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Overcoming evidence gaps on food systems

Synthesis paper

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Note by the Secretariat

Over the course of the 2021-22 biennium, the OECD developed work on overcoming evidence gaps on food systems. A first deliverable was a narrative piece, declassified in June 2021, which outlined the main issues regarding evidence gaps on food systems and possible approaches to overcome them. Three "deep dives" then explored in greater detail evidence gaps regarding food insecurity and food assistance programmes across OECD countries, gender and food systems, and environmental impacts along food supply chains. These deep dives were declassified in June 2022. As with the narrative piece, these deep dives were published in the OECD Food, Agriculture, and Fisheries Papers series:

- Deconinck, K., C. Giner, L.A. Jackson and L. Toyama (2021), "Overcoming evidence gaps on food systems", OECD Food, Agriculture and Fisheries Papers, No. 163, OECD Publishing, Paris, https://doi.org/10.1787/44ba7574-en. *Note: A shorter version was subsequently published as Deconinck, K., C. Giner, L.A. Jackson and L. Toyama (2022) "Making better policies for food systems will require reducing evidence gaps," Global Food Security 33, 100621*
- Giner, C. and O. Placzek (2022), "Food insecurity and food assistance programmes across OECD countries: Overcoming evidence gaps", OECD Food, Agriculture and Fisheries Papers, No. 183, OECD Publishing, Paris, https://doi.org/10.1787/42b4a7fa-en.
- Giner, C., M. Hobeika and C. Fischetti (2022), "Gender and food systems: Overcoming evidence gaps", OECD Food, Agriculture and Fisheries Papers, No. 184, OECD Publishing, Paris, https://doi.org/10.1787/355ba4ee-en.
- Deconinck, K. and L. Toyama (2022), "Environmental impacts along food supply chains: Methods, findings, and evidence gaps", OECD Food, Agriculture and Fisheries Papers, No. 185, OECD Publishing, Paris, https://doi.org/10.1787/48232173-en.
- Deconinck, K. and M. Hobeika (2022), "Improving environmental outcomes along food supply chains: A review of initiatives and their effectiveness", OECD Food, Agriculture and Fisheries Papers, No. 186, OECD Publishing, Paris, https://doi.org/10.1787/d549eb43-en.

This synthesis paper brings together the main insights from this work. It summarises the findings of the narrative piece as well as the three deep dives, discusses roadmaps for overcoming evidence gaps, and presents four overarching recommendations.

This paper has been prepared by Koen DECONINCK and Céline GINER. The paper was DECLASSIFIED at the meeting of the Working Party on Agricultural Policies and Markets March 2023 held on 14-15 March 2023.

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1. Introduction

1. There is a growing awareness of the need to transform food systems. The United Nations Food Systems Summit held in September 2021, as well as the impacts on global agricultural markets of the COVID-19 pandemic and the Russian invasion of Ukraine, firmly placed food systems at the top of the global policy agenda. In November 2022, the Declaration from the OECD Meeting of Agriculture Ministers stressed that there is an urgent need for transformative solutions to achieve sustainable agriculture and food systems. Yet successful actions require sound evidence – on the extent, characteristics, and drivers of issues; on the effectiveness of different policy instruments, and their synergies and trade-offs; on how policy proposals would affect stakeholders; and on citizens' values and preferences. There are considerable evidence gaps on many of these aspects.

2. This paper presents the main findings from the OECD project "Overcoming Evidence Gaps on Food Systems," conducted in 2021-22 as a follow-up to the OECD report "Making Better Policies for Food Systems" (OECD, 2021[1]). The goal of this project was to identify different types of evidence gaps, as well as pragmatic approaches to overcome these evidence gaps. The project explored this question through a broad overview of evidence gaps in food systems, as well as through three "deep dives" analysing evidence gaps regarding food insecurity and food assistance programmes across OECD countries; gender and food systems; and environmental impacts along food supply chains. These three topics were deliberately chosen to span the different dimensions of the "triple challenge" facing food systems (OECD, 2021[1]), and to cover a wide range of relevant actors (civil society, business, government). Each deep dive explains what is known about the extent, characteristics, and drivers of the issue, about policy responses and their effectiveness, and the role of interests and values. Each deep dive also contains specific recommendations on how to overcome the evidence gaps.

3. This synthesis paper first summarises insights from the broad overview of evidence gaps in food systems, and then presents short summaries of the three deep dives. The final section then presents four overarching insights into overcoming evidence gaps from this work.

