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EDITED BY

Steven Wolf,
Cornell University, United States

REVIEWED BY

Phoebe Stephens,
Dalhousie University, Canada

*CORRESPONDENCE

Anant Jani
anant.jani@uni-heidelberg.de

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Transitions to food democracy through multilevel governance

Anant Jani^{1*}, Andreas Exner², Reiner Braun³, Brigitte Braun³,
Luisa Torri⁴, Sofie Verhoeven⁵, Anna Maria Murante⁶,
Stefanie Van Devijvere⁷, Janas Harrington⁸, Amalia Ochoa⁹,
Giorgia Dalla Libera Marchiori⁹, Peter Defranceschi⁹,
Aditi Bunker¹, Till Bärnighausen¹, Esther Sanz Sanz¹⁰,
Claude Napoléone¹⁰, Eric O. Verger¹¹, Christian Schader¹²,
Joacim Röklov¹, Ingrid Stegeman¹³, Samuele Tonello¹³,
Robert Pederson¹⁴, Niels Heine Kristensen¹⁴, Tim Smits¹⁵,
Dirk Wascher¹⁶, Peter Voshol¹⁷, Annemarie Kaptejins¹⁷,
Samantha Nesrallah¹⁸, Olav Kjørven¹⁸, Fabrice DeClerck¹⁸,
Cristina Biella¹⁹, Marija Adela Gjorgjioska²⁰, Ana Tomicic²⁰,
Ana Teresa Ferreira Oliveira²¹, Stefania Bracco⁴,
Sandra Estevens²², Luigi Rossi²³, Günther Laister²⁴,
Aleksandra Rózalska²⁵, Borche Jankuloski²⁶,
Christophe Hurbin²⁷, Maylis Jannic²⁷, Fiona Steel²⁸,
Ewoud Manbalıu¹², Karin De Jager²⁹, Athanasios Sfetos³⁰,
Maria Konstantopoulou³⁰, Pavlos-Alexandro Kapetanakis³¹,
Michaela Hickersberger³², Elsa Chiffard³³ and
Carina Woolhead³⁴

¹Heidelberg Institute of Global Health, University of Heidelberg, Heidelberg, Germany, ²Regional Centre of Expertise (RCE) Graz-Styria, Zentrum für nachhaltige Gesellschaftstransformation, Universität Graz, Graz, Austria, ³Open Science for Open Societies, Ludwigsburg, Germany, ⁴University of Gastronomic Sciences of Pollenzo, Bra, Italy, ⁵Stad Gent, Gent, Belgium, ⁶Institute of Management, Scuola Superiore Di Studi Universitari e Di Perfezionamento S Anna, Pisa, Italy, ⁷Epidemiology and Public Health, Sciensano, Elsenne, Belgium, ⁸School of Public Health, University College Cork, Cork, Ireland, ⁹Sustainable Resources, Climate and Resilience, ICLEI, Freiburg, Germany, ¹⁰Ecodéveloppement Research Unit, Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement, Avignon, France, ¹¹MolSA, Univ Montpellier, CIRAD, CIHEAM-IAMM, INRAE, Institut Agro, IRD, Montpellier, France, ¹²Department of Food System Sciences, Research Institute of Organic Agriculture (FiBL), Frick, Switzerland, ¹³Eurohealthnet Association Sans But Lucratif (ASBL), Bruxelles, Belgium, ¹⁴Department of People and Technology, Roskilde Universitet, Roskilde, Denmark, ¹⁵Institute for Media Studies, Katholieke Universiteit Leuven, Leuven, Belgium, ¹⁶Sustainable Design for Metropolitan Landscapes (Susmetro), Tilburg, Netherlands, ¹⁷Nutrition and Health, Stichting Louis Bolk Instituut, Bunnik, Netherlands, ¹⁸EAT Foundation, Oslo, Norway, ¹⁹OpenDot SRL, Milan, Italy, ²⁰Arete Institute for Sustainable Prosperity, Skopje, North Macedonia, ²¹CISAS, Escola Superior Tecnologia e Gestão, Instituto Politécnico de Viana do Castelo, Portugal, ²²Comunidade Intermunicipal Do Minho-Lima, Viana do Castelo, Portugal, ²³Azienda Unità Sanitaria Locale (USL) Toscana Nord Ovest, Pisa, Italy, ²⁴LEADER-Region Weinviertel Donauraum, Korneuburg, Austria, ²⁵Women's Studies Centre, Uniwersytet Lodzki, Lodz, Poland, ²⁶Sector for Financial Issues at the Municipality of Prilep, Prilep, North Macedonia, ²⁷myLabel SAS, Lyon, France, ²⁸Good Food Oxfordshire Ltd., Oxford, United Kingdom, ²⁹Center for Secretariat and Implementation, Rotterdam, Netherlands, ³⁰National Center for Scientific Research, Demokritos, Agia Paraskevi, Greece, ³¹Civil Protection, Sitia, Greece, ³²Okosoziales Forum Österreich and Europa, Wien, Austria, ³³Teaching Department, Commune D'Avignon, Avignon, France, ³⁴Guldborgsund Municipality, Guldborgsund, Denmark

Food systems in Europe are largely unjust and not sustainable. Despite substantial negative consequences for individual health, the environment and public sector health and care services, large multi-national corporations

continue to benefit from the way food systems are designed—perpetuating “Lose–Lose–Lose–Win” food systems that see these large corporations benefit at the expense of health, the environment and public sector finances. Transitioning to “Win–Win–Win–Win” food systems is challenging because of the heterogeneity, complexity and unpredictable nature of food systems— one-size fits-all solutions to correct imbalances and injustices cannot exist. To address these challenges, we propose the use of heuristics—solutions that can flexibly account for different contexts, preferences and needs. Within food systems, food democracy could be a heuristic solution that provides the processes and can form the basis for driving just transitions. However, ensuring that these transition processes are fair, equitable, sustainable and constructive, requires an approach that can be used across vertical and horizontal governance spheres to ensure the voices of key stakeholders across space, time and spheres of power are accounted for. In this manuscript we outline a new Horizon project, FEAST, that aims to use multilevel governance approaches across vertical and horizontal spheres of governance to realize constructive food democracy. We envisage this as a means to inform just processes that can be used to design and implement policies, in line with food democracy, to facilitate transitions to “Win–Win–Win–Win” food systems across Europe that makes it easy for every European to eat a healthy and sustainable diet.

