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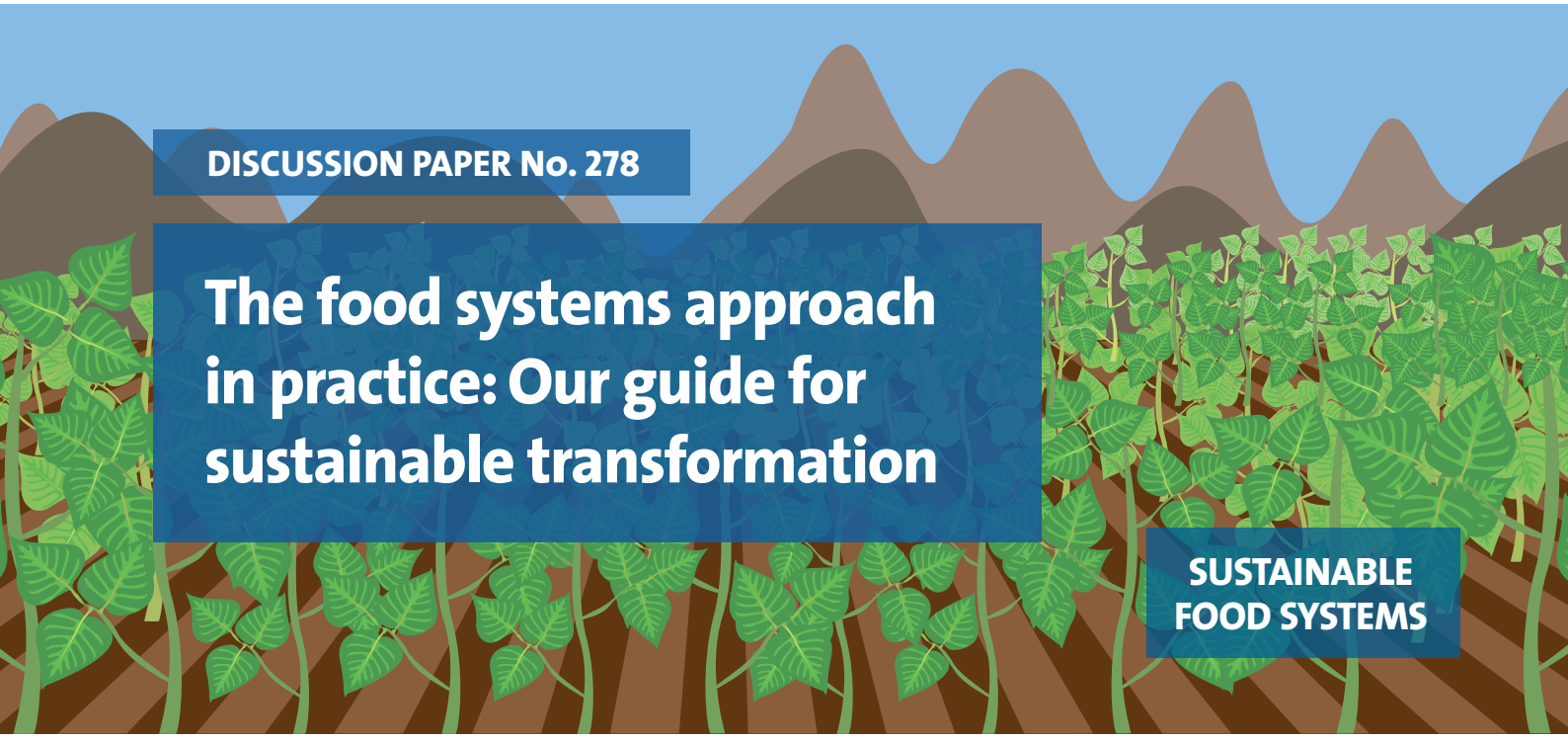

DISCUSSION PAPER No. 278

The food systems approach in practice: Our guide for sustainable transformation

SUSTAINABLE FOOD SYSTEMS

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Tackling the myriad sustainability challenges related to food – from the environmental impacts of food production to the health consequences of inadequate diets – requires systemic interventions that improve sustainability at local, national, and international level.

Recently, several approaches have been developed to guide systemic interventions, but due to the complexity of food systems, taking a 'food system approach' is often seen by practitioners and decision-makers as a daunting task requiring considerable resources.

In this paper, we develop an iterative, step-based sustainable food system approach that helps navigate complexity and is flexible in its required resources, thus enabling a fast overview or a deep dive as determined by a project's or organisation's objectives.

Our approach combines four components: food system, sustainability, political economy analyses, and the development of transformation pathways to advance food system sustainability. The use of each component is organised into steps, involving practical methods and tools. The goal of the approach is to help practitioners and decision-makers describe and diagnose food systems to develop more coherent, effective, and context-appropriate interventions for the necessary transformations.

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1. Introduction

Food is linked with a host of sustainability challenges, to name a few: food production provides most livelihoods but high agricultural employment is strongly related to poverty; food production and clearing land for agriculture are large contributors to greenhouse gas emissions and the leading causes of biodiversity loss; climate change is expected to depress yields in regions already plagued by low productivity; a growing population and dietary changes are likely to require much more nutritious food; while malnutrition caused by unhealthy diets is the leading cause of poor health globally (IPBES, 2019; Springmann et al., 2018; Swinburn et al., 2019; Willett et al., 2019). Concerning food, these challenges were, and are, often approached in isolation through simple linear cause-effect relations (an 'input-output' model; van Berkum et al., 2018). But the challenges of food and nutrition security, environmental sustainability and social equity are interlinked and can rarely be tackled in isolation (IPCC, 2019). Challenges are interrelated and solutions for one problem can have unintended consequences and cause or worsen other problems. Trade-offs between different dimensions of food system sustainability are unavoidable and need to be navigated explicitly when developing or implementing interventions (Béné, Oosterveer, et al., 2019). To understand the (inter-)linkages and act upon the resulting complexity, policy circles, development practitioners, and researchers increasingly move from a value chain analysis to a more holistic food systems approach that includes more environmental, social, and economic drivers (Béné et al., 2019; Ericksen, 2008).

