversity in the designers' profiles and backgrounds.

Initially, semi-structured interviews were conducted with each designer to find out more about their profile, the services on offer, and their vision of the positioning of their social media in relation to the agroecological transition. Then, between February and April 2021, three half-day workshops by videoconference were organised. The objectives were to:

- Identify the similarities and differences between the offers;
- Formalise the right questions that the designers asked themselves and, conversely, those that they should have asked themselves and that would have been useful to them;
- List tips and tricks to pass on to other potential future designers.

The first workshop focused on the choice of organisation and structure (start-up vs. institutional support, etc.) and the founding principles (funding, partnership ecosystem, governance, etc.); the second was devoted to identifying user needs and translating them into IT functionalities and associated services (value creation), and the third was about maintaining and monitoring the offer (coordination, analysis of user flows and feedback, etc.).

3.4 An innovative design workshop

One aspect of the project was mainly exploratory. The aim was to imagine what support services for the agroecological transition built around a social media 'of tomorrow' might look like, with representatives of users, content producers and designers of social media for the agroecological transition. The approach used was based on the design process inspired by the KCP® (Knowledge Concept Proposition) approaches (Agogu   et al., 2013) and those proposed by the IDEAS Platform⁷ to integrate and represent the future activity of users in the design of artefacts intended for them (Cerf et al., 2024).

The design workshop, conducted in June 2021, brought together three farmers, four advisers or leaders of farmer collectives, two mid- managers of agricultural advisory services, two designers of agricultural digital exchange platforms, two producers and publishers of agroecological content, and one teacher. The participants were divided into 3 groups. Each group was asked to:

- Choose a *persona*⁸, as well as:
 - o the actions inherent in his or her agroecological transition that the service to be designed will support (for example: experimenting together, exchanging contextualised knowledge, etc.).
 - o the emotions and values that characterise the *persona's* state of mind when he or her carries out his or her actions (for example: letting go, adventure, trust).

⁶ OK Eleveur (Idele), Amiculteurs, AgroBio Doc (P  le AB MC), Neayi-Triple performance, Brebis Link (Chambre d'agriculture de Dordogne), PEPS, GECO and LandFiles (for more information: https://agoragri.acta.asso.fr/wp-content/uploads/sites/5/2023/04/Agor@gri_6offresSERVICE2021_A3.pdf).

⁷ <https://ideas-agrifood.hub.inrae.fr/>

⁸ A *persona* is a semi-fictional character, i.e. one who does not exist but whose characteristics are those of existing people, representing a group of people who all share the same problem and the same position in relation to the subject under study (in this case, the use of social media for the agroecological transition). *Personae* are modelled in the form of cards with a name, a photo and all the information that characterises them. They make it easier for participants to imagine themselves in real-life situations of use.



The *personas* and their respective values were constructed and identified on the basis of interviews with farmers (see 2.1.) and workshops with Agor@gri partners between September and October 2020;

- Describe how the *persona's* agroecological transition actions are expressed in terms of social media services and functions, based on questions used to review the different dimensions of the activity system (Figure 2);
- Tell a story about the *persona's* use and articulation of the various services and functions from his or her point of view, in line with the values driving it.

For the analysis phase, each story was described and diagrammed from two perspectives:

- Types of knowledge (generic, singular, meta-knowledge to move from one to the other) and their circulation within the community and even beyond;
- The characteristics of the digital medium, the communities structured around it, and the functions ensuring the relationship between these two entities.

Analyses of the three stories were cross-referenced to identify common points and specific features that could be compared with the *personas*, action cards, and values-emotions chosen.

The various methods developed by and for the project produced results providing an understanding of the uses of social media for the agroecological transition and enabling us to suggest ways of improving these technological tools.

4. A look at how social media are currently being used to support the agroecological transition and how they can be optimised

4.1 Results of the online survey and interviews: a variety of uses depending on profiles and stages in the agroecological transition

Appendix 3 presents the main results of the online survey. The majority of respondents used social media in a professional context. However, the results show considerable diversity in: 1/ the uses farmers made of them and the objectives that motivated them to turn to these tools; and 2/ the content exchanged: videos, written messages, photos. This diversity was partly linked to that of the farmers themselves and their situation, particularly in terms of the stage they were at in the agroecological transition (Figure 1).

An analysis of the responses to the survey and the qualitative interviews revealed several usage and user profiles (Prost *et al.*, 2022). The uses identified are:

- *Use 1 self-training*: farmers see social media as a source of information for acquiring technical, economic, commercial or organisational knowledge, particularly when they encounter difficulties;
- *Use 2 reassurance*: farmers use social media to share their feelings and reassure themselves, to build or strengthen a professional identity and/or a sense of community;
- *Use 3 continuity with 'real life'*: farmers use social media in addition to face-to-face meetings, to maintain the collective dynamic between "real meetings". This use concerns farmers who are part of groups;
- *Use 4 transmission*: farmers are keen to pass on to their peers the knowledge and know-how they have acquired and which they consider interesting and useful for promoting agroecology.

