

Summary of the 2nd e-conversation, 2nd series

#Digitalisation and #agroecology: a challenging marriage?

Series 2, #e-conversation 2 | #D4agroecology

Collaborating organisations

This e-conversation has been hosted by the Digital Agri Hub in partnership with the Global Forum on Agricultural Research and Innovation (GFAR), the University of British Columbia, and the Agroecology Coalition with the re-post of digests on the FAO e-agriculture platform.



Some stats	 Starting date	 Closing date
		17 July 2023
 Number of posts	 Unique contributors	 New members
53	32	66

E-conversation framework:

The debate on whether digital solutions are compatible with agroecology is quite polarized. It has to be said from the onset that the level of polarization also depends on which area of application of digital technologies is considered: precision farming is the area where opinions diverge the most, but digital agriculture has many areas of application (sales/marketing, finance, knowledge sharing, learning).

Some people believe that precision farming technologies, which use digital tools to improve agricultural practices, can be beneficial for agroecology: they can help farmers manage soil and crop health, reduce chemical use, optimize resource efficiency and get context-specific information and recommendations. Many also observe that digital communications tools and online platforms improve access to markets, direct producer-consumer linkages, and knowledge exchange. On the other hand, critics argue that precision technologies prioritize productivity over ecological considerations, leading to monocultures and increased chemical use, and digital technologies in general perpetuate the concentration of

power, including on data and insights, in the hands of a few big corporate actors. They also highlight the risk of a lock-in effect of precision agriculture, i.e., the need for farmers to conform to pre-built agtech solutions, and subsequent devaluation of farmers' knowledge.

Q1: Which aspects of digital agriculture do you see as potentially most incompatible with the agroecological approach? Is it mainly precision farming? Is it the technologies themselves or the business models behind them?

Q2:

- How can digital technologies be more supportive of agroecology?** For instance, which could be an appropriate business models? What about experimenting with alternative providers, different forms of governance, collective ownership? Should we consider what is valued/measured and how? The degree of participatory design?
- What examples if any have you come across in your communities?** Please share if you have experience or knowledge of uses of digital technologies in line with the agroecological approach.

Q3: What can policy makers on the one hand, and farmers and the agroecology communities on the other, do to make the most of what digital technologies can offer without risking the perpetuation of an industrial "productivist" and power-asymmetric landscape?

Some take-aways

- In general, participants showed a very broad and systemic view of agroecology: when thinking of agroecology, most of the contributors highlighted the socio-economic and socio-cultural aspects, and spoke about farmers' knowledge, co-creation, business models, the collective dimension, data sovereignty, etc.
- There was a request to agree on a definition of agroecology, and given the breadth of views above, we could adopt the encompassing FAO definition: *"Agroecology is a holistic and integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of sustainable agriculture and food systems. It seeks to optimize the interactions between plants, animals, humans and the environment while also addressing the need for socially equitable food systems within which people can exercise choice over what they eat and how and where it is produced."*
- Most of the contributions seemed to show a certain consensus on the fact that **"digital" is not per se incompatible with an agroecological approach**: in the words of some of the contributors, *it depends on "how we design and deploy the tools", "practices and design choices in specific situations", "who develops the tool, what ways of thinking it privileges, what is measured and how, the model's assumptions, potential applications" and also "how the data are shared, who has access to them, and how their benefits and costs are distributed along the chain"*.
- Participants have given examples of how such compatibility can depend on:
 - the values behind the technologies (e.g. diversity as a challenge vs. diversity as a value; productivity vs. sustainability and holistic approach),
 - the business models (corporate profit model, lock-in and data concentration vs. cooperative- or farmer-led models and data sovereignty; low/high operational (input cost),
 - design/delivery approaches (e.g. top-down and prescriptive vs. peer-to-peer and co-design),
 - design choices (e.g. opaque standardized algorithms vs. transparent context-specific and farmer-centred algorithms),
 - and ultimately the power dynamics that are triggered and favoured (e.g. concentration of power in the hands of technology developers vs. empowerment of farmers through self-aggregation).
- However, several participants highlighted **challenges** and how rare (difficult? Impossible?) it is to see digital solution that do adopt values, business models, design approaches in line with agroecological principles: it was noted that the majority of mainstream digital technologies, in particular Precision Agriculture solutions, seem to *"intentionally target and support a specific type of farming (e.g., large-scale commodity crops, conventional agriculture)"* and that *"these are tools designed for another purpose and that their adaptation or incorporation process is still uncertain, despite being potentially interesting"*. One contribution in particular argued that there is **inherent incompatibility** between digitalization and agroecology because *"fundamentally agroecology is about prioritising the ecological and human in the process of farming and food production", while "fundamentally computer science and information technologies are about eliminating human being and transferring activities which used to be done by human beings (mostly) to a variety of machines"*. The major highlighted risks were: eliminating human labour and deskilling the farmer, the risk of monopoly, the dangers in terms of external control and dependence. (The risks of deskilling the farmers / devaluing their knowledge and making them dependent derive from an approach that has been defined as *"prescriptive agriculture"*: see the SOFA report in the Resources section, to which our colleague Tomaso Ceccarelli contributed the term).

