



An analysis of the transformative potential of major food system report recommendations

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ABSTRACT

Today's food systems are driving several intersecting public health and ecological crises of global concern. Acknowledging this, numerous major reports have made wide-ranging recommendations for achieving 'transformative' food systems change. However, no studies have yet analysed the transformative potential of these recommendations. Here we undertake a documentary analysis to assess the transformative potential of the recommendations of forty-one such reports. The report recommendations were coded against three systems science frameworks and organised by year published and actor type. We found a low number of reports made recommendations tackling food systems leverage points necessary to affect truly transformative change. Recommendations tended to ignore political economy factors, including power asymmetries between actors. The majority of recommendations were limited to adjusting or reforming rather than transforming food systems, indicating a mismatch between rhetoric and potential action.

1. Introduction

Numerous reports published by diverse expert groups and organisations spanning the state, civil society and industry sectors have called for an urgent and transformative, some even say 'radical', food systems change (Fanzo et al., 2020). These reports make wide-ranging recommendations for achieving healthy and sustainable food systems. Many have received global media attention and inform landmark global policy dialogues and initiatives now underway. This includes the recently held United Nations Food Systems Summit (UNFSS), which aimed to "spur national and regional action to deliver the United Nations 17 Sustainable Development Goals (SDGs) through transforming food systems" (United Nations 2021). In recent decades, there has been an increase in reports being produced by non-state expert bodies with diverse funding sources and epistemological approaches. These have in some cases, produced varying and conflicting recommendations which have potentially contributed to the increasing politicisation of knowledge production itself (Baker et al., 2021). To date, few studies have problematized the term 'transformation', nor assessed the transformative potential of the recommended actions. In this analysis, we aim to address this gap by answering key questions. Just how transformative are the report recommendations? How does this transformative potential vary across the

organisations making these recommendations, and the different types of actors involved in producing them?

The reports are in near universal agreement on several points. First, food systems in their present form are contributing to several intersecting and in some cases accelerating public health and ecological crises. More than a decade after the 2008-09 global food price crisis, malnutrition in all its forms and insufficient and precarious access to nutritious food, remains the reality for millions (FAO, IFAD, UNICEF, WFP and WHO, 2020), a situation greatly exacerbated by the Covid-19 crisis (Cable et al., 2021). Furthermore, the global food system is a leading driver of climate change (Willett et al., 2019), biodiversity loss and other forms of environmental degradation (Springmann et al., 2018, Mbow et al., 2019). Second, transforming food systems presents an immense opportunity for delivering on the SDGs, Paris Agreement on Climate Change (Searchinger et al., 2019), and other major policy initiatives for 'planet proofing the global food system' (Rockström et al., 2020). Third, progress towards achieving a healthy and sustainable food system is not happening as rapidly as required and transformative change will require operationalizing systems-thinking into status quo challenging (Fanzo et al., 2020), cohesive, system-wide, global to sub-national actions (Townsend et al., 2016; Development Initiatives 2020).

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Food systems experts recognize the need for a ‘holistic’ or ‘ecological’ approach to understanding how and where in the system actions can be applied to the greatest effect (HLPE 2017; HLPE 2019). Moreover, a leverage point perspective focuses on places to intervene in complex systems (Fischer and Riechers 2019) to change core systems goals, structures and operations (Forrester 1971; Meadows 2008). There are multiple ways to understand the transformative potential of recommended actions for food systems change. Acknowledging this, and to strengthen the conceptual validity of our analysis, we applied three frameworks. First, to guide analysis of recommendations on food systems governance, we developed a Governance Principles Framework by synthesising core criteria from four existing ‘governance principles’ frameworks (Hospes and Brons 2016, IPES-Food 2017, Smith et al., 2017; Termeer et al., 2018). Second, we determined the potential of the recommended actions to adjust, reform or transform the food system, using Lawrence et al.’s Order of Food Systems Change Schema (Lawrence et al., 2015). Third, to identify ‘food systems leverage points’ to understand where and how the recommended actions impact the system, we adapted three existing systems analysis frameworks (Meadows 1999, Johnston et al., 2014; Abson et al., 2017). We then organised the transformative potential of the recommended actions of reports by year published, actor type and individual report.

2. Methods

To assess the transformative potential of the recommendations of major reports on healthy and sustainable food systems, we adopted a qualitative documentary analysis method involving five steps.

3. Conceptual frameworks for guiding the analysis

To strengthen the conceptual validity of our analysis, we identified then employed or synthesised core criteria from existing governance, policy analysis and systems change frameworks.

Food system governance principles: cross-cutting elements from four identified food system governance frameworks were used to synthesise a set of six key governance principles for informing food systems transformation. First, Termeer et al., developed a diagnostic framework which was used to analyse the strengths and weaknesses of food governance arrangements and investigate what forms of governance are the most suitable to holistically govern food systems (Termeer et al., 2018). Second, Smith et al., highlighted key food system governance indicators for measuring or evaluating food system governance (Smith et al., 2017). Third, Hospes and Brons present four key areas where changes in food system governance can contribute to desired food system outcomes (Hospes and Brons 2016). Fourth, IPES-Food identifies five levers that support rebuilding food systems on new and healthier foundations (IPES-Food 2017). These frameworks identify principles, indicators, proposals and levers which are used to identify strengths and weaknesses of food system governance and policies, and the concepts were utilized as the base for synthesising a food system Governance Principles Framework. The six key governance principles, descriptions and an example recommendation (from a report) are provided below:

1. **Systems-based transparent approach:** The food system is governed in a holistic, transparent manner which drives transformative change through synergistic actions across the food system as a whole. Example: “Developing sustainable food and nutrition systems, taking a systems perspective to deliver health and well-being, linked to transformation in the circular economy and bioeconomy” (Inter-Academy Partnership 2018).
2. **Addressing power asymmetries:** Power asymmetries between actors are minimised in food systems governance, ensuring health and sustainability are paramount. Example: “Identify and acknowledge conflicts of interest (COIs) as well as imbalanced power relationships between stakeholders and establish participatory mechanisms in

order to address them in policymaking and implementation” (HLPE 2017).

