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Navigating the politics and processes of food systems transformation: guidance from a holistic framework

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The call for transforming food systems from their current unsustainable trajectories toward more desirable, healthy, sustainable, resilient, and equitable outcomes has received unprecedented echoes recently—particularly following the 2021 UN Food Systems Summit. But lack of guidance on how to do so in a comprehensive and integrated manner has left many actors uncertain, skeptical, or even low-spirited about the prospects of delivering such an ambitious task. Through this work, we argue that food systems transformation is not an impossible goal to aspire for; however, whether we achieve any form of transformation is essentially down to how food systems politics are enacted. Politics, we posit, is at the center of creating and maintaining current unsustainable food system trajectories and will also be crucial in guiding change processes toward sustainable goals. In this paper, we explore this argument through a conceptual framework. The framework, which is relevant for both high and lower-income countries, integrates multiple perspectives and practical experiences on transition, transformation and politics to propose a holistic diagnostic and prescriptive tool for food systems transformation. Three critical lessons emerge from this: first, the transformation (of food systems) must be normative, deliberate and goal-oriented—as opposed to driven by technological innovations; second, the process must account for, integrate, and build on the multi-dimensional and multi-procedural nature of the politics that drive (or resist) changes; and third, the transformation needs to build on a strong driving environment, one that transforms not just food systems but also their governance.

KEYWORDS

political economy, food system transformation, politics, food, system transition

1 Introduction

Food systems transformation—increasingly understood as purposive and normative changes that improve food systems processes and outcomes (Béné, 2022; Eliasson et al., 2022)—has become a buzzword in food literature and the global development community. From earlier expert reports (IPES-Food, 2016; HLPE, 2017) to the official 2021 UN Food System Summit (UNFSS) (Kalibata, 2021), the urgent and global need to redirect what scholars have described as a broken, dysfunctional and unsustainable system (Lartey et al., 2018; Baker et al., 2021; Fanzo et al., 2021) toward alternatives that deliver resilience, equity, health, and

sustainable outcomes is now commonly stressed (Webb et al., 2020; Fanzo et al., 2021; Béné and Devereux, 2023).

Arguably, a positive consequence of the drive for transformations is the enhanced visibility of the issue, which is partly evident in actors' contemplation on how to guide the process purposively. From specific actions (Elechi et al., 2022), to policy bundles (Barrett et al., 2022), search for pathways (Dentoni et al., 2017), or even paradigm shifts (Ruben et al., 2021; Sandhu, 2021), scholars are scrabbling with many propositions. From reducing meat intake (Rust et al., 2020) to the structural reconstitution of governance arrangements (Garnett, 2013; Fraser et al., 2016), there are many proposed "solutions" to redirect food systems toward more sustainable outcomes. We do not intend to produce an exhaustive review of these here. Instead, we observe that these propositions, although wide and diverse, collectively express the need for restructuring how actions, decision-making, and relationships in the current food systems are constituted and performed (De Schutter, 2017; Ruben et al., 2021). The breadth and diversity of these propositions also foreshadow the inevitable necessity for negotiating competing and potentially conflicting "means to the desired end" (Oliver et al., 2018; Duncan et al., 2022).

In parallel to the calls for food system transformations, discussions around "the politics of food system transformation" are gaining attention (Swinburn, 2019; Leach et al., 2020; Sodano and Gorgitano, 2022). The crust of this scholarship is that disagreements and competitions—over ideas, facts, interests, values, and desired outcomes—are inherent to the process of food systems transformation. As Pelling (2010) and others put it, true transformation cannot occur without contention of the underlying social, political, and economic arrangements that had created and maintained the existing status quo. These scholars urged us, therefore, to embrace politics to unpack how transformations may occur or not (De Schutter, 2017; Béné et al., 2020; Leach et al., 2020). This nascent literature remains, however, fragmented and underdeveloped (Oliver et al., 2018), or even sometimes, ignored, hindering the potential to offer clear guidance on how politics can be leveraged for food system transformation. In essence, despite the calls to improve political processes for the prospects of positive outcomes (Gillespie et al., 2013; De Schutter, 2017; Oliver et al., 2018), there is little guidance on what steps to follow. Aware of this critical gap, this paper proposes a holistic framework that aims to structure the literature on the politics of food systems transformation to provide coherent direction on delivering the preferred transformation.

To build this framework, we propose to draw on two well-established frames—the Multi-level Perspectives of transition (MLP) (Geels, 2002; Geels and Schot, 2007) and the framework for the creation of an Enabling Environment for Accelerated Undernutrition Reduction (henceforth FEEU) (Gillespie et al., 2013). We supplement those with an in-depth thematic review of political actions and practices that have been or are being used to transform food systems. We approach this review from a holistic perspective, drawing on transformation-relevant processes rooted in the traditional political economy analysis of structural issues and power dynamics (IPES-Food, 2017; Leach et al., 2020), complemented by more sociological locations of politics/power as embedded in discursive practices (Hinton, 2022), technological innovations (Hutter and Lawrence, 2021), knowledge (Szanton, 2004), and consumption choices (Boström and Micheletti, 2019). As such, the review is non-exhaustive but thorough (1,011 documents identified through Web of Science

and Google Scholar were initially reviewed after searching with keywords corresponding to the Framework's themes). After further review of their abstracts, 586 of these documents were considered relevant and thus included in a full-text review. Nvivo® for MAC (Release 1.7.8) was then used to code and categorize these 586 documents according to generic (broad) academic theories (post-structuralism, power, discursive practices, political knowledge, etc.). The papers cited in this review were eventually those considered the most relevant and/or illustrative (either conceptually or pragmatically) of these different fields and the themes of the Framework. We acknowledge the interpretive nature of the exercise (Bhattacharjee, 2012).

The outcome of the review is a two-dimension framework combining *domains of politics* with *processes of transformation*, which, together, outline how temporal configurations of political actions could be leveraged to overcome persistent unsustainable regime trajectories and drive food systems toward more normative transformative goals.

As such, the framework is mainly conceptual, fulfilling two distinct but related functions: a prescriptive function and, ensuing from it, a diagnosis function. As a *prescriptive* tool, the framework outlines the practices and political choices that *should* be considered across the domains and processes to effectively transform food systems toward normative, desirable outcomes. The *diagnosis* element results from the fact that the political domains and processes that structure the framework also provide benchmarks against which changes (or lack thereof) in countries' policies and interventions can be assessed. As such, the framework can be used to understand past transformation processes and explain why new ideas, institutions, innovations, and narratives fail to emerge or be scaled up.

Three critical lessons emerge from this work. First, the framework demonstrates the need for stronger normativity and goal orientation in the process of food system transformation to guide food systems toward more sustainable outcomes. Second, the framework makes evident the multi-dimensionality of food system transformation, arguing for actions to move beyond technological solutions and account for more political processes, including political economy around actors and knowledge, issues of capacities and resources, and the critical role of cultural norms and consumer behaviors. Third, through the different roles played by various actors at different stages of the process, the framework also highlights how the politics of food systems could create the driving environment needed for a "great food transformation to happen" (Béné, 2022).

2 The foundational frameworks

The first framework we draw from is the MLP, a hybrid analytical framework between evolutionary approaches and interpretivism that theorizes and explains patterns of long-term change in socio-technical systems (Rip and Kemp, 1998; Geels, 2002). The MLP, which aims to explain how (technological) transitions come about, takes a systems-based approach to understanding and analyzing large-scale, socio-technical transitions (El Bilali, 2020). It conceptualizes those transitions as "result[ing] from the interplay of developments at three analytical levels: niches (the locus for radical innovations and alternatives), dominant regimes (the locus of established practices and

associated rules that stabilize existing systems), and an exogenous landscape” (Geels, 2011, p. 27).

In the MLP, transitions involve four critical processes: (1) Innovations that may take the form of new technologies, practices, configurations of actor groups, beliefs and values, networks, or policies, created in the niches (Darnhofer, 2015). (2) These innovations gain momentum through learning and performance, drawing support from influential actor groups. (3) At the landscape level, pressure is exercised on the existing regime, destabilizing its business-as-usual practices to create windows of opportunity for innovations to emerge. (4) The destabilization allows new alignments that facilitate the breakthrough of novelties into the regime (Geels and Schot, 2007). Transitions occur with shifts from one socio-technical regime to another (Hölscher et al., 2018). However, such changes are mostly incremental and path-dependent and subject to lock-in mechanisms seeking to maintain old regimes in place. Those are often driven by power structures and vested interests (Avelino and Wittmayer, 2016; Conti et al., 2021).

The MLP has gained significant and mixed interests in several scholarly fields—especially in the energy and transport domains (Bergh and Bruinsma, 2008; Araújo, 2014)—as a heuristic to describe and guide sustainability transitions. Although it also appears to be increasingly prominent among agri-food scholars, several researchers question its real utility in analyzing agri-food sector transformation (e.g., El Bilali, 2019). We do not wish to revisit these discussions (see, e.g., Geels, 2011; Lawhon and Murphy, 2012), but we add our voices to them. First, while we appreciate MLP’s insights for food scholarship and practice (Hinrichs, 2014), we also raise the question of whether a framework developed for other sectors can fully capture the many unique specificities of food systems (HLPE, 2017; Baker et al., 2021). Second, – and perhaps more fundamentally—the random nature that characterizes MLP transitions –as opposed to normativity– may not be the best fit for analyzing the radical and goal-directed change that the unprecedented challenges of food systems require (Béné, 2022). These dynamics in agri-food systems and the need for a normativity of change motivate us to enrich the MLP to cater to food system-specific needs.