KEYWORDS

food systems, food democracy, multilevel governance, just transitions, health, sustainability

Introduction

The complex, non-linear nature of food systems belies simple solutions to supporting transitions to make them fair and sustainable. As with all complex systems, food systems have internal drivers that are influenced by external factors. A multitude of actors working across different scales of space and time with heterogeneous values and processes drive decisions about technologies, labor relations, prices, product range, the places of agriculture, processing and distribution, and the logistics of commodity chains as well as imaginaries of food and agriculture that help to stabilize specific spatio-temporal relations within the food system. Resulting contradictions, antagonisms and dilemmas constitute fundamental uncertainties within food systems (Jessop, 2016). The inability of actors in the food system to identify, understand or predict the intended or unintended consequences of their actions as well as the occurrence and/or impact of external events (e.g., wildfires, droughts, war, inflation) provides another area of uncertainty (Meadows, 2008; Marro, 2014). In complex systems, transitions occur at thresholds or “tipping points” that are characteristic of the system. Because of the nonlinear nature of complex systems, it is extremely difficult to predict what the tipping point will be, when it will occur or the response of system components, i.e., actors including non-human beings such as

pests, natural events, and their multiple sociospatial relations. When and how transitions develop and what the impact will be on the system represents a further area of uncertainty (Fieguth, 2017).

The aggregation of these factors means that we will be fundamentally uncertain of how food systems will evolve even if the strategies of all actors involved were known.

Despite the lack of certainty on the exact composition of our food systems or their tipping points, something that we can be more certain of is that food systems have imbalanced power relations and incentive structures that could impact the thresholds at which tipping points are reached as well as the recovery of the system in response to internal and/or external shocks. In Europe, food systems largely deliver a “Lose–Lose–Lose–Win” where large food corporations “win” at the expense of enormous negative consequences, and thus a “Lose”, for the environment, health and the public sector (FEAST, 2022).

At the level of the environment, the global food system is responsible for 26% of global greenhouse gas (GHG) emissions, 50% of global habitable land use, 70% of freshwater use, 78% of eutrophication and 60% of biodiversity loss (Leip, 2005; Whitmee et al., 2015; Poore and Nemecek, 2018; Ritchie and Roser, 2020; Xu et al., 2021). In the European Union

(EU), the agricultural sector is responsible for 10.3% of GHG-emissions and if we include the impact derived from imports, the environmental impact of the EU's food system will be even greater (Leip, 2005; Berkhout et al., 2018). Food systems and dietary behaviors also play a critical role in perpetuating preventable diseases. Consumption of poor-quality diets is increasing in Europe and it is the leading cause of death and a top contributor to Non-Communicable Disease (NCD) burden (Lobstein, 2018; Branca et al., 2019; Willett et al., 2019). Approximately 75% of all diseases and 85% of all deaths in Europe can be attributed to NCDs. In addition to the burden on individuals, EU governments spend about €700 billion annually to treat NCDs—which is about 70% of the ~€1 trillion (7–10% of GDP) EU governments spend annually on healthcare (ECDA, Internet; World Health Organization, 2021). Food systems have also contributed to creating, entrenching and widening health inequalities across the EU because of food deserts and food poverty that see subgroups of the population having differential access to and ability to choose healthy and sustainable food that can help them maintain their health, prevent disease and contribute to a healthier environment (Allcott et al., 2019).

Despite the negative impacts of the food system on the environment, health and public sector, the food industry has been remarkably profitable. Allen et al. (2019) found that transnational companies in the food industry earned billions with substantial profit margins (processed foods—sales: ~\$350 billion, ~7% profit margin; soft drinks—sales: ~\$100 billion, ~14% profit margin; fast food—sales: ~\$75 billion, ~13% profit margin). The food industry actively perpetuates poor diets by marketing foods that are high in calories, fat, sugar and salt, especially to vulnerable groups such as minors and lower socio-economic demographics (Backholer et al., 2021). Furthermore, through tactics including interfering with legislative process, using front groups to act on their behalf and public relations campaigns designed to make them appear responsible in the eyes of the public and policy-makers, the food industry blocks or stagnates governmental attempts to prevent and limit NCDs through measures such as controls on advertising and increased tax on food products high in fat, sugars and salt (Cowling and Magraw, 2019). It is important to note that most of the benefits of the current dietary trends go to large transnational companies; small companies and primary producers, especially small farmers, do not benefit with the average EU farmer earning ~50% of the average worker in the economy (EU Commission F2F strategy, 2020).

Correcting the imbalances and injustices of food systems, within the context of fundamental uncertainty, requires flexible approaches that can accommodate place-specific socio-spatial relations across space, shifting political, economic, social and cultural conditions as well as changing temporalities, including temporal horizons of actors' strategies. Such

approaches have become an integral feature of “the EU as a real-time laboratory for trial-and-error experimentation in governance” (Jessop, 2016, p. 27) and should be focused in terms of democratizing the food system in order to promote food justice, thus ensuring healthy, sustainable, affordable and culturally appropriate food for everyone.

Dealing with fundamental uncertainties: The role of heuristics

The outcomes that result from a given set of system components, dynamics, and environments are not predictable and will be place-specific and dynamic. Though knowledge and methods exist to collect data on how different elements interact within a small part of a system, this information does not yield insights to enable accurate predictions on outcomes within the system on the whole, including the tipping points that, if reached, can destabilize it (Mousavi and Gigerenzer, 2014; Katsikopoulos et al., 2021).