3. **Policy cohesion:** Addressing system issues through synergistic cross-cutting actions whilst managing trade-offs and avoiding conflicts between the objectives of different system components and sectors. Example: “Engaging all concerned sectors and partners in implementing nutrition actions and using the full spectrum of delivery channels, ensuring effective coordination mechanisms by placing them at high political levels to facilitate multisectoral collaboration and policy coherence across sectors, while safeguarding against potential conflict of interest in the development and implementation of nutrition programmes” (World Health Organization 2018).
4. **Inclusivity:** All food systems actors are included in food policy development, implementation, monitoring and evaluation, and in the accountability of the outcomes process, while protecting against and managing conflicts of interest. Example: “Recognize the contributions that excluded people already make to food systems with their time and labour through policies that empower them to secure more equal benefits” (International Food Policy Research Institute, 2020).
5. **Adaptiveness & responsiveness:** Governing bodies and policies are reflexive and responsive in dealing with interlinked multi-causal issues, including underlying drivers and have the flexibility to manage future unknowns. Example: “Secure resilient livelihoods and value chains through early warning systems and adaptive safety nets” (Steiner et al., 2020).
6. **Connectivity:** The exchanging of information occurs within and across siloed governance structures, actors and boundaries, monitoring mechanisms and food system components. Example: “Promoting practices farmer-to-farmer knowledge sharing” (IPES-Food 2018).

Orders of Food Systems Change: the Orders of Food System Change schema draws on systems dynamics thinking to identify, assess and propose policy options for redesigning food systems (Lawrence et al., 2015). Lawrence et al., identify three orders of change; first order (adjust), second order (reform) and third order (transform), shown in Supplementary Table 2. The three orders of change, descriptions and an example recommendation are provided below:

1. **First order change:** The action seeks to make modest adjustments to specific aspects of a system’s structure and/or operation to address problems framed in technical terms. Example: “Regulate health claims on food packaging and adopt a front labelling system that is easy to interpret” (HLPE 2017).
2. **Second-order change:** The action seeks to reform the system, and may impact the systems drivers and create behaviour change, though do so by ‘improving’ rather than significantly changing the systems structures and operation. Example: “Optimise agricultural subsidies and increase public investment for producing a broader range of more diverse and healthier foods” (Development Initiatives 2020).
3. **Third-order change:** The action seeks to transform the system as a whole by radically changing or replacing existing structures and operations. Example: “Better understand and address political economy factors. Shifting biased consumer food policies and production subsidies and to avoid conflicts of interest, food regulatory agencies should be public entities funded by government, and not rely on private company user fees. Global guideline on healthy diets” (Townsend et al., 2016).

Food Systems Leverage Points Framework: we developed a novel ‘systems science’ framework for analysing food policies for their ‘transformative potential’, by looking to the systems science, public health policy and sustainability science literature. The application of a ‘systems lens’ approach in evaluating policies and recommendations has been used to analyse recommendations in studies on obesity policy (Johnston et al., 2014), the social determinants of health (Carey and Crammond 2015) and sustainability science and transformation (Abson

et al., 2017). These analyses applied either an authoritative systems analysis perspective from Meadows: Places to intervene in a system framework (Meadows 1999), shown in Supplementary Table 3 or an adaptation of the Meadows framework through the designing a novel framework, including Johnston et al.'s Intervention Level Framework (ILF) (Johnston et al., 2014) and Abson et al.'s Four Realms of Leverage (Abson et al., 2017), shown in Supplementary Tables 4 and 5 respectively. The Meadows framework, identifies and proposes a hierarchy of twelve places in a complex system where in order of effectiveness, transformative changes can be made, whereas Johnston et al. and Abson et al. condense the Meadows 12 places into five and four mutually exclusive levels respectively, whilst maintaining the original concepts and ideas.

The Food System Leverage Point Framework is an adaptation of Meadows 12 Places to intervene in a system framework and identifies six 'food systems leverage points' for global food system policy recommendation analysis. It allows the identification and categorisation of the recommendations transformative potential from a systems perspective. An overarching figure of how the frameworks fit together is shown in Table 1. Identifying effective recommendations using 'leverage points' provides an 'under-recognised heuristic and practical tool' in determining a recommendations impact on the system, which is particularly advantageous for sustainability science (Fischer and Riechers 2019) and decision making when actions are required to redefine the structures, activities, values and goals of a complex system (Meadows 1999). The six food system leverage points, descriptions and an example recommendation for each leverage point, are provided below:

1. *System paradigm*: System's deepest held beliefs. Example: "New Governance Structures: a Treaty to deliver transnational oversight of agri-food consolidation" (IPES-Food 2017).
2. *Power, control structures and goals*: Source of system's goals, rules, and structures: where the goals are translated into policies/actions. Example: "Adopt a "whole of government" approach to design food, agriculture and environmental policies to enable healthier diets" (World Economic Forum 2017).
3. *System rules*: Policies that conform to the system's paradigm and targets need to be achieved for paradigm to shift. Example: "Ensure zero agricultural land expansion on high carbon landscapes" (Steiner et al., 2020).
4. *Information flows*: Interconnections and information flows between system elements and subsystems (collaborative). Example: "Join up the silos of thinking and action to create platforms to work collaboratively on common systemic drivers and double-duty or triple-duty actions" (Swinburn et al., 2019).
5. *Feedback loops*: Allows the system to regulate itself by providing information about the outcome of different actions back to the source of the actions. Example: "Assess knowledge gaps and research needs to address various challenges to inform policies to achieve food system transformation, such as the interconnectedness of food systems with all relevant sectors and systems." (HLPE 2020).
6. *System elements and adjustment mechanisms*: Subsystems, actors, activities, and physical elements of the system. Example: "Strengthen and increase research spending to address major nutrition questions, identify cost effective solutions and stimulate innovation" (Development Initiatives 2020).

4. Systematic search strategy

Major reports which both address current global food system challenges and call for transformative change were identified using the following steps. First, an initial list of relevant reports was identified from the Appendix of the Project proposal - Global Food Database and EAT report: The State of the Global Food System (Biguet et al., 2015) which identified global food system reports addressing food, nutrition, health and environmental sustainability. Several reports were annual publications so we sourced the most up to date publication if this was the case. Second, online searches of the grey literature, governmental and non-governmental agency reports, reference list checks, and hand searching was carried out to capture other relevant reports. Our starting point for the search was April 2016, the month in which the 'Decade of Action on Nutrition' was proclaimed (United Nations 2016) and the endpoint was July 2020.

4.1. Search results and report inclusion criteria

The initial search identified sixty-two reports and the secondary search of the grey literature and hand searching the reference lists added another twenty-five reports, totalling eighty-seven reports. The lead author read each report and excluded those that did not meet the following inclusion criteria: i) published after April 2016; ii) published in English; iii) presented a view of the food system from a global/international perspective; iv) adopts a whole of food system approach (systems thinking); v) proposes clear principles, priorities, recommendations and/or specific policy actions for achieving food systems change/transformation. From this, 46 reports were deemed ineligible, with the number of reports which were excluded due to not meeting the inclusion criteria; (iii) n = 7; (iv) n = 14; (v) n = 25. A total of 41 reports were included in the final analysis.