Hence, we complemented the MLP analysis with the FEEU framework. The FEEU differs from the MLP in two major ways. First, contrary to the conceptual/theoretical nature of the MLP, the FEEU is a practice-informed framework developed from the experiences of practitioners working on reducing undernutrition worldwide (Gillespie et al., 2013). It stipulates that an enabling environment, that is, “the policy and policy processes that build and sustain momentum for the effective implementation of actions that reduce undernutrition” (Gillespie et al., 2013, p. 553), is critical. This enabling environment, according to FEEU, can be crafted through political actions embedded in three linked domains: (i) knowledge and evidence, (ii) politics and governance, and (iii) capacity and resources, across two stages: the creation and sustaining of momentum; followed by the conversion of the momentum into results. Second, unlike the MLP, the FEEU suggests that calculated political processes at the intersections of broad economic, political, environmental, social, and cultural contexts can deliver the normative goal of reduced undernutrition (Smith and Haddad, 2015). Hence, it posits politics and deliberate actors’ actions (as opposed to random innovation) as the central element to enacting change that meets societal goals –see also Béné et al. (2020). Although the FEEU focuses on undernutrition, it is believed to have applicability for other food systems goals (Gillespie et al., 2013), and researchers

have drawn on its framing to foreground undernutrition reduction and other nutrition goals (see Gillespie et al., 2015; Hunter et al., 2016). What is evident in the later engagements with FEEU is that it does hold some prospects to positively influence nutrition outcomes and, possibly, other food system goals if practicalized.

However, the FEEU, like any other framework, is limited in multiple ways. Nisbett et al. (2014) acknowledged that the FEEU’s three domains of politics do not effectively consider how critical issues such as power, social accountability, and the role of political narrative affect enabling environments. Meanwhile, understanding these issues would be critical in exploring the structures and processes of food systems (McNeill, 2019; Swinburn, 2019). Likewise, the FEEU does not explicitly address potential political processes that may resist changes, neither the management of trade-offs nor the need for prioritization, which, as we will show through the proposed framework below, are not just necessary but critical to achieve desired food systems outcomes. Essentially, despite the current practical relevance of the FEEU evidenced by the various applications (Hunter et al., 2016), the framework would benefit from the extension to other aspects of politics and particular attention to specific processes like identifying potential resistance to change. Finally, beyond the need for such extensions, we also argue that a framework with nutrition as the underlying core goal may not be optimal for tackling the transformation of the whole food system(s) and delivering the multiple, sometimes conflicting outcomes that are known to characterize such systems beyond nutrition.

3 A holistic framework of politics and processes for food systems transformation

Building on the strengths and complementarities of the MLP and FEEU frameworks but acknowledging their limitations, we develop a holistic framework. While introducing the framework, we stress that using the word *holistic* is intentional as we consider food systems transformation achievable only through a systemic approach to change. It is also holistic in that it considers the interactions between the different politics and areas of food systems actions discussed in the literature and combines them into one framework.

Table 1 summarizes the different elements of the framework while the paragraphs below provide a more detailed description. The elements of the framework are structured into two dimensions – later organized into the two main axes of the framework– a vertical axis, distinguishing the different *domains of politics*, and a horizontal axis, considering the different *processes of transformation*.

3.1 Domains of food system politics

The domains of food systems politics describe the different spaces of (a)political activities within which actions of resistance and mechanisms that break barriers/locks-in and propel systematic transformation take place. These different domains are informed by the pluralistic and multi-dimensionality of politics identified across the scholarships (Anderson M. et al., 2019; Leach et al., 2020). We identified four domains where (anti)political processes define food systems dynamics.

TABLE 1 The different political domains and processes involved in food system transformation.

The domains	Domains of politics involved
A. Powers, discourses and knowledge	Powers, discourses and knowledge represent the different forms of direct control or influence of actors and the mechanisms through which those are channeled. Power in food systems is mainly established within political economy scholarship, where it is said to emanate from dynamics embedded in instrumental, structural, and discursive forces. It offers valuable insights into how existing deeply embedded unsustainable structures, institutions, discourses and knowledge, dominate and lock-in the system into its current trajectory but also how to leverage deep-rooted power dynamics to trigger transformations.
B. Culture, social norms and behaviors	Food choices and behaviors describe why and how individuals eat the foods they do. Food choices and behaviors, influenced by cultures and social norms, can slow down social change or, on the contrary, provide leverage for personal and collective reforms. Politics in this domain is understood in the context of socio-cultural struggles around change processes at individual and social/collective scales, as illustrated through, e.g., political consumerisms. Issues of culture and norms, however, are still under-represented in the literature on food systems or even rarely viewed as political.
C. Capacity and financial resources	Capacity and financial resources refer to the available human, organizational and financial assets available to institutions that facilitate food system actions. These resources have often been recognized as potentially highly political, for example, in the case of capacities and resources inadequacies in low- and middle-income countries' public administrations, leading to competition between public needs and priorities or between levels of public policy (national vs. sub-national), or between relevant sectors (e.g., health vs. education vs. agriculture).
D. Technological innovation	Technological innovation describes novel and better technologies, tools, systems, and technical processes in the food system space. It often viewed as engine of change, unavoidably implies competition between the new and the old, propelling particular values at the expense of others, and ultimately resulting in the reshaping of power relations in food systems. Through these and other mechanisms (e.g., lobbying), technological innovation is said to have the potential to catalyze transformations, while it is also very often source of inertia —making it a critical element to control in order to navigate transformations.
The processes	Nature of the processes involved
1. Identifying resistance to change in the current regime	The first process necessary in transforming food systems is identifying the resistance to change in the current food regime. Scholarships in political economy, socio-technical transitions, and innovation theories have all highlighted resistance as an integral element of food systems and the analysis of their dynamics. The argument is that dominant incumbents and established institutions may have interests in maintaining and protecting the structures on which their current position and benefits depend.
2. Creating and maintaining new momentum	After identifying and challenging resistances, the second process that needs to take place is creating and maintaining a new momentum, that is, the emergence of a new pathway (in the form of an alternative narrative, change in norms, behaviors, and/or institutional arrangements) that bears a different vision from the established regime/model/paradigm. This is the stage where the foundation for the normativity that must guide the transformation toward sustainable goals are made explicit.
3. Converting new momentum into sustainable options	The third process consists in converting the new momentum into sustainable options. This stage refers to the step where the desirable emerging alternative momentum becomes mainstream to compete and replace the dominant unsustainable practices and structures. It is thus at this stage that alternative framings, technologies, behaviors and norms, and capacity arrangements created in the prior stage become institutionalized, converting new momentum into diffusible and followable prospects and new social, technological, economic and political standards.
4. Managing trade-offs, reducing incoherence, and prioritizing actions	Finally, crosscutting the three processes above is managing trade-offs, reducing incoherence, and prioritizing actions. Drawing from (food) systems perspective, we describe this stage as systematically assessing actions and policies to minimize contradictions and maximize co-benefits in processes and outcomes. Empirical data indicate that the many complexities of food systems—including competing issues, objectives, goals, and potential outcomes—make those trade-offs and prioritization critical to transformation processes since, ultimately, every action (as well-intentioned as it may be) always results in winners and losers.

3.1.1 First domain: powers, discourses, and knowledge

Politics within this first domain is mainly established within political economy scholarship, where food systems change (or no-change) is conceived to emanate from power dynamics embedded in instrumental, structural, and discursive forces (Clapp and Fuchs, 2009), reinforced by knowledge and science (De Schutter, 2017; Anderson and Leach, 2019; Duncan et al., 2019; Clark et al., 2021). Specifically, whether food systems change or not depends on the political negotiation of more profound struggles between actors (and their interests) (Harris et al., 2019), the interplay of socially and politically positioned knowledge and evidence (Tomlinson, 2013; Sodano and Gorgitano, 2022) and the structurally-determined rules of the game (Clapp, 2020).¹ Being probably the domain with the largest scholarly engagements, it offers valuable insights into how existing deeply embedded unsustainable structures have come to dominate and lock-in the system into its current trajectory but also how to leverage deep-rooted power dynamics to trigger transformations. However, as Duncan et al. (2019) and others (e.g., Béné and Lundy, 2023) have noted, this initial political-economic perspective needs to be complemented by other approaches acknowledging other forms of power and influence.

3.1.2 Second domain: culture, social norms, and behaviors

Food choices and behaviors, influenced by cultures and social norms (Higgs, 2015), can slow down social change. It can, however, also provide leverage for personal and collective reforms. Politics in this domain is understood in the context of socio-cultural struggles around change processes at individual and social/collective scales. Discussions of values and meanings of (food) actions in social practices (e.g., Spaargaren et al., 2011; Shove et al., 2012; Sargant, 2014) and increasingly, in poststructuralist informed political economy (Duncan et al., 2019) through works such as political consumerisms (Goodman and DuPuis, 2002; Lockie, 2002; Jacobsen and Dulsrud, 2007) makes these politics evident. Yet, issues of culture and norms, as Noack and Pouw (2015) argued, are still under-represented in the literature on food systems and, even when considered, are rarely viewed as political. This makes the inclusion of this domain (even more) imperative in order to extend the horizons and levers of food systems transformations.

3.1.3 Third domain: capacity and financial resources (of the public sector)

Several scholars in development, public administration and governance (Wu et al., 2015; Yee and Liu, 2021), and political economy (Gillespie et al., 2019) have emphasized the political elements of this domain; for example, the discussions of capacities and resources inadequacies, especially in low- and middle-income countries (LMICs)' public administrations, have often been identified as a

source of competition between public needs and priorities (e.g., food vs. energy) or between levels of public policy (national vs. sub-national), as well as between food systems sectors (e.g., health vs. education vs. agriculture) (Hampshire et al., 2004; Gillespie et al., 2013; Pereira and Drimie, 2016). The political dynamics in this domain, thus, essentially translate into how the different mixes of competencies (analytical, operational, and political) and capabilities, as well as resources, at individual, organizational, and systemic levels, enable or hinder the initiation of changes in practices and in mental models, to counter resistance and deliver desired food systems outcomes (Gillespie et al., 2013; Holt-Giménez, 2019).