2. Evidence gaps in food systems[1]

4. Much is known about the challenges facing food systems, and about possible initiatives to improve their performance, as reflected by a growing number of reports (OECD, 2021[1]; FAO, 2018[2]; Fanzo et al., 2020[3]; HLPE, 2017[4]; Parsons and Hawkes, 2018[5]; FABLE, 2019[6]; TEEB, 2018[7]; Bene et al., 2018[8]; Gladek et al., 2017[9]; Global Panel on Agriculture and Food Systems for Nutrition, 2016[10]) (Parsons and Hawkes, 2019[11]; SAPEA, 2020[12]; UNEP/SFSP, 2019[13]; Willett et al., 2019[14]). Yet, despite these contributions, there remain important evidence gaps.

5. Evidence gaps may exist regarding the extent, characteristics and drivers of issues, making it difficult to know how serious the problems are or what causes them. In many cases, the problem is not an absolute lack of evidence, but rather that the available evidence is not sufficiently detailed – for example, evidence might have insufficient geospatial granularity, may not be disaggregated across socio-economic groups, or may not have the right frequency or time horizon. Similarly, evidence may exist but may be fragmented across different public or private actors. Evidence may also be generated using different

[1] This section is based on Deconinck et al. (2021[133]).

methodologies, making it difficult to compare across countries, across different groups of people, or over time.

6. An example of incomplete evidence is found in reporting gaps on food-related Sustainable Development Goals (SDGs). The seventeen SDGs have been translated into 169 targets, which are in turn tracked through 231 indicators. Of these, 21 food and agriculture-related indicators are tracked by the UN Food and Agriculture Organization (FAO). For many of these indicators, important gaps exist, in part because internationally agreed methodologies were only established recently. For example, in recent years no countries reported complete data for the food loss index or the proportion of agricultural area under productive and sustainable agriculture, and only a handful of countries reported disaggregated information on average income of small-scale producers. The fact that important reporting gaps remain on these highly visible indicators suggests that evidence may be even more incomplete in areas not explicitly covered by SDG indicators.

7. One example of insufficiently disaggregated data is found in the field of nutrition. On many questions related to nutrition policy, it is costly to obtain detailed evidence disaggregated by socio-economic groups, which would be useful in targeting policy approaches. For example, it is clear that globally there are widespread deficiencies of micronutrients such as iron, zinc, or vitamin A (Development Initiatives, 2018[15]). However, there is a lack of disaggregated data on micronutrient deficiencies in vulnerable populations like children, adolescent girls, and women, while other segmentations (e.g. by income and age groups) are also lacking. In response to these gaps, researchers have often used proxies, which can shed some light on the extent of the problem but are not sufficiently detailed to be useful in policy design.

8. Biodiversity is one area where evidence gaps reflect the difficulty of comparing a wide array of indicators and methodologies (Bioversity International, 2019[16]). OECD work on biodiversity indicators has noted that very few indicators are used consistently across multiple countries (OECD, 2019[17]) (OECD, 2019[18]). One attempt is the Agrobiodiversity Index developed by Bioversity International and the International Centre for Tropical Agriculture which aims to bring together data on "the agrobiodiversity that people sell and eat, the agrobiodiversity in their fields and lands, and the genetic resources that underpin them" (Bioversity International, 2018[19]). Given the importance of local context, biodiversity indicators are particularly prone to the problem of insufficient granularity noted earlier. Ideally, biodiversity indicators would use geospatially explicit data on land use and habitats, but this is currently limited (OECD, 2019[18]).

9. Evidence gaps may also exist regarding the effectiveness of different policy instruments and their synergies and trade-offs. This in turn makes it difficult to know how ambitious policy makers can be, which concrete initiatives can be undertaken, and what the likely effects on other policy objectives will be. For example, while it is well understood that a sizeable share of global food production is either lost in the supply chain or wasted at household level, surprisingly little is known about the effectiveness of possible policy interventions to address food loss and waste, as well as about possible synergies and trade-offs with other objectives (Cattaneo et al., 2021[20]; Reynolds et al., 2019[21]; Caldeira, De Laurentiis and Sala, 2019[22]). What is true for food loss and waste also holds for food systems more broadly: a major recent review of evidence to help support a transition to a sustainable food system for the European Union concluded that "[e]vidence of the need for concerted action is overwhelming, but evidence of what works in practical policy terms is scarce and often limited to specific contexts" (SAPEA, 2020, p. 158[12]).

10. The different types of evidence gaps may be interlinked: a lack of information on the extent of problems, or the various policies in place in different countries, may in turn make it difficult to assess the effectiveness of different policy instruments.

11. In addition, there may also be evidence gaps around interests and values, for example on how a proposed initiative would affect different stakeholders, or what matters more to citizens in the context of the relative importance of competing objectives for food systems policies.