Within complex systems, studies have shown that heuristic solutions, simple “rules of thumb”, can outperform complex algorithms based on big data models, which can sometimes lead to overfitting, which occurs when big data-led statistical models fit against the data used to train the model (Mousavi and Gigerenzer, 2014). Heuristics (efficient, fast and frugal cognitive processes) can be adapted to decision-makers' place-specific conditions and can avoid overfitting, reduce resources required to make decisions while also supporting more accurate judgements (Gigerenzer and Gaissmaier, 2011). Some examples of heuristics include (Mousavi and Gigerenzer, 2014; Katsikopoulos et al., 2021):

- 1/N rule: For investors, allocating resources equally to N alternatives can help to diversify portfolios and has been shown to outperform optimal asset allocation portfolios.
- Tallying: For estimating criteria, counting the number of positive cues, rather than trying to estimate weights, can lead to predictions that are as accurate or better than multiple regressions.
- Satisficing: For decision makers, exploring alternatives and selecting the first option that exceeds his/her aspiration levels can lead to better choices compared to chance.

Though we can be certain that our food systems are unfair and unsustainable, given that they are complex and non-linear means that the approaches that can be used to make them fair and sustainable will have to be simple and flexible enough to adapt to different and place-specific

conditions over space and time. In this manuscript, we propose food democracy as heuristic solution that can be used by stakeholders at all spatio-temporal scales and in all parts of the food system to manage complexity while driving desirable shifts toward fair and sustainable food systems that deliver a “Win–Win–Win–Win”.

Food democracy: A heuristic solution with complexities

Democracy can be defined as “a way of making binding, collective decisions that connects those decisions to the interests and judgements of those whose conduct is regulated by the decision (Cohen, 2007; Szulecki and Overland, 2020).”

Justifications for democracy can either be instrumental (i.e. democracy delivers the best results) or procedural (i.e. democratic processes are ideal because they allow for greater representation across a population) (Tonello, 2020). In this manuscript, we are concerned only with the procedural aspects of democratic processes—namely, that democratic orientations can be realized by devolution of decision-making to local levels away from elite and centralist-driven governance and government through a variety of forms including cooperatives, civil networks, and alternative/networked governance structures that may contribute to rearticulating different spatial-temporal scales to foster decisions ensuring healthy and sustainable food for everyone (Szulecki and Overland, 2020).

As with any social processes, different stakeholders, over space and time, will have different conceptualisations of values (e.g., democratic orientations of justice and sustainability) and failing to account for this can lead to counterintuitive outcomes (Tschersich and Kok, 2022). For example, democratic processes can:

- increase existing inequalities because people who are more likely to participate are already privileged and able to invest the resources needed to participate (Szulecki and Overland, 2020);
- lead to private sector policy capture (Szulecki and Overland, 2020; Tschersich and Kok, 2022);
- lead to “state encroachment” and undesirable regulations that increase bureaucracy and inefficiencies (Szulecki and Overland, 2020);
- lead to the pursuit of short-term goals that can manifest in “food populism”; borrowing from the literature on “energy populism”, “food populism” can be framed as “a political discourse that pits the supposed interests of “the people” against “the elites”, often combined with resource nationalism, suboptimal but popular economic solutions such as subsidies, and promises of an easy life (Szulecki and Overland, 2020)”.

Given “the tendency of all forms of governance and associated policies to fail (market failure, state failure, network failure, or collapse in trust)” (Jessop, 2016, p. 16), food democracy as a heuristic does not necessarily lead to a stable, healthy, just, and sustainable food system, but rather facilitates the ongoing moderation of “contradictions, dilemmas and antagonisms” (ibid., p. 26), which always remains partial and provisional, in a “contested process, involving different economic, political, and social forces and diverse strategies and projects” (ibid.).

Notwithstanding the risks, as a heuristic, food democracy can deliver many benefits while also helping to overcome some of the aforementioned risks. Deliberative democratic processes that are the foundation of food democracy require that all citizens are given equal freedom to speak and contribute to shaping their food system (Held, 2006). Shifts to these modes of decision-making within food systems can give citizens a sense of ownership and responsibility because they are engaged “...in fashioning the nature of the food system and as a consequence strengthening their civil lives as citizens (Heldeweg and Saintier, 2020; Szulecki and Overland, 2020).” This in turn can yield several positive outcomes including:

- just and equitable representation and ensuring that marginalized voices are heard (Szulecki and Overland, 2020; Pike, 2007).
- addressing and redirecting power imbalances (Szulecki and Overland, 2020; Tschersich and Kok, 2022).
- a greater engagement in civic affairs (Barber, 1984).
- tolerance for opposing points of view (Gutmann and Thompson, 1996).
- increase in the community’s social capital through more informed decision-making (Fishkin, 1997; Putnam, 2000).

These outcomes in aggregate can drive a “creative reconfiguration of social relations” and their spatial as well as temporal dimensions that increase social cohesion and can lead to more effective innovations to address problems faced by food systems, while also addressing some of the risks of private sector policy capture and state encroachment (Szulecki and Overland, 2020; Tschersich and Kok, 2022). Furthermore, deliberative processes can lead to more effective and innovative solutions because of the “pluralities of knowledge” represented by the diverse stakeholders involved in these processes (Tschersich and Kok, 2022). Bringing together this cognitive diversity can aggregate, align and codify latent knowledge within the community that can yield insights that will be superior to the knowledge that could be provided by individual or small groups of experts (Ober, 2008; Landemore, 2013; Surowiecki, 2004; Hong and Page, 2004; Page, 2007). It can also help to navigate some of the problems seen with “food populism”.

Food democracy can give stakeholders a voice in shaping their food systems but it must be implemented and managed

carefully to ensure it does not perpetuate undesirable food systems through unsustainable and unjust “organizational, institutional and spatiotemporal fixes” (Jessop, 2016, p. 16).