3.1.4 Fourth domain: technological innovations

Technological innovations, described in varied literature as engine of (systems) change (Bear and Holloway, 2015; Khan et al., 2021), imbue competition and tensions between the new and the old, as well as between the multiple novelties vying for attention (Herrero et al., 2020). Some argue that “technologies” cannot be detached from what they do (Carolan, 2020, p. 209) and how they come into being (Béné, 2022; de Boon et al., 2022)—which is mainly political, propelling specific values at the expense of others, and ultimately resulting in the reshaping of power relations in food systems (Carolan, 2018; ETC Group, 2022). Through these and other mechanisms (e.g., lobbying), technological innovations are said to be ambiguous (Mialon et al., 2015): on the one hand, they have the potential to catalyze transformations (e.g., hybrid seeds and green revolution), but on the other hand, they are more often than not source of inertia (e.g., farmer capital investment in machinery limiting diversified production or defensive research and development) (ERF, 2008; Hendrickson and James, 2016). In this context, technological innovations emerge through diverse politics—making this space critical in navigating how to deliver transformations.

3.2 The processes of transformation (and political actions)

In addition to these four domains of politics, we posit that the trajectory of transformations in food systems must materialize over time through four distinct processes (or stages), as follows.

3.2.1 Process 1—identifying resistance to change in the current regime

The first process necessary in transforming food systems is *identifying the resistance to change in the current food regime*. Scholarships in political economy (De Schutter, 2017; Béné, 2022), socio-technical transitions (Geels, 2014; Anderson C. R. et al., 2019), and innovation theories (Friedman and Ormiston, 2022) have all highlighted resistance—the processes through which newness and change are restrained—as an integral element of food systems and their dynamics (Conti et al., 2021, see also Goldstein et al., 2023 for an extensive review across disciplines). The argument is that dominant incumbents and established institutions may have interests in maintaining and protecting the structures on which their current position and benefits depend (IPES-Food, 2017; Harris et al., 2019; IPES-Food, 2023). The inevitability of resistance and the challenges they pose to food systems sustainability efforts make their identification, understanding, and eventual unlocking, a critical step

¹ For more comprehensive discussions about the different forms of power and how they can interact, complement and compete with each other in influencing processes related to food system transformation see (among others) (Clapp and Fuchs, 2009; Avelino and Wittmayer, 2016; Anderson M. et al., 2019; Swinburn, 2019; Clark et al., 2021; Carriedo et al., 2022; Béné and Lundy, 2023).

in the transformation process. In effect, challenging the status quo to overcome change-resisting biases of all forms is a prerequisite for transformation (Pelling et al., 2015; Carriedo et al., 2022; Duncan et al., 2022).

Given the critical position of resistance in transformation processes (Béné, 2022), food scholars have identified and discussed many specific examples relative to the global food systems (see Oliver et al., 2018; Conti et al., 2021; Friedman and Ormiston, 2022; Goldstein et al., 2023) and/or about specific topics within the system, such as the reduction in red meat consumption (Sievert et al., 2021; Béné and Lundy, 2023). Later in this paper, we will enrich these discussions by emphasizing some of these resistances as they emerge within the four political domains introduced above, showing in particular that these resistances can take many different forms of political (in)actions, and that those (in)actions are not confined to the political economy of corporations and governments but are, instead, widespread across the activities of diverse actors, including consumers and civil society.

3.2.2 Process 2— creating and maintaining a new momentum

After identifying and challenging resistances, the second process that needs to take place is *creating and maintaining new momentum*. Our use of the term momentum is deliberate, as the term is commonly used to describe a force or movement. So, we view momentum as the emergence of a force, power of new and alternative political actions, with the potential to challenge and impact existing regimes in ways that sow the seeds for transformation. Hence, drawing from socio-technical transitions (Geels, 2002; Bremmer and Bos, 2017) and alternative foods networks (Tregear, 2011), we describe new momentums as alternative narratives, innovations, changes in norms, behaviors, and/or institutional arrangements that *bear politically different visions* from the established regime/model/paradigm. Particularly, this stage is motivated by well-established concepts and processes of transitions/transformation, such as niches in the MLP (Schot and Geels, 2007; Bremmer and Bos, 2017) and the preparation phase of change described by Olsson et al. (2014) and Pereira et al. (2020). However, unlike niches that are novelties from lower levels and sheltered from the rigors of regime competition (Schot and Geels, 2007), new momentums take a systematic and fluid approach as we envision them to manifest across all domains and scales of food systems.

Critical in this process is visioning for alternatives and setting out a different direction for the system (Lam et al., 2022). At this stage, alternative visions, directions, and expectations that drive the trajectory of the food systems transformation are articulated and deliberately crafted into change actions (Lartey et al., 2018; Jia, 2021; Kugelberg et al., 2021). This sets the foundation for the explicit normativity that actors must pursue to deliver transformation. This is where the actual goals of transformation (for example, sustainable healthy diets) are fused into the emerging food systems by employing such visions as the indices for negotiating political actions.

3.2.3 Process 3—converting the new momentum into sustainable options

The third process is *Converting the new momentum into sustainable options*. We take inspiration from niche-regime linkages in MLP

(Ingram, 2015; Bui et al., 2016; Lam et al., 2022), diffusion/adoption of innovations under transition dynamics (Silvestri G. et al., 2022), and the recruitment of practitioners in social practices (Shove and Pantzar, 2005; Shove et al., 2012) to describe this stage where the emerging alternative momentum becomes mainstream and replaces the unsustainable dominant practices and structures. It is thus at this stage that the alternative framings, technologies, behaviors and norms, and capacity arrangements created in the prior stage are institutionalized as sustainable options from which potential takers can choose. Converting new momentum into these diffusible and followable prospects involves enlarging, replicating, and moving alternatives into available political opportunities in the broader system for others to follow (Prost, 2019).

However, as Aramyan et al. (2021) argue, motivation alone is not enough to make niches become the norm, in our case, to turn alternatives into sustainable regime options. For this to happen, several conditions need to be fulfilled. In particular, translating framings and agendas into implementable policies is considered central (Kanter et al., 2016; Milat and Li, 2017; Ajates Gonzalez et al., 2018). This involves using policy and policy instruments to institutionalize sustainable alternatives (Tummers, 2019). It also entails turning those alternative narratives into actionable activities (Ajates Gonzalez et al., 2018; European Commission, 2021) and drawing the right external partners and followers to ensure these alternatives become the new standard (Aramyan et al., 2021). In the end, new visions and outcomes must be acceptable to potential takers (Shove and Pantzar, 2005; Shove and Walker, 2014) to draw transformation-worthy engagements.

3.2.4 Process 4—managing trade-offs, reducing incoherence, and prioritizing actions

Finally, cross-cutting the three already outlined processes is *managing trade-offs, reducing incoherence, and prioritizing actions*. Trade-offs refer here to situations where improvement in one aspect/dimension of the food system or the implementation of one action/policy is associated with decline, losses or limitation in a different aspect/dimension (cf. IPES-Food, 2017). Thus, we draw from (food) systems perspectives (Horton et al., 2017; Mausch et al., 2020) to describe this stage as systematically assessing actions and policies to minimize contradictions and maximize co-benefits in processes and outcomes (HLPE, 2017; Vågsholm et al., 2020; Jagustovic et al., 2021). This stage also involves temporal choices to ensure enhanced long-term actions and outcomes while minimizing unavoidable negative short-term consequences (Gillespie et al., 2013; Ssebunya et al., 2017).

Empirical data indicate that the many complexities of food systems –including competing issues, objectives, goals, and potential outcomes– make those trade-offs and prioritization critical to transformation processes. In this context, some scholars have argued that trade-offs need to be *intentionally* addressed for true sustainability to occur because diversity in complex systems inherently creates competition (Horton et al., 2017; Herrero et al., 2020; Barrett et al., 2022) or even conflicts (Galli et al., 2018; Bojić et al., 2022). Ultimately, every (in)action results in winners and losers, which must be managed to ensure the least resistance possible in change processes.

In sum, whether in relation to the resistance to change or in establishing alternative(s) leading to new outcomes, trade-offs occur in every food system (in)action and at every stage of the transformation process.

4 A comprehensive view of the political economy of food system transformation

In this section, the literature discussing different aspects of food system transformation is reviewed. While a substantial number of papers were considered, we limit the review to the most relevant ones that speak to the themes of the Framework. In completing the exercise, we intend to show how the framework provides a comprehensive and cohesive overview of the politics and processes to be considered when engaging in food system transformation. The framework and the key findings emerging from the review are synthesized in [Tables 2](#) and [3](#). *Italics* phrases in the text refer to specific elements of the framework.

4.1 Identifying resistance to change in the current regime

4.1.1 Resistance in the domain of powers, discourses, and knowledge

Several sources of resistance to food system transformation related to *Powers, discourses and knowledge* (top-left part in the framework) can be found in the literature.

Concentration and domination by the “big corporate”—Widely discussed by political economy scholars, the influence of powerful corporate actors is at the heart of the opposition to food system reforms. “Big Food” and “Big Ag,” as they are commonly called, are influential actors who wield enormous powers in their respective segments of the food system ([Stuckler and Nestle, 2012](#); [Bronson and Sengers, 2022](#)). Along with new-comers such as technology companies (Microsoft, Google, etc.), they exert tremendous control over the food systems through digital innovations ([Abdulai, 2022](#); [ETC Group, 2022](#)), financialization, and capitalization ([Clapp, 2014](#)) – often at the detriment of local/indigenous communities ([Lugo-Morin, 2020](#)). Meanwhile, recent analyses reveal that the level of concentration in the agro-industry has reached some unprecedented levels: four firms controlled half of global commercial seeds, six companies controlled 58% of seed markets, four firms controlled 68% of the agrochemical market, and three companies controlled about 100% of commercial poultry genetics worldwide ([ETC Group, 2022](#)). While classical economists consider concentration positively as it is (theoretically) expected to facilitate economies of scale ([Bain, 1954](#); [Gale and Branch, 1982](#)), empirical evidence demonstrate that, on the contrary, high concentration in a sector tends to be associated with lower levels of innovation and competition ([US Federal Trade Commission, 2003](#); [ERF, 2008](#)).