The reports were published from a range of organisations and almost one quarter of the reports were the result of collaborative efforts between organisations (n = 10). Civil society actor reports (n = 17), primarily from research and other non-governmental organisations, and intergovernmental organization reports (n = 13), represented the

Table 1
Overarching figure including the Food System Leverage Point Framework..

Meadows 12 Leverage Points	Food Systems Leverage Points
Governance Principles	
Systems-based transparent approach 1	1. System paradigm
2	
Addressing power asymmetries 3	2. Power, control, structures and goals
4	
5	3. System rules
Policy cohesion	
6	4. Information flows
7	
8	5. Feedback loops
9	
10	6. System elements and adjustment mechanisms
11	
12	

greatest number of actor types in the forty-one reports. Market actor (n = 6) reports (primarily food industry and business interest NGOs [BINGOs]) and Hybrid actor (n = 5) reports (mostly public/private partnerships) contributed the least reports to the total reports included.

5. Data extraction and identification of recommendations

The reports were read by the lead author and the report characteristics (title, year published, author, actor type, report focus areas and aim) were extracted into a table format in Excel (Microsoft) (Supplementary Table 1). The recommendations were identified and extracted by analysing the report's contents section for chapters or concluding section's which detailed change focused policies, actions or recommendations. If the reports contents section did not clearly state a 'recommendations' section, the reports were scanned for the keywords: 'recommendations', 'actions', 'policies', 'pathways', 'solutions', 'suggestions' and synonyms.

6. Analytical process

The analysis of the identified reports and recommendations was conducted in three stages. First, reports were categorised by 'actor type' of the publishing organization, using Baker and Demaio's Food Systems Actor framework (Baker et al., 2019). This includes three main actor types – state, civil society and market – and multiple 'hybrid' types involving combinations of the three main types (e.g. multi-stakeholder and public private partnerships, philanthropic organisations). Second, to determine the governance approach and the transformative potential of recommendations made, the recommendations were coded against the three frameworks described earlier. Third, a secondary analysis of the coding results was conducted to provide further analysis of the report recommendations overall transformative potential by further analysing the recommendations by year, actor type and individual report.

The secondary analysis involved a novel approach, by averaging the coding levels of recommendations for both the Orders of Food System Change and the Food System Leverage Points as per the Orders of Food System Change schema and the Food System Leverage Point Framework. This method was employed to provide a quantitative 'overall score' which reflects the entirety of the recommendations in each report. As both the Orders of Food System Change schema and the Food System Leverage Point framework -which is based off the Meadows Framework- are organised on a scale from most to least transformative, this averaging method is appropriate for this secondary analysis. The scoring scale for the Orders of Food System Change schema ranges from 1 to 3, where 1 represents the lowest transformative potential and 3 represents the most transformative. The scoring scale for the Food System Leverage Point framework ranges from 1 to 6, where 1 represents the most transformative and 6 represents the least transformative in terms of overall potential to transform the global food system.

7. Coding and interpretation

Only one code was given to each recommendation in each framework guided analysis. In coding, a four-step process was followed. First, a 'scale setting' example was identified through author group discussion until consensus was reached. This discussion focussed on what to do when vagueness or ambiguity in the recommendations description was evident. It was decided that the intended outcome of the recommendation was projected to 'where' the impact of the policy would be greatest and by considering the 'intent', the category/code became evident. The defining aspects of coding levels were also discussed and agreed upon. Second, the lead author coded the recommendations according to the systems science frameworks used in the analysis. Third, a 10% sample of the reports were randomly selected (using an online random number generator tool; <https://numbergenerator.org/>) and a

co-author extracted recommendations and coded the sample for robustness in recommendation extraction and coding. Fourth, a comparison of the extracted recommendations and coding was made to cross check and achieve consensus agreement on classifications.

8. Results

8.1. Reports by actor type

Forty-one reports published since the April 2016 launch of the UN Decade of Action on Nutrition were identified and included in the analysis (see Supplementary Table 1). Fig. 1 shows the distribution of reports published by actor type between April 2016 and July 2020. There was a notable increase in the number of reports published in 2019. In total, 575 recommendations were extracted from across the reports. The number of recommendations per report ranged from a minimum of four, to a maximum of seventy-four.

8.2. Food system governance principles

The High-Level Panel of Experts (HLPE-CFS) refer to food governance as the "formal and informal rules, norms and processes that shape policies and decisions that affect food systems" (HLPE 2020.p.12). We categorised recommendations by the six key principles, and the results are shown in Fig. 2. Recommendations coded at the level of 'policy cohesion' were the most common (n = 269 or 48.6% of total), representing almost half of all governance-related recommendations. Recommendations were coded as 'policy cohesion' either because they explicitly stated 'cohesion', 'integrated policies' or similar in the text (e.g. Increasing coherence in policies of different sectors to ensure synergistic action to address nutrition challenges) (World Health Organization 2018), or the recommendations intent implied that 'policy cohesion' or 'policy integration' is undeniably required to achieve the outcome sought (e.g. Recognize the diversity of food systems [traditional, mixed, modern] and design context-specific policies and programmes that support the co-existence of diverse food systems and diets) (HLPE 2017).

Recommendations 'addressing power asymmetries' were the least common (n = 22 or 3.8%), and of these most referred to addressing 'conflicts of interest' (COI) within governance and policy processes (n = 7 or 1.2%). For example, the HLPE-CFS 2017 report states this as an overarching recommendation and details 3 further specific COI recommendations also in their list (e.g. Identify and acknowledge conflicts of interest (COIs) as well as imbalanced power relationships between stakeholders, and establish participatory mechanisms in order to address them in policy-making and implementation) (HLPE 2017).

Of all the recommendations addressing governance, approximately one third (n = 65 or 11.3%) were aimed at creating change in global governance, whereas two thirds (n = 125 or 21.7%) focussed on governance at the national and or sub-national level. The majority of governance recommendations (both global and national/sub-national) sought to make change to existing governance structures across all levels, by 'strengthening, improving or enhancing capacity' (e.g. Strengthen national and international governance levers to fully implement policy actions which have been agreed upon through international guidelines, resolutions and treaties) (Swinburn et al., 2019). A relatively small number of recommendations (n = 4 or 0.7%) mentioned or implied the need for creating entirely new governance structures (e.g. New Governance Structures: a Treaty to deliver transnational oversight of agri-food consolidation) (IPES-Food 2017).

