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Has transformation of food systems reached an impasse? Considerations on the role of agri-food research

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Introduction

The ongoing process of food system transformation, underscored with a renewed sense of urgency, seems to have reached an impasse. While the challenges posed by COVID-19, the conflict in Ukraine and the crisis in the Red Sea, revealing the vulnerability of globalized food systems to systemic shocks, have changed priorities in public action, the costs associated with transformation have sparked a significant debate regarding the goals of the transformation. In the meanwhile, the power equilibrium in the political arena has changed, and the increasingly vocal grievances of the groups who feel endangered by the transition—see the farmers' protests during the winter 2024—have made policymakers more prudent on these matters. For example, announcing the withdrawal of the Sustainable Use of Pesticides regulation, Ursula von der Leyen declared that `more dialogue and a different approach is needed.'

At the same time, we note that anti-transition movements increasingly target science, which has been one of the most relevant drivers of transformation[1] through the accumulation of data and analyses signaling the risks of humanity of 'business as usual' policies, and the personal engagement of an increasing number of high-reputation scientists.[2] When the political field is characterized by polarization, legitimacy of science is at risk, also of being used instrumentally for supporting ideological positions. On the one hand, the weight of anti-scientific or denier claims grows, pushing for a disconnect between public opinion and science. At the same time, political polarization can affect the scientific community, trying to split it into opposing and non-communicating fields (Huber et al. 2022).

[1] https://www.politico.eu/article/fake-news-and-personal-attacks-how-the-political-right-took-down-europes-green-agenda/

[2] See, for example, the EAT-Lancet report as well as the recent Global Policy Report (Ruggeri Laderchi et al. 2024).

With reference to the Green Deal, so far, the scientific community has largely supported the ambitious goals set by the European Commission, being aware that they are consistent with the goals set by the Agenda 2030 and the Paris agreements on climate change. In several cases, scientists have criticized the agricultural policies for the gap of coherence with these goals (see the editorial by Matthews (2020) published in this journal). What is increasingly debated, also within the scientific community, is the way to achieve these goals. For example, a relevant group of scientists believes that technological innovation is the key to transformation, implying, among other actions, the prioritization of the uptake of bio- and digital technologies and consequent adaptation of business structures and business models (Conti et al. 2024). According to this approach, technologies can trigger dramatic increases in productivity in the use of resources, reducing the ecological footprint per unit of product. In this way, food systems can maintain or increase adequate production levels to satisfy the growing demand while reducing the pressure on natural resources. Another group claims that that transformation will imply a redesign of the material and symbolic structures of the agri-ecosystems and of everyday lives, starting from consumption practices, and including farming and business practices all over the food system (Willet et al. 2019). According to this approach, the demand side of the food system should be tuned with the carrying capacity of natural resource systems, and governance and policies should introduce in the system the necessary norms to provide all actors feedback that prevent resource depletion. Much more emphasis is given to social and institutional innovation rather than technology.

In a context of increasing polarization, controversies such as those related to synthetic food, genetic modification of crops, artificial intelligence, and even agro-ecological practices and food labeling, rather than normal differences of views waiting to be solved through evidence, risk to feed reciprocal accusation of 'science' and 'anti-science' positions within the scientific community. The role of corporate-led research can exacerbate this process, raising the suspicion that science is manipulated by private interests.

What is the role of science?

We believe that a renewed scientific commitment to steer policy toward transformation should be coupled with the effort to bolster the legitimacy of science, also through a reflection on the role of science itself in policymaking. This, however, should be based on acknowledging that scientific knowledge is not inherently superior to any other form of knowledge.

Where high systemic complexity makes knowledge uncertain, and diverse interests and values compete, scientists have much less authority to claim the truth, and policymakers cannot legitimize their choices solely based on the claims of scientists.

Moreover, as we will see, the strength of science is to provide robust claims coherent with specified research questions, but the formulation and prioritization of the research questions are much more a policy-related matter and should result from a co-creation process with society. As a consequence, science should equip itself to enter into dialogue with society and policymakers to listen to different voices, analyze emerging problems, support formulation and prioritization of research questions and assess—in an impartial way—the implications of alternative solutions. This way, science could increase the relevance of its knowledge, thus building credible and legitimate knowledge.

Researchers in the socio-economic field can play a key role here. Some recent papers have identified a set of themes that could support socio-economic agri-food studies to achieve these goals. All of them point to the policy process and the dynamics of transformation. Resnick and Swinnen (2023) propose to explore the political economy of food system transformation, that is, to study how political decisions and institutions shape economic policies and outcomes, and how economic structures and conditions, in turn, affect political processes. They propose a framework that links economic incentives, mobilization in the political field, design of policies, and adaptation to specific situations. Schebesta and Candel (2020) invite to consider the unresolved ambiguity of the meaning of `food sustainability,' the discrepancy between policy objectives and the specific legal actions proposed, the vulnerable institutional embedding within the European Commission and limited coordination with the EU Member States. Deconinck (2023) highlights the need to explore the links between facts, interests and values in shaping policies and their outcomes.