Current/dominant regime coalitions’ discourses—Closely linked to this concentration of resources and reinforcing it are specific discourses and narratives adopted by incumbent actors to legitimize their strategies and/or deny outsiders’ entrance into the sector ([IPES-Food, 2023](#)). For instance, in addition to various forms of discourses aiming at compartmentalizing food system problems into simplistic or reductionist approaches encouraging quick fixes and technological solutions ([Anderson C. R. et al., 2019](#); [ETC Group, 2022](#)), other strategies include alarmist discourses framed around population growth, hunger, and climate change. These powerful stories around the imperative need to “feed the world” solidify a singular emphasis on productivity in favor of corporate-led, intensive systems

([Tomlinson, 2013](#)). More generally, through the promotion of concepts such as ecological modernization, climate-smart agriculture, or sustainable intensification, those discourses deflect attention away from indigenous knowledge and local communities’ roles in the future of food system ([Lugo-Morin, 2020](#); [Kuhnlein and Chotiboriboon, 2022](#)), toward technocratic solutions where the broader social, cultural, political, and spatial dimensions of food and agriculture are removed or ignored ([Holt-Giménez and Altieri, 2013](#); [Canfield et al., 2021a](#)). Whether these are intentional or otherwise is still being debated, as some still view these approaches as good faith efforts to support change ([Garnett and Godfray, 2012](#)), while evidence, including lobbying practices (see below), suggests on the contrary that these discourses are more likely to be intentional than coincidental ([Baker et al., 2020](#); [Moodie et al., 2021](#); [Schoneveld, 2022](#)).

Lobbying, power of influence of incumbents—The third key source of resistance to change in the food system is the influence exercised by incumbents through their lobbying power—for instance, the fact that, between 2015 and 2016, US food corporations have spent at least \$192.8 million to influence GMO labeling legislation, state-based referenda on GMO labeling laws, and other issues relating to consumer access to information ([IPES-Food, 2017](#)). Even though lobbying in itself is neither illegal nor necessarily leads to negative public policy (e.g., the Community Food Coalition in the US has successfully lobbied for food reforms on many occasions), in documenting the growing influence and profits of food corporations, [Moodie et al. \(2021\)](#) observe that more often than not corporate lobbying puts profits over public health, thus entrenching current unsustainable trajectories and preventing the emergence of disruptive, more sustainable or healthier alternatives.

Other key-elements contributing to resistance to change in the domain of power, discourses and knowledge are mentioned in [Table 2](#). The first is the *economic and political interests of governments*. Even though some large food system actors are known to have huge negative externalities on the environment and/or human health, national or local governments may still support these actors simply because their activities contribute substantially to GDP, tax revenues, exports, or employment ([Schneider, 2017](#); [Winders and Ransom, 2019](#); [Béné and Lundy, 2023](#)). In the US, for example, agriculture, food, and related industries contributed roughly \$1.264 trillion to the country’s GDP in 2021 ([USDA, 2023](#)).

Another source of resistance acknowledged in the literature is the *influence of scientific paradigms and mainstream science* often used to maintain or reinforce particular framing and agenda through what is referred to as instrumentalization of evidence, weak science and other forms of discursive practices ([Mandrioli et al., 2016](#); [Parkhurst, 2017](#); [Béné and Lundy, 2023](#)). In this regards, omission or exclusion of indigenous and local knowledge ([Antonelli, 2023](#)) or disregard of the role of informal actors such as street vendors ([Kawarazuka et al., 2018](#)), is frequent. In parallel, several recent analyses also discuss the *dysfunctional policy-science interfaces* ([Sibanda and Mwamakamba, 2021](#); [Singh et al., 2021](#); [Hainzelin et al., 2023](#)). [Sievert et al. \(2021\)](#) show, for instance, how, in Australia, evidence of the impact of red meat on the environment is continuously challenged as financial interests at the heart of decision-making take precedence over data from challenging science. In Vietnam, [Béné et al. \(2021\)](#) show how evidence and policy agenda are “distorted” toward particular issues (food safety) to the detriment of other longer-term structural trends, such as the rapid emergence of obesity in the urban population.

TABLE 2 Holistic framework of food system transformation with detailed elements populating the four domains and first three processes.

The domains	The processes		
	1. Identifying resistance to change in the current regime	2. Creating and maintaining new momentum	3. Converting new momentum into sustainable options
A. Powers, discourses and knowledge	<ul style="list-style-type: none"> • Concentration and domination by the “big corporate” • Current/dominant regime coalitions’ discourses - Justification (narrative) of the current status quo • Lobbying, power of influence of incumbents (private sector) • Economic and political interests from governments (e.g., trade export) • Role of scientific paradigms and mainstream science • Dysfunctional policy-science interface and the role of media 	<ul style="list-style-type: none"> • Framing of the problem and narratives of change (policymakers) • Enabling and incentivizing positive contributions from the private sector • Generation of demand for evidence of effectiveness • Incentivizing horizontal coherence (multisectoral coordination) • Advocacy to change priority (civil society) 	<ul style="list-style-type: none"> • Translation of new framing and agenda into concrete policies • Create political coalitions in support of change • Evidence-based documentation of coverage, scale, and quality (scientific community) • Research for alternative food system configurations and “preferred solutions”
B. Culture, social norms, and behaviors	<ul style="list-style-type: none"> • Consumer lifestyle, habitus, norms, and societal expectations 	<ul style="list-style-type: none"> • Creating and raising consumer awareness • Building counter-narratives (civil society, users/consumers) 	<ul style="list-style-type: none"> • Encouraging the role of civil society and individuals in changing societal values (e.g., political consumerism) • Alignment of consumer demand with food systems sustainability objectives
C. Capacity and financial resources	<ul style="list-style-type: none"> • Lack of human and/or capital resources in government institutions • Lack of know-hows in government institutions 	<ul style="list-style-type: none"> • Leadership and championing • Systemic and strategic capacity building 	<ul style="list-style-type: none"> • Delivery and operational capacity around compliance and enforcement • Identifying new forms of resource mobilization
D. Technological innovation	<ul style="list-style-type: none"> • Technological path dependency and lock-in • Absence of alternative technological solution 	<ul style="list-style-type: none"> • Supporting the creation and diffusion of new sustainable innovations • Creating (technological) infrastructure supporting innovations/changes 	<ul style="list-style-type: none"> • Alignment of innovations with food systems sustainability indicators • Creating a business case for innovation using financial instruments
4. Managing trade-offs, reducing incoherence, and prioritizing actions (see Table 3 for detail)			

4.1.2 Resistance related to culture, social norms, and behavior

The second domain of the framework –*Cultural norms, expectations, and individual values*– widen the consideration beyond the “usual suspects” discussed above (governments, private sector and science) and redirects the attention to a fourth, less often considered in traditional political economy analysis, but equally important group of actors: the consumers. Through this *Cultural norms, expectations, and individual values* domain, the framework reminds us that *consumer lifestyle, habitus, norms, and societal expectations* can also create serious resistance to change and maintain production and consumption in unsustainable trajectories (Spaargaren et al., 2011; Shove et al., 2012; Sargant, 2014). These inertias generally result from people preferring to adhere to and follow accepted norms (DuPuis and Goodman, 2005; Berger, 2019), reproducing them even when they are deemed undesirable or harmful (Nyborg et al., 2016). The consumption of red meat is a case in point. Social, personal, and cultural values around eating meat, as shown in the case of Germany (Hübel and Schaltegger, 2022) and Scotland (Macdiarmid et al., 2016) and much of the Western world, continue to reproduce and support the perpetuation of red meat

consumption. Amidst these cultural attachments, even the emergence of alternative proteins has not managed to slow down red meat consumption (Gravely and Fraser, 2018), which is projected to grow at least 14% by 2030 (compared to the 2018–2020 level) (OECD and FAO, 2021).

4.1.3 Resistance related to Capacity and financial resources

Next, in the list of barriers to change is the *Capacity and financial resources* domain, including the *lack of public capacities and resources*. The issues considered here are about how resource inadequacies can undermine the initiation and execution of transformational changes, especially in low- and middle-income countries (LMICs) (Pereira and Drimie, 2016; Yee and Liu, 2021). Unsurprisingly, of the many capacity limitations discussed in these examples, financial constraints appear to receive considerable attention (HLPE, 2021). But, while the lack of financial resources is well acknowledged (Millan et al., 2019), poor and ineffective prioritization of actions is where another large part of the challenge lies. The amount of money channeled into harmful subsidies (OECD, 2021; Politico, 2022) demonstrates that resources are often available, but governments are not always effective in deciding the right actions to use them wisely.

The lack of capacities is not limited, however, to financial resources and the way they are allocated between and within ministries. Also challenging is the *Lack of know-how in government institutions* leading to a poor knowledge and conceptual understanding of what, when, and how to deliver transformation (Yee and Liu, 2021; Zerbian et al., 2022). From their experience in nutrition transition in India, Nepal, Bangladesh, and Pakistan, Gillespie et al. (2019) noted, for instance, that the lack of understanding and knowledge of nutrition (as a multi-sectoral issue) is usually a crucial barrier to the prioritization of nutrition in LMICs.

4.1.4 Resistance related to technological innovations

Technological innovations domain refers to two important sources of resistance that are discussed in the literature. The first, and arguably one of the most debated sources of resistance, is the *Technological path-dependencies and lock-ins* (Oliver et al., 2018; Conti et al., 2021; Friedman and Ormiston, 2022; Goldstein et al., 2023). Drawing largely from dominant traditions in the socio-technical transitions, it is argued that, once established, technologies become entrenched, leading to the exclusion of competing views and practices, thus making the system “blind” to possible alternatives and keeping it moving on the established trajectory (Geels, 2014; Conti et al., 2021; Friedman and Ormiston, 2022). Path-dependency is often used to express that “history matters,” highlighting how “initial moves in one direction elicit further moves in that same direction,” thus elucidating why and how certain technologies manage to dominate markets despite being inefficient, harmful or unsustainable (IPES-Food, 2016; Friedman and Ormiston, 2022).

