



EGUsphere, author comment AC3
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Reply on CC3

Johan Bouma

Author comment on "Transforming living labs into lighthouses: a promising policy to achieve land-related sustainable development" by Johan Bouma, EGU sphere, <https://doi.org/10.5194/egusphere-2022-307-AC3>, 2022

Reply on comments by Anna Krzywoszynska.

Comments by Anna K., largely based on the social-science literature, are highly relevant and helpful to better and more sharply focus the debate on Living Labs and Lighthouses. A reaction to some of her major comments:

- According to Anna K., emphasis in the current article appears to be not so much on the *"composition of the issues"* but on *"their solution"*. *"Scientists define the nature and extent of the problem and set a frame within which solutions can be found"*. This, however, was not the intended message of the article and rephrasing will be needed to make this clear. The 17 UN-SDGs of 2015, approved (!) by 193 Governments, have formulated goals, thresholds and indicators for sustainable development (defining, in fact: *"the nature and extent of the problem"*). This was based on long discussions with the citizen and policy arena and scientists. The United Nations have already, in fact, *"framed"* the issue! We should not restart those discussions at this point in time but focus on ways to implement in the real world the intentions articulated in 2015. There is still much to do! Sure, consumers and markets are important but they are addressed directly or indirectly already by some of the SDGs and farmers would be wise to focus now on what all this implies for their particular enterprise. The Living Labs can make essential contributions in this particular context involving all participants, including scientists.
- As mentioned by the quoted Molinari et al 2011, the original concept of Living Labs was established in an urban context and was based on common agreement as to the definition of the problem being assessed. With the SDGs, conditions are fundamentally different. There are huge perception gaps between science, stakeholders and society when focusing on sustainable development. Most farmers still have an economic focus on their enterprise, and attention for water quality, biodiversity preservation and climate mitigation, required by the SDGs, is all too often seen as an (abstract and offensive) outside intrusion on their entrepreneurship. Indeed, *"uptake, use and implementation of the framework"* is what ultimately counts. How can we, therefore, reach a condition where societal goals, as articulated by the SDGs, are also internalized by land users, among which farmers are the largest group. Again, here Living Labs can play an essential role, particularly in defining thresholds for indicators that separate the *"good"* from the *"not yet good enough"* (note the positive framing). Such thresholds should be thoroughly discussed with all participants and should have a regional character.

- Interactive studies at a given Living Lab don't start with "defining problems". Scientists should start by listening and observing the practices of a given farmer, often the results of many years of experience. Next, scientists will define how this particular system scores in terms of the various SDG-indicators and their thresholds. This will provide much needed clarity for all involved. Attention can then be focused on improving ecosystem services that don't meet their threshold. Information by farmers from other Living Labs on the same type of soil, rather than topdown scientific advice, may be most effective here.
- I feel that problems are "wicked" rather than just "complex". There are no simple straightforward solutions to sustainability problems, but, rather, a series of alternative options or scenarios: "Desirable Futures" as mentioned by Hajer and Vertsteeg, 2018. Different farmers working on the same type of soil in a given region can meet ecosystem thresholds in different ways. That's why good documentation of management practices being followed at a given Living lab is essential.
- Joint learning should, in my view, involve both the "nature" of the problem and its "solution". By assisting farmers to meet sustainability thresholds, thereby showing society at large how farming can contribute to sustainable development, scientists can play a key role in closing the current gap between science and society. They have undeniable "power" by way of their expertise but certainly not the "authority" to define management or rules and regulations that form and should form the domains of farmers and the policy arena. Demonstrating modern agricultural production systems that may be considered to be sustainable (as they meet the various SDG thresholds), can be a crucial contribution to "joint understanding and solution of issues", the more so since they require an integrated view that avoids getting lost in details.
- Interesting to note that Anna K. focuses in this SOIL journal on ecosystem services and not on soil health. When addressing soil scientists there is still resistance to define soil health as: .. *contributing to ecosystem services in line with the SDGs and the Green Deal*". (Veerman et al, 2020). But soils cannot do it alone; an interdisciplinary effort is essential to which, no doubt, soil science contributes essential information. Emphasizing that contribution, as I have consistently tried to do, is more effective than pontififying about soils in general.
- The issue of a possible threshold yield of 80%Yw illustrates that the discussion takes place at different levels. SDG2 has been abbreviated as: "No More Hunger" and relates to the complete food chain from farm to fork. The farmer finds herself at the start of the foodchain, having to produce a sufficient quantity of healthy products that constitutes the economic basis of the enterprise. The 80%Yw for a standard crop tells us the theoretical attainable production level at a particular location with a particular soil, including the water regime while assuming that the plants receive adequate nutrients and there are no pests and diseases. If this level is not met, an analysis is needed of causes and when it is met it provides a starting point for experimentation with different crops and crop rotations within Living Labs on the same type of soil in the same climate zone.

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