Using a food systems approach is crucial for effectively addressing the systemic challenges related to food, and can greatly benefit practitioners and policymakers to analyse, diagnose, and help decide in food systems (HLPE, 2020; van Berkum et al., 2018). The first advantage of a food systems approach is **understanding the activities, drivers, outcomes, events, and trends** related to food in a certain context by linking these elements in a wide 'mapping'. Our focus moves from a single element – such as food production or distribution – to their interactions, including the influence and interests of actors. Second, the approach makes **trade-offs and synergies more explicit** due to the linkages and the wide view provided. This is particularly relevant as food systems need to attain multiple – often conflicting – objectives simultaneously, and action in one section can impact other sections (Hawkes et al., 2019; UNDP, 2019). Third, the approach helps in **identifying more effective entry points for change and opportunities for synergetic interventions** by enhancing the 'menu of opportunities' (Ruben et al., 2018). Also, a food systems approach enables to distinguish interactions between other sectors and systems, thus providing potential linkages with other policy domains. Lastly, participation of stakeholders can be built into the design of interventions to advance sustainability. Knowledge about different parts of the food system needs to be brought together, and using a food system approach can help create a shared understanding amid complexity, as a basis for coherent action. In short, if you want to work more coherently and effectively, you need to think and work at the system's level.

A food systems approach is often seen by practitioners and decision-makers as a **too complicated, unattainable task which requires considerable resources** and may be outside of their mandate or expertise. As such, ECDPM developed an **iterative, step-based sustainable food systems approach that is flexible in its required resources**, thus enabling a fast overview or a deep dive as determined by a project or organisation's objectives. This approach helps to deal with the complexity of food systems and to make policies and interventions more coherent, effective, and context-appropriate by analysing a food system through four components: 1) food system analysis (to focus on the drivers and outcomes), 2) political economy analysis (to focus on the governance of the food system), and 3) sustainability analysis (to focus on the sustainability shortcomings in the system), to develop 4) pathways of change towards improved sustainability.

ECDPM's Sustainable Food System programme contributes to the necessary transformation towards social, environmental, and economic sustainability in food systems, particularly in Africa and Europe. The programme provides both 'think'-analyses and 'do'-work driven by local stakeholders. Our specialties are policy processes and political economy issues in food systems and making analyses and recommendations usable for policy makers and development practitioners.

Our analysis and research informs policies, investment plans and strategies related directly and indirectly to sustainable food systems.

These may involve agriculture and healthy diets, but also private sector development or climate change. We bring different partners together to work for sustainable food systems, aligning efforts, stimulating dialogue and building partnerships. We are a strong advocate of policy coherence for development, stressing that policies in domains other than food is aligned with progress towards sustainable food systems. Our ultimate goal is effective and workable policies designed to build sustainable food systems in Africa.

ECDPM developed this sustainable food systems approach in the multidisciplinary research and dialogue project Sustainable Agrifood Systems Strategies (SASS) in Kenya and Tanzania (2017-19). Recent publications include:

- Bizzotto Molina, P., D'Alessandro, C., Dekeyser, K., & Marson, M. (2020). Sustainable food systems through diversification and indigenous vegetables – an analysis of the Arusha area. Maastricht: European Centre for Development Policy Management.
- Rampa, F., & Knaepen, H. (2019). Sustainable food systems through diversification and indigenous vegetables: An analysis of southern Nakuru County. Maastricht: European Centre for Development Policy Management.

More information at https://ecdpm.org/sass

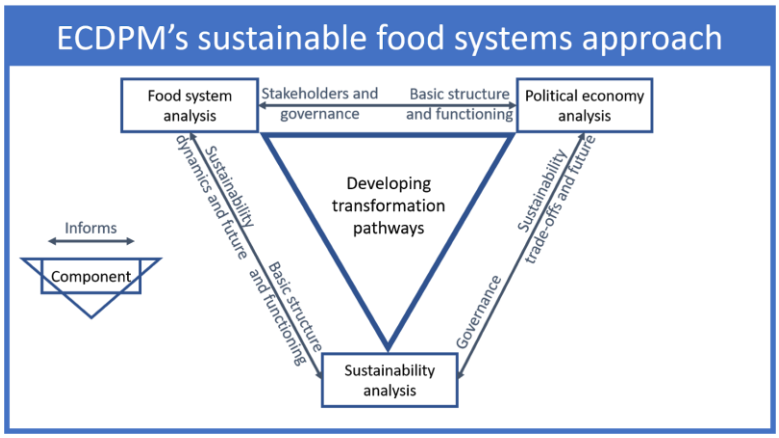
2. ECDPM's sustainable food systems approach

Our sustainable food systems approach combines four components for the food system under study. First, within the set boundaries, a food system analysis helps understand the food system elements, drivers, and interactions. Second, the sustainability analysis helps to understand current sustainability dynamics and reflect on future sustainability challenges. Third, the political economy component provides understanding about the governance of the food system as it helps focus on the dynamic interactions between structures, institutions, incentives, and actors (DFAT, 2016). Combined, a food system, sustainability, and political economy analysis provides what the food system looks like, how it operates, who makes decisions and why they are made, especially related to sustainability. Fourth, based on the analyses, transformation pathways are developed that present targeted and politically feasible options to increase the sustainability of the studied food system. In short, a sustainable food systems approach analyses and helps in designing and/or implementing transformation pathways that address the unsustainability in food systems (UNDP, 2019; van Berkum et al., 2018).

As shown in figure 1, **these four components are all interlinked**. This paper describes them separately to clarify the rationale and importance of each component and to explain the respective steps and methods, but **our approach is an iterative process**. Every component informs and helps guide the others, without a strict chronology. Being intertwined, there may be overlaps between the components, with sustainability dimensions, for instance, emerging from the general food system analysis, or political economy insights helping to focus on a particular part of the food system. Importantly, the choices about, and results of, the food system, sustainability, and political economy analysis (and the associated multi-stakeholder dialogue)

are supported and improved by the insights from each other. Given the uncertainties involved in complex change processes, transformation pathways, our fourth component, will be developed adaptively as well, to adjust to unexpected changes and to iteratively take into account further insights that in the meantime have emerged from one or more of the other three components.

