



Solutions from the Land response to call for submission to FAO

Global Forum on Food Security and Nutrition* FSN Forum call for submission # 199

From Foresight to Field: Exploring regional and multistakeholder perspectives to implement a foresight on emerging technologies and innovations in agrifood systems

The *Harvesting Change: Harnessing emerging technologies and innovation for agrifood system transformation* (FAO/CIRAD, 2023) global synthesis report released in 2023 identifies and assesses emerging and maturing high technologies and innovations that will affect local, national and global agrifood value chains and transform agrifood systems. This report does a good job of synthesizing 20 selected innovations, broadly discussing strengths and potential pitfalls, and developing five future scenarios where these technologies and innovations might take global agrifood systems. This discussion is not only timely but necessary if we are to understand changes taking place, deeply evaluate their potential and articulate shared visions for local and global healthy food and agricultural systems. In the development of a full report key **underlying questions for UN FAO** are:

- 1) how might technologies and innovations transform and affect the capacities of under-developed, developing and developed countries to achieve individual national economic, environmental and social goals?
- 2) how will these technologies and innovations increase capacities to achieve globally shared UN Sustainable Development Goals (SDGs) in ways that treat them as interconnected challenges in need of system approaches and concurrent solutions?

Solutions from the Land (SfL), a 501c(3) nonprofit led by farmers and scientist partners

focuses on land-based solutions to global challenges. We appreciate the invitation to review the Background Document and the *Harvesting Change* synthesis report, contribute to the call for comments in the development of a full report on technologies and innovations in agrifood systems, and the opportunity to make a number of observations that we hope will be of value of the report authors.

The *Harvesting Change* synthesis report seems to primarily call for repurposing of research and development of programs, policies and investments to accelerate and prioritize emerging technologies and innovations in agrifood systems. It appears much of the data are drawn from a

“back-casting exercise with multistakeholder audience from the World Investment Forum 2023” (pg 53) which would be congruent with findings that focus on “high tech” AI, drones, quantum computing, biotechnologies, gene engineering and other technologies and innovations that reflect investor interests. It is unclear the extent to which end users of these technologies which are transforming global agrifood systems were involved in the framing, assessments and rankings presented. Farmers, ranchers, foresters and fishers are the beginning of the food system and major targets of technology innovations and applications. Were any farmers, men and women; large, mid-sized and/or smallholders participants in contributing data or helping to synthesize the meanings and applications to future food and agricultural systems?

Several Key Findings of the synthesis report are congruent with SfL’s core values and operating principles:

- No single technology can address all challenges in all geographies or cultures. A combination of context-specific solutions, tools and approaches tailored to specific conditions in specific locations is necessary;
- Policy, nature and data integration. Policy changes, nature-based solutions and data-driven technologies have high potential to improve agrifood system production efficiencies per unit of land and water concurrently with ecosystem/habitat enhancing production and management;
- Investment gap. There is a potential imbalance between investment in emerging technologies and the perceived versus real impacts on agrifood systems, the environment and larger society.

Many Recommendations are congruent with SfL high priority actions:

- Alignment. Research and innovation agendas should be aligned with solutions that provide value—an array of tools and approaches- to farmers, ranchers, foresters and fishers and their communities who are cornerstones of successful, productive, nature-positive, and profitable local and global agrifood systems
- Stakeholder capacity. Strengthen technical and functional capacities of diverse stakeholders across different geographies and cultures to manage complexity, change and uncertainty in their section of the value chain; and increase understanding of the roles they play in national and global agrifood systems.
- Contextualization. Technologies and innovations should be adapted to local context and challenges.
- Continuous monitoring and evaluation of technologies and innovation enable adjustments to real world needs based on performance and outcomes under diverse local/regional conditions
- Co-creation/co-innovation. Scaling of solutions across production systems and agrifood value chains will require collaborative innovation involving diverse stakeholders and partners

What’s missing?

- Circular biosystems. There is no mention of circularity of systems in this report. Yet system circularity approaches 1) offer unlimited opportunities to integrate multiple technologies in diverse contexts-discouraging the silver bullet technology trap; 2) build in naturally continuous feedbacks to monitor/adjust/redesign innovations and emerging technologies that work at specific locales/regions, and varying scales; 3) reuse outputs as inputs via technologies creating new co-products while reducing waste and pollution to the environment; 4) can be implemented at any scale- integrating a variety of low, mid and high technologies allowing “priority” technologies to emerge that are useful and affordable at all scales; and 5) can be utilized in the context of diverse climate, topography, resources and cultures associated with foods and agrifood production. Circular biosystem approaches are continuous improvement systems that respond to change, reflect the circularity of natural systems and enable nature-based and ecosystems innovations and new technologies to be evaluated, modified, adjusted and expanded to landscape applications.
- Human and social dimensions. The synthesis report leaves the human and social aspects of new technologies and innovations as a “black box.” For a “foresight” document to be truly useful, to guide strategic planning and move to action, it must include an assessment of where humans are in relation to technologies and innovations and how they perceive these innovations will affect their futures. This means there is a need for ideas/words/experiences/foresights of on-the-ground stakeholders...the farmers, ranchers, foresters and fishers from Africa, Asia, Pacific, South America, Europe and North America, the producers, processors and distributors- the value chains that are feeding the world and want to continue to make a living in a “new” agrifood world.