8.3. Orders of food system change

We used Lawrence et al.'s Orders of Food System Change schema (Lawrence et al., 2015) to categorise the transformative potential of the reports' recommendations. Fig. 3 presents the distribution of

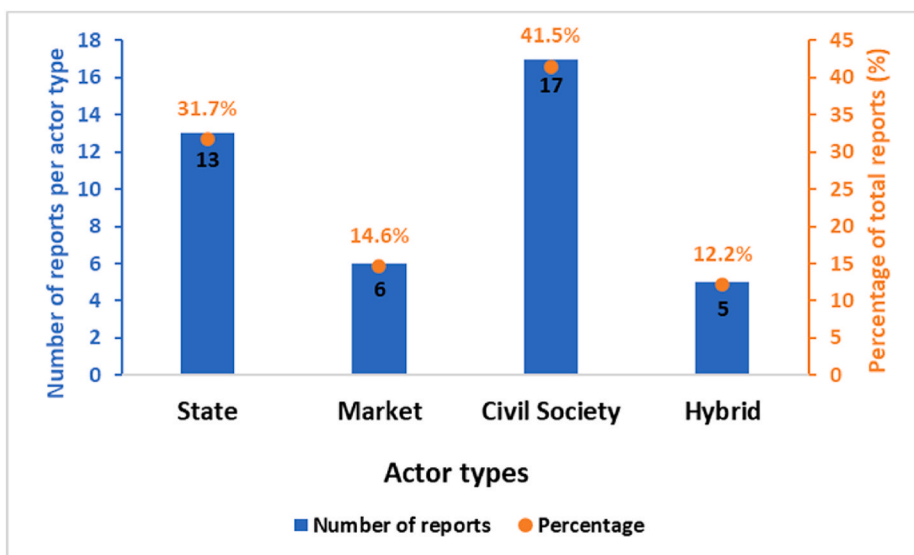


Fig. 1. Distribution of reports published by publishing organization actor type.

Footnotes: We used actor categories as defined by Baker and Demaio’s Food actor types (Baker et al., 2019). **State** includes inter-governmental organisations; **Market** includes private-interest for-profit organisations; **Civil society** includes public interest, non-governmental organisations, social movements, research organisations and academics; **Hybrid** includes those with characteristics of more than one type, including multi-stakeholder and public private partnerships, and philanthropic organisations with private and public interests.

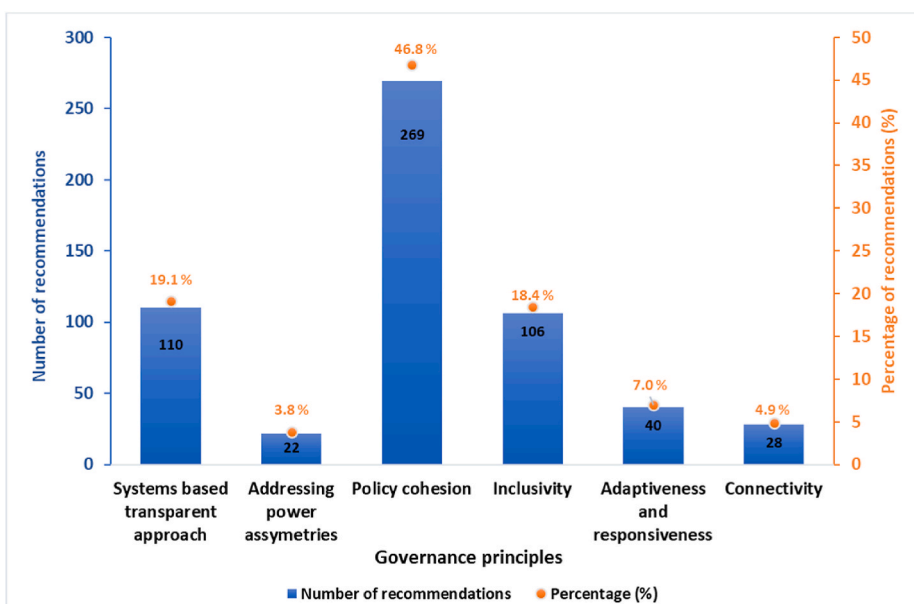


Fig. 2. Distribution of governance-related recommendations by key principles.

Footnotes: **Systems-based transparent approach:** the food system is governed in a holistic, transparent manner which drives transformative change through synergistic actions across the food system as a whole; **Addressing power asymmetries:** power asymmetries between actors are recognised and minimised in food systems governance, ensuring health and sustainability are paramount; **Policy cohesion:** addressing system issues through synergistic cross-cutting actions whilst managing trade-offs and avoiding conflicts between the objectives of different system components and sectors; **Inclusivity:** all food systems actors are included in food policy development, implementation, monitoring and evaluation, and in the accountability of the outcomes process, while protecting against and managing conflicts of interest; **Adaptiveness & responsiveness:** governing bodies and policies are reflexive and responsive in dealing with interlinked multi-causal issues, including underlying drivers and have the flexibility to manage future unknowns; **Connectivity:** the exchanging of information occurs within and across siloed governance structures, actors and boundaries, monitoring mechanisms and food system components.

recommendations against the schema. Transformative recommendations accounted for 19.7% (n = 113) of the total recommendations and were those which mentioned or had the intent to radically change or replace existing structures and operations (at global, regional or national level) across multiple or all food system components. The recommendations coded as first order changes or ‘adjusting’, were most frequently those that used ambiguous language and generally specified a targeted sector, system component or required actor behaviour change (e.g. Shift public support towards diversified agroecological production systems) (IPES-Food 2016). The high representation of first order and second order change recommendations (n = 462 or 80.3%) demonstrates that the general view is that the system needs mostly ‘improvements’ in certain areas to function efficiently with respects to achieving a healthy and sustainable food system. Third order changes were coded as such if they truly created a ‘transforming’ effect on the systems controlling structures, operations and behaviours.