Operationalising food democracy and avoiding its pitfalls: The role of multilevel governance

Ensuring that food democracy is realized as a constructive heuristic solution, especially for vulnerable groups, requires processes that incorporate the constant reflection and adaptation needed to address power imbalances and incorporate perspectives on justice (Tschersich and Kok, 2022). Furthermore, considerations on dilemmas, contradictions and antagonisms as well as tradeoffs and unintended consequences are essential to avoid creating or perpetuating injustices. For example, an approach that delivers benefits in one context, or point of time, could lead to injustices for stakeholders in a different context or for “distant voices” who are not able to participate in the democratic processes (Meadows, 2008; Tschersich and Kok, 2022; Jessop, 2016).

There are a variety of approaches that could be used to rearticulate different place and socio-temporal scales of decision-making to support food democracy. One such approach, multilevel governance (MLG), has been used in a variety of domains including urban sustainability, energy infrastructure and climate change adaptation (Liesbet and Gary, 2003; Bulkeley and Betsill, 2005). At its core, MLG results in the distribution of decision-making authority through a heterarchy that manifests in a shared and integrated mode of decision-making across multiple dimensions including: different scales of governance reaching from micro to meso; between and within different sectors (e.g. food systems vs energy or within a sector, for example, within food systems the distribution of decision-making authority between producers, distributors, retailers, consumers); and between different resource stewards within and across the aforementioned dimensions (Marzeda-Mlynarska, 2011).

MLG's origin and evolution was based on a recognition of the limitations of other modes of governance; it was, therefore, a means to an end rather than an end in itself. The most well-recognized example of this is within the EU where an opposition to state-centric modes of governance led to an approach that would facilitate different types of stakeholders contributing to and making governance decisions (Liesbet and Gary, 2003; OECD, 2010). This yielded four key characteristics (Marzeda-Mlynarska, 2011):

- Involvement of transnational, national and subnational stakeholders.

- Institutional relationships driven by negotiations and networks as opposed to constitutions and legal frameworks.
- An important role for non-governmental bodies.
- A flat and open decision-making structure as opposed to one driven by pre-defined hierarchies.

MLG can generally be disaggregated into two subtypes. MLG-Type I, normally focused on policy outcomes, is carried out along vertical governance axes that have well-defined tiers and a limited number of, usually government, entities that have shared decision-making powers (Liesbet and Gary, 2003; Bulkeley and Betsill, 2005; OECD, 2010; Saito-Jensen, 2015). MLG-Type II, or “polycentric governance” focused on particular issues, is carried out along flexible horizontal governance axes and forms (e.g., state and non-state governance) where organizational boundaries are blurred, or even disappear (Liesbet and Gary, 2003; Bulkeley and Betsill, 2005; OECD, 2010; Saito-Jensen, 2015).

Though MLG is not very common in practical attempts to promote food democracy, the examples that have proven to be successful, such as the Denmark-Aarhus-Copenhagen initiative on vertical integration of sustainable food procurement, demonstrated sustainable impact (Gradziuk et al., 2022). Given its key characteristics, MLG is also a potentially powerful mechanism that can be used to realize and support the deliberative processes that underpin food democracy. In so doing, FEAST attempts to contribute to a change in sociospatial relations in specific places and on different sociospatial scales in the sense of action research, i.e. gaining scientific data that also serves to change mindsets and relations of those involved in the project as stakeholders (Rauch, 2014). In this way, the project will also collect further information on barriers to change. Therefore, food democracy as a heuristic within FEAST encompasses three aspects: involving a variety of key stakeholders for assessing strategies through deliberative processes that include voices otherwise neglected; changing stakeholders' mindsets and relations to foster democratic decision-making going beyond representational democracy through MLG; creating knowledge about mindsets and relations by analyzing these deliberative processes, their barriers and their outcomes.

By supporting a more equal distribution of power and formal/informal joint decision-making between different spheres of governance (including different levels of government as well as between non-governmental actors including communities, not-for-profit organizations and the private sector), MLG provides a structured perspective to incorporate the key voices that need to inform how food democracy can be used as a heuristic solution to support just and sustainable food system transitions under different conditions. Through these mechanisms, MLG can be an efficient and effective way to realize the key pillars of the deliberative aspects of food democracy including ensuring full and equitable representation

across key stakeholders in the food system, which can also contribute to providing the cognitive diversity needed to derive innovative solutions. Furthermore, by integrating different levels of governance into the identification and articulation of problem statements and solutions exploration, meso- and macro-governance scales can contribute to the creation of conditions that can support citizens to contribute deliberative processes that can overcome the barriers often seen in locked-in socio-technical systems such as incumbencies and undesirable resilience (e.g. the dominance of private sectors organizations in the shaping and functioning of food systems manifest in occurrences like policy capture driven by large multinational food companies) (Rawls, 2001; O'Neill and Williamson, 2012; Tonello, 2020).

To develop and implement experimental approaches based on MLG that can realize constructive food democracy across Europe and deliver “Win–Win–Win–Win” food systems, in July 2022 a consortium consisting of 35 partners across 15 European countries launched a Horizon Europe project called FEAST (Food systems that support transitions to hEalthy And Sustainable dieTs) under HORIZON-CL6-2021-FARM2FORK-01-15 (FEAST, 2022). A 5-year project, FEAST aims to explore how both MLG-Type I and MLG-Type II can support and enable food democracy by delivering transition processes that are empowering, allow for meaningful participation of diverse voices and perspectives while also supporting co-development of knowledge and solutions across Europe's diverse food systems.

Research and innovation activities across FEAST will be carried out through a nested mixed methods design on three broad analytical levels of governance and decision-making across the entire food system (Figure 1). These levels speak to different governance scales but are not identical with these.

MLG-Type I

MLG-Type I will be explored by investigating macro-level food system dynamics driven by government actors at different vertical scales of governance and government to better understand the role of municipal, national and EU policies in shaping the food system. The aim is to better understand how regulations, discourse, rules of the games of policy-making, as well as power dynamics can serve to enforce both progressive and regressive interests and visions. Further to this, there will be an exploration of the interaction between top-down and bottom-up mechanisms that can be used to shape and deliver policies across these vertical levels of governance.