12. Several promising initiatives are trying to identify and prioritise evidence gaps, while digital technologies can drastically lower the cost of collecting some types of evidence. The prioritisation of evidence needs can be aided by a variety of different tools, such as Evidence Gap Maps (EGM), initially developed by the International Initiative for Impact Evaluation (www.3ieimpact.org). An EGM is a table which visually represents the quantity and quality of available evidence on possible policy interventions and their outcomes. EGMs thus make it possible to see at a glance for which effects there is strong evidence, and which possible effects have not been studied at all or only have low-quality evidence. The emergence of new tools and novel data sources also makes it possible to fill gaps at lower cost and at a greater level of detail (World Bank, 2021[23]). Digital tools in particular hold considerable promise for improving agricultural and agri-environmental policies (OECD, 2019[24]) as well as for demand-side policies (e.g. policies to improve consumer health or to enable more sustainable consumption choices) (Baragwanath, 2021[25]).

13. There is also a broader shift towards more evidence-based policy making, as demonstrated by the growing use of randomised controlled trials (RCTs) to obtain more precise estimates on the impact of social and economic policies.[2] There is considerable potential to increase the use of RCTs for food systems, including e.g. in the design of agricultural policies in developed countries (Behaghel, Macours and Subervie, 2019[26]). Advances in statistical approaches also make it possible to derive rigorous estimates of policy impacts in many cases where RCTs are not feasible (Angrist and Pischke, 2010[27]; Athey and Imbens, 2017[28]; Cunningham, 2021[29]). Cross-country comparisons, case studies, and model-based estimates can all be used as additional sources of evidence. Uncertainty about the effects of interventions can be further reduced if insights from these different approaches reinforce each other, and when findings are consistent with what is known in other disciplines (e.g. about human psychology, organisational behaviour, or environmental systems).

14. At the same time, policy makers will never have perfect information. Collecting further data and evidence comes at a cost, takes time, and requires technical expertise which may not always be available. More fundamentally, the precise effects of any policy intervention are inherently uncertain, and can only be approximated ex ante based on experience in other times or places, or based on theoretical insights. Furthermore, postponing a policy decision until more information is available is itself a decision which is potentially costly. Completely resolving all evidence gaps is therefore not a reasonable goal. Rather, the goal is to pragmatically identify the evidence gaps where additional efforts can make the biggest impact, and to find effective ways of reducing those evidence gaps to the point where policy makers can feel comfortable in deciding on a course of action. Thus, an "evidence gap" can be defined as the gap between the evidence policy makers would need to decide on a course of action, and the actual evidence currently available to them.

[2] An RCT was used in France in 2016 to test the impact of different front-of-pack nutrition labels. Four different designs were tested on 1 300 products in 60 retail stores, which were divided into different treatment groups (each group of stores testing one design) and a control group (stores not testing a simplified labelling system). The evidence gathered from this experiment provided support for the introduction of the Nutri-Score labelling system (Dubois et al., 2021[145]; Giner and Brooks, 2019[48]).

15. Food systems are not unique in facing evidence gaps, but several characteristics suggest that evidence gaps may be especially pronounced in food systems. First, the term "food systems" is broad, potentially encompassing food security and nutrition issues for eight billion people, livelihoods of millions of people (many of whom are working under conditions of informality), and environmental effects along several dimensions (greenhouse gas emissions, biodiversity, water pollution, etc). Second, food systems are characterised by diversity, making it difficult to extrapolate from findings in one context to draw conclusions about other contexts. Third, by its very nature, the concept of "food systems" emphasises spillover effects across different domains (agricultural production, environmental sustainability, food security and nutrition, etc.), and these spillovers themselves vary depending on local context and spatial scales. This greatly increases the number of possible effects to be investigated, and hence the likelihood of evidence gaps.

16. With less than ten years left to meet the Sustainable Development Goals, the importance of addressing evidence gaps on food systems is clear. Fortunately, there is growing momentum. A pragmatic approach to overcoming evidence gaps focuses on where better evidence can make the biggest difference to reduce uncertainty for policy makers. Tools such as evidence gap maps (EGMs) can help to prioritise efforts. New technologies (e.g. digital tools) and institutional innovations can make it easier to overcome gaps. Moreover, wherever possible, the effort to fill evidence gaps should build on existing infrastructure.

3. Overcoming evidence gaps on food systems

17. The role of evidence gaps in food systems was explored in depth in three "deep dive reports" that explored in greater detail evidence gaps regarding food insecurity and food assistance programmes across OECD countries, gender and food systems, and environmental impacts along food supply chains. The three next sections summarise the main insights from these studies and provide roadmaps for overcoming evidence gaps on these issues.