Figure 1. ECDPM's sustainable food systems approach



Moreover, **our approach is a neutral guide** that can be applied at different levels of complexity of the food system (eg, choosing to work only on few drivers and outcomes of the system) and does not prescribe any particular strategic choice (eg, what specific sustainability improvements a particular project or organisation should aim for in using this approach). This food systems approach thus offers a **'menu of options' to choose from**. While we recommend integrating all steps as they inform one another, each project or organisation can decide on where to place its resources best, including devoting less efforts to certain steps. Similarly, not every organisation may be able and willing to undertake the food system, sustainability, and political economy analyses together and facilitate the development of pathways; partners collaborating around this food systems approach may decide to task divide on the basis of respective comparative advantages.

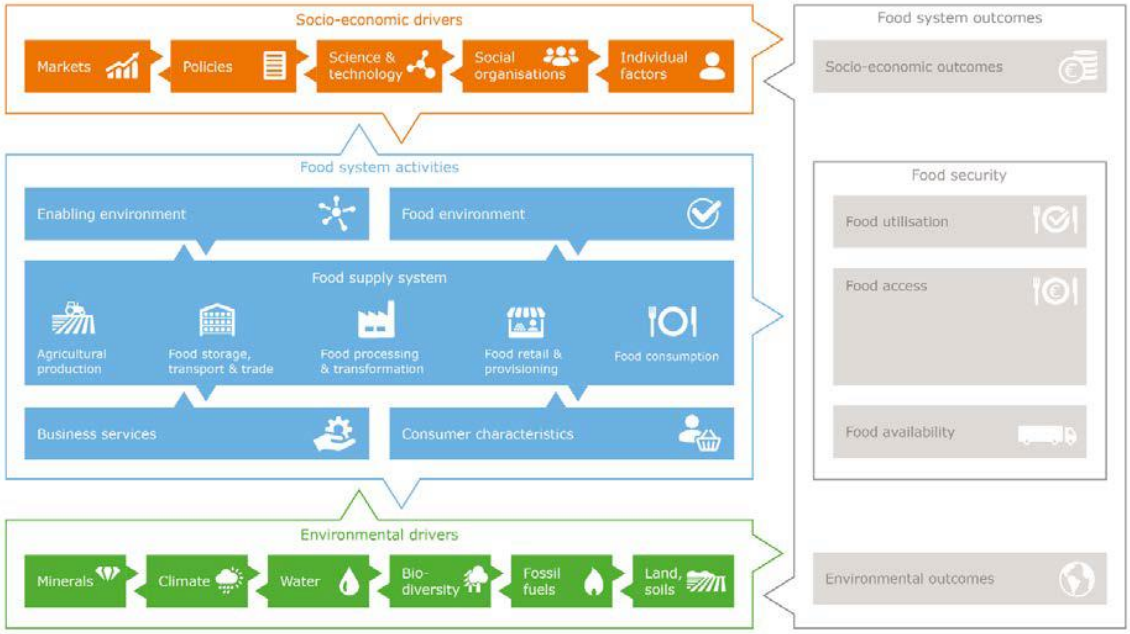
The following subsections present the key concepts underpinning each component, while section 3 outlines how to practically apply the food system, political economy, and sustainability components and how to facilitate the development of transformation pathways. The associated steps and tools are a combination of analytical and multi-stakeholder dialogue methods. We hope, therefore, that our food system approach provides a toolbox for practitioners, researchers and decision-makers that **practically facilitates participation and learning for all stakeholders involved**.

2.1. Conceptualising food systems

The challenges of food and nutrition security, environmental sustainability and social equity are interlinked and can rarely be tackled in isolation (IPCC, 2019; Springmann et al., 2018). To understand the (inter-) linkages of these issues with food and to act upon the resulting complexity, **policymakers and researchers increasingly turn to the concept of food systems**. In general, food *systems* refer to the embedding of food in multifaceted and multilayered processes, linking food production, processing, distribution, and consumption, while recognising that these processes are underpinned by complex political, economic, social, and ecological relationships. A food system is defined as '*All elements and activities that relate to production, processing, distribution, preparation, and consumption of food*' (Willett et al., 2019, p. 4), depicted in figure 2. This includes the environment, people, inputs, processes, infrastructure, and institutions involved that takes food from farm to mouth (IFPRI, 2016).

We build on the conceptualisation of food systems developed by van Berkum (2018) and HLPE (2020). We include both 'hard' (eg, biophysical) and 'soft' (eg, social, economic, and political) elements in order to study relevant linkages, for instance between the production of particular crops (hard) and social relations among middlemen (soft). In this conceptualisation, **food system activities linked to socio-economic and environmental drivers deliver food system outcomes**. Myriad food system activities generate a number of food system outcomes, which are also influenced by various socio-economic and environmental drivers (which also influence one another). These drivers also influence the myriad food system activities (which also influence one another). At the same time, food system activities and outcomes also impact the various socio-economic and environmental drivers. Within a system, the boundaries of what constitutes an outcome, activity, and driver can shift as one element – such as food production – can be an activity, driver, and outcome simultaneously.