8.4. Food system leverage points

We developed a Food System Leverage Point Framework by adapting three ‘systems science’ frameworks that identify six key ‘food systems leverage points’. Fig. 4 shows the distribution of recommendations by these food system leverage points. System paradigm (n = 31), Information flows (n = 30) and Feedback loops (n = 25) were the least targeted leverage points. Recommendations were coded at the ‘system paradigm’ level if the impact of the recommendation could be noted throughout the entire global food system. System paradigm level recommendations differed from ‘power, control, structures and goals’ recommendations primarily if the action has the potential to correct the failures of the current paradigm at the global level. Recommendations coded at the ‘information flows’ leverage point were those which recommended collaborative efforts, knowledge sharing actions and the creation of connection across sectors and sub-systems. The main difference between the information flows leverage point and others was

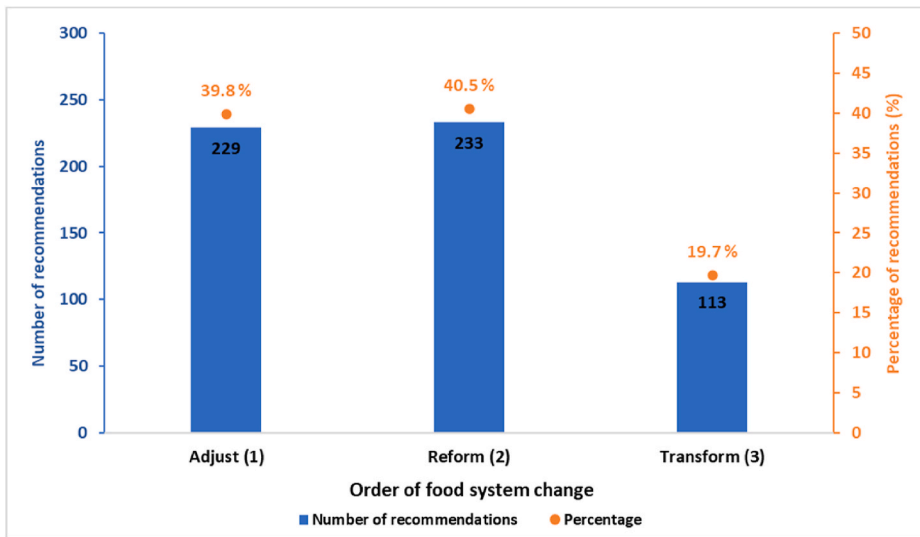


Fig. 3. Distribution of recommendations against the Orders of Food System Change Schema.

Footnotes: 1 = **First-order change:** the action seeks to make modest adjustments to specific aspects of a system’s structure and/or operation to address problems framed in technical terms; 2 = **Second-order change:** the action seeks to reform the system, and may impact the systems drivers and create behaviour change, though does so by ‘improving’ rather than significantly changing the systems structures and operations; 3 = **Third-order change:** the action seeks to transform the system as a whole by radically changing or replacing existing structures and operations.

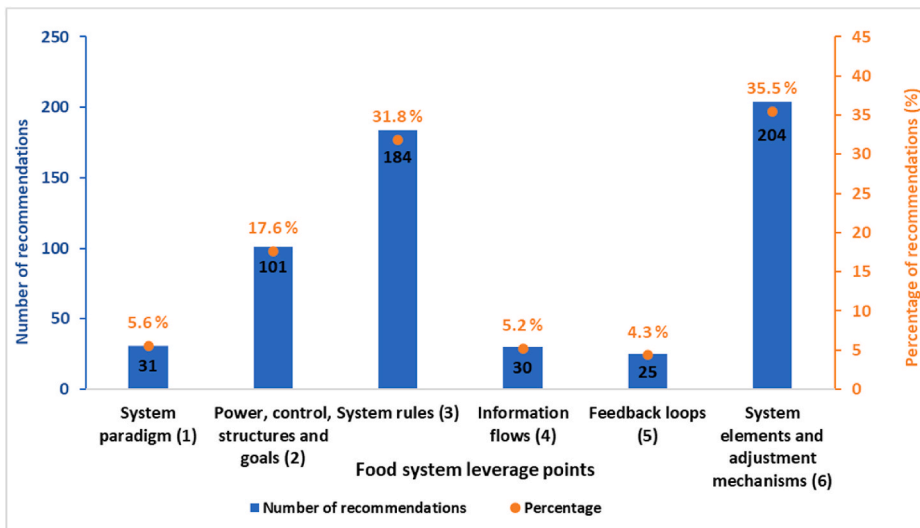


Fig. 4. Distribution of recommendations by food system leverage points

Footnotes: 1 = **System paradigm:** system’s deepest held beliefs; 2 = **Power, control, structures and goals:** source of system’s goals, rules, and structures: where the goals are translated into policies/actions; 3 = **System rules:** policies that conform to the system’s paradigm and targets need to be achieved for paradigm to shift; 4 = **Information flows:** interconnections and information flows between system elements and subsystems; 5 = **Feedback loops:** allows the system to regulate itself by providing information about the outcome of different actions back to the source of the actions; 6 = **System elements and adjustment mechanisms:** subsystems, actors, activities, and physical elements of the system.

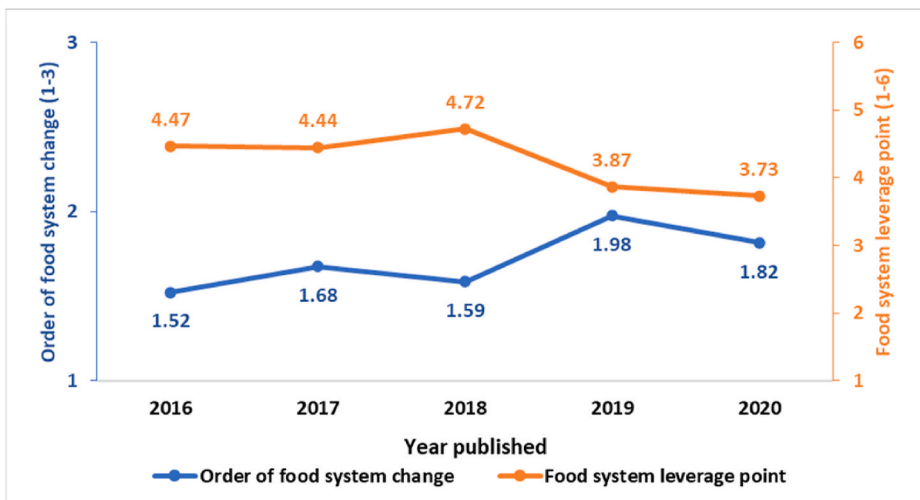


Fig. 5. Transformative potential of recommendations by year.

Footnotes: The recommendations were organised by year published and scores were calculated by averaging the total coding level numbers by year. In the Orders of Food System Change schema, 1 represents the least transformative and 3 represents the most transformative. In the Food System Leverage Point Framework, 1 represents the most transformative and 6 represents the least transformative.

that the recommendations intent was focussed on the information aspect of the action (e.g. Capitalising on opportunities in the biosciences and other advancing sciences: choices should be made at the national and regional levels but on the basis of global sharing of evidence) (Inter-Academy Partnership 2018). Feedback loop recommendations were the least numerous (n = 25 or 4.3%) were coded as such if they specifically stated an intention to ‘follow up’ an initial policy action to enact change, generally to make policy adjustments (e.g. Advancing the nutrition policy agenda with fit for purpose evidence) (United Nations System Standing Committee on Nutrition 2017).

