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Perspectives

Supporting food systems transformation: The what, why, who, where and how of mission-oriented agricultural innovation systems

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ABSTRACT

Agricultural innovation systems has become a popular approach to understand and facilitate agricultural innovation. However, there is often no explicit reflection on the role of agricultural innovation systems in food systems transformation and how they relate to transformative concepts and visions (e.g. agroecology, digital agriculture, Agriculture 4.0, AgTech and FoodTech, vertical agriculture, protein transitions). To support such reflection we elaborate on the importance of a mission-oriented perspective on agricultural innovation systems. We review pertinent literature from innovation, transition and policy sciences, and argue that a mission-oriented agricultural innovation systems (MAIS) approach can help understand how agricultural innovation systems at different geographical scales develop to enable food systems transformation, in terms of forces, catalysts, and barriers in transformative food systems change. Focus points can be in the mapping of missions and sub-missions of MAIS within and across countries, or understanding the drivers, networks, governance, theories of change, evolution and impacts of MAIS. Future work is needed on further conceptual and empirical development of MAIS and its connections with existing food systems transformation frameworks. Also, we argue that agricultural systems scholars and practitioners need to reflect on how the technologies and concepts they work on relate to MAIS, how these represent a particular directionality in innovation, and whether these also may support exnovation.

1. Introduction

Agricultural systems transformation and more broadly the food systems transformation to which this contributes, has been the subject of debate for several decades already (Dentoni et al., 2017; El Bilali, 2019a, 2019b; Elzen et al., 2012; Weber et al., 2020; Klerkx et al., 2010; Lamine, 2011). However, recent years show a rise in concerns of how to manage future food security and sustainability without compromising food safety (Vågsholm et al., 2020). This has generated a social momentum for change regarding food systems development with studies concluding that the food system is ‘broken’ (Oliver et al., 2018) and needs to be made ‘planet-proof’ (Fraser and Campbell, 2019; Rockström et al., 2020; Willett et al., 2019), ‘circular’, ‘regenerative’ and ‘inclusive’ (Gosnell et al., 2019; Pouw et al., 2019; Van Zanten et al., 2019).1 Recent events such as the COVID-19 pandemic have catalysed such reflections (Baudron and Liégeois, 2020; Blay-Palmer et al., 2020;
Kanter and Boza, 2020; Stephens et al., 2020). As a response to these calls to transformative action, there is increasing scientific reflection on how to shape future food systems and the technologies and concepts that would underpin future food systems (Herrero et al., 2020; Kirova et al., 2019; Klerkx and Rose, 2020; Mier et al., 2018; Tittonell, 2014).\(^2\)

In order to realize future food systems, there is a key role for agricultural innovation systems (AIS).\(^3\) An AIS is concerned with the networks of actors from science, business, civil society, and government that co-produce the suite of technological, social, and institutional innovations that co-shape these future food systems (Gaitán-Cremaschi et al., 2019; Herrero et al., 2020; Mier et al., 2018). Many of the future food systems envision novel forms of agriculture (e.g. urban farming, vertical agriculture, cellular agriculture), which deviate substantially from the current systems which are usually land-based and in rural areas. Therefore, an AIS increasingly incorporates actors from other sectors (e.g. information technology, energy, construction) and may employ a suite of generic technologies with applications in different sectors (e.g. solar energy generation, satellite technology, robot technology, nature based and ecologically regenerative solutions) (Andersen et al., 2020; Frantzeskaki, 2019; Laibach et al., 2019; Pigford et al., 2018; Tittonell, 2020). Also, it has been argued that agricultural innovation systems, in view of them supporting particular transition pathways towards future food systems, need to become ‘mission-oriented’ (Klerkx and Rose, 2020; Pigford et al., 2018). These missions need to tackle grand societal and planetary challenges, such as ecosystem integrity, biodiversity, climate change mitigation and adaptation as also comprised by the Sustainable Development Goals (Mazzucato et al., 2020).