Absence of alternative technological solutions is the second element discussed in the literature in relation to the resistance of technological innovation to change. The explanation here is that the dominant regime, by using its power to suppress the creation or dissemination of alternative technologies, binds actors to existing options (Conti et al., 2021; Goldstein et al., 2023). Once a dominant technology is established, actors are compelled to use it –as Hübel and Schaltegger (2022) demonstrate in the case of Germany’s meat processing. We note, however, that while the absence of alternative technologies appears a legitimate claim in perpetuating unsustainable practices, resistance may lie in the *lack of access* to alternatives rather than their actual absence (Holt-Giménez and Altieri, 2013; Holt-Giménez, 2019).

4.2 Creating and maintaining a new momentum

4.2.1 Creating a new momentum through powers, discourses, and knowledge

Central to the second stage of transformation (*Creating a new momentum*), are the *Framing of the problem and the associated narratives of change* (by and for the policymakers). These framings and narratives are what gives currency to the visions and actions that will have to be adopted to move us toward food systems sustainability (Garnett, 2013; Fraser et al., 2016). While it is important to embrace the plurality of pathways that may drive food systems toward broader sustainability goals (Leach et al., 2020; Duncan et al., 2022), this quest should not ignore the fact that choices will still have to be made on what root problem(s) to focus on and what narratives to amplify (Béné et al., 2019a). There is, therefore, a need for discussion and negotiation

between these multiple framings, and policymakers have a critical role to play in the process along with other actors (Fanzo et al., 2021; Duncan et al., 2022). In that context, academic institutions, public bodies, civil society organizations, or independent entities can contribute to challenge dominant regimes by offering alternative framings and narratives (Klerkx and Begemann, 2020; IPES-Food, 2023).

Enabling and incentivizing positive contributions from the private sector—The second element in this process relates to the claim sometimes made that a successful transformation would not be possible without the active involvement of the private sector (see, e.g., FAO, 2019b; Folke et al., 2019; Kennedy et al., 2021). If this was the case, then, powerful steering and guarding mechanisms would still have to be institutionalized to keep these actors aligned with the vision of sustainability, as history has demonstrated that private sector’s self-regulation is more an ideology-driven myth than an actual, efficient, self-guarding tool (Sharma et al., 2010; Stuckler and Nestle, 2012; Ronit and Jensen, 2014; Kelly et al., 2019; Yates et al., 2021). Many would argue instead that more positive outcomes are to be expected through mandatory tools such as strict food environment regulations, food marketing controls, and the strict enforcement of food labeling and taxation of unsustainable foods and practices (Giner and Brooks, 2019; Ngqangashe and Friel, 2022). Sugar-sweetened beverages and nonessential energy-dense food taxes in Mexico, food labeling in Chile and Ecuador, and trans fatty acids in Argentina are examples of such mandatory tools (Boza et al., 2017; Corvalán Aguilar et al., 2019; Carriedo et al., 2021), even if the ultimate effectiveness of those interventions remains to be demonstrated, as no evidence of obesity reduction and other targeted metrics have yet been firmly established (Haines, 2017) albeit changes in individual behavior are observed.

Generation of demand for evidence of effectiveness—Another integral element in the process of creating new momentum is to support (or to respond to) the *demand for evidence of effectiveness*. Evidence of effectiveness is derived from evidence-based policymaking, described as “the use of the best available scientific evidence on the effectiveness of programs, practices, and policies to guide the decision-making process” (Gies et al., 2020, p. 157). Demand for such evidence thus justifies sustainable alternatives by supporting them and ensuring that only actions and interventions that have the potential to lead to sustainability goals are pursued. In that context, the numerous demands expressed by governments and other key-actors in many countries for more food system data, dashboards and monitoring systems (Fanzo et al., 2020, 2021; HLPE, 2022; Béné et al., 2023) and for better understanding of what could constitute appropriate investments and interventions supporting the post-UNFSS process (e.g., Eliasson et al., 2022; Havemann et al., 2022; Herens et al., 2022) is an encouraging example of this dynamics.

Finally, the last two elements mentioned in this part of the framework are *The need for horizontal coherence*, and a clear *Advocacy strategy to change agenda*. The need (and the implementation) of horizontal coherence will be discussed in “*Delivery of horizontal coherence*” below. As for advocacy, the literature suggests that CSOs are often regarded as the most vocal detractors of the dominant paradigm (MacRae and Abergel, 2012), arguing for the democratization of the food systems (Hassanein, 2003; Andree et al., 2019). Articulation of these alternative visions and associated framings are instrumental in challenging the neoliberal model underlying the current system (Dorninger et al., 2020; Friel, 2021; Duncan et al., 2022). For example, sustained civil society campaigns have led to a

crackdown on junk food in countries like Chile, Mexico, or the UK (Carriedo et al., 2021); municipalities around the world are increasingly introducing local/sustainable procurement schemes; and local and national governments (most recently Canada) have established food councils and food policies (Mattioni et al., 2022). Deliberative dialogues, traditional crop and local seed management, and opposition to life patenting also got their start locally or nationally before migrating into regional and global campaigns (Mudigere Sannegowda and Garkoti, 2022).

4.2.2 Creating a new momentum through culture, social norms, and behavior

Raising consumer awareness through communication (see Lizie, 2012) is absolutely crucial in affecting behaviors and norms and in supporting newly created momentums (Freeland-Graves and Nitzke, 2002; Rowe, 2002). Diverse communication approaches can facilitate this (Parsons and Barling, 2021), including public information/campaigns, interpretive tools providing information in accessible ways (e.g., dietary guidelines), and labeling, such as front-of-pack traffic light labels (Vermeulen et al., 2020). Other available mediums include education provision and professional education interventions beyond schools (see Parsons and Barling, 2021). Communication through traditional channels (TV, radio, etc.), social media, inter-personal communication (home, school, peer, etc.), social support networks, and social mobilization through special events and community engagements have all been tested, especially within the nutrition field, with various degrees of success (Gillespie et al., 2013; White et al., 2016; Brouwer et al., 2021). In parallel, the engagement of consumers in alternative food systems, such as increased demand for agroecology practices or organic products in both high and lower-income countries, is attributed to impacts of awareness of critical food issues, such as environmental impacts and animal welfare (Bui et al., 2016; Schiller et al., 2020).

Building counter-narratives—There is no absence of counter-narratives to the neoliberal-driven productivist ideals (Leeuwis et al., 2021; Elechi et al., 2022). Food sovereignty, regenerative agriculture, and rights-based approach, which have been championed by organizations such as Via Campesina and other civil society entities or even the UN, are testaments of these emerging counter-narratives (Claeys, 2013; Holt-Giménez and Altieri, 2013; Anderson and Rivera-Ferre, 2021). These have certainly crept into food policy circles. More efforts are still needed, however, to create successful counter-narratives that can genuinely compete and, if possible, replace the dominant discourse in the long run (Holt-Giménez and Altieri, 2013; Anderson C.R. et al., 2019; Anderson M. et al., 2019). Some possible ways of achieving this are through continuous (evidence-based) advocacy around alternative narratives (see above) and consumer actions that demand transparency and accountability in the food systems (see below).

4.2.3 Creating a new momentum through capacity and financial resources

Leadership and championing—Multiple practical experiences have shown how leaderships across food systems can contribute to, or can be leveraged, for actions. In the case of maternal and child nutrition transition for instance, Gillespie et al. (2013) noted that all success stories of making visible progress toward desirable goals in countries such as Vietnam and Thailand had leadership at their cores. Similar national leadership and championing efforts were reported in several

Latin American countries, including Brazil, Peru, or Chile, where one “campeón” was said to have contributed to healthy diets through the enactment of warning labels on healthy foods, restrictions on marketing to children, healthy school food policies and taxes on sugary drink (Swinburn, 2019; see also Corvalán Aguilar et al., 2019). Yet, despite the demonstrated role of championing and leadership, this aspect is one of the most overlooked pieces in food systems (Kang et al., 2022), and more research is needed, especially at the local level, where the outcomes of transformations become visible.

Systemic and strategic capacity building. Systemic capacities are the diverse skills, instincts, abilities, processes, and resources needed by (public sector) organizations to enhance the creation and maintenance of alternative food system actions, while strategic capacities are decision-making forums or multistakeholder platforms in which food systems discussions occur (Gillespie et al., 2013). The objective of capacity building is inherent in most development interventions in the developing world, where this challenge is more pressing (Morkel and Ramasobama, 2017; Masters et al., 2018; Babu, 2020). Although initiatives in these areas of systemic and strategic capacity building are encouraging, the persistent challenges, especially at local level in LMICs, means government activities are often entangled within competition for scarce resources (Wu et al., 2015; Qiao et al., 2019). Overall, existing gaps and failures indicate a need to redirect (food system) capacity building toward more sustainable alternatives created around (local) governments. These (local) governments, which are at the heart of where everyday changes in the food system occur, could indeed safeguard long-term sustainability while reducing external dependence on other parties to drive change efforts.