Figure 2. Food system framework



Source: van Berkum et al., 2018

Socio-economic drivers affect or influence the food system through, for example, trade relations and economic growth (Markets); land rights and food safety legislation (Policies); technological innovations (Science & technology); households and social movements (Social organisations); and lifestyles (Individual factors; van Berkum et al., 2018). We expand this conceptualisation by adding 'Demographic drivers', which involves population growth and urbanisation, and by broadening 'Policies' to 'Governance' as the latter better reflects the myriad informal and formal rules beyond the state that influence or affect the food systems. The core of a food system are the **food system activities**, which link food production and food consumption through supply chains, and which are supported by an enabling environment[1] and businesses services. The food environment[2] and consumer characteristics influence the retail and consumption side of the activities. The **environmental drivers** indicate the biophysical context in which the food system operates, but its influence differs per food system element. For example, food production is especially influenced by the biophysical context, and is likewise the main food system pressure on the environment, but food transport

[1] Eg, regulations and research (van Berkum et al., 2018).
[2] A food environment '*…refers to the physical, economic, political and socio-cultural context in which consumers engage with the food system to make their decisions about acquiring, preparing and consuming food*' (HLPE, 2017, p. 11).

less so. The **outcomes** are primarily food and nutrition security (including diets), socio-economic (eg, livelihoods), and environmental (eg, soil and water quality). Each food system will have a unique combination of drivers, activities, outcomes and governance arrangements (HLPE, 2017; van Berkum et al., 2018).

2.2. Sustainable food systems

Food systems contribute positively and negatively to sustainable development. For citizens, governments and businesses **to make sustainable decisions, understanding the current and potential outcomes of food systems is of paramount importance**. An analysis of the sustainability of food systems can be useful as a base- or end line to debate pathways that advance sustainability. A sustainable food system *"...explicitly meets the needs of society, economy and environment over time, and guarantees sustainable outcomes in all these three dimensions, hence balancing their trade-offs"* (Arnold et al., 2018, p. 34). There are various visions of food systems sustainability and the weighting of its multiple dimensions.

First, **there are multiple ways to construct food systems sustainability**. While the environmental dimension is the least contested, evaluations vary in defining the depth of sub-dimensions such as water, water quality, and water safety. Food and nutrition security are sometimes considered part of the social dimension, sometimes as a separate dimension. Other assessments propose to evaluate the resilience, equity, or governance of food systems. We refer to food system sustainability as entailing these three dimensions: social (eg, governance quality and malnutrition), economic (eg, livelihoods), and environment (eg, soil quality). As such, we expect food systems to attain multiple — often conflicting — objectives simultaneously (FAO et al., 2017). Second, while this multidimensionality of sustainability is widely recognised, in practice **certain dimensions are weighted more based** on local or global agendas or different normative and political visions on what constitute a sustainable food system and what the best transition pathways are (Béné et al., 2019; Gaitán-Cremaschi et al., 2019). For example, both 'industrial' and food sovereignty proponents envision their desirable — and sustainable — food systems vastly different, and will weigh dimensions such as 'social inclusion' differently (Dekeyser, 2019). Lastly, food systems are changing rapidly, thus those analysing food systems need to be wary of future sustainability challenges. Current sustainability dynamics can shift rapidly, and additional pressures — driven by, for example, climate change or population growth — could increase or decrease in importance. Without a reflection on future sustainability challenges, proposals for transformation could decrease the ability of food systems to absorb future pressures. Both the construction of sustainability and weighting of current and future dimensions is inherently political and involves issues of political economy.

2.3. Political economy

Formulating and implementing governance, investment and behaviour change around food rarely resembles the ideal versions forwarded by policy analysis due to the influence of political economy issues such as ideas, interests, and power structures (Pinstrup-Andersen & Watson II, 2011).

Political economy places actors, the power relationships between them, and the institutional frameworks in which actors operate at the centre of its analysis (De Schutter, 2019). Analysing the political economy in food systems can result in more grounded proposals by incorporating the perspectives and economic incentives of stakeholders (Bizzotto Molina et al., 2020). **A food systems approach is inherently political** as ideas, interests and perceptions on food and nutrition vary between different stakeholders (FAO et al., 2017), such as assumptions around government and the market's roles, for example, or balancing efficiency and resilience.

Food system interventions regularly challenge vested interests of actors or institutions who lack incentives to support reform (FAO et al., 2017). Power asymmetries in decision-making processes often sideline the needs and limit contributions of less powerful actors. **An inclusive food systems approach that incorporates a political economy component can integrate less powerful actors**, **and can help identify trade-offs and synergies** among interventions. Political economy analysis is about "*...understanding the political dimensions of any context and actively using this information to inform policy and programming, while looking at the dynamic interaction between structures, institutions and actors (stakeholders), to understand how decisions are made*" (DFAT, 2016, p. 2). This analysis can help incorporate the ideas, interests and power structures in formulating and implementing policy, investment and behaviour change around food systems by better understanding informal institutions or dynamics, such as the enabling environment or incentive structures. As a result, **policy and intervention proposals can be more grounded, effective, and coherent, through the crucial insights into power structures and context.** Political economy analysis, furthermore, can help tackle issues of sustainability often being 'wicked hard', involving collective action problems, conflicting interests and resistance to reform.

2.4. Transformation pathways towards sustainability

The complexity of food systems raises challenges for the design and implementation of coherent and effective interventions that strengthen food system sustainability. Because the different elements of food systems are all interconnected and change processes inherently complex, uncertain and dynamic, **no universal pathways or win-win solutions exist** for sustainability transitions. Food systems transformation is a highly context-specific process, and differs particularly between developed and developing countries. Local factors that impact food systems sustainability, such as consumption patterns, input use, or poverty, vary tremendously, even within regions. Moreover, countries differ greatly in the available resources and capacities to implement policies or regulations, but also in the political will and policy space to reform and enforce them (Bizzotto Molina et al., 2020). As such, the required transformation needs improved knowledge of the interdependencies and feedback loops within the food system as well as of local factors and actors. This knowledge helps to tackle key drivers of unsustainable trends through **context-specific public and private actions** that can induce changes towards the desired outcomes (Béné et al., 2019; Ruben et al., 2018).

Interventions that aim at strengthening food system sustainability are also intrinsically normative, as **multiple visions for re-orienting future food systems exist** (Béné et al., 2019). Various actors have not only different narratives on food and nutrition security and sustainability, but can also have diverging views on the routes towards desirable goals (eg, through incremental innovations, aimed at improving the sustainability of predominant food systems, or radical and transformative ones) and on the entry-points for action (eg, in production systems, value chains or consumption; Gaitán-Cremaschi et al., 2019). Inevitably, any intervention produces **winners and losers**. As such, formulation pathways need to reflect possible opposition and/or introduce measures to compensate specific actors.