8.5. Secondary analysis

We then assigned an average score for the recommendations of each report as coded against the levels of the Orders of Food System Change schema and the Food System Leverage Points framework. Figs. 5 and 6 show the transformative potential of recommendations by year and actor type. There was an increase in the transformative potential of recommendations towards reforming and transforming actions as coded against the Orders of Food System Change schema, and a shift towards more effective actions according to Food System Leverage Point framework. When analysed by actor type reports published by State and Civil Society actors made recommendations with the greatest transformative potential and more effective leverage points, whereas Market actor type reports recommend the least impactful and least effective policy actions.

Fig. 7 displays the transformative potential of recommendations by report. The secondary analysis of the individual reports demonstrates that only a small number of reports made recommendations which focussed mostly on the governance, controlling power and structures in the global food system and addressed the controlling structures regularly (IPES-Food 2017, United Nations System Standing Committee on Nutrition 2017, Bortoletti and Lomax 2019, Swinburn et al., 2019, Willett et al., 2019). Only three reports, the HLPE, 2017 (HLPE 2017), the IPES-Food-2017 (IPES-Food 2017) and the Global Alliance for the Future of Food and IPES-Food, 2017 (IPES-Food 2017) reports addressed power asymmetries within the food system in more than one recommendation.

The reports which made the most transformative recommendations on average were the EAT-Lancet report (Willett et al., 2019), the Lancet Commission report (Swinburn et al., 2019) and the IPES-Food-2017 report (IPES-Food 2017), which were produced either by independent expert group scholars and/or supported by nongovernmental organisations. Only three reports made more than one system paradigm level recommendation in their list of recommendations, of which all three were published by the HLPE-CFS (HLPE 2017; HLPE 2019; HLPE 2020).

9. Discussion

The alarming nature of current planetary and human health challenges inspired this study’s research question – what is the transformative potential of the recommendations made by major international reports calling for food systems transformation, as published by different stakeholder groups? The first major finding of this analysis is that most recommendations are confined to adjusting and reforming, rather than transforming, food systems. Similar to the ‘orders of change’ concept applied by renowned political scientist Peter Hall in his seminal work on ‘policy paradigms’ (Hall 1993) where ‘first’ or ‘second order’ policymaking takes place within an existing paradigm (Cairney and Weible 2015), Lawrence et al.’s Orders of Food System Change schema follows a similar approach. Each order of change can play a legitimate role in improving food systems however our analysis shows that the selection of these different approaches is skewed towards first and second order changes. Thus, the relatively low number of ‘transforming’ or ‘third-order of change’ recommendations suggests a dominant paradigm of ‘improving’ the current system by applying adjustments to broken system components, rather than a paradigm shifting and truly transformative food systems change. This is a position which differs from the literature where much scholarship states that a balanced, coherent combination of all three orders of change (Garnett 2013), which impact varying food system contexts (Albrecht et al., 2013) at all levels are required (IPES-Food 2016, Willett et al., 2019; FAO, IFAD, UNICEF, WFP and WHO, 2020).

Significant to this finding is that many recommendations were categorised as less transformative because they used broad, general and ambiguous language (Carey and Crammond 2015). For example, the

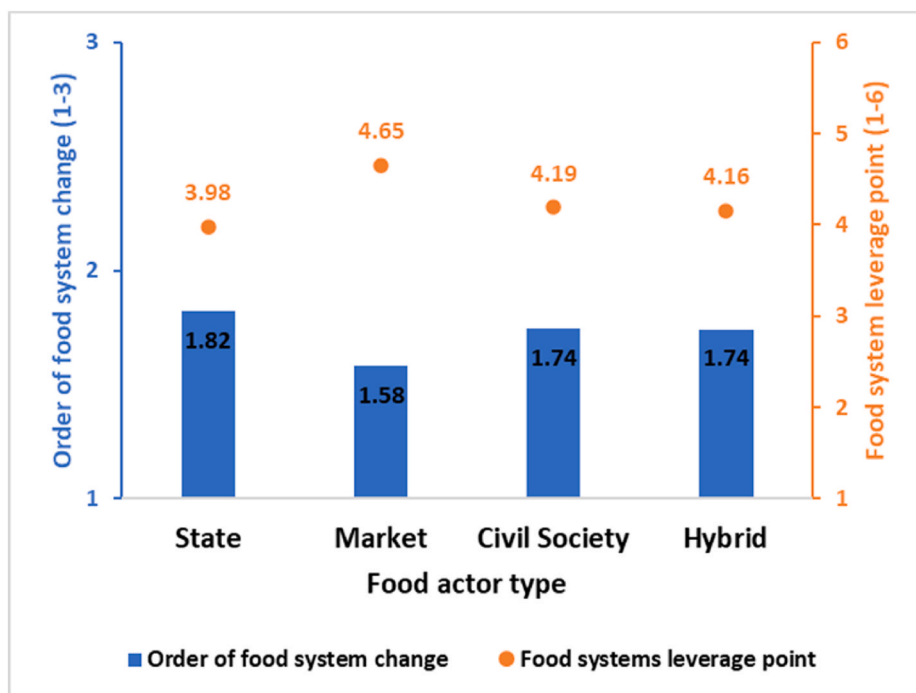


Fig. 6. Transformative potential of recommendations by actor type.

Footnotes: The recommendations were organised by actor type and scores were calculated by averaging the total coding level numbers by actor type. In the Orders of Food System Change schema, 1 represents the least transformative and 3 represents the most transformative. In the Food System Leverage Point Framework, 1 represents the most transformative and 6 represents the least transformative.