4.2.4 Creating momentum through technological innovations

New sustainable innovations are expected to be instrumental in creating the required momentum (Herrero et al., 2020; Khan et al., 2021; Barrett et al., 2022). Past food systems transformations, including the Green Revolution (Evenson, 2003), the biotechnology revolution (Herring and Paarlberg, 2016), and the ongoing digital revolution (Barrett and Rose, 2020; Birner et al., 2021) have all taken off on the back of technological innovations. The issue, however, is not innovation *per se* but rather their contribution (or failure thereof to contribute) to sustainable outcomes. While some scholars insist that the current innovation pipeline is healthy with the creation and diffusion of wide-ranging, potentially transformative technologies (e.g., Herrero et al., 2020; Barrett et al., 2022), others remark that the underlying driver of these innovations, ultimately, remains profits, raising doubt about the ability of innovations to guide transformation toward sustainable outcomes (Carolan, 2020; Béné, 2022; ETC Group, 2022). In line with this argument, some other scholars call for more creative financial schemes and a re-orientation (re-alignment) of innovation motives and metrics to encourage sustainable alternatives, including local/indigenous and community-level ones (IPES, 2016; Mazzucato, 2016; Miles et al., 2017; Schiller et al., 2020). Among others, social financing, community investments, ethical banking, alternative currencies, social impact bonds, and impact investing are beginning to gain traction (Stephens, 2021; Feng et al., 2022).

In parallel, the need for *creating supporting infrastructures* is being emphasized by scholars who argue that food systems will likely be trapped within unsustainable trajectories if the required infrastructures to support local and alternative innovations are not created (Popkin and Reardon, 2018; Ruben et al., 2021). While these

calls are legitimate, we argue that more infrastructure does not necessarily equate to sustainable change. The support for alternative sustainable food systems would, therefore, require not only addressing the broader local and regional infrastructural needs that most current calls do acknowledge (Bloom and Hinrichs, 2011) but would also require doing so within the realms of normative goals of sustainability.

4.3 Converting new momentum into sustainable options

4.3.1 Converting momentum through powers, discourses, and knowledge

Several entry points are highlighted in the framework under this *Converting momentum* process. *Translation of new framing and agenda into concrete policies* is the first of them. National food policies, food guides, and sector-specific policy documents are potential avenues to translate framing into concrete and actionable policies. Food systems literature offers successful experiences, such as new policy instruments used to translate agroecology approach into existing agro-environmental measures (Miles et al., 2017), or instruments such as sugar taxes or labeling supporting fair trade or environmental considerations (Grunert et al., 2014). These actions are necessary because, without policy backing, most promises for sustainability would remain abstract statements of good intentions without clear, practical action plans for implementation (Oliver et al., 2018).

Create political coalitions to support change—While translating new framings and agendas into concrete policies is important, creating political coalitions to support changes is also critical (IPES-Food and ETC Group, 2021; Yates et al., 2021). In this domain, combining entities with common alternative visions is recognized to have a higher chance of positive change than working in isolation (Swinburn, 2019; Aramyan et al., 2021; Yates et al., 2021). Many successful examples of coalition wins have been documented in the food systems literature, even though there is no single vision of sustainable food systems (Béné et al., 2019a; Duncan et al., 2022). When well-managed, these coalitions certainly have the potential to provide the impetus to drive sustainable change across diverse issues and contribute to systemic transformation (Blay-Palmer et al., 2016; Prost, 2019).

Next, *Evidence-based documentation of coverage, scale, and quality* is critical to show how alternatives progress, what works or not, and what areas can be improved (Schwarz et al., 2021; McDermid et al., 2023). In their work on the politics of undernutrition reduction, Gillespie et al. (2013) discussed knowledge and evidence in converting new momentum into results. They note that numerous efforts already exist in several areas, including the growing attention to feasibility studies and formative research, costing studies, monitoring research, and evaluations conducted in relation to food systems. Within these spaces, governments, researchers, and civil society organizations played a critical role in providing evidence in support of interventions (Bhutta et al., 2013; HLPE, 2022). Yet, more targeted and intentional documentation of evidence is still needed (Singh et al., 2021). This is where the research community can be instrumental by providing independent evidence. The monitoring framework proposed by Fanzo et al. (2021) is an example of how consolidated documentation of evidence could be shaped.

Research for alternative food system configurations and “preferred solutions” is the last element under this part of the framework. Roggio

and Evans (2022) argue that while there is extensive published research on food insecurity, there is far less consideration of what an effective local food system might look like. This calls for more focused research aiming to uncover the best arrangements and combinations of food systems' actions that meet the visions of sustainability set out in stage two of the Framework (*Creating and maintaining new momentum*). However, as already established, there is no single pathway or solution to food systems sustainability and what constitutes sustainable food systems and their attributes vary extensively by scholarship (Fraser et al., 2016; Eakin et al., 2017; Béné et al., 2019a). Hence, it makes sense to have deliberate research portfolios clarifying what configurations attract potential followers. In this regard, the presentation of evidence-based alternatives would likely increase the chance of acceptance and diffusion into the broader regime, thereby moving sustainable configurations beyond niches to becoming the norm (Maye, 2013; Aramyan et al., 2021) in a way that resonates closely with the idea of “bright spots” (Bennett et al., 2016) as advocated in the environmental literature.

4.3.2 Converting momentum via culture, social norms, and behavior

Encouraging the role of individuals and civil society is one of the ways changes in societal values can be aligned with desired visions. The innovation diffusion theory shows that a critical mass of people adopting a different (sustainable) behavior can initiate a new norm through social network (Shove et al., 2012; Maye, 2013). Meanwhile, changing social values around food habits can be difficult (*cf. Resistance related to culture, social norms, and behavior* above). Remaining to be discussed in this context is the importance of consumer engagement that emanates from advocacies. Scholars have often viewed civil society advocacies as important to creating alternatives to the dominant food systems, at least in the eyes of consumers, allowing them to move from being passive consumers to becoming active citizens (Jacobsen and Dulsrud, 2007; De Schutter, 2014). The idea of consumer' engagement as a form of political consumerism involves mechanisms through which consumers use purchasing and sometimes protest power to shape food system actions (Boström and Micheletti, 2019; Hossain and Scott-Villiers, 2019; O'Brien and Macoun, 2022). Through actions such as ethical food labeling (e.g., organic, fair trade, or halal), consumers can demand accountability from other actors and decision-makers and shape broader societal values regarding food system activities (Evans and Miele, 2017; Keller et al., 2017).

Alignment of consumer demand with food systems sustainability objectives—The rise of terms like sustainable and ethical consumption (Friel et al., 2014; Sargant, 2014; van Gameren et al., 2015) and environmental sustainable consumption in particular (Vermeir et al., 2020) opens conversations around the question of the alignment of consumer demands to sustainable consumption (Reisch et al., 2013; Verain et al., 2015). Within these discussions, information-based instruments (e.g., food labels), market-based initiatives (e.g., taxes), direct regulations (e.g., control of unhealthy foods and drinks advertising), and “nudges” (e.g., “buy-local” campaigns) are commonly proposed (Reisch et al., 2013; Vermeir et al., 2020; Vermeulen et al., 2020). While these diverse mechanisms could facilitate the alignment of consumer demands to sustainability objectives, such changes may not happen, however, unless the right socio-economic conditions and the capacities of public sector entities to support such initiatives are in place (Green et al., 2013; Cornelsen et al., 2015) -see next point.

4.3.3 Converting momentum through capacity and financial resources

Delivery and operational capacity around compliance and enforcement—In addition to supporting the critical role of consumers, the ability of the public sector to ensure compliance and enforcement around food systems is pivotal (Wilkinson et al., 2014; Wu et al., 2015; Pudjastuti, 2021). New public programs can help minimize the greenwashing that voluntary standard settings have created amid the voids (Fulponi, 2006; Guo et al., 2019). However, the ability to strengthen these capabilities may partly hinge on reinforcing the public resources base (Verbruggen, 2013). In that context, there is recognition that a diverse mix of capabilities is needed to stimulate transformative practices (Den Boer et al., 2021; Singh et al., 2021). In their proposal for processes needed for nutrition transition, Gillespie et al. (2013) outlined three key capacities required for the implementation and enforcement of nutrition actions: (i) individual capacity by way of methods and skills, (ii) organizational capacity by way of staff and infrastructure, and (iii) systemic capacity by way of structure, systems, and roles. Such capacities would also be required for food systems transformation—see also *Systemic and strategic capacity building* above.

Identifying new forms of resource mobilization—It is not enough to reinforce the capacities of the public sector. New forms of resource mobilization to scale sustainable alternatives are also needed (Bhatia and Ghanem, 2019; FAO, 2019a). Financial resources are critical in those mobilizations (Hasnain and Chaudhury, 2021; Díaz-Bonilla, 2023). At least \$80 billion in annual investments throughout food value chains are estimated to be required to meet the expected 70% rise in food demand by 2050 (World Bank, 2020). Alternative and sustainable finance schemes, such as social finance (Stephens, 2021) or blended finance that mobilizes commercial banks, non-bank financial institutions, and their clients, are being tested, with varied degrees of success (Apampa et al., 2021; Convergence, 2021). These schemes de-risk the financing of food systems activities by drawing from diverse sources in an otherwise limited pool of support (Havemann et al., 2022). Some scholars, however, are still skeptical of these alternative resource mobilizations, pointing out that they depend on capital from the private sector, where incentives to address social and environmental concerns are rarely the priority (Barrett et al., 2022).

4.3.4 Converting momentum through technological innovations

Alignment of innovations with sustainability indicators is needed to ensure technologies and novel ideas contribute to supporting sustainable alternative visions of food systems. By aligning innovations to sustainability indicators, we mean to ensure that novelties have sustainability as an explicit goal (Matthews et al., 2019; Béné, 2022) and that there are readily verifiable indicator systems/frameworks to guide innovation processes. Laudable efforts to develop frameworks for sustainability indicators are already available (Béné et al., 2019b, 2023; Aznar-Sánchez et al., 2020; Silvestri C. et al., 2022). But also important is curating and presenting these indicators in accessible ways and as a means for accountability. Here, dashboards and other visualization mechanisms are used to turn indicators into guides from which the innovation processes can be assessed (Poconi et al., 2022) or as decision-support tools that can be used to support the alignment of efforts toward sustainability (Fanzo et al., 2020; Béné et al., 2023). Though understandable, the focus on monitoring progress rather than

on process limits the suitability of these tools for aiding decisions and for using them as accountability tools. Similar initiatives focusing on normative goals could serve as a springboard for aligning innovations with sustainability.