3.1. Overcoming evidence gaps on food insecurity and food assistance programmes across OECD countries[3]

3.1.1. Food insecurity across OECD countries: knowns and unknowns

18. The FAO defines food insecurity as the "lack of regular access to enough safe and nutritious food for normal growth and development and an active and healthy life" (FAO, 2022[30]). Drivers of food insecurity relate to conflicts, climate variability, and economic slowdowns (FAO, 2021[31]). Poverty and inequality amplify the negative impacts of these global drivers (EC, 2022[32]; WFP, 2020[33]; FAO, 2021[31]). The United Nations' 2030 Agenda for Sustainable Development requires countries to work towards "ending hunger and ensuring access by all people to safe, nutritious and sufficient food all year round" (SDG Target 2.1) and to ending "all forms of malnutrition" (SDG Target 2.2). However, according to the FAO, 30% of the global population was faced with food insecurity in 2020 (FAO, 2021[31]).

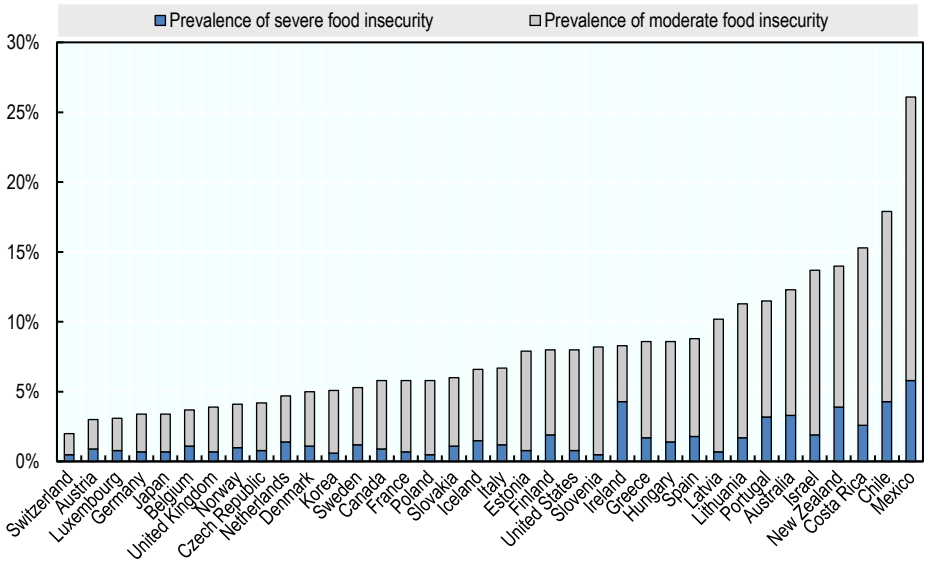
[3] This section is based on the OECD report on *Food insecurity and food assistance programmes across OECD countries* (Giner and Placzek, 2022[44]). It provides a roadmap for overcoming evidence gaps on these issues.

What do we know about food insecurity across OECD countries?

19. While food insecurity is more acute in developing countries, OECD countries are also affected. Figure 3.1 presents the average prevalence of moderate to severe food insecurity across the OECD area over the 2018-2020 period based on the Food Insecurity Experience Scale (FIES) (Box 3.1). Moderate food insecurity was experienced on average by 7.5% of the OECD population over the 2018-2020 period.

Figure 3.1. Moderate food insecurity affects OECD populations

Average prevalence of moderate to severe food insecurity across the OECD area over the 2018-2020 period



Note: Information is unavailable for Colombia and Türkiye.
The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
Source: FAO Food Insecurity Experience Scale, http://www.fao.org/faostat/en/#data/FS

20. Certain population groups who are more likely to be represented in low-income households are particularly vulnerable to food insecurity[4] in OECD countries: adults with disabilities (Placzek, 2021[34]), single mothers with children (Giner, Hobeika and Fischetti, 2022[35]; DEFRA, 2021[36]) and some ethnic groups and Indigenous populations (Moran et al., 2020[37]; USDA, 2021[38]; Bowden, 2020[39]).

[4] The FAO defines food insecurity as the "lack of regular access to enough safe and nutritious food for normal growth and development and an active and healthy life" (FAO, 2022[30]). Food insecurity can be defined in relation to missing dimensions of food security. If one of these dimensions of food security (*Availability*, *Access*, *Utilisation*, *Stability)* is not fulfilled, a population would be considered food insecure.