A key element missing in all this discussion is the “human” capacity to adapt, adjust, innovate to survive. Where is the assessment of human skills, knowledge, cultures, attitudes and perceptions of all these innovations and technologies that will “save” the world? Is it a black box “wild” card? Or are these intelligent, intuitive, skilled, agriculture-nature smart people that “somehow” will make the “right” moves toward adoption IF they have access to the tools of the future and a willingness to learn new ways of providing food and agricultural products to themselves and society.

SfL RESPONSE TO CALL FOR SUBMISSION

Q1. From the 20 innovations identified in the *Harvesting Change* synthesis report, select the three key technologies and innovations that have the potential to accelerate each of the following: a) inclusion; b) sustainability; and c) resilience.

- * Nature-based ecosystem innovations
- * Agricultural innovation labs. 1) Experimental research tested via practice in different regions, cultures and biophysical conditions (soil, water, climate etc) and 2) policy development, hypothetical testing and real world evaluations

* Regional-landscape level value chains

The 20 technologies and innovations in the synthesis report focus on “high” technologies such as AI and digital innovations which have huge potential to be transformative but will not necessarily lead to “inclusion, sustainability, and/or resilience” of agrifood systems. Many high tech innovations are data and energy intensive, costly to end users in ways that limit accessibility to low-income regions/countries and are of limited value and affordability to small holder farmers, ranchers, fishers and other end users in ALL countries. There is a need for a mix of technologies and innovations including “high, low and mid-tech” tools and approaches for ALL producers, including but not limited to smallholders in low-income countries and women to choose from to make their production systems more efficient, effective, nature positive and profitable.

The category label “Frugal Innovations” does not well represent the potential of mid and low-tech technologies to also be of value to ALL farmers and agrifood value chain enterprises. Further, the term “frugal” and the stated focus of targeting rural development [e.g. limited income countries and their farmers and end users] implies that smallholders and those who do not chose [either by cultural value, accessibility, affordability or some other reason] are being allocated lesser quality technologies. Does this mean rural places and people are only entitled to the limited model of innovation and technologies? This of course is not our intent, but this kind of language only increases the divide between resource rich and resource poor.

Please rethink the use of the terminology “frugal innovations”. The category “frugal innovation” in the report is described as a way to simplify, reuse and redesign products and services/processes to provide high-quality/affordable solutions under limited resource conditions. Reuse-redesign-simplify are worthy and practical intents that should be pursued but under a different set of assumptions about income. Would not “circular biosystems innovations” that design out waste and pollution while providing efficiencies and efficacy, encourage reuse, and repurposing of resources within and beyond the rural region (Morton and Shea 2022) without regard for incomes be a more fruitful “label” that could apply to multiple agrifood enterprises, geographies, and adoption readiness with nature positive locale-global circularities?

Q2. What would be the trade-offs and for whom if we advance: a) inclusion; b) sustainability; and c) resilience? How to minimize them while maximizing the benefits?

There will always be trade-offs. The goal should be to try to minimize the risks and downsides. But the real question is “who” gets to make the trade-off decision; and is policy structured to favor one technology over another? Approaches that focus on integrated end goals and outcomes (e.g. rather than maximizing one innovation) should encourage uses of innovations and technologies that limit undesired outcomes (e.g. pollution, profit loss, food and nutrition insecurity etc.) and concurrently deliver multiple SDGs. This removes the focus on individual

technologies as single solutions. Provide a suite of tools-high, mid, low-tech innovations and let the end user at the country/region and farm/enterprise level choose which of these innovations work best for them. The comment from Viet Nam by Dr. Schuftan says this well, let rural communities “decide the technologies most suited for their specific needs. Yes, an interface is needed with science, but ultimately it is the communities that know what level of complexity they can manage and need for sustainability. Nothing wrong with learning from trial and error.”

SfL would expand this statement to include individual men and women as well as their collective communities: “let *farmers, ranchers, foresters, fishers* and their rural communities decide”” ultimately, it is *farmers, ranchers, foresters and fishers and the communities in which they live* that know what level of complexity they can manage.”

Q4. What are the most important triggers of change...?

From agricultural and food producers’ perspectives key drivers of change (presenting both challenges and opportunities) are: 1) population dynamics and urbanization; 2) increased extreme events and variability in intra-seasonal weather and longer-term year-to-year weather patterns; i.e. climate change; 3) market shifts and uncertainties especially structural transformations and consolidations; and 4) innovation and science

SfL CLOSING THOUGHTS

- Strategic Planning. A light touch might be more productive rather than heavy-handed “planned” incentives for specific priority technologies and innovations we “think” will solve the world problems? Change will continually happen, and technologies and innovations will change; we need to have structures that can retain stability but allow emerging innovations to mature or sunset.
- Beyond a Blue Sky report, how do we get to action that fosters co-creation/co-innovation and collaborative efforts that involve all scales of agriculture and food systems, both women and men in local & regional geographies and cultural spaces and enables embracing continuous change?
- Polycrisis. Every change and challenge is NOT a crisis. We have many complex and urgent challenges to address if we are to have agrifood systems that serve society well. However, we have to stop treating the SDGs with crisis language and emergency policies and just get to work building the flexible structures and institutions capable of managing change--co-creating collaborative strategies that address current, anticipated and unanticipated challenges. These are opportunities for our leaders to take fresh looks at the local, regional and global worlds around us, what’s working and what is not; and consider where we should individually and collectively invest our resources of time, energy, and material goods to survive and thrive.