The idea of mission orientation in innovation has become increasingly popular, and this has inspired concepts such as ‘challenge-led innovation’ and ‘mission-oriented innovation policy’ (Boon and Edler, 2018; Hekkert et al., 2020; Mazzucato, 2016; Rathenau Institute, 2020). Mission-oriented innovation policy brings together elements of innovation policy, which traditionally aims to create economic growth, and transition policy, which principally aims to create change that is beneficial for society at large (Alkemade et al., 2011; Schot and Steinhmueller, 2018; Rathenau Institute, 2020). In this way, mission-oriented innovation policy serves a clear transformative purpose and aspiration in view of realizing public goods such as a clean environment, biodiversity, animal welfare, and social justice (Hall and Dijkman, 2019; Pigford et al., 2018; Schlaile et al., 2017; Timmermann, 2021). Instead of focusing on single technological fields or disciplines, mission-oriented policies are targeting a concrete problem/challenge, often cross-disciplinary, with a large impact and a well-defined time frame (Wittmann et al., 2020). Also, there is a much stronger emphasis on directionality, to articulate the role of innovation and its contribution to a societal or environmental end (Boon and Edler, 2018; Janssen et al., 2020; Pigford et al., 2018; Schlaile et al., 2017; Rathenau Institute, 2020). This requires a more active and guiding role of the state with comprehensive innovation policies to govern innovation towards this end (Hekkert et al., 2020; Mazzucato, 2016). Moreover, state involvement moves from fixing market failure to shaping markets for societally relevant innovation and fixing directionality failures (Robinson and Mazzucato, 2019). In the mission-oriented innovation policy framework, roughly four basic principles are maintained (Mazzucato, 2016)\(^5\):

1. Clear direction-setting from the start.
2. A portfolio of innovation projects to embrace risks, failures and uncertainties.
3. Investments across different sectors by different types of actors (public, private and third sector actors across the innovation chain).
4. Joined up policymaking and reflexivity to avoid lock-in scenarios.\(^6\)

The ideas on mission-oriented innovation are not completely new (Robinson and Mazzucato, 2019), and have been inspired by earlier mission-oriented programs such as those from NASA. In agriculture, missions have also played a role, such as those underpinning productivity growth and modernisation in view of the Green Revolution (Sprei and Kopff, 2011; Wright, 2012). However, these missions were often seen from an agricultural science system perspective rather than an AIS perspective.\(^5\) Combining the idea of mission-oriented innovation policy with the innovation systems perspective Hekkert et al. (2020) introduced the concept of ‘mission-oriented innovation systems’, an idea alluded to earlier also for AIS by Pigford et al. (2018). A mission-oriented innovation system is defined as “the network of agents and set of institutions that contribute to the development and diffusion of innovative solutions with the aim to define, pursue and complete a societal mission” (Hekkert et al., 2020:77). Steered by a clear directionality, it can be seen as “a temporary innovation system in which policy makers and other actors aim to coordinate innovation activities, with the objective of developing a coherent set of technological, institutional and behavioural solutions” (Hekkert et al., 2020: 78).

The concept of mission-oriented innovation systems can be used to critically reflect upon how mission-oriented policies are nationally and supra-nationally embedded and how this loops back on the process of

\(^2\) Also, it is the subject of debate of policy initiatives and think tanks such as the Transforming Food Systems Under a Changing Climate initiative led by CCAFS (https://www.transformingfoodsystems.com/), the Global Alliance for the Future of Food (https://futureoffood.org/), the Food Systems Dialogues (https://foodsystemsdialogues.org/), the Commission on Sustainable Agriculture Intensification (https://wle.cgiar.org/cosai/), the International Panel of Experts on Sustainable Food Systems (IPES-Food- http://www.ipes-food.org/) and Food Tank (https://foodtank.com/), part of policy strategies such as the EU Farm2Force strategy as part of the European Union’s Green Deal (European Union, 2020), the focus of technology events, incubators and accelerators such as Evoke Ag, Food & Farm 4.0, FKA Next, and Thought for Food (https://www.farm-and-food.com/en/, https://www.fanext.com/, https://evokeag.com/, https://thoughtforfood.org/), high level events such as the UN Food Systems Summit 2021 (https://www.un.org/sustainabledevelopment/food-systems-summit-2021/), and steering the agenda of science organizations such as the Australian Future Foods CRC (https://www.futurefoodies.com.au/), Oxford University (https://www.oxfordmartin.ox.ac.uk/food/) in The United Kingdom, and Utrecht University (https://www.uu.nl/en/research/sustainability/research/future-food-utrecht) and Wageningen University and Research (https://www.wur.nl/en/About-Wageningen/Strategic-Plan.htm) in The Netherlands.