Creating a business case for innovation using financial instruments—Even with the right alignment, sustainable alternatives still need to make business sense for actors to use them. Undoubtedly, thus far only innovations that yield profits make it to the market (Whitfield, 2017; ETC Group, 2022). Turning this phenomenon toward sustainability would require attention to true cost accounting to cater to social and environmental costs (Gemmill-Herren et al., 2021; Michalke et al., 2023). Financial instruments could open the door for sustainable alternative innovations: once an innovation shows promising ecological and/or social properties, regulations and financial instruments such as green bonds, green banks, and green investment funds could be used to support their successful emergence (Horbach, 2005; Gyura, 2020; Maltais and Nykvist, 2020). This is not to ignore of course that currently financial instruments such as derivatives, hedge funds, futures markets, and private equity companies are often reorganizing the power structures in the agro-food systems in ways that are detrimental to the sustainability of food systems (Burch and Lawrence, 2009; Clapp, 2014).

4.4 Managing trade-offs, reducing incoherence, and prioritizing actions

4.4.1 Managing trade-off through powers, discourses, and knowledge

Documenting and quantifying trade-offs—The inherent nature of trade-offs and their implications for food systems' decision-making makes it necessary to document them at every stage of the transformation process (as represented in Table 3). Though fragmented, efforts to develop systematic frameworks for food systems analysis are being proposed (Zurek et al., 2018; Gaitan-Cremaschi et al., 2019; Amiri et al., 2020), with the ambition to improve the general understanding about trade-offs and synergies. Within different system contexts, there exist specific strategies and approaches for quantifying trade-offs, including trade-off analysis, visioning and backcasting, modeling tools, foresight processes, trend analysis or scenario planning (Lentz, 2021; Wiebe and Prager, 2021; Zurek et al., 2021; Béné et al., 2022). These different tools have been used to inform national governments and stakeholders (Knight et al., 2022). The experience of these cases shows that a participatory process bringing together scientists and stakeholders (i.e., public and private sector actors, as well as local population representatives and civil society organizations) is crucial for trade-off identification and prioritization (Antle and Valdivia, 2021; Tui et al., 2021; Béné et al., 2024). As part of this process, the visualization of the results is key and should include outcomes, pathways, and decisions and how these affect the various components. Dashboards, scorecards, indices, and profiles are common visualization techniques (HLPE, 2022) and successful examples abound to learn from, especially in the nutrition field (Manorat et al., 2019). Equally important is the need for high-quality data (Béné et al., 2019b; Fanzo et al., 2021; HLPE, 2022).

Strengthening delivery of vertical coherence—Vertical coherence—where the different levels of government (international, national, regional, and local) follow common policy objectives and align food systems' actions toward agreed normative goals (OECD, 2015,

TABLE 3 Detailed elements of the fourth process of the framework: managing trade-offs, reducing incoherence, and prioritizing actions.

The domains	The processes		
	1. Identifying resistance to change in the current regime	2. Creating and maintaining new momentum	3. Converting new momentum into sustainable options
	4. Managing trade-offs, reducing incoherence, and prioritizing actions		
A. Powers, discourses and knowledge	• Documenting and quantifying cross-sectoral trade-offs		
	• Strengthening delivery of vertical coherence		
	• Use of multi-stakeholder platforms to establish collaborative or pluralist/fragmented governance		
	• Delivery of horizontal coherence (multisectoral coordination)		
B. Culture, social norms, and behaviors	• Development of mechanisms of accountability of and to citizens and CSOs		
C. Capacity and financial resources	• Prioritization and sequencing of financing		
D. Technological innovation	• Dis-incentivize emergence of unsustainable technological innovations		

2016)—is critical to managing trade-offs and ensuring synergies at different levels. To strengthen coherence in food systems transformations, multi-level governance initiatives are often suggested (OECD, 2010, 2016; Marzeda-Mlynarska, 2011) to (i) encourage participatory governance and strategic planning at all relevant scale(s), (ii) provide an analytical foundation for short and long-term planning, (iii) support experimentation and innovation, and (iv) establish a long-term planning horizon (OECD, 2010). The institution of governance arrangements around these principles could enhance the coherence of food systems policies while minimizing potential trade-offs. But, while vertical coherence is instrumental to managing trade-offs, it certainly is not enough to ensure holistic food systems transformation; catering for inconsistencies between different sectors at the same level through multi-sectoral (horizontal) coordination is indispensable—see below.

The use of multi-stakeholder platforms to establish collaborative or pluralist governance is the next element in the framework. Multi-stakeholder platforms (MSPs), that is, “governed spaces for multistakeholder interaction, bringing together multiple actors (from different sectors), involving a certain level of institutionalization” (Herens et al., 2022), have emerged as potential mechanisms for actions in the sphere of food system transformation. According to Thorpe et al. (2021, p. 3), the interest in MSPs is driven by “a recognition that transformation in complex systems cannot be achieved through simple or technical fixes, (...). Instead, change requires new forms of governance which bring stakeholders together to plan and act in new ways.” The potential governance-shaping roles of MSPs have led to their proliferation with hopes of stimulating alternative food systems governance (Termeer et al., 2018; Bedeau et al., 2021; Kugelberg et al., 2021). Yet, their impacts on food systems transformation have been mixed so far. While some MSPs, such as the Scaling-up Nutrition Platform (SUN), are arguably successful in their causes, they appear less effective in driving shifts to systems-based narratives (Herens et al., 2022). One key challenge is cited as the “stakeholder” paradigm—grounded in a largely undifferentiated categorization of actors (“stakeholders”)—allowing powerful corporations to dominate governance processes (IPES-Food, 2023). The hijacking of the UNFSS processes and dialogues to further corporate interest is a case in point on how platforms can be turned against the true ideals of transformation (Canfield et al., 2021b; Clapp et al., 2021; Yates et al., 2021). This means that despite their potential

to facilitate positive change, MSPs may still have limited capacity to deliver radical food systems transformations, unless critical issues, including leadership, motivations, capacities, and clear guidance, are addressed (De schutter et al., 2021; Herens et al., 2022).

Delivery of horizontal coherence (multisectoral coordination)—Because the complexity of food system processes and outcomes cannot be overcome through siloed interventions (Torres-Salcido and Sanz-Canada, 2018; Augustin et al., 2021; Mattioni et al., 2022), conventional governance mechanisms are generally inadequate (Termeer et al., 2018; Bedeau et al., 2021). Instead, evidence shows that multi-sectoral coordination to food systems can positively influence development and practices. For example, Brazil’s award-winning social protection program, the Bolsa Familia, is said to have been successful because of the multisectoral governance of its implementation (see Kushitor et al., 2022). Likewise, as Fanzo et al. (2020) argued, the alignment of nutrition and agricultural development and environmental sustainability, which are at an all-time high today, are consequences of multi-sectoral coordination. There is still massive room for improvement, however, and establishing cross-sectoral platforms that can be used to develop and share food systems information, knowledge, and coordination expertise are an important step in that direction.

4.4.2 Managing trade-offs and prioritization through cultural dynamics, norms, and behavior

Establishing accountability of and to citizens and CSO is integral to managing trade-offs and ensuring synergies. Mechanisms to hold food systems decision-makers, especially private actors and governments, accountable have been extensively discussed by alternative food systems and governance scholars (Renting and Wiskerke, 2010; Kraak et al., 2014; André et al., 2019). In their work on strengthening accountability for healthy diets, Swinburn et al. (2015) outlined several accountability mechanisms to be leveraged by consumers and CSOs to hold private companies accountable: legal (constitutional rights to food), quasi-regulatory (codes of conduct and ethics guidelines), political (shareholder activism), market-based (consumer demand and boycotts), and communication (media, advocacy campaigns, social media, public forums, petitions, and demonstrations). Overall, CSOs continue to progress in holding businesses and governments accountable. Yet, Swinburn et al. (2015) and others note that current measures to increase the transparency of government processes are

confined to public communications depending on media, formal channels through government committees, and advocacy mechanisms. These measures, though encouraging, are deemed insufficient because they are voluntary rather than mandatory (Swinburn et al., 2015). Even for mandatory ones, CSOs may still lack enforcement power, legal accountability mechanisms or access to effective justice (IPES-Food, 2023). Civil society advocates have, therefore, underlined the essence of legally binding instruments, with baseline examples drawn from successful mechanisms such as the WHO Framework Convention on Tobacco Control, the WHO Framework of Engagement with Non-State Actors, and the WHO Financial Regulations and Financial Rules (IPES-Food, 2023).

4.4.3 Managing trade-offs and prioritization through capacity and financial resources

Prioritization and sequencing of financing—All actions that remove barriers, create alternative visions, and convert them into sustainable options should ideally be implemented simultaneously. However, among many challenges, the resource and capacity constraints discussed earlier make prioritizing and sequencing necessary at every step of transformation (Kuchiki, 2004; Gillespie et al., 2013). There is no one standardized approach to prioritizing actions, as evidenced by governments' continuous contemplation on what to do first amidst competing pressing demands. At present, the prioritization of actions is primarily influenced by economic viability, visibility, and political gains (Timilsina, 2007). But such an approach certainly does not deliver radical food systems transformation, on the contrary. While many alternative prioritization and sequencing tools and processes exist, each has different purposes, strengths, and limitations. Most tools are too broad and lack the context specificity for food systems. Developing food systems-specific prioritization and sequencing tools that consider system-level outcomes and show a deeper understanding of the political economy and ethical dimensions of the process would be critical, going forward (Horton et al., 2017).