One concluding remark stated that there are pathways to use digitisation for agroecology, but they “require a radical and innovative look at how the technology is framed for use”.

- Two useful distinctions / categorizations were made, which also help classify the solutions highlighted below: one between farming / food processing and distribution / extended value chain (digital farming information, marketplaces, fintech...); another one between digital technologies that remove effort, reduce labour, eliminate the attention/observation of the farmer and the decision-making process, and digital technologies used to educate, train, communicate good practices. Under the second element of the two comparisons fall most of the solutions that are described below.
- Participants made several interesting observations on **which features a digital solution that supports agroecology should have**, like:
 - decision making algorithms biased towards the preservation of natural resources and biodiversity,
 - combining / "hybriding" local knowledge and data-driven or formalized knowledge,
 - offering online and offline access,
 - being interpretable - no black box,
 - supporting local languages / multilingualism, and local culture and traditions
 - supporting collective resources,
 - supporting farmer-to-farmer knowledge exchange,
 - supporting fair data treatment: data sovereignty, data dignity, MID (Mediators of Individual Data),
 - supporting the aggregation of fragmented farmers,
 - blockchain-like verifiable identity enabling personal data sovereignty and countering the corporate profit model.
- Some features (strong participation of rural communities, emphasis on the digital divide, and focus on problems/needs rather than on technology) are also highlighted in the Policy Roadmap for rural digitalisation of the EU project DESIRA (see Shared resources below).
- One proposed “maxim” was: *“If the technology decreases the operational (input) cost and complexity of the smallholder - consider it - else send it back to the drawing board”*, then extended to accommodate additional conditions (like integrating the knowledge of the farmer, supporting sustainable soil management...) resulting in *“If the technology decreases the operational (input) cost and complexity of the smallholder, while enhancing social equity and transparency through agroecology - consider it - else send it back to the drawing board”*.
- Some **examples of existing digital solutions** that in some way support (some aspects of) agroecology were shared (see also the Shared resources section below):
 - Access Agriculture supports organic farming and agroecology enabling access to quality training videos in local languages (see the videos of Entrepreneurs for Rural Access).
 - The Digital (Web and App based algorithm) called CETARA-NF (Certified Evaluation Tool for Agriculture Resource Analysis - Natural Farming) from the Himalayan State of Himachal Pradesh in India, which *“Innovates with Agroecology at its core”*.
 - Bilim, a platform for sharing knowledge in a safe environment for women farmers focused on agroecology across 11 countries in Eastern Europe and Central Asia.
 - The experiment in India with specialty equity vehicles where the Ownership must accrue to Farmers, specifically as Farmer Producer Companies (FPCs).
 - JaivikKheti - e-Bazaar for market linkage by the Government of India for Organic/ Natural Farmers.
 - The AgriCOOPh cooperative digital platform developed in house in the Philippines, which the cooperative owns and can control.

- The use of drones to spray organic pesticides in the Bolivian Southern Altiplano.
- And finally, the example that was described in most detail: LiteFarm, a free open-source farm management tool build with and for agroecological and diversified farmers through community-based research, supporting agroecology following the principles of food- and data-sovereignty.
- Some features: a) agroecology indicators: the data generated and measurements in the farm management are in line with agroecological principles (e.g., including data on biodiversity, labour experiences, etc.); b) addressing needs expressed by agroecological farmers: c) ways to measure each field, crop, etc. with control over the measure of measurement (e.g., including peer-to-peer trade or exchange, gifts, etc.); d) the application's function and output are designed to be compatible with the participatory guarantee systems (PGSs) for agroecological certification; e) farmers can maintain control over and access to the information they produce, etc.; f) prioritizes capacity building with community organizations to support their farmers in using the tool, with any many or as few functions in the platform as make sense for their operations. The application is available in local languages: currently, Spanish, Portuguese, French, and English.
- LiteFarm is perhaps the only example that goes beyond the categories of extended value chain / training and knowledge sharing identified above and goes into farming and decision making applying the agroecological principles.

science, technology and society, as well as the importance of considering the diversity of knowledge and values in decision-making processes for more sustainable and fair practices in agriculture”.