\(^3\) For an extensive explanation of emergence of the AIS concept see (Hall et al., 2008). AIS have been variably conceptualised and studied at a national or regional, sectoral (e.g. dairy, horticulture), and technology level (e.g. pest management, water harvesting) (Kebebe et al., 2015; Kruger, 2017; Mih, 2019; Sixt et al., 2018; Turner et al., 2016). See (Klerkx et al., 2012) for an explanation how the different boundaries of AIS are cross-cutting (e.g. an AIS at a country level may contemplate several sectoral and technological AIS, which in turn may have global characteristics). In the European Union context, AIS are generally referred to as Agricultural Knowledge and Innovation Systems (AKIS).

\(^4\) For a broader explanation, see also the insightful position paper of Janssen et al. (2020). See also the informative overview of key elements of mission-driven innovation policy by Rathenau Institute (2020), whose piece provided inspiration for the title of this paper, and also refers to the Dutch circular agriculture mission (see further footnote 8).

\(^5\) Lock-in implies that a (food) system becomes inert to change in view of the interplay of established infrastructures, institutional frameworks (rules, regulations, values), and sunk investments. It has been argued that many current food systems have such a lock-in (i.e. ‘food regimes’) (Gaitán-Cremaschi et al., 2019; Leach et al., 2020), but it may also happen that an emerging alternative system becomes locked-in before it has fulfilled the envisioned goal.

\(^6\) Though earlier mission-oriented programmes incorporated AIS principles such as TransForum in The Netherlands (Fischer et al., 2012), and the our Land and Water Science Challenge in New Zealand (de Jong et al., 2019; Duncan et al., 2018).
innovation and system change. We argue that studying AIS as a ‘mission-oriented agricultural innovation system’ (MAIS) would enable a better understanding of forces, interactions, catalysts, barriers in transformative food systems change, as so far studies on AIS have rarely engaged with issues such as directionality, power, and the diversity of food systems futures (Hall and Dijkman, 2019; Pigford et al., 2018; Mier et al., 2018). The purpose of this perspective is to get a debate and reflection started on this topic among agricultural systems and food systems scholars.

To enact research on MAIS, there are different sorts of questions to be asked, in terms of what, why, who, where and how, on which we will elaborate in section 2 (see also Table 1).

2. Mission-oriented agricultural innovation systems: What, why, who, where and how?

2.1. What missions are in a MAIS?

As Mazzucato (2016) argues, missions are about setting concrete directions and comprise a strategic portfolio of innovation projects (technological, social, institutional innovation), i.e. what Meynard et al. (2017) have called ‘coupled innovations’. The scope of these portfolios may vary and be driven by different expectations, narratives, assumptions, policy rationales and theories of change (Janssen et al., 2020; Thornton et al., 2017)). They may be science and discovery based and technology-driven or may be driven by visions for broad systemic change (Polt, 2019; Rathenau Institute, 2020). To achieve food systems transformation, missions may include concepts such as agroecology, circular or regenerative agriculture, digital transformation of agriculture, bioeconomy, or protein transitions (Gosnell et al., 2019; Mockshell and Kamanda, 2018; Shepherd et al., 2018; Tziva et al., 2020; Van Zanten et al., 2019; Wezel et al., 2009), or a combination of concepts (Kristensen et al., 2016; Laibach et al., 2019; Mockshell and Kamanda, 2018). Different existing and emerging agriculture and food technologies may support the former approaches (Herrero et al., 2020). These rather broad conceptual missions for food systems transformation may be underpinned by different types of ‘sub-missions’. For example the broad mission of ‘circular agriculture’ may be achieved by sub-missions emphasizing either a place-based local model with closing cycles on farms, high in-field diversity and short supply chains, or a regional model in which different sorts of monoculture agriculture are connected within wider rural-urban interactions and material and energy flows (Garrett et al., 2020; Van Zanten et al., 2019). Hence, these sub-missions represent diversity in possible future food systems transition pathways and supporting technologies (Gaitán-Cremaschi et al., 2020).