Through these approaches, FEAST aims to deliver concrete, practical and evidence-based policy recommendations for all levels of policy makers to support the design and implementation of food

systems that enable all European citizens, particularly vulnerable groups, to easily access healthier and more sustainable diets.

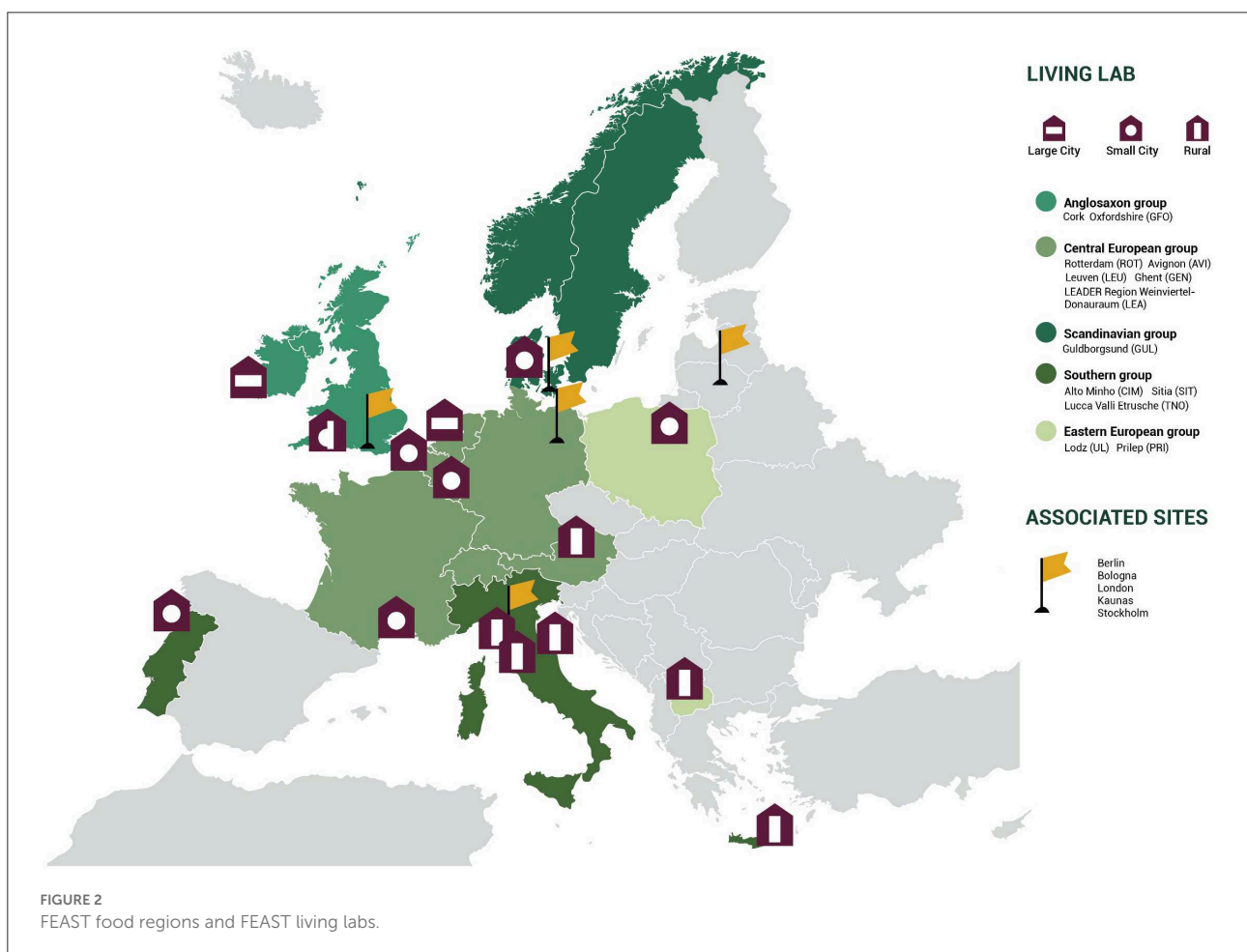
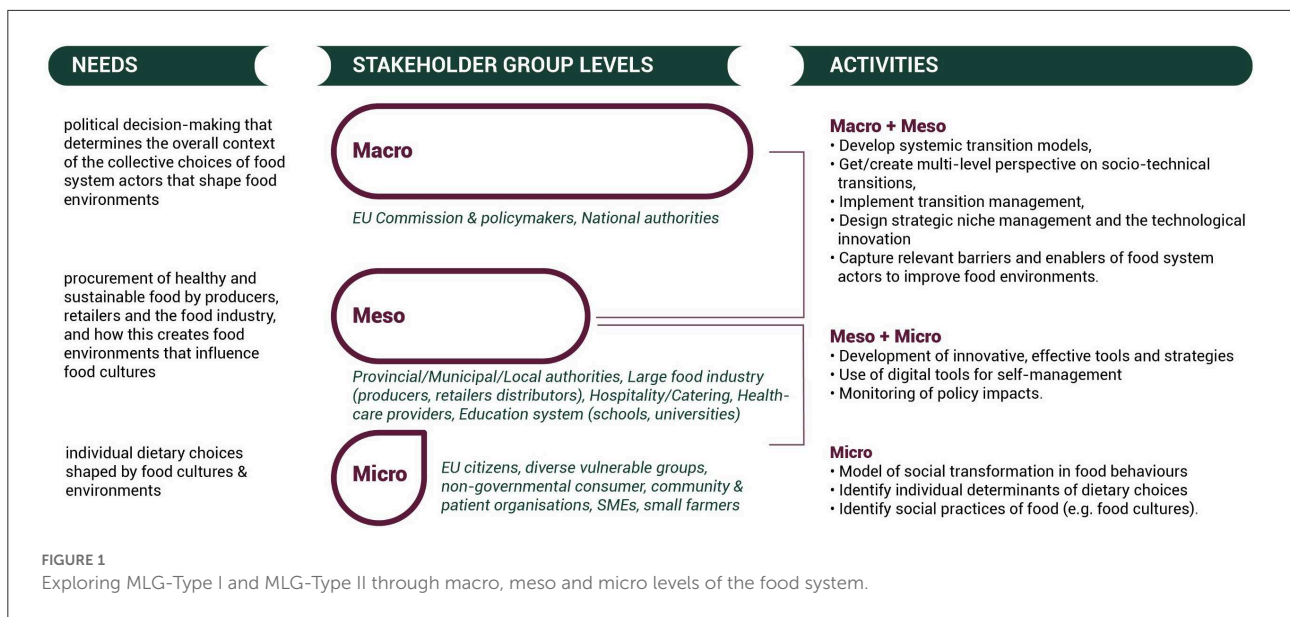
MLG-Type II: Co-design and co-ownership through living labs