Based on the combination of these uses and their intensity, four farmer profiles can be distinguished with regard to the way in which they rely on social media for their agroecological transition: 1/ farmers who are cautious and reserved about using these tools; 2/ those who use them exclusively for one of the above uses (social link without technical questions or conversely only technical exchanges without personal interactions); 3/ farmers who use these tools intensively but who distinguish between the above uses, i.e.



who choose specific social media and communities for each of them; and 4/ social media 'experts' who use them very frequently and know how they work.

These uses and profiles are not exclusive and may evolve. The same farmer may be involved in several of them simultaneously or successively, often on different social media or online communities.

4.2 Results of the case studies of farmers' groups: the role of facilitator still needs to be optimised

The cross-analysis of the case studies of groups of farmers who knew one another "in real life" (cf. 2.2) was conducted along three lines: the characteristics of the communities, the activity of the farmer-members of the group, and the place and roles of the facilitator.

The first area of analysis focused on commonality, *i.e.* the characteristics of communities and the collective use of social media. As they had been in existence for several years, the groups studied had already built up a foundation of shared values (*e.g.* autonomy) and a shared vision of the agroecological transition. This 'common ground' ensured that no member was excluded from the community. These groups mobilised several social media. They chose free tools (social media not specific to agriculture) generally because the farmer members were already using these media in their private lives. On average, discussion threads contained 70% text, 20% photos or videos and 10% links. The subjects covered were mainly technical.

The case studies provided an opportunity to take a closer look at the profile of the facilitator. In the groups studied in the project, the facilitator was always an agricultural adviser. On average, the facilitators posted 15 to 20 messages per month, during working hours. Their online presence was separate from their main activity. However, after the launch phase of the initiative, they took a back seat. The group leaders considered in the project adopted a role of facilitator rather than prescriber. They supported the discussion process, for example by asking questions and putting forward challenges, and they created a framework of trust (charter, operating rules, any regulations).

The case studies also provided information on the way in which social media support the learning of each member of the group with regard to the agroecological transition, and helped to identify ways of taking this objective further. We note that in the groups studied, the potential of social media was still under-utilised (*e.g.* for joint diagnosis, problematising complex situations, assessing failures and mistakes). Facilitators gave little thought to the *continuum* between face-to-face and distance learning. Their role as "learning facilitators" and the associated skills were not sufficiently recognised and questioned, which are all avenues to explore for optimised future use⁹.

4.3 Results of the design workshops: recommendations for the three stages of designing, developing and running the service

The conclusions and recommendations formulated during the design workshops (cf. 2.3.) have been associated with the three stages in the construction and subsequent dissemination and maintenance of a service organised around a computer interface¹⁰: designing the offer, developing the service, and running it.

⁹ See also: the article by Slimi et al, 2023, on the use of WhatsApp within a cooperative; and CASDAR Xp@irs, supported by GRAB, on the use of digital tools to promote the use of plant cover in market gardening and viticulture: <https://www.grab.fr/projet-x-pairs/>

¹⁰ To find out more on: designing (<https://agoragri.acta.asso.fr/g2-n3-p6-concevoir-une-offre-de-service-numerique-pour-la-transition-agroecologique/>), developing (<https://agoragri.acta.asso.fr/g2-n3-p7-developper-un-service-daccompagnement-de-la-transition-agroecologique-autour-dun-media-numerique/>), and managing (<https://agoragri.acta.asso.fr/janime/>)



Designing a service means identifying farmers' needs. The workshops showed that the expectations in terms of activities linked to the agroecological transition to be supported were often insufficiently characterised. Designers need to define and understand their targets, a task made all the more difficult by the fact that farmers' profiles, uses and expectations of social media are diverse and even contradictory (cf. 3.1.). The activity triangle (Figure 2) can help designers to clarify needs by specifying usage situations, and then imagine the appropriate IT functionalities.

During the development stage, designers must ensure that the service is not limited to the digital medium, and that they imagine and anticipate all the elements of the activity system. The aim is to design a service, not just a digital tool. Involving users from the early stages of prototype testing is essential. As far as governance and the economic model are concerned, the workshops revealed a diversity of approaches, each with its strengths and limitations.

Whether the designers themselves or the users are in charge, this role is essential to maintain the momentum and achieve the objectives in terms of the needs identified. The service to offer must therefore either integrate this role, or ensure that it is facilitated by the person in charge. The associated procedures and tasks will differ depending on whether the primary objective is to bring a community to life and encourage interaction between its members, or to co-create and capitalise on knowledge.