Hence, it important to characterize what sort of mission a MAIS represents, how broad or narrow it is, how explicit it is made, and possibly what sub-missions may exist. Finally, just as MAIS may have a layering in its mission, there may also be several competing, co-existing or converging MAIS (e.g. agroecology and digital transformation), in view of the diversity argument and portfolio approach (Mazzucato, 2016). A variety of competing or co-existing sub-missions has already been observed for concepts such as agroecology and Agriculture 4.0 (Plumeccò et al., 2018; Klerkx and Rose, 2020; Bellwood-Howard and Ripoll, 2020). Studying this diversity of MAIS can illuminate aligning or competing interests and infrastructures that have the potential to facilitate or constrain food systems change.

2.2. Why do MAIS emerge or are set-up?

As already alluded to in the previous point, it is important to determine where missions come from, as mission-oriented policy is a product of the system which it is supposed to change. Sometimes, a mission may involve a truly novel focus, and sometimes it is a ‘re-framing’ or ‘rebranding’ of ongoing efforts (Janssen et al., 2020). Missions may arise from a supply-push (e.g. by policy, science, or business), or rather from a demand-pull (raised by social movements and worried citizens and consumers) or a combination of these forces. They may arise ‘pro-actively’ in view of horizon scanning and scenario building exercises of future food systems (CSIROFutures, 2017; De Wilde, 2016; Hebink et al., 2018; Manners et al., 2020; Rutter, 2012; van der Weele et al., 2019; WorldBank, 2019), or rather ‘reactively’ when sectors or countries are faced with intractable problems such as intensifying droughts. In terms of the mission set up, it is important to consider if the missions provide strong steering and close down innovation options or consider a wide range of solutions that allow to be tinkered with, as this will result in different operationalization strategies of the missions (Janssen et al., 2020).

It is also important to contemplate whether MAIS can be considered as an ‘alternative’ AIS or emerge from within the dominant AIS of a country or sector. It has for example been argued that an AIS in a country may on the one hand still be focused on improving ‘business-as-usual’, while on the other hand may have the characteristics of a MAIS with highly transformative ambitions (Pigford et al., 2018). This would require what has been referred to as ‘ambidexterity’ (Turner et al., 2017; Rathenau Institute, 2020), i.e. the capacity of an AIS to simultaneously manage existing networks and policies to support (incremental) innovation in current food systems, and create new networks and policies to overcome lock-in and support radical innovation and food systems transformation. Perhaps paradoxically, food systems transformation thus also implies deconstruction of existing AIS systems or ‘exnovation’, by for example phasing out research investments in a non-sustainable technology or practice (David and Gross, 2019; Kivimaa and Kern, 2016; Krüger and Pellicer-Sifres, 2020). Beyond questioning environmental sustainability of production systems and supply chain set-up, exnovation may also include questioning prevalent economic paradigms (e.g. neoliberal capitalism, economic growth) (Feola, 2020; Ghisellini et al., 2016; Mier et al., 2018; Giuliani, 2018). This requires scrutinizing prevalent policy frames, goals, and policy instruments (Candel and Biesbroek, 2016; Galli et al., 2020; Janssen et al., 2020). Understanding the dynamics of MAIS emergence and its set up may as such shed light on particular policy framings, direction-alities, and prevailing lock-in scenario’s that influence the innovation and exnovation capacity of MAIS.9

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9 Innovation capacity is built through the practices, routines or processes used to mobilise, create and reconfigure arrangements of resources and capabilities in order to innovate (Turner et al., 2017). Exnovation as a concept has had limited application in agriculture and food systems, but there is ongoing work, see e.g. the project of Laura van Oers (https://www.uu.nl/staff/lmvanoers/Research).
2.3. Who (or what) drives MAIS?

To drive missions, Mazzucato (2016) emphasizes direction setting by policymakers and highlights the role of the public sector. Borrás and Edler (2020) have refined these ideas and show that states can combine roles as observer, warner, mitigator, opportunity, facilitator, leader-user, enabler of societal engagement, gatekeeper, promoter, moderator, initiator, guarantor and watchdog. As we argued in the previous sections and following Hekkert et al. (2020), missions may also arise from and be shaped by different actors beyond the state. While it can already be challenging to get ‘conventional’ AIS actors to co-innovate (Meynard et al., 2017), MAIS may include food economy actors previously not considered to a large degree in agricultural transformation and AIS studies (Weber et al., 2020), such as Agtech and FoodTech start-ups, Think Tanks, and social enterprises. Given this diversity of actors and values, there are processes of negotiation and contestation in MAIS. The greater complexity or ‘wickedness’ of the grand challenge, the greater the negotiation and contestation generally is (Janssen et al., 2020; Wanzenböck et al., 2019).