Box 3.1. The FAO Food Insecurity Experience Scale (FIES)

The FIES is at present the only household or individual food security assessment method that ensures global comparability of measures due to the possibility of calibrating these measures against a global reference standard (FAO, 2021[40]; FAO, 2020[41]; Saint Ville et al., 2019[42]). It is the official instrument used by the FAO to produce estimates of food insecurity prevalence in the context of SDG Target 2.1 monitoring. FIES is an eight-question survey designed to be administered face to face to gauge a respondent's access to adequate food.

The FIES measurement system enables the assessment of household or individual food insecurity across two levels (namely severe and moderate) that can be compared across countries. Used together with traditional measures of food consumption, dietary quality and nutritional status, the FIES has the potential to contribute to a more comprehensive understanding of the causes and consequences of food insecurity, including its nutritional and dietary impacts (Ballard et al., 2014[43]).

Source: (Giner and Placzek, 2022[44]).

21. Crises tend to expose more households in situations of vulnerability to food insecurity. During the COVID-19 crisis, several major food bank networks reported an increase in demand for emergency food aid, ranging from 25% to 50% in 2020 in comparison to 2019[5] (FEBA, 2020[45]; Trussel trust, 2020[46]; Feeding America, 2020[47]). Some population groups were vulnerable to the impacts of the deteriorating socio-economic conditions which undermined their food security status.[6] The disruptions from the COVID-19 pandemic have been compounded by the war in Ukraine. The conflict in Ukraine has created further pressures on global food and energy markets, raising elevated food prices even further. As lower income households tend to spend a higher proportion of income on food and generally tend to adopt less healthy diets with consequences on their health and economic outcomes (Placzek, 2021[34]; DEFRA, 2021[36]; Giner and Brooks, 2019[48]), high food prices over the short- to medium-term could imply that poorer households across the OECD area are at risk of making compromises on the quality of their diets.

Evidence gaps on food insecurity across OECD countries

22. Data on food insecurity is often outdated. Less than half of FAO member countries on average officially report their basic statistics on food and agriculture to the FAO. According to the Committee on World Food Security (CFS, 2021[49]), the success, or failure, of policies and programmes to promote food security rests largely upon strengthening the capacities of countries to collect, analyse, and use quantitative and qualitative data for planning, policy formulation, and investment.

23. The measurement of food insecurity is often not comparable across countries (Paul Harvey, Karen Proudlock and Susanne Jaspars, 2010[50]). Researchers point to a lack of

[5] The participation rate in food assistance programmes is often used to approximate food insecurity estimates when official data are missing (Placzek, 2021[34]).

[6] In particular workers who lost their jobs and self-employed, older people (OECD, 2020[148]), households with children, single-parent households (OECD, 2020[143])), students (OECD, 2020[146]), and migrants (OECD, 2020[140]).

routine measurement and incompatible definitions across countries (Jones et al., 2013[51]; Pollard et al., 2021[52]). A routinely used scale in the United States and Canada is the USDA Household Food Security Survey 18-item Module (USDA, 2021[53]).[7] Countries also commonly use semi-regular dietary surveys, household income and expenditure surveys (HIES), or food intake surveys (FIS) to evaluate the prevalence of food insecurity in their population.

3.1.2. Food assistance programmes across OECD countries: knowns and unknowns

What do we know about food assistance programmes across OECD countries?

24. Responses to food insecurity can focus on livelihood assistance programmes or on food assistance programmes. Direct food assistance programmes target food insecurity by providing food to people who are unable to access sufficient food, often with a particular focus on infants, children, students, people in situations of vulnerability and elderly people. Food assistance programmes may be run by public authorities at the local or national level or by civil society not-for-profit organisations that operate with or without public funding.

25. Food assistance programmes often focus on the access and stability dimensions of food security, but some also include interventions such as nutritional education and counselling programmes (Lentz and Barrett, 2013[54]). The COVID-19 crisis has, in addition, highlighted the importance of the availability dimension of food security, in view of the problems created by lockdowns and school closures.

26. The debate on how to address food insecurity has ethical aspects. A first aspect is the right to food. This right is specified in the 1948 Universal Declaration of Human Rights (United Nations, 1948[55]) as part of the right to an adequate standard of living (Article 25). According to this Declaration, states have the obligation to respect, protect and fulfil the right to food (UN, 2015[56]). A second aspect relates to the ethics of food redistribution. People in a situation of vulnerability often report experiencing stigma when they receive food that is left over and past the best-before date (Placzek, 2021[34]; Rizvi et al., 2021[57]). Concerns also exist regarding the nutritional value of food products provided by food banks, which mainly consist of long shelf-life products (Bazerghi, McKay and Dunn, 2016[58]; Placzek, 2021[34]; Fanzo et al., 2020[3]).