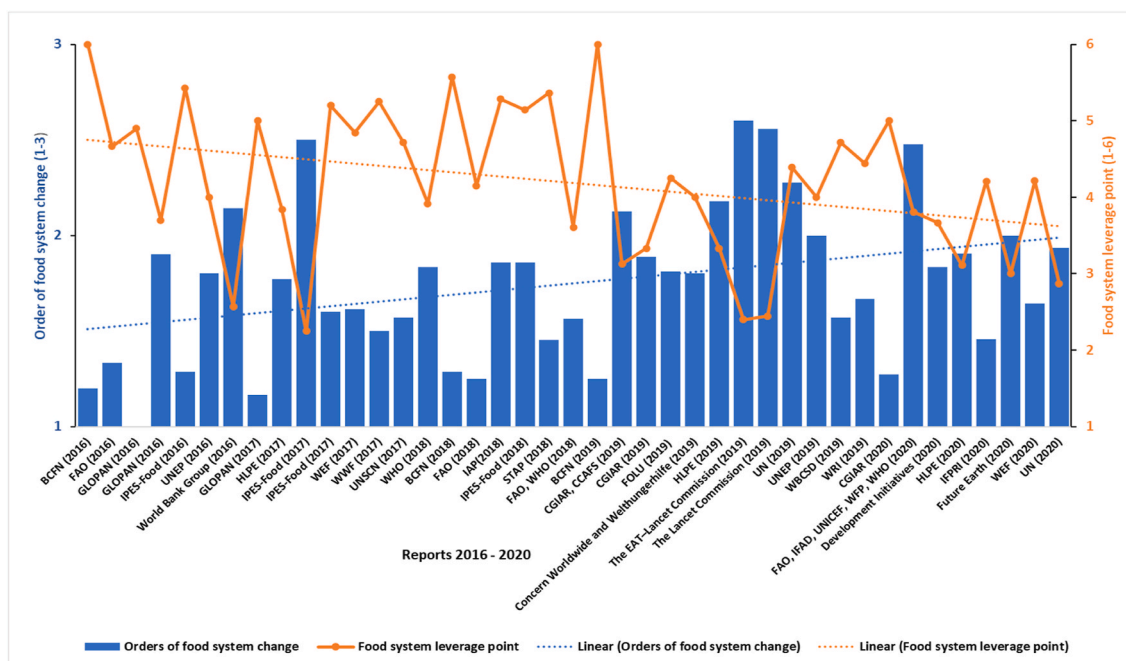


Fig. 7. Transformative potential of recommendations by reports across the 2016–2020 timeline.

Footnotes: The report recommendations were coded and scores were calculated by averaging the total coding level numbers by individual report. In the Orders of Food System Change schema, 1 represents the least transformative and 3 represents the most transformative. In the Food System Leverage Point Framework, 1 represents the most transformative and 6 represents the least transformative.

recommendations, “Support short supply chains & alternative retail infrastructures” (IPES-Food 2016) and “Reduce losses, encourage reuse and recycle, and promote sustainable consumption” (Food and Agriculture Organization of the United Nations 2018), inform the policy maker of what type of action is required rather than a clearer, more direct message of ‘how’ and what is the extent of the change sought. By using language such as ‘support’, ‘reduce’, ‘encourage’ and ‘promote’ etc, it creates an interpretive aspect to the recommendation and by lacking a scaling reference, context and supporting evidence, (which is often the case in recommendation lists) it leaves the decision maker questioning what the message is, and the order of food system change the recommendation seeks.

The second major finding is that the least common governance principle targeted in the recommendations were those which address asymmetries in power between food system actors and that overall, the tendency of recommendations made in many reports is to avoid challenging existing political and economic arrangements and structures that perpetuate existing systems. This finding contrasts with the food system governance literature, where it is commonly stated that the political and economic influence of a small number of powerful nation states and corporations on food system decision making is one of the major barriers inhibiting truly transformative change (IPES-Food 2017). The importance of actions targeting power asymmetries and the corporate concentration of power are highlighted by the potential they have to significantly impact the dynamics of the system, particularly the systems key goals and values (Clapp 2021), which in the current political and economic climate, can lead to changing problematic activities and practices of powerful actors within the system.

The third major finding is that Civil Society and State funded (all intergovernmental organisations) reports, particularly those authored by independent expert group scholars and/or nongovernmental organisations endorsed more radical governance and strongly transformative actions, including those grounded in challenging existing political and economic structures. In contrast, reports published by Market actors tended towards less transformative (from a systems leverage point perspective) market-based and technical solutions of an apolitical nature

(e.g. Expand markets by developing new healthy and sustainable food products to meet demand) (Barilla Center for Food & Nutrition, 2018). This finding potentially suggests that underlying political economy factors may influence some report recommendations and the order of change sought. As the reports represent a spectrum across a timeline and are produced within a specific political and economic context, it could be expected that the degree of change and ideology driving the recommended policy actions proposed would vary greatly. However, rendering of food systems transformation as a largely ‘technical’ challenge, arguably serves to depoliticise and perpetuate the current system paradigm, whilst also limiting the structural transformation of food systems (Baker et al., 2021). This finding is supported by many of the critiques of the UNFSS, which have also found this to be an issue as the corporate actors involved sought to capture the food system transformation narrative to push innovation based technological solutions which are beneficial, both economically and in lending them further power (Canfield et al., 2021; Clapp et al., 2021; IPES-Food and ETC Group 2021).

According to many of the analysed recommendations, there is only one global governance option that can feasibly address power asymmetries and the current capture of food policy decision making by powerful nation states and corporations (IPES-Food 2017, Swinburn et al., 2019). It involves coordinated, strong state and global intergovernmental governance structures and a healthy and sustainable global food policy framework being committed to, implemented and followed through. Several reports portray this in their recommendations, such as the Lancet Commission on Obesity’s “Strengthen national and international governance levers to fully implement policy actions which have been agreed upon through international guidelines, resolutions and treaties” (Swinburn et al., 2019) and the IPES-Food report “New Governance Structures: a Treaty to deliver transnational oversight of agri-food consolidation” (IPES-Food 2017). Unlike other global public health interventions which have experienced policy resistance and challenged powerful corporate interests in the past (e.g. tobacco control), there is an effective option to change current practices and activities to participate (and potentially profit) in the transformation

(Meadows 2008). This opportunity was recognised in recommendation from the United Nations Environment Programme “Flexible, participative governance and co-opting with private actors that integrate sustainability as the core of their business” (Westhoek, J et al., 2016).

We found an increase in the urgency of the recommended actions. This was evidenced by a progression towards more transformative recommended policy actions made by reports over time. In 2019, which has been referred to as ‘2019; a super year in science for food systems transformation’ (EAT Foundation 2019), there was a significant increase in total reports published and also recommendations which impact the food system at second and third orders of change and were focussed on food system governance structures, compared to the reports from 2016, 2017 and 2018 (see trendlines in Fig. 7). From a systems perspective, this indicates a shift towards higher and more effective leverage points, and greater potential to change the system overall (Meadows 1999).

There is a key distinction in the way a systems approach is applied, and it relates to ‘causes and effects’ (Jackson 2007). In complex human systems, it is understood that “cause and effect are not closely related in time and space” (Senge 1990.p.48). The systems approach habitually applied in the current food system leans towards the ‘effect’ position, meaning policies tend to focus on addressing negative externalities (symptoms) while disregarding underlying political economy factors (root causes) (Caron et al., 2018). For example, food security and agricultural policies have tended to adopt a production-output maximisation approach, that seeks to create change through increasing the supply of food to those in need (Caron et al., 2018; Nguyen 2018). This trend was also evident in this analysis, with many reports focussing their recommendations on ‘inclusivity’ and making sure the most disadvantaged populations are represented in the policy agenda (International Food Policy Research Institute, 2020; Steiner et al., 2020). Despite being beneficial for some, this tendency predominantly focuses on the systemic issue from an ‘effect’ position, which from a systems perspective is less effective and does not address the root causes of the problem.