Therefore it is important who is included in a MAIS, and who is excluded (Herrero et al., 2020; Leach et al., 2020; Pigford et al., 2018) (see 2.1). And also, whether those excluded in one MAIS may be served by another MAIS which enacts transformative missions in a different way, thus accommodating a diversity of farmers and food system actors in terms of for example farm size, farming style, value chain model (Klerkx and Rose, 2020; Stringer et al., 2020). Furthermore, the question is not only ‘who’ drives MAIS, but also ‘what’. It is increasingly argued that also nature itself and biological and ecological agents (e.g. plants, animals, ecosystems) need to be seen as drivers in innovation systems in view of ideas on ecological feedback loops and biomimicry and the ‘more-than-human’ debate in rural sociology, as well as technologies such as robotics, digital twins and artificial intelligence (Andersen and Wicken, 2020; Darnhofer, 2020; Klerkx et al., 2019; Pigford et al., 2018; van der Jagt et al., 2020).

2.4. Where do MAIS play out?

Many proposed food systems transformation concepts transcend national, sectoral and technological boundaries. They are developed in many countries simultaneously, and are connected to supra-national or even global transformative policy narratives, and flows of technologies and capital (Wanzenböck and Frenken, 2020). Also, the spaces where missions are defined (see footnote 2) are highly globalized since they consider actors from different countries, or are shaped in virtual spaces (e.g. social media). Hence, a MAIS may have the traits of a global innovation system (Binz and Truffer, 2017) and at the same time may be connected to specific national or even sector contexts. Hence, the geographical boundaries of a MAIS are fluid (Hekkert et al., 2020; Janssen et al., 2020; Pigford et al., 2018). Missions may ‘travel’ geographically and a MAIS may have a different pace of development in different countries. This is due to differences in state governance, and between cultural and regulatory contexts (e.g. the Common Agricultural Policy and Novel Food Legislation of the European Union) that for example may determine consumer attitude (Bekker et al., 2017; Gupta et al., 2013). Such travel may be through multinational companies who introduce products in different countries (e.g. plant based protein products), through large international innovation programs and efforts from countries to ‘export’ missions (Minkman and van Buuren, 2019), or through social movements (e.g. agroecology) (Mier et al., 2018; Wezel et al., 2018).

To understand MAIS, it is this important to unravel global linkages in enacting missions. Also, one can compare MAIS development between countries, in terms of what missions are espoused by a country, the stage of development of missions and whether technologies and practices have reached certain stages of readiness to go to scale (Herrero et al., 2020; Sartas et al., 2020).

2.5. How do MAIS evolve and how do we study this process?

It has been argued that transformative change in agriculture is generally a process in which innovative processes in several ‘innovation niches’ gradually change incumbent systems or ‘regimes’ (El Bilali, 2019a; Geels et al., 2016; Geels and Schot, 2007; Leach et al., 2012; Olsson et al., 2014; Pigford et al., 2018), though it is increasingly recognized it may also come from within incumbent agricultural systems (Gaitán-Cremaschi et al., 2019; Runhaar et al., 2020). Transformation is then the outcome of many ‘small wins’ instead of a sudden radical change (Termeer and Dewulf, 2019; Termeer and Metze, 2019). Equally, a MAIS does not establish overnight, but the network of actors connected to the MAIS, their interactions and the funding and innovation policies that support the MAIS will emerge gradually (Eastwood et al., 2017). Though the mission-oriented innovation approach presupposes a degree of steering, some parts of a MAIS (being a complex adaptive system) will be self-organized without the support of central steering mechanisms. Given the geographical fluidity of a MAIS, system complexity and degree of self-organization, the analytical boundaries of a MAIS not easy to establish. This affects MAIS characterization, as well as the accomplishment of a mission by a MAIS (or for that matter- several co-existing or competing MAIS).

Janssen et al. (2020) have indicated some relevant points for the analysis of MAIS (which connect to what has been discussed in section 2.1 to 2.4):

1. Complexity and ‘wickedness’ of the challenge, and how the challenges/solutions are understood and prioritized in the MAIS.
2. Mission design including theory of change, in geographical and temporal terms, and focus and emphasis.
3. MAIS governance, such as decision making and participation processes, accountability and learning.
4. Development of MAIS in time and space, in view of their theory of change.