Given the different food system's visions, a political economy component can help assess the boundaries and feasibility of the proposed pathways towards sustainability. Grounded pathways, rather than being based on external best practices, are based in the analysis ('technically sound') as well as context ('politically feasible'; Samji et al., 2018). In addition, given the uncertainties involved in complex change processes, transformation pathways that are **adaptive and iterative** can better address the interlinkages of food systems challenges and adjust to unexpected changes, as they allow for policy experimentation and experiential learning. This increases the chances of success and reduces those of unintended outcomes (Samji et al., 2018).

Finally, we incorporate the **participation of stakeholders** in the design and implementation, as pathways gain in feasibility when a supportive coalition of actors is built and drives change (UNDP, 2019). Well-functioning multi-stakeholder approaches can foster joint learning and reflection among diverse actors, allowing for the inclusion of multiple perspectives (Dekeyser & Rampa, 2019; Ison et al., 1997). They can also facilitate consensus building, alignment of views and actions and ownership of future interventions (Nguyen et al., 2011). To safeguard the inclusivity and effectiveness of these approaches, however, power imbalances need to be acknowledged and addressed (Kay et al., 2018). This can increase the **space for arbitration of trade-offs** between different goals and policy instruments, enhance coordination and create **opportunities for synergetic interventions** and integrated decision-making.

In sum, through the combination of food system, sustainability and political economy components, we provide an approach to **deliver a context-specific and viable set of solutions to the unsustainable trends identified in the food system** under study. This approach can explicitly acknowledge trade-offs and support the active engagement of local stakeholders throughout the design and implementation of policies and investments. The next section provides the practical steps of the sustainable food systems approach.

3. Our sustainable food systems approach in practice

The goal of our sustainable food systems approach is to describe, diagnose, and help develop more coherently, effective, and context-appropriate interventions in food systems to improve their sustainability. To do this, we combine food system, sustainability, and political economy analyses of the food system under study to develop transformation pathways. ECDPM developed this approach through the *Sustainable Agrifood Systems Strategie*s project in Kenya and Tanzania (2017-19; Bizzotto Molina et al., 2020; Rampa & Knaepen, 2019), drawing on van Berkum et al. (2018), Posthumus et al. (2018), and ECDPM's political economy analysis (2016). In doing so, we **built upon some of the latest and best established tools** in food system approaches and political economy analysis. This approach uses the food system, sustainability, and political economy components and pathway development iteratively, meaning that there is not necessarily a set order but that the components and steps can be dynamically reapplied with information from other components. These components can be applied at different levels of depth and scales depending on the project's or organisation's objectives, from a quicker review of existing literature to workshops to in-depth analysis.

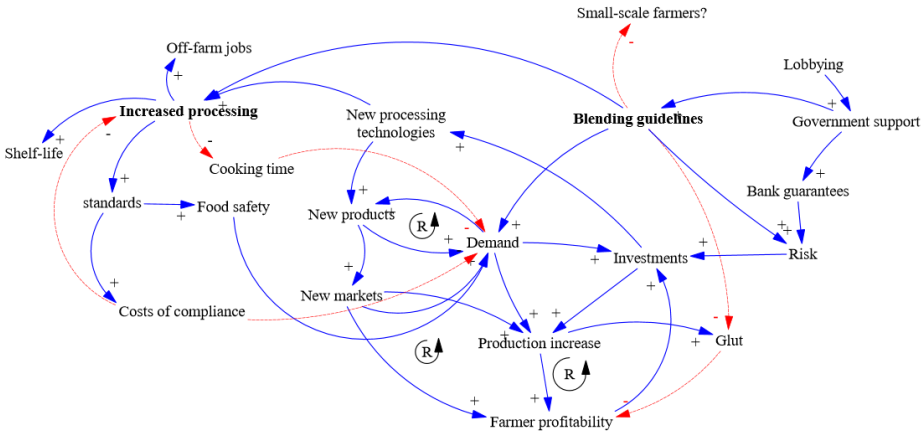
3.1. A food system analysis

A food system analysis is used to describe the different elements in the food system and the relationships between them. It "...gives new insights in intervention pathways which enrich the 'menu of opportunities' for linking key food policy instruments and for involving different stakeholders" (Ruben et al., 2018, p. 9). A key feature in food systems are feedback loops, in which certain interactions reinforce or balance each other out. For example, increased agri-inputs can lead to more income, which in turn can lead to more agri-inputs. The presence of these feedback loops means that **food systems lack clear cause-effect relationships**, and that the outcomes are uncertain. A food system analysis can distinguish overarching patterns that emerge from the interactions, but which are invisible when focused only on the individual elements.

I. The first step **identifies the food system and draws boundaries,** which can be a geographical and/or functional boundary or the level of study detail. Given the potentially vast complexity of food systems, these boundaries make it feasible to operationalise and analyse a food system. **These boundaries are guided by the project's or organisation's objectives**, such as a specific problem or a particular region, and will influence the results of the food systems approach to a large extent. Setting these boundaries is inherently subjective as there are no clear rules for delimitation, which requires a reflection including on questions of political economy, such as class, gender, power, to make biases of delimitation explicit. Later on, boundaries can be revisited and adjusted as the analysis progresses. Interviews or multi-stakeholder workshops can help in identifying appropriate boundaries. A possible outcome of this step are study boundaries around an area (eg, a city or country), or selecting a value chain (Gaitán-Cremaschi et al., 2019; Posthumus et al., 2018, 2019).