27. Each type of food assistance programme has a specific objective and target group. The provision of school meals represents a long-term commitment to children and students, while food vouchers, by making food accessible and available to population groups in situations of vulnerability, aim to fill a basic need. Food banks were initially developed as an emergency tool, and they still play a major role for food insecure households in many OECD countries and across the world. Other food assistance programmes seek to fill short-term food needs that arise due to natural disasters.[8]

[7] The 18 questions that are asked to assess household food security can be found at https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/measurement/ Variations of the survey include the adult food secure 10-item module and a 6-item short form. These variations were used by the United Kingdom and France (Placzek, 2021[34]) to measure food insecurity while minimising respondents' burden.

[8] Food assistance programmes in OECD countries are described in the OECD report *Food insecurity and food assistance programmes across OECD countries: Overcoming evidence gaps* (Giner and Placzek, 2022[44])

28. The COVID-19 pandemic and its economic and social consequences have shed new light on the importance of food assistance programmes for households in situations of vulnerability across the world, including in OECD countries. Many countries deployed public emergency food assistance measures to prevent a rise in food insecurity, and which complemented other livelihood support measures to contain the pandemic's socio-economic consequences, and thus the spread of poverty across OECD countries (OECD, 2021[59]).

Evidence gaps on food assistance programmes

29. Evidence gaps on food assistance programmes are numerous. They concern:

- *Participation of eligible households:* Most food assistance programmes are subject to eligibility criteria that are defined either by public entities at the national or local level, or directly by not-for-profit organisations that run the programmes. It appears difficult to monitor the actual number of beneficiaries of food assistance programmes and the number of people who could qualify to benefit from them but who do not apply.[9]
- *Budget:* At the supra-national level, although several OECD databases[10] present budgetary information for food assistance programmes, there is no single repository for this information.
- *Organisation:* Comparative information on how food assistance programmes operate is also missing. This gap might be due to the variety of stakeholders involved or to the difficulties in identifying appropriate models for their operations. The newly launched School Meals Coalition and the Research Consortium for School Health and Nutrition[11] are establishing a ten-year research agenda to overcome such evidence gaps for school meal programmes. Not-for-profit organisations involved in food banks are also trying to improve the evidence base on organisational aspects (Fiocco et al., 2020[60]; FEBA, 2022[61]; Galli, Hebinck and Carroll, 2018[62]; Hebinck et al., 2018[63]).
- *Monitoring and evaluation:* The monitoring effort should focus on the quantity and the nutritional quality of food provided to beneficiaries, the cost of implementing the programmes, and the recipients' preferences and willingness to use the programmes. A key challenge is to collect evidence on the nutritional impact of food assistance programmes (World Bank, 2014[64]; Hebinck et al., 2018[63]; Lentz and Barrett, 2013[54]).[12] The monitoring of food assistance programmes might entail

[9] These concerns are particularly important for school meal programmes. The United States, Chile and Finland track the participation of students to their school meal programmes and have amended their programmes to simplify registration procedures and improve acceptance rates.

[10] The OECD *Agricultural Monitoring and Evaluation* (OECD, 2022[144]) uses a comprehensive system for measuring and classifying on an annual basis support to agriculture. Some food assistance programmes are included in the Consumer Support Estimates category. Spending devoted to food assistance programmes are included in some cases in the "Other Social Policy areas / Benefits in kind" category of the OECD *Social Expenditures Database* (SOCX) (OECD, 2022[141]). In addition, the OECD Development Centre tracks *food aid programmes* (OECD, 2022[142]).

[11] Research Consortium for School Health and Nutrition

[12] In the United States, USDA collects a wide range of interrelated data on food security, food purchases, and the food environment that enables thorough research and analysis on participation in

the set-up of harmonised guidelines for programme stakeholders. Such guidelines need to focus on how programmes must operate and on indicators to be reported.

3.1.3. Addressing evidence gaps: A roadmap

30. This section provides a roadmap (Figure 3.2) to address evidence gaps related to food insecurity and food assistance programmes across OECD countries.