FEAST will utilize Living Labs to explore MLG-Type II. Living labs can be used to engage in experimental democratic approaches while accounting for context-sensitive factors that could have an impact on the realization of food democracy. To ensure representation across the EU, FEAST has identified living labs from rural areas, small/medium cities and associated large city living labs according to a specific typology of food systems that cover aspects including regional diets, food production systems and welfare system characteristics (i.e., Beveridge/Bismarckian healthcare systems; Figure 2; Andersen, 2010; Freisling et al., 2010; Vanham et al., 2013; de Ruiter et al., 2014; Irz et al., 2016; Guarnizo-Herreño et al., 2017).

FEAST's Living labs will be used to establish user-focused experimental environments in which key food system actors responsible for shaping food environments along the horizontal micro- and meso-scales of the food system (end-users (citizens), municipal, provincial and national authorities as well as production, distribution and retail organizations) will participate in the co-development, testing and research of novel community, technology and policy-based solutions in real-world settings. Importantly, living labs are particularly well-suited for identifying, defining, and addressing the needs of vulnerable groups struggling economically and geographically to access solutions to support them to adopt and maintain healthier and more sustainable diets. As such, those who will benefit directly from the outcomes of this project will be closely involved in generating the solutions. Partners will also co-design recommendations for policymakers using a participatory and inclusive analysis of policy constraints to innovation across food systems. The specific approaches we will use at the analytical micro- and meso-levels that speak to respective governance scales include.

Micro-level

Sociological and human geography methods will be used to investigate the geographic, socio-economic, behavioral and cultural factors determining dietary choices on individual and group-specific levels, accounting for food environments across Europe involving urban, suburban, rural and coastal regions, with a particular focus on different vulnerable groups, gender and demographics. This information will be elicited using a variety of methods including cross-sectional survey



across Europe, direct engagement with vulnerable groups, tracking purchasing behavior through digital apps and modeling informed by large datasets. The impact of individual and group-specific dietary choices on the environment will be analyzed by using biodiversity, nitrogen flow and energy efficiency of agriculture as indicators. The consequences of these choices on public health and group-specific quality of life will be assessed by using mortality rates and cardiovascular illnesses. The insights on the factors influencing dietary behaviors will be leveraged by our partners in cities and community groups to improve food environments and empower citizens to make healthier and more sustainable dietary choices.

Meso-level

Economic science and sociology will guide investigations of the determinants of food procurement by producers, retailers and the food industry. Furthermore, FEAST will explore how these determinants shape food environments. Using validated instruments developed by our partners (e.g., Food-EPI) we aim to directly engage with food system actors to better understand their barriers and facilitators to supporting transitions to healthier food environments. We will also co-design innovations that can be used to shape food environments and institutions in a way that empowers and supports consumers to easily access and make healthier and more sustainable dietary choices. For businesses, we aim to explore how fewer unhealthy and unsustainably produced dietary products are offered while simultaneously increasing affordable, local, healthier and more sustainably produced products on offer. For institutions, we aim to support them to increase availability and use of healthier and more sustainable meal options.

Integrating MLG-Type I and MLG-Type II insights

The outputs of our MLG-Type I and MLG-Type II approaches will be integrated into scenario methods and modeling approaches that allow for integrated health impact and sustainability assessments of planned policy measures that follow from specific scenarios and visions based on FEAST's co-created community, technology and policy-based solutions. Models will be able to calculate cost-benefit ratios of various measures and will also take into account multiple valuation languages impacting policy choices and debates in socially heterogeneous environments. These models will also help to identify potential leverage points for food system change while accounting for social, environmental and economic effects as well as trade-offs and synergies within and across these domains. As far as we are aware, this is the first attempt at integrating

outputs from both MLG-Type I and MLG-Type II approaches in this way.

Conclusion

Given the heterogeneity, complexity and unpredictable nature of food systems, one-size fits-all solutions cannot exist. Heuristics are a type of solution that can provide the flexibility needed to account for different contexts, preferences and needs. Within food systems, food democracy could be a heuristic solution that can form the basis for driving transition processes but ensuring that these transition processes are fair, equitable, sustainable and constructive, requires an approach that can be used across vertical and horizontal governance spheres to ensure the voices of key stakeholders across space, time and spheres of power are accounted for.

In this manuscript we outline a new Horizon project, FEAST, that aims to use multilevel governance approaches across vertical and horizontal spheres of governance to realize constructive food democracy. We envisage this as a means to inform just processes that can be used to design and implement policies, in line with food democracy, while being able to accommodate the shifting demands of complex food systems.

The ultimate goal is to enact food democracy as a heuristic solution to overcome the current imbalances and injustices while facilitating transitions to “Win–Win–Win–Win” food systems across Europe that makes it easy for every European to eat a health and sustainable diet that is good for their health, good for the environment, reduces demand on public sector services, while also being beneficial for businesses.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

AJ and AE were responsible for the conceptualization and writing of the manuscript. RB, LT, and SV were contributed to writing and reviewing the manuscript. BB created the figure and reviewed the manuscript. AM, SVD, JH, AO, GM, PD, AB, TB, ES, CN, EV, CS, JR, IS, ST, RP, NK, TS, DW, PV, AK, SN, OK, FD, CB, AG, AT, AF, SB, SE, LR, GL, AR, BJ, CH, MJ, FS, EM, KD, AS, MK, OK, MH, EC, and CW contributed to the conceptualization of the manuscript and contributed to reviewing it for content. All authors contributed to the article and approved the submitted version.