II. The second step **maps the delimited food system**, which can be guided by conceptualisations such as those developed by van Berkum et al. (2018; figure 2) or HLPE (2017). Generally, this step includes assessing key dynamics of food system **activities, drivers, outcomes, events, and trends**, in order to identify key processes that influence the delimited food system. Given the heterogeneity of food systems, the selection of indicators will differ per food system and aim to describe its various activities, drivers, and outcomes. This step entails both 'hard' (eg, biophysical) and 'soft' (eg, social, economic, and political) elements, with the latter best analysed with step II of the political economy component. A map provides a momentary snapshot, even though all the food system elements are dynamic. The sources for mapping are various given the large scope of themes, and can range from (multiple scientific fields) literature reviews, interviews, and public datasets to scoping studies, in-depth research, and other research methods. A possible result of this step is a food system map that includes, among other elements, farm types, informal distribution channels, government taxation, and consumer preferences (Gaitán-Cremaschi et al., 2019; Posthumus et al., 2018, 2019; van Berkum et al., 2018).

Figure 3. Causal loop diagramming of increased processing and blending guidelines discussed at Nairobi workshop and created by Vensim software



Source: Dekeyser & Rampa, 2019

III. The last step in the food system component involves linking activities, drivers, outcomes, and trends of step II, so that we can **identify interactions that help understanding feedback loops, trade-offs, and synergies**. One way to link is through causal loop diagrams (figure 3), which links dynamics at various levels of depth. Minimally, this involves drawing positive (eg, more lobbying increases government support) or negative (eg, more processing decreases cooking time) linkages to create dynamic 'maps'. Added layers of depth and confirmation can be attained by involving stakeholders into the drawing or validation, as the drawing can foster further discussion and thus expand or complement step II. Still, this linking is mostly qualitative and limited to positive or negative relationships. Additional depth can be achieved by adding or creating stock-flow diagrams, Bayesian belief networks, or other modelling tools, and the other components in this food system approach. Given the complexity of food systems, more depth likely requires more resources (Posthumus et al., 2019).

3.2. A sustainability analysis

The sustainability component can help define social, economic, and environmental sustainability, analyse their trade-offs, and reflect on future sustainability challenges in the studied food system.

I. The first step is to **operationalise sustainability**. Sustainability is a multidimensional concept and can be constructed differently, hence a debate is warranted about which indicators to select and how to weight them. Iteratively, the food system and the transformation pathway component of ECDPM's approach can inform the choice of sustainability indicators and the stakeholders for discussion. Practically, sufficient data availability and reliability, both qualitatively and quantitatively, might influence indicator choice and its representativeness.

II. After agreeing on how to construct sustainability, its **relevant sustainability indicators are highlighted, expanded, or brought into the food system mapping**. While primary or secondary research might be necessary, hence collaborations established with researchers from different scientific fields, there are various data sources for sustainability indicators as well, especially at country-level.[3] Bringing these indicators into the food system mapping allows trade-offs and synergies between sustainability dynamics to be analysed through a variety of qualitative or quantitative methods. Not all trade-off analysis needs to be highly technical. Causal loop diagramming can qualitatively link sustainability elements to underscore their causal linkages as, for example, less herbicide usage (environmental dimension) might lower yields (economic) and thus raise hunger (social). The Sustainable Development Goals (SDGs) Synergies tool provides user-friendly trade-off analysis between different SDGs. More quantitative methods could incorporate cost-benefit analysis or utilise modelling that show the size of trade-offs and synergies among different dimensions.

III. Food systems change rapidly under various drivers, which increase existing and add new sustainability pressures (Béné, Prager, et al., 2019). Without **reflecting on these future pressures** when designing transformation pathways, food systems can be left less resilient. The future is inherently uncertain, but theories and models exist that can help to understand upcoming sustainability pressures and how they change the food system. Some pressures are also more certain than others. The future pressures that are likely to impact the food system could be incorporated in the food system mapping and trade-off analysis.

[3] Useful data sources are the Food Systems Dashboard, FAOSTAT, UN Comtrade, the World Development Indicators, and the Global Food Security Index.

The political economy component can contribute to advancing food system sustainability, as it contextualises the power issues around sustainability and thus can help better define what are more politically feasible sustainability targets. Political interests and preferences underpin the prioritisation of development objectives, the identification of viable transformation pathways and subsequent interventions, and managing the trade-offs between different sustainability objectives. Furthermore, choices concerning sustainability depend on (economic) incentives and expected benefits that differ for each stakeholder. As such, political economy can 'ground' the food system sustainability analysis more.

3.3. A political economy analysis

Combining a political economy and food system component enables the **identification of realistic entry points for improving the outcomes, and sustainability, of the studied food system**. This is achieved by analysing its actors and institutions together with the (economic) power relations and the formal, and informal, rules of the game that shape decisions and behaviours of key stakeholders and therefore influence food system outcomes.

The political economy component is thus central to the last component of our food system approach, which develops strategies to improve food system sustainability. The political economy component helps to analyse the synergies and trade-offs emerging from specific pathways; and it is also **important for the other two components of our food systems approach**, the sustainability assessment (as explained in the previous sub-section) and the food system analysis itself, which are all interlinked through the iterative use of the four components.

The large number of stakeholders and topics and high complexity of food system interactions need to be 'navigated' and possibly simplified, as they can discourage usage of the food systems approach. So identifying the roles and interests of different actors, and respective spheres of influence and incentive structures, can help narrow down the scope of the food system analysis. Understanding these political economy dynamics can help to **indicate how and where to focus the food system analysis**, and the level to delve deeper, such as: unit of analysis (national or local food system? urban or rural? or both?); sub-sectors (what are the most relevant value chains and food system activities? are the key sustainability bottlenecks in the production, distribution or consumption part of the food system?); actors (eg, who has decision making capacity for those more relevant levels or parts of the food system? who are the actors suffering the most from unsustainable food system outcomes?). Once the key information about the food system has been collected (on activities, drivers and outcomes), the political economy component insights help us deepen the analysis of the food system on the most relevant parts, stakeholders, and interactions.

Combining political economy and food system analyses is done by **applying ECDPM's political economy 'five lenses' (2016) to the studied food system.** This is done by combining relevant analytical tools, and iterative use of literature reviews, individual interviews with local actors, focus groups, and multi-stakeholder workshops.