4.4.4 Managing trade-offs and prioritization through technological innovations

Dis-incentivize the emergence of unsustainable technological innovations is a crucial step to managing food systems trade-offs. This involves using instruments, processes and actions to discourage technological innovations that do not contribute to attaining alternative sustainable visions. On multiple occasions, we have noted how current technological innovation pipelines, though argued as healthy (Herrero et al., 2020), are unsustainable, necessitating a change in direction for sustainable food systems transformation (Béné, 2022). But it may not be enough to encourage sustainable innovations; it must be complemented with disincentivizing unsustainable technologies essentially because these are recognized to have shorter-term economic pull than sustainable alternatives (Miles et al., 2017)—posing a risk of out-competing the latter when left to compete. Theoretically, measures of regulations, taxes, and subsidies could also serve as disincentives to unsustainable technologies, if designed appropriately. In fact, the successes of sugar and beverage taxes leading some corporations to adjust their strategies (Roache and Gostin, 2017; Carriedo et al., 2021) testify to how such disincentives can influence the direction of innovations. Complementary regulatory measures are still required, however, to ensure that these taxes are not transferred to consumers by “smart businesses.”

It must also be acknowledged that placing disincentives is not a straightforward process, partially because of the challenges in

assessing what is truly sustainable and what is unsustainable. For instance, some argue that “sustainable technology” does not exist because no one technology can meet all the metrics of sustainability (Kemp, 2010). Likewise, it can be argued that technologies are not inherently “bad” or “good” (Miller, 2021), and that their effects are dictated by their usage, not their nature. Evident in these claims is the difficulty of determining if an innovation would end up unsustainable. The development of sustainability indicators could provide some foundation for overcoming this challenge.

5 Delivering normative food systems transformation—what the framework teaches us

Three critical considerations emerge from the analysis.

5.1 The need to ensure normativity and goal(s)-driven food systems transformation

The framework emphasizes the need for normativity, visioning, and directionality in food systems transformation. While other frameworks (such as the MLP) may see transformation as a random process (El Bilali, 2020), our Framework differs through its explicit normative view, intending to outline the steps necessary for a goal-directed (sustainability) food systems transformation (Ruben et al., 2021; Woodhill, 2023). The four distinct stages/processes of actions across the four domains of politics outlined in the Framework illustrated by experiences and practices described in the literature provide the basis for normative transformation. Also critical to the normativity of the Framework is the emphasis on the visioning (the trajectory and end outcomes) of transformation. Moving from identifying resistance to creating alternatives, converting them into sustainable options, and managing trade-offs at every point offers the route to transformation toward (sustainable) visioned processes and outcomes. This makes for a goal-oriented transformation rather than the random processes that some, uncritically, have assumed can bring the necessary change (Béné, 2022).

But even more important is the ability of the Framework to direct actions that can deliver multiple levers of the required change. A plethora of past and present initiatives aim to set a narrow focus, such as “sustainable, healthy,” or even “inclusive” diets on which all actions are pitched to align (van Bers et al., 2019; Ruben et al., 2021) without paying attention to other elements such as resistance to change or ensuring that alternatives maintain the path of sustainability once they are started. Though such efforts are laudable, the persistence of food systems' unsustainable trajectories shows that a narrow focus on meeting some set goals is not enough to deliver transformation. There is a need for mechanisms that simultaneously tackle multiple aspects of transformation, which the holistic nature of the Framework moves us toward. Specifically, the processes outlined here show how to execute food system changes that are *intentional* in avoiding path dependency (through identifying resistance to change) and reducing overreliance on single solutions (e.g., technological fixes) through the domains of politics, while also explicitly encouraging alignment with the desired sustainability goals (through the creation and maintaining of alternative momentum and their conversion into sustainable options). As we clarified, tackling these multiple aspects of transformation is critical to steering food systems changes.

5.2 The multi-dimensionality of food systems transformation

Another important lesson from the framework is the multiple dimensions of food systems' actions necessary to deliver transformation. Political economy scholars (Leach et al., 2020 and others) have called for attention to the plurality of food systems politics to gain a fuller picture of transformation processes. The Framework responds to such calls through the domains of politics and their specific political actions at different stages. By acknowledging and charting the political configurations of actions across these multiple spaces, which Leach et al. (2020, p. 14) believe are necessary to achieve sustainable, equitable food systems of the future, we emphasize that transformation cannot be limited to single, sector-focused solutions.

Currently, technocratic solutions such as digitalization and sustainable intensification (Herrero et al., 2020; Barrett et al., 2022; von Braun et al., 2023), favored by corporations with financial power and governments desperate for quick and visible fixes, have resulted in the political concentration on “big food” actors and innovations (Clapp and Ruder, 2020; ETC Group, 2022; IPES-Food, 2023). Although discussions in these frames are important to shaping food systems change, critical considerations of politics embedded in other domains, such as the political economy of actors, public sector capacities, and cultural dynamics, are equally imperative. Specifically, political actions that cater to resources/investments, policies and legislations, innovations, and behavioral change are equally, and critically necessary. Hence, transforming food systems toward any specific goal – such as sustainable healthy diets – must be deliberately rooted in acknowledgments and establishment of political actions across all the domains highlighted in the Framework.

One way to approach this is to explore political actions through systemic, interlinked dynamics. In this sense, we are suggesting and adding our voices to a growing number of scholars (e.g., Caron et al., 2018; Gill et al., 2018; Leeuwis et al., 2021) calling for shifts to systemic, holistic, and comprehensive processes in food systems research and practice. By adopting systemic approaches, the politics of transformations would mirror real-world processes and embrace the complexities that must be accounted for to attain holistic changes. Such an approach, we posit, adds value to the isolated approaches of politics and/or transition that have been proposed so far.

5.3 From an enabling to a driving environment

Enabling environment for food systems change has gained attention in the development literature (Gillespie et al., 2013; van den Bold et al., 2015; Ajieroh et al., 2023). It describes changes in more distal factors related to food systems' broad economic, political, environmental, social, and cultural context (Nisbett et al., 2014; Kampman et al., 2017). Though relevant to delivering some positive food system outcomes (Kampman et al., 2017), we consider the enabling environment too “passive” as it leaves initiatives (to change or not) to the private sector without challenging its responsibility in contributing to the system's initial unsustainable and unhealthy conditions. In setting out some of the critical elements needed for a food system Great Transformation, Béné (2022) argued for the “establishment of not just an enabling but a

normative environment.” Our Framework backs this proposition while furthering how to create such a normative environment. We propose to call this a *driving* environment and define it as the set of political processes and actions from diverse actors that actively support or contribute to establishing clear/evidence-based pathways toward desirable food systems outcomes.

Within this driving environment, the Framework directs attention toward not just the transformation of food systems, but also the *transformation of the governance of those food systems*. It shows that for a normative transformation to happen, we must challenge how things have been (or still are) governed. In particular, the description of the Framework's driving environment challenges the assumption that transformation cannot happen without the private sector leading or being a central stakeholder (Folke et al., 2019; von Braun et al., 2023). Instead, it emphasizes governance through active interactions and leadership of multi-actors of the food system. Through the four stages of transformation, we show what changes in institutional, policy, legal, and regulatory environments must come together for food system transformation to happen and how those could be achieved through deliberate political actions involving multiple actors across the food systems, anchored on participation and leadership, but also accountability. Here, rather than waiting for political will to emerge by chance or for private entities with the resources and power to dictate the process, our framework proposes cultivating and nurturing the change normatively across four distinct but related transformation stages.

Finally, the framework emphasizes that trade-offs and synergies (of interests, values, goals, actions, and so on) abound at each stage of the transformation process. In this sense, goal-oriented governance mechanisms, different from current arrangements centered on corporate interests, are proposed to be pursued to realize transformation. These new governance mechanisms must draw on sustainability (as opposed to profit) as the basis of relationships and interactions to enhance their chances of success.

6 Concluding reflections

Global food systems face unprecedented challenges (Haddad et al., 2016; Dury et al., 2019; Kawarazuka et al., 2023) that risk attaining the Agenda 2030 and the SDGs. Hence, guidance on how to steer food systems away from unsustainable and unjust trajectories toward more sustainable, healthier, resilient, and equitable outcomes cannot be more urgent than now (Webb et al., 2020). Through this work, we argue that food systems transformation is not an impossible goal to aspire for; however, whether we achieve any form of transformation is essentially down to how food systems politics are enacted. Politics, we posit, is at the center of creating and maintaining current unsustainable food system trajectories and will also be crucial in guiding change processes toward sustainable goals. We expand on this argument through the elaboration of a holistic framework.

The Framework, which is relevant for both high and lower-income countries, integrates multiple perspectives and practical experiences on transition, transformation and politics to propose a holistic diagnostic and prescriptive tool for food systems transformation. As a diagnostic tool, the Framework can be applied to understand past transformation processes and investigate why new ideas, institutions, innovations, and narratives failed to emerge or to be scaled up. It can

also be leveraged by actors across various levels to assess the nature of diverse politics that hinder current transformation actions. As a normative, prescriptive tool, the framework outlined the actions and political choices that should be considered across the different domains and processes (the two axes of the framework) to ensure the transformation of the food system toward desirable, normative goals and values – such as, healthy diets, environmentally friendly food production and retail processes, equitable distribution of social and economic benefits, inclusive governance, and respect of cultural/local norms and values.

In this regard, cognizant of the need for context-specific and place-based approaches (Caron et al., 2018; Ambikapathi et al., 2022; Losch and May, 2023), the framework should not be presented as a universal prescription; instead, we view it as an adaptable tool. As illustrated through the numerous empirical examples reviewed above, the nature of politics may vary across typologies of food systems (traditional, modern, consolidating), levels of development, or scales of consideration (international, national, sub-national, and community). We suggest drawing on specific politics of framings, social norms, public capacities, and innovations as they manifest within different contexts and cultures to diagnose and propose place-context-system-specific political actions for the transformation of food systems. In-depth country-level and sub-national considerations will be necessary to identify and design these political processes required for normative transformations. Through such explorations, the Framework's practicality and relevance in different settings will be revealed and areas where improvement is needed identified.

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.

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CB: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. A-RA: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation.

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