- There is a need for a “*radical and innovative look at how the technology is framed for use*” (for instance the values involved, like diversity as a value instead of diversity as a challenge).
- Importance of government intervention and challenge in having the private sector embrace this radical innovative look.
- Importance of the empowerment and participation of indigenous peoples, local and rural communities from the point of view of science and technology policy making.
- Need to review of the values and goals of science and technology policies.
- All the suggested features that digital solutions should have as identified above can be useful indications of the direction to follow in the development of digital solutions.

Some more immediate follow-up ideas that were proposed:

- The Digital Agri Hub dashboard being able to filter tools that support agroecology.
- Organizing a dedicated hackathon (or more in general the idea of considering “*support to agroecology*” as an awarding criterion or an awarding category in hackathons?).
- A call for interest directed to the more motivated solution developers reached by this network.

Way forward

Here and there in the discussion some **broader indications** were suggested as way forward:

- In general, all comments acknowledged the importance of the socio-economic and socio-cultural aspects (farmers' knowledge, co-creation, business models, the collective dimension, data sovereignty etc.), and more in general “*the interdependence between*

Besides the ideas that came up in the e-conversation, the organizers would also like to propose considering:

- A research agenda on innovative approaches (e.g. gaming/simulation?).
- An entity with a relevant mandate to launch the idea of a Manifesto (on Digital Agroecology?), to be developed in a very participatory way including consultations with rural community and associations of small-scale producers.

Shared Resources

Cited literature:

- Ajena F., Bossard N., Clément C., Hilbeck A., Oehen B., Thomas J., Tisselli E. (2022) *Agroecology & Digitalisation: traps and opportunities to transform the food system*. <https://tinyurl.com/2caxjsv6> IFOAM Organics.
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- Véronique Bellon Maurel, Ludovic Brossard, Frédérick Garcia, Nathalie Mitton, Alexandre Termier. *Agriculture and Digital Technology: Getting the most out of digital technology to contribute to the transition to sustainable agriculture and food systems*. pp.1-185, 2022, <10.17180/wmkb-ty56-en >. <https://hal.inrae.fr/hal-03604970>
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Cited multimedia:

- Access agriculture | video distribution: <https://www.accessagriculture.org/video-distribution>
- Agroecologie tv Web: <https://www.youtube.com/@agroecologiewebtv/about>
- Jaron Lanier Fixes the Internet | NYT Opinion <https://www.youtube.com/watch?v=Np5ri-KktNs>
- Malawian farmers demonstrate how to make low-cost fertilizer: <https://youtu.be/s1y5NBv-LI>
- The danger of a single story: <https://tinyurl.com/t839ceb>

Cited websites / webpages:

- Access Agriculture Panorama Newsletter No. 34 - May 2023: <https://www.accessagriculture.org/newsletter-34-May-2023>
- Agroecologia na América Latina: construindo caminhos: https://cepagro.org.br/?page_id=4105
- Bilim, a co-designed digital platform for agroecology at the use of women and youth: <https://tinyurl.com/274ywnqd>
- Commonwealth Secretariat (2022). The State of Digital Agriculture in the Commonwealth: A Baseline Report – 2022. <https://state-digitalagriculture.thecommonwealth.org/digital-agriculture/>
- Data Dignity: <https://www.radicalxchange.org/concepts/data-dignity/>
- DESIRA Policy Roadmap: Ten pathways to support Policies towards a more inclusive and sustainable rural digitalisation in Europe: <https://zenodo.org/record/8191857>
- Gram Disha Trust <https://gramdisha.wordpress.com/>
- How to Make Mbeya Fertilizer: <https://orantcharitiesafrica.org/how-to-make-mbeya-fertilizer/>
- <http://ongamsd.org/>
- <https://agristack.gov.in/>
- <https://nurture.farm/>
- <https://ofe2021.com/node/35>
- <https://premiumhortus.com/>
- <https://www.litefarm.org/>
- <https://www.varaha.earth/>
- Organizações de nove países se reúnem no Equador para debater indicadores de Agroecologia: <https://cepagro.org.br/?p=16313>
- Paving the Way towards Digitalisation Enabling Agroecology for European Farming Systems <https://cordis.europa.eu/project/id/101060789>
- Pixel cropping: <https://www.wur.nl/en/project/pixel-cropping.htm>
- Responsible digital agroecology from farm to fork. 13/10/2022 – Webinar: <https://tinyurl.com/2ap97hmg> | Summary: <https://tinyurl.com/2aztq4a9>
- Swisscontact (2023) Drones in the Bolivian Altiplano: a technological solution for farmers and the environment: <https://tinyurl.com/2c35lyxx>
- The 10 Elements of Agroecology: <https://www.fao.org/agroecology/overview/overview10elements/en/>
- the Living Lab for Digital Agroecology in Occitanie: <https://www.occitanum.fr/eng/>

Partners



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