Figure 3.2. Closing evidence across gaps on food insecurity OECD countries: a roadmap

Step 1: Measurement of food insecurity	To what extent does food insecurity exist?
	Which population groups are particularly vulnerable?
	Measurement methodology ? Frequence of measurement?
	=> Developing a routine monitoring of food insecurity
Step 2: Developing evidence on policy responses - food assistance programmes	Participation of eligible households
	Budget
	Organisation
	=> Collecting comparable data on food assistance programmes
Step 3: Monitoring and evaluating policy impacts and effectiveness	How does food assistance impact food insecurity?
	How effective is the policy instrument in achieving policy goals?
	What data is needed to measure impacts and policy effectivness?
	=> Evaluating data on impact and effectiveness of food asisstance
Step 4: Adjusting policy responses in place and how they are managed	What goal needs to be addressed though the food assistance policy instrument?
	Which policy instruments are most relevant and fit for purpose?
	Which adjustments are needed?
	=> Assessing the food assistance options and select/adjust relevant instruments

Source: (Giner and Placzek, 2022[44]).

31. The first step is to develop routine measurement processes concerning food insecurity prevalence. These should be standardised across countries to allow for comparability. Two main scales are available: the FAO FIES and the USDA Household Food Security Survey Module. As highlighted by the US experience during the COVID-19 crisis, developing a measurement process that can be implemented frequently and rapidly in periods of crisis can help to better target policies aimed at addressing food insecurity.[13] The recent surge in food prices and potential consequences in terms of food insecurity

and effectiveness of these programmes by its Economic Research Service (ERS) and by academic researchers (Giner and Brooks, 2019[48]; Baragwanath, 2021[25]).

[13] In addition to the USDA Household Food Security Survey Module, during the pandemic USDA and the U.S. Census Bureau also collected data on food (in)sufficiency using the Household Pulse Survey, see https://www.census.gov/programs-surveys/household-pulse-survey/data.html.

prevalence call for the implementation of food insecurity surveys on a regular basis across the OECD area, and more widely across the world.

32. The second step is to identify policy responses to food insecurity and close evidence gaps on these instruments. These gaps are related to the actual participation of eligible households, to public spending and, more generally, to the organisation of these programmes. Comparable information is missing across countries. Harmonised evidence on these aspects can be collected and digital technologies facilitate such evidence gathering.

33. The third step is to monitor and evaluate the effectiveness of food assistance programmes. Evidence could focus on whether food assistance programmes actually improve the food security status of beneficiaries (and ultimately reduce the number of beneficiaries). It is also interesting to look at the impact of the programmes on well-being and health. Harmonised guidelines on the monitoring and evaluation of food assistance programmes could be developed based on the experiences of some OECD countries. Given the important role of food banks in the provision of food assistance, public authorities should accompany and facilitate the monitoring and evaluation efforts of food bank networks.

34. The final step is to adjust policy responses to food insecurity. Some countries may focus on alleviating poverty via cash transfers as part of universal social protection schemes. Other countries have developed a mixture of food assistance programmes, with different objectives and targets. For example, school meal programmes are a long-term commitment towards children and students. Food vouchers aim to make food accessible and available to population groups in situations of vulnerability, while food banks are supposed to respond to emergency food needs. Organisational and budgetary aspects as well as effectiveness need to be taken into account in the mix of programmes.

3.2. Overcoming evidence gaps on gender and food systems[14]

3.2.1. The role of women in food systems: knowns and unknowns

35. The livelihoods of men and women in food-related activities differ. The Ministerial Declaration on Transformative Solutions for Sustainable Agriculture and Food Systems (OECD, 2022[65]), adopted on 4 November 2022 during the OECD Meeting of Agriculture Ministers, commits signatories to promote and measure progress towards inclusive food systems and to reinforce measures to foster greater opportunity for women in the agricultural sector. The United Nations Food Systems Summit in September 2021 (UNFSS) also emphasised the importance of gender inclusive food systems that promote

[14] This section is based on the OECD report on *Gender and food systems* (Giner, Hobeika and Fischetti, 2022[35]). Gender is here defined as socially constructed and socially learned behaviours and expectations associated with females and males. All cultures interpret and elaborate the biological differences between women and men into a set of social expectations about what behaviours and activities are appropriate and what rights, resources, and power women and men possess. Like race, ethnicity, and class, gender is a social category that largely establishes one's life chances and participation in society and in the economy (OECD, 2018[149]).

gender equality[15] and women's empowerment,[16] resulting in the launch of the Coalition "Making Food Systems Work for Women and Girls".

What do we know about the role of women in food systems?