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Conflict of interest

Authors RB and BB were employed by Open Science for Open Societies. Authors IS and ST were employed by Eurohealthnet ASBL. Authors SN, OK, and FD were employed by EAT Foundation. Author CB was employed by OpenDot SRL. Author SE was employed by Comunidade Intermunicipal

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The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

- Allcott, H., Diamond, R., Dubé, J.-P., Handbury, J., Rahkovsky, I., and Schnell, M. (2019). Food deserts and the causes of nutritional inequality". *Q. J. Econ.* 134, 1793–1844. doi: 10.1093/qje/qjz015
- Allen, L. N., Hatefi, A., and Feigl, A. B. (2019). Corporate profits vs. spending on non-communicable disease prevention: an unhealthy balance. *Lancet Global Health* 7, e1482–e1483. doi: 10.1016/S2214-109X(19)30399-7
- Andersen, E. (2010). *System for Environmental and Agricultural Modelling: Linking European Science and Society Regional Typologies of Farming Systems Contexts*. Wageningen: SEAMLESS. Available online at: https://www.seamless-ip.org/Reports/Report_53_PD4.4.3.pdf (accessed September 7, 2022).
- Backholer, K., Gupta, A., Zorbas, C., Bennett, R., Huse, O., Chung, A., et al. (2021). Differential exposure to, and potential impact of, unhealthy advertising to children by socio-economic and ethnic groups: a systematic review of the evidence. *Obes. Rev.* 22:e13144. doi: 10.1111/obr.13144
- Barber, B. (1984). *Strong Democracy: Participation Politics for a New Age*. Berkeley, CA: University of California Press.
- Berkhout, P., Achterbosch, T., van Berkum, S., Dagevos, H., Dengerink, J., van Duijn, A. P., et al. (2018). *Global Implications of the European Food System; A Food Systems Approach*. Wageningen: Wageningen Economic Research, Report 2018–05.
- Branca, F., Lartey, A., Oenema, S., Aguayo, V., Stordalen, G. A., Richardson, R., et al. (2019). Transforming the food system to fight non-communicable diseases. *BMJ* 28, 296. doi: 10.1136/bmj.l296
- Bulkeley, H., and Betsill, M. (2005). Rethinking sustainable cities: multilevel governance and the "urban" politics of climate change. *Environ. Polit.* 14, 42–63. doi: 10.1080/0964401042000310178
- Cohen, J. (2007). "Deliberative democracy," in *Deliberation, Participation and Democracy: Can the People Govern?*, ed S. W. Rosenberg (Basingstoke: Palgrave Macmillan), 219–236. doi: 10.1057/9780230591080_10
- Cowling, K., and Magraw, D. (2019). Addressing NCDs: protecting health from trade and investment law comment on "Addressing NCDs: challenges from industry market promotion and interferences." *Int. J. Health Policy Manag.* 8, 508–10. doi: 10.15171/ijhpm.2019.41
- de Ruyter, H., Kastner, T., and Nonhebel, S. (2014). European dietary patterns and their associated land use: variation between and within countries. *Food Policy* 44, 158–166. doi: 10.1016/j.foodpol.2013.12.002
- EU Commission F2F strategy (2020). *Farm to Fork Strategy for a Fair, Healthy and Environmentally-Friendly Food System*. New York, NY: European Commission, 4.
- European Chronic Disease Alliance, European Public Health Alliance, Non-Communicable Disease Alliance. *Towards an EU Strategic Framework for the Prevention of Non-communicable Diseases (NCDs) Joint Paper [Internet]*. Available online at: <https://easl.eu/wp-content/uploads/2019/05/Final-NCD-Paper-full-version.pdf> (accessed September 7, 2022).
- FEAST (2022). *FEAST*. Heidelberg: FEAST. Available online at: <https://feast2030.eu/> (accessed September 7, 2022).
- Fieguth, P. (2017). *Springerlink (Online Service. An Introduction to Complex Systems: Society, Ecology, and Nonlinear Dynamics)*. Cham: Springer International Publishing.
- Fishkin, J. S. (1997). *The Voice of the People*. New Haven, CT: Yale University Press.
- Freisling, H., Fahey, M. T., Moskal, A., Ocké, M. C., Ferrari, P., Jenab, M., et al. (2010). Region-specific nutrient intake patterns exhibit a geographical gradient within and between European Countries. *J. Nutr.* 140, 1280–1286. doi: 10.3945/jn.110.121152
- Gigerenzer, G., and Gaissmaier, W. (2011). Heuristic decision making. *Annu. Rev. Psychol.* 62, 451–482. doi: 10.1146/annurev-psych-120709-145346
- Gradziuk, A., Kristensen, K., and Heine, N. (2022). *Aalborg Universitet Connecting Local and Global Food for Sustainable Solutions in Public Food Procurement*. Available online at: <https://core.ac.uk/download/pdf/60618153.pdf> (accessed September 7, 2022).
- Guarnizo-Herreño, C. C., Watt, R. G., Stafford, M., Sheiham, A., and Tsakos, G. (2017). Do welfare regimes matter for oral health? A multilevel analysis of European countries. *Health Place* 46, 65–72. doi: 10.1016/j.healthplace.2017.05.004
- Gutmann, A. and Thompson, D. (1996). *Democracy and Disagreement*. Cambridge: Harvard University Press.
- Held, D. (2006). *Models of Democracy*. Cambridge: Polity.
- Heldegeweg, M. A., and Saintier, S. (2020). Renewable energy communities as "socio-legal institutions": a normative frame for energy decentralization?. *Renew. Sustain. Energy Rev.* 119, 109518. doi: 10.1016/j.rser.2019.109518
- Hong, L., and Page, S. (2004). Groups of diverse problem solvers can outperform groups of high-ability problem solvers. *Proc. Natl. Acad. Sci. U.S.A.* 101, 16385–16389. doi: 10.1073/pnas.0403723101

