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We need more common sense rather than AI to make agriculture sustainable



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Key challenges in agri-food systems can't be solved with artificial intelligence (AI) and digital technologies.

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Opinion by Jörn Sanders & Adrian Müller



We recently met organic farmers at a farmers' field day where they praised the health of their soils. When we raised the trendy topic of regenerative agriculture (a concept of sustainable farming systems that in particular focuses on healthy soils and good soil management) some farmers condemned the use of this buzzword.

They argued that organic agriculture regenerates soils and that regenerative agriculture is not new; these practices were in place centuries ago. They did not see the point of “selling old wine in new bottles”. They also talked about greenwashing and dubious business talk, about recycling the discourse promoted by the organic movement.

Other farmers we spoke to viewed regenerative agriculture in a more positive light given that their livelihood depends on healthy soils and on increasing and sustaining fertility of their soils. They know that in many cases more could be done to make their soils healthy, and they welcomed any effort to bring the central role of healthy soils to the focus.

Both views are justified and arguing about concepts is not very helpful. In any case, healthy soils are central for agriculture and farmers know how to build and sustain healthy soils. Regrettably, this knowledge is not implemented everywhere and not all farmers cultivate their soils in a manner that can avoid their degradation.

Adding technology or common sense?

One solution is to embrace digital innovations such as robotics, artificial intelligence and data from remote sensing. However, here too opinions diverged among the farmers we spoke to. Some were in favour of embracing technology such as precision fertilisation

and plant protection, soil mapping and light robotic devices that work the soil with minimal disturbance.

Others rather asked for more common sense than artificial intelligence. One farmer referred to brown coal mining, which is highly polluting. “Would it make sense to mine this coal with machines powered by renewable energy?” he asked.” And would it make sense to invest in innovations to develop more efficient brown coal power plants?”. Maybe not. Maybe abandoning brown coal mining altogether would be a better solution.

A similar logic is also applicable in agriculture. For example, another farmer told us about a partnership between fast food chain McDonalds, meat producer Lopez Foods and agricultural firm Syngenta to make beef production in the US more sustainable by feeding cattle a special variety of maize, claiming that this is a good example of a holistic approach. This farmer then referred to a statement by Jeff Rowe, the CEO of Syngenta, that the company’s “guiding principle is not to sell products, but to develop solutions that help farmers to sustainably produce healthy food for society”.

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Well, to us, this sounds like a fairy tale. Aren't we aiming at transforming the current agri-food system to make agriculture and food production more sustainable while ensuring productivity? What role could beef raised on special genetically modified corn play in such a transformation? None; it is clearly geared towards profit-making. Companies make money from selling their products while the hidden costs from environmental pollution, animal suffering and impact on human health are borne by society as a whole.

None of the farmers we spoke to saw corn-fed beef as a holistic solution to transform agriculture to a sustainable food system. AI may tell us how to develop most efficient corn-fed beef production, but common sense tells us that developing these systems is not a good idea in the first place.

The way forward

AI does not have understanding but it is very good at identifying patterns in huge datasets. It can thus be of great help, for example, when certain developments in local weather, climate or soil data suggest imminent pest outbreaks or nutrient shortages on certain plots.

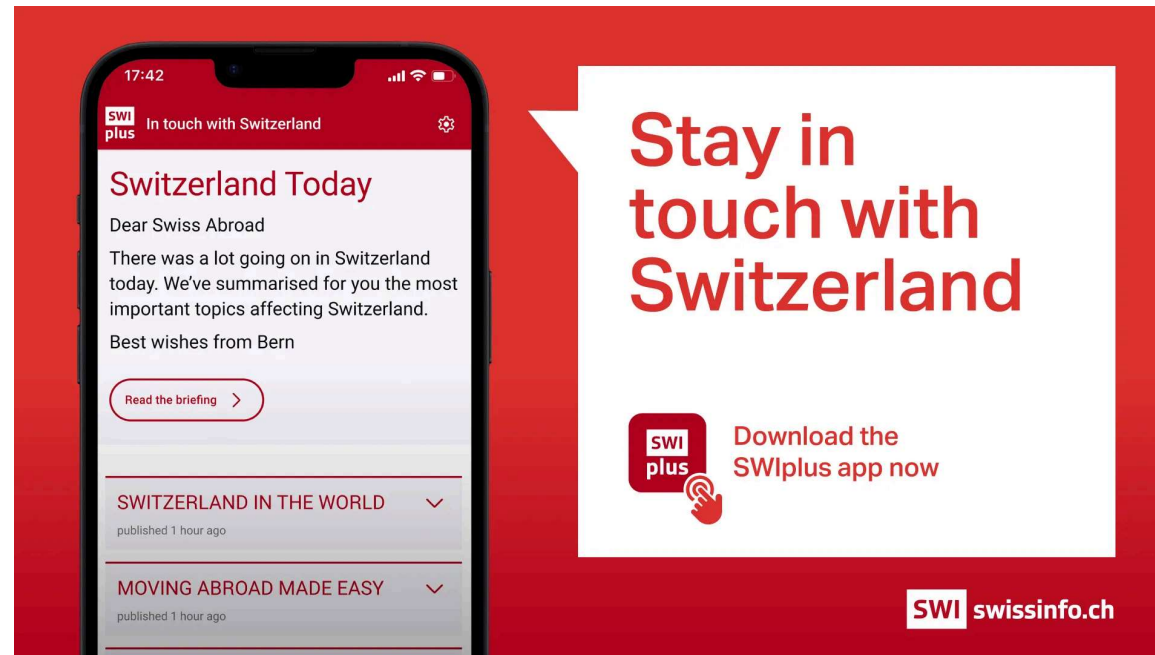
AI is less helpful when data is scarce and expensive to collect, for example, for identifying which farming practices are best suited to increasing soil carbon sequestration. In this case, farmer knowhow on organic and other agroecological and regenerative practices for soil management and crop rotation design may be more helpful than shaky proxies based on remote sensing data on some soil surface variables.

And finally, common sense is often the better advisor than AI when we need to understand the bigger picture. When we need to make a decision on productivity, for example, are we more interested in high efficiency with high yields for single commodities or would we rather produce a decent amount of diverse food commodities from a landscape over extended periods of crop rotations with limited impact on the environment? If it is the former, then corn-fed beef will play a central role while in the latter case grass-fed ruminants as part of a circular food system will be the better solution.

In the end, the centrepiece of sustainable agriculture is the rich knowledge and common sense of farmers. This can definitely be combined with AI as a very potent tool for specific cases, but AI will not provide solutions or take difficult decisions on our behalf. The big leverage points for a transformation towards sustainable agriculture and food systems are already well known. The list includes healthy soils (as organic and regenerative agriculture and agroecology promote), less fertilisers where nutrient surplus is

high as in all industrialised countries, optimised crop rotations, locally adapted crop varieties, no feed production on croplands beyond what is agronomically required and reduced food waste.

Edited by Virginie Mangin and Anand Chandrasekhar



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