4.4 Results of the innovative design workshop: needs that go beyond digital functionalities

The main conclusions drawn from the analysis of what the participants produced during the design workshop (see 2.4.) are as follows:

- The narratives show needs for services that can be considered basic (sharing experiences, interacting, belonging to a collective, etc.) and yet that are not currently fully satisfied. The responses devised by the groups lie not only in the development of new IT functionalities, but primarily in the use and management of social media, which is in line with the results of the case studies of farmers' groups (see 3.2.);
- The ideal workings described require skills and occupations that are not currently held together by one person or group, or even that do not exist at all: community leader-manager, knowledge broker (monitoring, translation), boundary spanners (between communities, tools);
- The users, situations and needs described are heterogeneous and even contradictory. This shows how important it is for designers to specify their targets in terms of the values, objectives and stages of the agroecological transition they wish to support.
- The results of the workshop highlight the position and responsibility of designers. They must do more than just provide a functional IT interface; they must also co-construct the associated communities, which implies anticipating and even participating in defining all the dimensions of the activity triangle (Figure 2).

5. Conclusion and prospects for future research

The Agor@gri project focused on an issue that had barely been explored at the start of the project, namely the potential contribution of social media in supporting the agroecological transition. The challenge was threefold: 1/ to understand and describe the current uses of these tools and what they can bring to players involved in the agroecological transition, while 2/ producing practical resources useful to the project's target audiences (farmers, advisers, designers), and 3/ to move away from a purely descriptive stance on the current state of play and look ahead to tomorrow's offerings and how they should be designed. It quickly became apparent that we needed to develop an analytical framework for understanding this interface between social media and agroecology, which cannot be summed up by superimposing the two fields.



These three-and-a-half years of work have led to advances in our understanding of the current and potential uses of social media:

- To initiate and support agroecological transitions
- To identify approaches and methods for studying the interaction between social media and agroecology
- To make their synergies operational for agricultural and digital players, while alerting them to potential pitfalls and excesses.

While the knowledge gained from Agor@gri is helping us to think about the links between social media and the agroecological transition, and operational deliverables on how to optimise their design and use have been produced, the project is opening up avenues for further reflection:

- *Changes in occupations and skills.* The project has shown the need for new roles: "knowledge brokers", "boundary spanners", "community facilitators", which currently often fall to agricultural advisers without them being adequately trained and without these roles being recognised and valued from a career perspective;
- *The transformative effect* and the conditions for online interactions to become drivers for action in an agroecological approach, whatever the profile of the farmers and the level of online activity;
- *Inter-collectives:* Agor@gri has shown that farmers often belong to several groups and communities. In addition to the interest they find in each group, based on its specific characteristics, the linkage provides an additional dimension that Agor@gri does not really take into account. In the same way, social media can be a tool for bringing different groups together, for example by making known the knowledge produced in one group;
- *The environmental, energy and social impacts of digital technology.* The introduction of digital tools into the ecosystem of players involved in deploying agroecology must be accompanied by consideration of the related issues, which may be new to them, e.g. the energy needed to cool data centres; pollution and working conditions linked to the production of materials and their recycling; inequality of access to these technologies; white zones; the right to disconnect, etc.

Ethics

The authors declare that the experiments were carried out in compliance with the applicable national regulations.

Declaration on the availability of data and models

The data supporting the results presented in this article are available on request from the author of the article.

Declaration on Generative Artificial Intelligence and Artificial Intelligence Assisted Technologies in the Drafting Process.

The authors used artificial intelligence in the translation process from French to English.

Declaration of interest

The authors declare that they do not work for, advise, own shares in, or receive funds from any organisation that could benefit from this article, and declare no affiliation other than those listed at the beginning of the article.

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¹¹ ACTA: *Association de coordination des instituts techniques agricoles* (association for the coordination of agricultural technical institutes)



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References

Agogu  M., Arnoux F., Brown I., Hooge S., 2013. *Introduction   la Conception Innovante:  l ments th oriques et pratiques de la th orie CK*. Presses des MINES

Cerf M., Prost L., Lefeuvre T., Le Du L., Gross H., 2024. Repr senter l'activit  pour ouvrir l'exploration et l'imaginaire des concepteurs : le cas de la conception d'artefacts pour la transition agro cologique. *Activit s*

Engestr m Y., 1987. *Learning by Expanding: An Activity-Theoretical Approach to Developmental Research*. Helsinki, Finland: Orienta-Kosultit Oy

Prost M., Gross H., Prost L., 2022. How could social media support farmers concerned with sustainability issues? *The Journal of Agricultural Education and Extension*, DOI: 10.1080/1389224X.2022.2153888

Slimi C., 2022. La transformation des situations des agriculteurs et agricultrices en transition agro cologique : analyse du soutien des collectifs de pairs par le prisme de la th orie de l'enqu te. PhD thesis in Agroecology, Universit  Paris-Saclay, INRAE, AgroParisTechUMR SAD-APT

Slimi C., Prost L., Cerf M., Prost M., 2023. The potential of community interactions as inducers of agroecological transition: the case of a digital agricultural community. *The Journal of Agricultural Education and Extension*, 2023, pp.1-26.