Facts provide information linked to system processes. To be addressed properly, policies on greenhouse gas emissions, resource depletion, inequalities, malnutrition need to be grounded on reliable scientific knowledge and metrics. However, facts alone are not sufficient to change power relations. The events that are readily observable to everyone are akin to the tip of the iceberg, representing merely 10% of the whole. Beneath the surface, which constitutes the remaining 90% of the iceberg, discernible patterns lie, and underneath these patterns are the underlying structures that give rise to them. Sustainable transformation requires altering the fundamental ways of thinking ingrained in the key actors of the system. In this regard, facts and values matter. Conflicting interests can be negotiated, while values are less negotiable, so when coalitions of interests are supported by values, they can be relevant drivers of conservation or change. The Agenda 2030, with its long and complex process of consultation, has generated a new landscape of values, and its strength is linked to the wide consensus reached around it. This means that when there is a public space where all voices (not only the usual suspects) are considered and facts, values and interests are components of deliberation, values can be changed, and interests negotiated. However, the recent events show that the consensus is often unstable, and interpretations of it diverge.

In this context, we think that science should put more attention to frames. Frames are the rules that allow us to interpret facts. Frames provide the assumptions that move policy design and search for evidence. Concepts such as 'consumer sovereignty' or 'market imperfection,' for example, often hide unquestioned assumptions. Frames, often embodied into narratives, can exacerbate the divide between mainstream approaches and alternative approaches, which interpret the same evidence with different frames. According to Benton (2023), `framing assumptions are so deep seated and orthodox that they are rarely formally questioned in the mainstream literature, but rather taken as the framing within which interventions need to be sought.'

We claim that research able to address the current challenges should question mainstream frames and contribute to building new ones. By making assumptions explicit and looking at the assumption behind scientific claims of others, scientists would be able to reflect on the role of science in society, with the aim to produce actionable knowledge and to build, together with policymakers and civil society, strategies for addressing

wicked problems. With a recognized autonomy from interests and within a set of shared values, science can establish relations with social and political groups that don't belong to dominant coalitions, providing a wider understanding of the problem through an accurate mapping of interests and values at stake. Recognizing and making sense of the plurality of interests, values and frames would avoid creating a science/anti-science polarization. For individuals engaged in socio-economic research within the agri-food sector, and especially within the AFE community, this role holds particular significance. They naturally serve as a crucial link between policymakers and various social groups.

New challenges for transformative food studies

So, how can research unlock transformation from the present impasse? We think that the first step could be to reflect on what transformation implies for science. For example, is transformative knowledge different from 'normal' knowledge? Transformation knowledge leads to transformative action, and for this reason it should be capable of challenging existing assumptions and building new ones. To do this, research should put into evidence contrasting assumptions and analyze how they can lead to different interpretation of evidence, while proposing new assumptions that embody different views.

Recent contributions have highlighted the role of alternative frames when considering problems such as food security, malnutrition, environmental and social justice. The policy implications of considering 'food as a commodity' and 'food as a common good' are dramatically different from each other. Likewise, considering food security as a productivity issue rather than a distribution and social welfare issue would result in very different policy solutions and very different transformation pathways. The shift to system approaches, now gathering a wide endorsement in science and in policymaking, provides a radical alternative to the current sector-based thinking. Frames such as 'nature-based solutions,' 'circularity' and 'ecosystem services' are changing the way scholars describe, measure and interpret value creation. If seen through this lens, the debate between 'techno-optimists' and 'techno-sceptics' looks outdated. The question to be addressed concerns how to transition from the theoretical assumptions and methodological approaches inherent with international agreements such as Agenda 2030 or the more recent Kunming-Montreal Global Biodiversity Framework, to the formulation of possible strategic directions for a real transition process that combines a balance–compromise between environmental sustainability and economic–social sustainability of the stakeholders involved. New knowledge for transformation will need to go beyond this divide and look for new and more advanced frames.

Conclusions

Scientific research and the debate within the scientific community should renew the efforts to have a dialogue aimed at mutual understanding, considering different claims as opportunities to reflect on own assumptions and to learn from different positions. This would have implications for research ethics, for theoretical and methodological styles and for the research agenda. For knowledge to deploy its transformative potential, it is necessary for scientific research to rigorously address not only evidence building, but also to take into consideration the links between facts, frames, values and interests.

To be a driver of transformation, research should work to identify the frames that bring to specific outcomes, provide facts that challenge dominant frames and support new frames, contribute to build new frames and contribute to map the interests at stake and the values behind the frames. In a world populated by different frames, values and interests, researchers can act in the public space as 'honest brokers': actors within society, not above society, but able to support the building of non-partisan views of the world and consent over solutions to societal challenges.

Author contributions
Gianluca Brunori provided a first draft; all the authors contributed to the writing of the final version.

Declarations

Competing interests
The authors declare that there are no competing interests.

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