- Irz, X., Leroy, P., Réquillart, V., and Soler, L.-G. (2016). Welfare and sustainability effects of dietary recommendations. *Ecol. Econ.* 130, 139–155. doi: 10.1016/j.ecolecon.2016.06.025
- Jessop, B. (2016). Territory, politics, governance and multispatial metagovernance. *Territ. Politics Gov.* 4, 8–32. doi: 10.1080/21622671.2015.1123173
- Katsikopoulos, K. V., Simsek, O., Buckmann, M., and Gigerenzer, G. (2021). *Classification in the Wild*. Cambridge, MA: MIT Press. Available online at: <https://mitpress.mit.edu/9780262045155/classification-in-the-wild/> (accessed September 7, 2022).
- Landemore, H. (2013). *Democratic Reason: Politics, Collective Intelligence, and the Rule of the Many*. Princeton, NJ: Princeton University Press.
- Leip, A. (2005). *Greenhouse Gas Emissions from Agriculture in Europe*. Copenhagen: EEA. Available online at: <https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-agriculture> (accessed September 7, 2022).
- Liesbet, H., and Gary, M. (2003). Unraveling the Central State, but how? Types of multi-level governance. *Am. Polit. Sci. Rev.* 97, 233–243. doi: 10.1017/S0003055403000649
- Loebstein, T. (2018). The language of obesity just makes matters worse. *Nat. Hum. Behav.* 2, 165. doi: 10.1038/s41562-018-0295-6
- Marro, J. (2014). *Physics, Nature and Society A Guide to Order and Complexity in Our World*. Cham: Springer International Publishing.
- Marzeda-Mlynarska, K. (2011). *The Application of the Multi-Level Governance Model outside the EU-context—The Case of Food Security*. Bolzano: European Diversity and Autonomy Papers—EDAP.
- Meadows, D. H. (2008). *Thinking in Systems: A Primer*. White River Junction, Vermont: Chelsea Green Publishing.
- Mousavi, S., and Gigerenzer, G. (2014). Risk, uncertainty, and heuristics. *J. Bus. Res.* 67, 1671–1678. doi: 10.1016/j.jbusres.2014.02.013
- Ober, J. (2008). *Democracy and Knowledge: Innovation and Learning in Classical Athens*. Princeton, NJ: Princeton University Press.
- OECD (2010). *Multi-level Governance: A Conceptual Framework | READ Online*. Paris: OECD Publishing. Available online at: https://read.oecd-ilibrary.org/governance/cities-and-climate-change/multi-level-governance-a-conceptual-framework_9789264091375-11-en#page4 (accessed September 7, 2022).
- O'Neill, M., and Williamson, T. (2012). *Property-Owning Democracy: Rawls and Beyond*. Malden, MA: Wiley-Blackwell.
- Page, S. (2007). *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools and Societies*. Princeton, NJ: Princeton University Press.
- Pike, J. (2007). "Deliberative democracy," in *Political Philosophy A-Z*. (Edinburgh: Edinburgh University Press).
- Poore, J., and Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. *Science* 360, 987–992. doi: 10.1126/science.aq0216
- Putnam, R. D. (2000). *Bowling Alone: The Collapse and Revival of American Community*. New York, NY: Simon and Schuster.
- Rauch, F. (2014). *Promoting Change Through Action Research*. Rotterdam; Boston, MA: Sense Publishers.
- Rawls, J. (2001). *Justice as Fairness: A Restatement*. Cambridge: Harvard University Press.
- Ritchie, H., and Roser, M. (2020). *Environmental Impacts of Food Production. Our World Data* Oxford: University of Oxford. Available online at: <https://ourworldindata.org/environmental-impacts-of-food> (accessed September 7, 2022).
- Saito-Jensen, M. (2015). Multilevel governance theory. *JSTOR* 2015, 2–6.
- Surowiecki, J. (2004). *The Wisdom of The Crowds*. New York, NY: Doubleday.
- Szulecki, K., and Overland, I. (2020). Energy democracy as a process, an outcome and a goal: a conceptual review. *Energy Res. Soc. Sci.* 69, 101768. doi: 10.1016/j.erss.2020.101768
- Tonello, S. (2020). *Resolving the democratic dilemma: contestation, anti-power and democracy*. Available online at: http://researcharchive.vuw.ac.nz/bitstream/handle/10063/8845/thesis_access.pdf?sequence=1 (accessed September 7, 2022).
- Tschersich, J., and Kok, K. P. W. (2022). Deepening democracy for the governance toward just transitions in agri-food systems. *Environ. Innov. Soc. Trans.* 43, 358–374. doi: 10.1016/j.eist.2022.04.012
- Vanham, D., Hoekstra, A. Y., and Bidoglio, G. (2013). Potential water saving through changes in European diets. *Environ. Int.* 61, 45–56. doi: 10.1016/j.envint.2013.09.011
- Whitmee, S., Haines, A., Beyrer, C., Boltz, F., Capon, A. G., de Souza Dias, B. F., et al. (2015). Safeguarding human health in the Anthropocene epoch: report of the Rockefeller foundation–lancet commission on planetary health. *Lancet* 386, 1973–2028. doi: 10.1016/S0140-6736(15)60901-1
- Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., et al. (2019). Food in the anthropocene: the EAT–lancet commission on healthy diets from sustainable food systems. *Lancet* 393, 447–492. doi: 10.1016/S0140-6736(18)31788-4
- World Health Organization (2021). *Noncommunicable Diseases*. Geneva: World Health Organisation. Available online at: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-disease> (accessed September 7, 2022).
- Xu, X., Sharma, P., Shu, S., Lin, T.-S., Ciais, P., Tubiello, F. N., et al. (2021). Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods. *Nat. Food* 2, 724–732. doi: 10.1038/s43016-021-00358-x

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