Our findings on feedback loop recommendations, which are the ‘mechanisms’ that allow the flow of information to create change in systems, demonstrates a relatively low number ($n = 25$) compared to ‘system element and adjustment mechanism’ recommendations ($n = 204$). As policy makers can often be unsure about how to integrate policies that support food systems transformation (Singh et al., 2021), this low acknowledgement of feedback loops in recommendation lists potentially contributes to the choosing of a lesser order of change option by policy makers seeking to limit unintended consequences and or the social and political backlash to substantial system change. For example, the overarching recommendation regarding research from the HLPE report 2020 states, “Encourage and support more research on FSN (food security and nutrition), key emerging issues and contentious areas” (HLPE 2020) and does not follow through with a directive in translating the evidence back into policy (i.e. a feedback loop). Additionally, two of the four recommendations which sit under this umbrella recommendation also do not state a ‘pathway’ to feedback the information. Consequently, this resulted in recommendations which were coded at a lower order for transformative potential and effectiveness. This is not to say that the report authors made research focussed recommendations that are ineffective in content, rather it provides further evidence that the language used in the recommendations matter, and more explicit, outcome driven, decisive language leaves less room for confusion in policy making.

Analyses have shown that governments often prioritise ‘populist’ policies that result in short-term economic and electoral benefit, over policies related to longer-term and truly transformative outcomes (Cullerton et al., 2016). As a result, ‘temporal alleviation’ type food policies, which are politically ‘easier’, make the real economic and political problems ‘invisible’ (Roggio 2019), and often target less effective leverage points are implemented. The findings of our analysis reflect this, as evidenced by the unbalanced ratio of recommendations which are directed towards ‘inclusivity’ ($n = 106$) compared to ‘addressing

power asymmetries’ ($n = 22$) and ‘connectivity’ ($n = 28$), even in a time when radical, bold, coordinated global actions are required. This does not infer that inclusive governance and policies are not vital to food system transformation. Rather, it suggests that recommendations in this global transformative context must be redirected towards impacting the ‘causes’ and drivers of systemic issues, and terms like ‘inclusive governance’ and ‘food systems transformation’ must be problematized.

Although this analysis highlights the differences in terms of governance approaches and transformative potential of recommendations across the analysed reports, many similarities in messaging were also evident. A key theme that was common through all the reports analysed was that food system transformations’ main goal is referred to broadly as moving to a food system which is healthy and sustainable for all people and the planet. Furthermore, the reports also agree upon the need for coordinated global actions, which according to the literature, suggests that a strategic combination of (first, second and third order) policy actions will be required (Garnett 2013, Lawrence et al., 2015). Clearly, current food affordability data, where negative trends over the last decade (The Economist Group 2021) now leaves 3 billion people unable to afford a healthy diet (Global Panel on Agriculture and Food Systems for Nutrition, 2020), tells us that more than system adjustments are required. As a global community, the endorsing of the ICN2 Framework for Action and the declaration of the Decade of Action on Nutrition in April 2016, was the moment when, as Dr José Graziano da Silva, former Director-General of the FAO refers, the agreed plan became the agreed starting point for global food system transformation (FAO and WHO 2018). Yet, these plans and messages have not galvanised actions at the required levels, as current trajectories towards global goals (i.e. the SDG’s, the Parris Agreement) are off track and the consequences of inaction are now clear (Fanzo et al., 2020). In food systems, “systems thinking is nothing new, but systems doing has not been very widely achieved and this is where we have to do better than we have in the past” (FAO and WHO 2018.p.9), particularly the addressing of root causes of issues, if healthy and sustainable food systems are to be achieved.

This analysis has several limitations. The main limitation of the study is the interpretative nature of the analysis in extracting and coding of the recommendations as many of the recommendations have the potential to fit in multiple coding levels. The impact of this limitation was mitigated by the blinded ‘cross-checking’ in extracting and coding recommendations from a 10% randomly selected sample of reports. Another important factor to note is that two of the frameworks used in the analysis were adaptations of existing frameworks identified from the literature. To limit impact, minimal adjustments were made, and the original framework concepts and defining features were also included in the adapted frameworks. We also recognize that the results of the analysis are not necessarily an exhaustive representation of each report as a whole, including a reflection of any of the report authors or how the reports were written, but rather the analysis concentrated on the reports attempt to identify – through the presented recommendations – the key areas and required policy actions to transform the food system.

Finally, another limitation that might be considered was if reports differ on definitions of what is considered transformational? As stated previously, transforming food systems in the literature means achieving healthy and sustainable food systems. Thus, transformative change occurs when the systems paradigm, goals and values are changed (Meadows 1999) in a holistic manner towards the desired condition (i.e.: a healthy and sustainable food system). Furthermore, decision making - using systems science concepts - involves a three-step process: (i) indicating the conditions that are desired (a healthy and sustainable food system); (ii) observing what is the actual current condition (an unhealthy, unsustainable and unequal food system); and (iii) the generation of actions (through recommended policy actions) which change conditions toward desired conditions (Forrester, 1992). Therefore, by indicating the desired condition or goal, the variation of what is considered transformational in the reports can be mitigated in this type of systems analysis.

10. Conclusion

This analysis shows that a disconnect exists between the stated goal of food system ‘transformation’ outlined in major reports and the potential of their recommendations to achieve truly transformative change. The majority of recommendations do not address the primary political and economic drivers of current food system structural and operational problems, instead choosing to target ‘negative externalities’ and making modest adjustments to food system leverage points. The analysis also highlights the value of systems science concepts in food policy design and decision-making processes which focus on *how* and *where* transformative change can and must occur. Food system scholars seeking to help explain transformative change need to pursue a bold approach to practically advancing the research agenda, by focussing on the root causes and drivers of current systems problems. Persisting with the current ‘business as usual’ global food governance approach will be inadequate to mitigate, much less prevent, the existential threat to humanity of multiple unfolding health and environmental crises. Although adjustment and reform initiatives can complement transformative initiatives to provide a comprehensive strategic approach for food systems change, the evidence indicates that too often they are instead being used as politically ‘easier’ alternative courses of action. The time for global, national and local political leaders to implement governance arrangements and policy actions to truly transform broken food systems is now overdue.

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: The authors declare the existence of a non-financial competing interest. PB was a co-author on The Lancet Commission report. PB and ML both were contributors to the 2020 Global Nutrition Report.

Appendix A. Supplementary data

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