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GRAB: Organic farming research group

IDEAS: Initiative for design in agrifood systems

ITAB: Technical Institute for Organic Agriculture

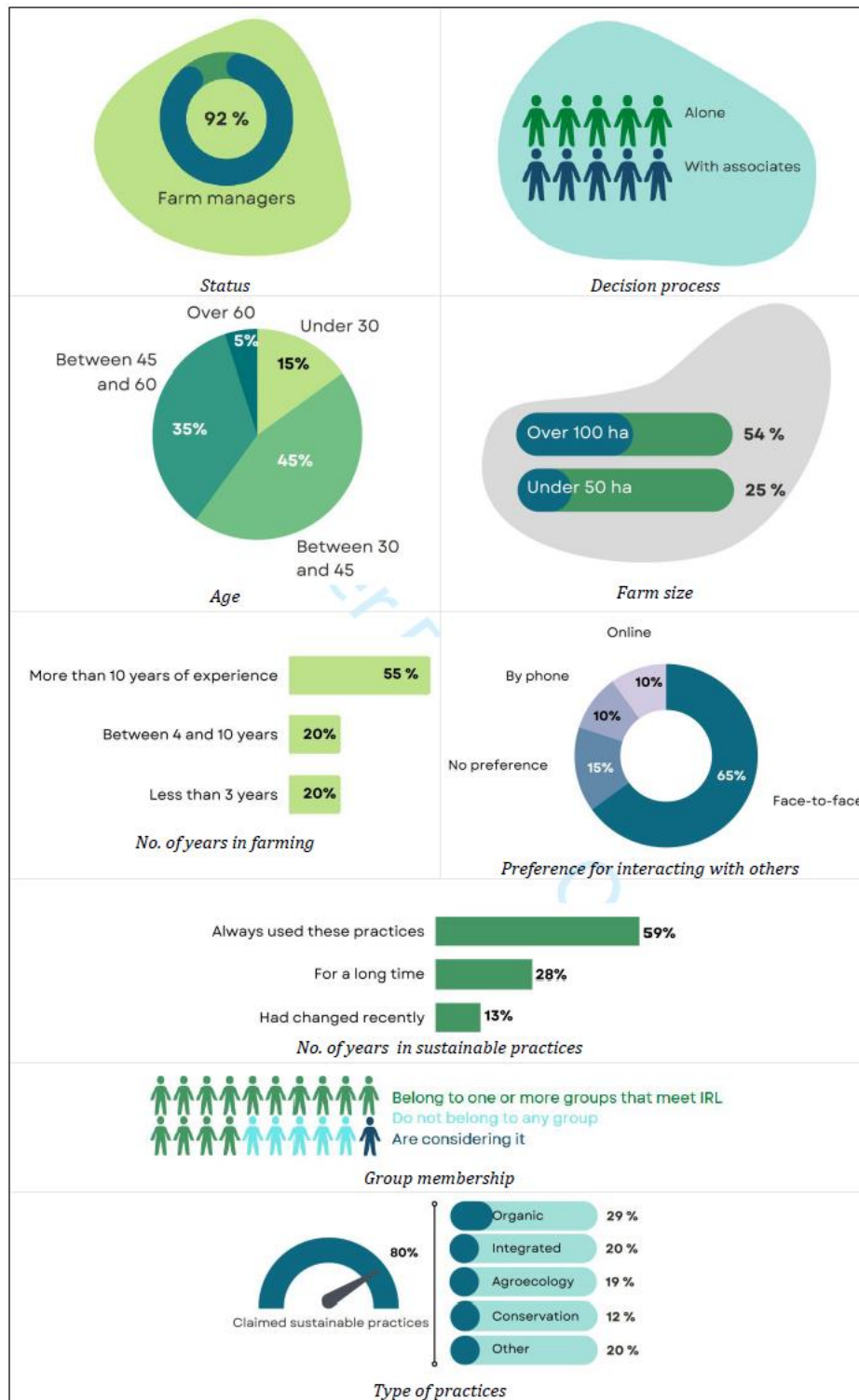
INRAE: French National Research Institute for Agriculture, Food and the Environment

MFR: *Maison familiale rurale* (rural family centre)

UBO: University of Western Brittany



Appendix 1: Characteristics of the panel of survey respondents online with farmers





Appendix 2: Some quantitative results from the farmers' survey