I. **The structural or foundational factors** are the hard-to-change, long-run, geographical, economic and historical factors affecting a food system. Most emerge from the food system analysis itself, but devoting specific and deeper attention to these factors helps explain why the food system is shaped like it is. They allow, for example, to identify the bottom lines in terms of natural resources endowments, historical path dependency, ownership and legitimacy of state and non-state stakeholders, the credibility of commitments by different actors, as well as issues related to power, such as gender issues. For instance, the availability of minerals in a country, even if distant from the studied food system, could be an important structural driver that could explain why water is mostly used for extractive industries at the expense of food production, or why agriculture is stuck in a path of under-investment.

II. **Actors, agency and incentives**. Stakeholder mapping is a crucial part of the political economy analysis and can be done by listing actors, assessing their roles, incentives, interests and sphere of influence within the food system. Various methods can be used. Drawing actor diagrams is useful to visualise food system actors in various ways by, for example, categorising public-private and production-distribution-consumption actors. They can be linked according to their vertical (along value chains) and horizontal relations (among peers), formal/informal (commercial) dealings, converging or conflicting interests. Compiling 'AAA' tables is another method to understand the food system dynamics, and also to identify groups and individuals to be incorporated in the decision-making process or approached to create partnerships for food system interventions.[4]

III. **Formal and informal 'rules of the game'** are the policies, laws, regulations, enforcement mechanisms, and practices (such as budget processes, price setting, marketing, research and advisory services, and customary behaviours) that influence and regulate the food system. Analysing the most important of these 'rules', and summarising and visualising them through, for example, a policy map, allows to understand stakeholders' decisions and their key incentives driving the activities and outcomes of the food system. These rules can contribute to an overall 'system bias', in which an overall rule structure makes certain choices easier than others. For instance, Rampa & Knaepen found such a system bias in favour of one crop to the detriment of another in Kenya (2019). The 'interest-influence diagram' is another method to combine actor mapping and analysis of the 'rules of the game'. Charting stakeholders along these two dimensions helps decisions such as who, and how, to engage in the desired food system change. For example, it might be beneficial to create an alliance with those who have both high interest and influence, or to support those who have strong interests in the outcomes but little influence.

IV. **Sub-sector specific characteristics**. Food systems comprise many subsystems (eg. food production, processing, and consumption) and parts (eg. different value chains). Analysing the sub-sector specific features (including through value chain analysis methods) and their linkages to the broader food system can be relevant both to prioritise the most relevant subsystems where improvements are needed and to understand the 'big picture'. For instance, concentrated land ownership (part of the production subsystem) in a non-elite ethnicity can steer the policy choices of the ruling ethnicity to favour food imports instead of domestic agricultural support, which may impact overall nutritional outcomes. As such, the nutritional outcome of the food system is impacted because of a power struggle originating in the production sub-sector.

[4] Agenda (with each actor's mandate, mission and strategic objectives); Arena of influence (meaning the field of action, span of outreach); and Alliances (type of relations the actor has with others, eg, institutional relations, coordinated activities, co-production using joint resources). For an example, see Rampa & Knaepen, 2019.

V. **Exogenous factors** are the main international and other external drivers that affect the food system. Their importance to food systems, and interaction with formal and informal actors and institutions, only grew in a globalised world. For instance, the food system of a landlocked country may be strongly shaped by its heavy dependence on importing staples like rice. The local rice price may not only be determined by international market fluctuations, but also by the efficiency and governance arrangements around the port in another country through which the rice is imported. Without understanding this key exogenous factor (including the power it gives to local rice importers), it would be difficult to grasp the alignment of interests determining the trade and food policies of this rice-importing country. It would furthermore explain why, in this example, transporters of imported rice would benefit the most from efficiency improvements in the foreign port, while local rice producers would suffer from an even stronger competition.

3.4. Transformation pathways

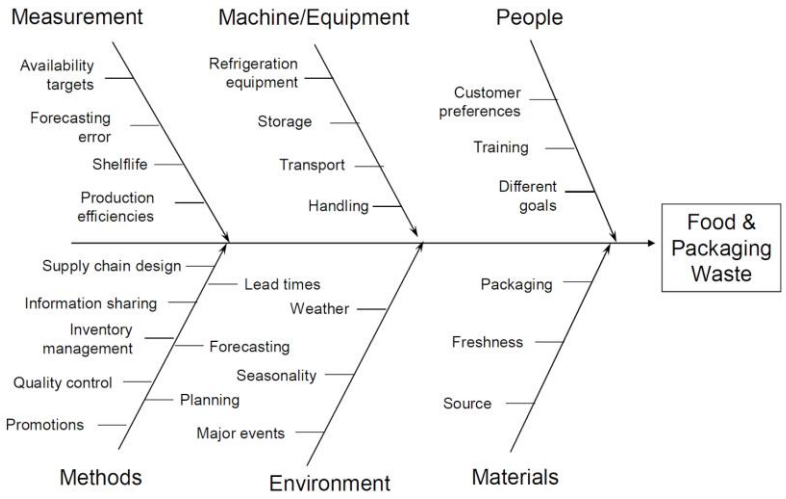
The food system, sustainability, and political economy components provide the analytical base for developing context-specific pathways and identifying entry-points towards more sustainable food systems. These pathways consist of debating the sustainability challenge to prioritise, identifying where action should be taken for transforming the food system, and marshalling a coalition of actors willing to drive the change. In sum, **developing pathways is using the components' analyses to strategise towards actions that advance the food systems' sustainability**. At the same time, given the high degree of complexity and uncertainty involved in food system change, pathways are not necessarily the endpoint of the food systems approach, but can be enriched by re-analysing certain food system steps. Pathways towards sustainability can be developed with stakeholders through "*iteration, experimentation, and learning*" (Samji et al., 2018, p. 31). Such participatory creation avoids formulating problems according to one single perspective (Ison et al., 1997) and helps researchers, policy-makers and practitioners refrain from promoting predetermined solutions. When the proposed pathways **include opportunities for reflection and learning,** they can be adjusted and adapted if the understanding of the food system progresses and/or its underlying dynamics change (Posthumus et al., 2019). This also allows to **build feedback into the design and implementation of policies and investments**.