MAIS analysts, drawing on generic innovation system theories, can utilize some of the existing innovation system analysis frameworks such as functional-structural analysis, innovation policy mix analysis, or social network analysis to analyse MAIS (Hermans et al., 2019; Lamprinopoulou et al., 2014; Spielman et al., 2011; Wieczorek and Hekkert, 2012; Schut et al., 2015). This can be combined with agricultural and food systems assessment and modelling approaches focusing for example on resilience (Meuwissen et al., 2019; Tittonell, 2020), and drawing on recent frameworks to analyse different aspects of food systems transformation (Gaitán-Cremaschi et al., 2019; Hebinck et al., 2018; Kanter et al., 2015; Termeer et al., 2018; Zurek et al., 2018). Such analysis may make use of data science or citizen science driven approaches bringing together large datasets of biophysical and socioeconomic data to track mission evolution (Beza et al., 2017; Fielke et al., 2020; Guo et al., 2020; Klerkx et al., 2019; Sauermann et al., 2020). Since MAIS are often global with national or regional ‘branches’,

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10 A relevant consideration is where the boundaries of MAIS lie: from a food systems perspective, consumers are for example highly important in view of food preference and dietary change as well as food choice environments (retail and domestic environments) and food waste prevention and recycling (Vermeulen et al., 2019; Willett et al., 2019). New AgTech and FoodTech inspired food systems (e.g. urban agriculture, vertical agriculture) also bring new players into AIS (Pigford et al., 2018). Also, food systems may have a ‘blue component’, based on food captured or cultivated in water bodies (Belton et al., 2020; Tezzo et al., 2020) so can aquaculture also be considered a form of agriculture and are ‘aquaculture innovation systems’ (Joffre et al., 2018) also part of MAIS? One can even question whether MAIS is the correct term, if the mission is food systems transformation. For example, the concept of a ‘food innovation system’ (Leach et al., 2020) may be then perhaps more appropriate.
Table 1
Questions and possible actions to further conceptual development and analysis of MAIS.

| Question | Possible actions |
|----------|------------------|
| What missions are in a MAIS? | Map the diversity of food systems transformation missions, and the sub-missions that underpin them, including the contribution of different sorts of science (e.g., biophysical science, engineering, social and policy science) and the role of trans-disciplinarity. Identify the (policy) drivers for missions and their emergence and evolution. |
| Why do MAIS emerge or are set-up? | Map the networks of actors driving missions and constituting MAIS, and the governance and power dynamics within MAIS. |
| Who (or what) drives MAIS? | Map MAIS at a (sub) country level, how they are linked supranationally, and what are the connections with other sectors. Further develop methodologies to capture MAIS and connect them to ongoing agricultural innovation and food systems analysis. |
| How do MAIS evolve and how do we study this process? | |

3. Conclusion and future outlook

In this perspective paper, we have elaborated on the emerging concept of MAIS. We think its relevance lies in better understanding what drives transformative change, and create insights for policy makers and other AIS actors on innovation system directionality and innovation policy mixes for enhancing food systems transformation. This may spur reflection on subnational, national and supranational innovation activities and the adequacy of MAIS for supporting transformative change (Wanzenböck and Frenken, 2020). Table 1 summarizes some of the possible actions that may be undertaken to investigate MAIS and do MAIS mapping.

Besides introducing a MAIS perspective to understand food systems transformation, this paper aims to stimulate agricultural systems scholars and field level practitioners to critically reflect upon their own positionality within a MAIS.12 This includes asking questions on what mission or sub-missions they contribute to and what type of contribution they make, e.g. systems (re-)design, modelling and scenario building to support mission formulation, or monitoring and analysing effects of technologies and interventions in missions.13 Furthermore, in view of the need to create coupled innovations (Meynard et al., 2017) as well as exnovation, it requires scrutiny of the actor networks and institutional structures they are part of and whether and how these align with a MAIS. This also includes asking questions with whom they need to engage to support the formulation and development of missions and what kind of incentive systems are needed to support these interactions.

We conclude this paper by inviting the Agricultural Systems community as well as other natural and social scientists to progress the analysis of MAIS and develop it further as a concept and approach to understand and support agricultural innovation in relation to food systems transformation.

Declarations of Competing Interest

The authors declare that there are no conflicts of interest related to this paper.

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