I. The first step in pathway development is to **prioritise the sustainability challenge to tackle**. Sustainability is multi-dimensional, with interventions advancing one dimension (eg, food security) possibly impacting others positively or negatively (eg, soil fertility), and needing sufficient resources. The choice of what to prioritise is normative and political, which requires debate — served with evidence thanks to the analyses — among those invested and affected. Ignoring synergies and trade-offs can lead to policy incoherence, adverse impacts of policy in one sector to another sector, loss of opportunities for positive synergy, and delayed outcomes (Mainali et al., 2018). A combination of analytical and participatory methods[5] offers a promising way forward for weighting trade-offs (Gusenbauer & Franks, 2019). At the same time, synergetic interventions simultaneously advancing multiple goals are possible. The debate on prioritisation can be helped by developing a possible solution to each of the causal links identified in the analysis (Samji et al., 2018). A problem tree or a fishbone (figure 4) diagram can be used to visually represent the sustainability challenges for which we are seeking solutions. This debate should also reflect on where to intervene, as easier entry-points will lower the required resources to change and can generate additional synergies or trade-offs.

5 These include simulation methods, optimisation methods, multicriteria analysis, spatially explicit methods, integrated modelling methods and stakeholder-centred methods (Gusenbauer & Franks, 2019).

II. The second step in pathway development identifies **key entry-points** for action. This clarifies where interventions have more potential to generate wider change based on the food system mapping and the political economy component — which analyses the overall policy environment, actor networks, and local stakeholders' needs and incentives (Bizzotto Molina et al., 2020). Multiple entry points may exist to address specific challenges in the food system, and different intervention options (including policies and investments) can be developed that likely advance sustainability. For example, food waste can be tackled by improving post-harvest management or by increasing consumer awareness (van Berkum et al., 2018). This would, combined with step I of pathway development, create a 'menu of options' for interventions.

Figure 4. Cause and effect fishbone for food waste



Source: Gooch, Felfel, & Marenick (2010)

III. The third step consists of **developing those options into pathways by outlining their advantages and disadvantages**. While each of the intervention options can improve the sustainability of the studied food system, they may differ on their impact, local suitability, and political feasibility. For example, it is much easier to launch an information campaign about appropriate cooking techniques than to improve regional trade agreements or build infrastructure (Bizzotto Molina et al., 2020). This step entails narrowing down the available options to ensure that proposed interventions are adapted to the local context. For instance, it may require to drop or postpone technically sound objectives and reforms that will not receive traction. Useful tools to refine such selection include the ECDPM's 'five As' framework, which investigates what possibilities are there to *alter* existing incentives, *adapt* to current drivers and constraints, *avoid* political blockages to reform, *await* more propitious political-economic circumstances, or *abandon* all together interventions with little to no chance of success (ECDPM, 2016).

IV. The last step **analyses the key actors or coalitions of actors** that can drive the desired changes by reflecting on the potential roles and responsibilities of key stakeholders to support the chosen transformation pathways and ensure their buy-in. Engaging multiple agents across sectors and organisations can ensure reforms are viable, legitimate and relevant (Samji et al., 2018), increase chances of implementation, as well as opportunities to maximise synergies and minimise trade-offs. If an in-depth analysis is chosen, this step may also lead to drawing alternative scenarios based on the combination of several pathways into a 'package' of reforms, leading to integrated governance responses addressing unsustainable trends and leading to

transformation. Joined-up foresight, ex-ante and ex-post analysis, and participatory scenario building with food systems actors are possible tools that can enable better decision-making as they build legitimacy and ownership for policy agendas and stimulate action (Steiner et al., 2020). In this last step, it is particularly important to map existing promising initiatives, partnerships, policy processes and drivers of change related to the identified pathways, in order to foster behavioural change, while building on ongoing political traction and agency, and anticipating possible opposition to transformation.

4. Conclusion

Around the world, food systems are changing rapidly and are confronted with unprecedented, interlinked sustainability challenges requiring responses at local, national, and international level. A food systems approach is necessary to analyse the complexity and interrelated drivers of food system sustainability and to develop more coherent, effective, and context-appropriate interventions to address food system sustainability challenges. **ECDPM has developed an iterative, step-based sustainable food systems approach that helps navigate complexity and is flexible in its required resources.** Our approach combines the use of food systems, sustainability, and political economy components to conduct analysis and develop pathways that advance food system sustainability.

The use of each component is organised into steps, involving practical methods and tools. A food system component is used to describe the different elements in the food system and the relationships between them, in order to understand dynamics at the system level. The sustainability component can help define social, economic, and environmental sustainability, analyse sustainability trade-offs, and reflect on future sustainability challenges. The political economy component is used to analyse the actors and factors, including power relations and formal and informal rules of the game that shape food systems.

The food system, sustainability, and political economy components provide the analytical base for developing context-specific pathways and identifying entry-points for promoting more sustainable food systems. These pathways consist of debating what to prioritise, identifying where action should be taken for transforming the food system, and marshalling a coalition of actors willing to drive the change. Given the complexity, uncertainty, and political character of food systems transformations, the development of these pathways can benefit greatly from involving all relevant stakeholders from the start. Together, these four components can help guide practitioners and decision-makers to describe, diagnose, and develop more coherent, effective, and context-appropriate interventions in food systems to improve their sustainability. **We present here a guide of options, not a manual.** While we recommend integrating all steps as they inform one another, each project or organisation should decide on where to place its resources best, including dropping steps or bringing in other tools.

Developing interventions that advance sustainability in food systems can seemingly be a daunting task due to their high complexity, and may require understanding many different topics. With this approach, ECDPM developed a practical guide to navigate this complex landscape of food systems and transformations, and **support the development of more coherent, effective, and context-appropriate interventions with stakeholders**. We remain committed to advancing sustainable food systems where people can flourish socially and economically in a healthy environment. Through multidisciplinary research, participatory policy dialogues, and partnership facilitation, we hope to contribute to solutions for more sustainable food systems and the SDGs in Africa, Europe, and globally.

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