36. This section explores the extent of women's participation and barriers to their participation across food systems using a framework developed in a recent OECD report on trade and gender (Korinek, Jane; Moïsé, Evdokia; Tange, 2021[66]) that considers their roles as entrepreneurs, workers and consumers.[17]

Women as entrepreneurs

37. Companies in the agri-food industry are less likely to have women co-owners (MWOMA, 2019[67]); women-led businesses tend to be concentrated in the service, retail and hospitality sectors and are generally smaller in terms of sales, earnings, assets and number of employees (OECD Data, 2020[68]; Goldstein, Gonzalez Martinez and Papineni, 2019[69]; Carranza, Dhakal and Love, 2018[70]). In the agricultural sector, women are also less likely than men to own and manage a family business in OECD countries[18] (European Commission, 2021[71]; Erasmus, 2018[72]; USDA, 2017[73]); census data in the European Union show that they tend in addition to manage smaller farms (European Commission, 2018[74]; Danmarks Statistik, 2020[75]).

38. Carranza et al. (2018[70]) identify three distinct types of barriers to enhanced women's entrepreneurship:

- *Inequality of endowments* with unequal access to land and assets, education, entrepreneurial and digital skills, and professional networks.
- *Formal and informal external barriers* including longstanding sociocultural and institutional gender norms and land inheritance systems.
- *Internal barriers* such as internalised discriminatory practices that lead to reduced self-confidence and undervaluation of competencies of women with consequences on the tasks undertaken by female farm owners and managers (USDA, 2017[73]).

Women as workers

39. Globally, one-third of workers in agriculture are women (The World Bank and ILO, 2021[76]). Women are also involved in unpaid and informal activities on family farms and fishing enterprises, and combine working hours with household responsibilities (The World Bank, 2020[77]; FAO, 2015[78]). In developed countries, women are overrepresented in the food services industry with often lower-paid and lower-skilled jobs than men (UK Office

[15] "Gender equality" is defined as equality under the law, equality of opportunity, and equality of voice (the ability to influence and contribute to policy making). This encompasses the concept of gender equity in terms of women's and men's fair and equal access to information, services, justice, resources, benefits and responsibilities (OECD, 2018[149]).

[16] "Empowerment" is defined here as the expansion of assets and capabilities of individuals to participate in, negotiate with, influence, control, and hold accountable the institutions that affect their lives (OECD, 2018[149]).

[17] The OECD Gender Data Portal https://www.oecd.org/gender/data/ provides an inventory of all the analyses related to gender issues undertaken at the OECD.

[18] For example, on average, less than 30% of farms across the European Union are managed by a woman (European Commission, 2021[71]);

for National Statistics, 2022[79]; Rewards Network, 2017[80]; Mojtehedzadeh and Vendeville, 2016[81]). According to the OECD STI Intellectual Property Database,[19] women produce about 40% of agriculture-related patents in the OECD.

Women as consumers

40. Given their overrepresentation among low-income and single parent households, women tend to spend a larger share of their disposable income on consumer goods, including food (Korinek, Jane; Moïsé, Evdokia; Tange, 2021[66]). This implies they may sometimes compromise on food quality or quantity (Placzek, 2021[34]) and be at risk of facing food insecurity (Giner and Placzek, 2022[44]).

Gender and the food systems triple challenge

41. Addressing gender aspects and fostering gender inclusion can have positive impacts on the triple challenge faced by food systems (OECD, 2021[1]): to ensure food security and nutrition for a growing population, support the livelihoods of millions of people working in the food supply chain, and to do so in an environmentally sustainable way:

- *Livelihood challenge*: using the full potential of women would benefit countries' and companies' economic efficiency and wellbeing (European Institute for Gender Equality, 2017[82]; McKinsey & Company, 2017[83]; McKinsey Global Institute, 2015[84]; FAO, 2011[85]). Better gender diversity can also contribute to innovation and diversification for the agricultural sector (European Institute for Gender Equality, 2017[82]; Riley, 2009[86]; Mc Fadden and Gorman, 2016[87]).
- *Food security and nutrition challenge*: IFPRI analysis (Ragasa, Aberman and Alvarez Mingote, 2019[88]) undertaken in Malawi finds agricultural and nutrition educational programmes to be more effective in overcoming food insecurity when they engage both women and men in households.
- *Environmental sustainability challenge:* Greater gender diversity in companies' decision-making roles can translate into more environmentally-conscious policies and decisions (University of Colorado, 2019[89]; Nadeem et al., 2020[90]; Kassinis et al., 2016[91]). As consumers, women tend to have more environmentally sustainable consumption habits on average, regardless of socioeconomic determinants (OECD, 2017[92]; Snyder and Sapra, 2015[93]; University of Colorado, 2019[89]).

Evidence gaps on women in food systems

Women as entrepreneurs

42. Data on women's entrepreneurship across food systems is largely incomplete, and sex-disaggregated data on land ownership is not collected by international organisations for high-income countries. Sex-disaggregated data on access to finance, credit, training and on working conditions is not often collected. Detailed data on the decision-making role of women within farm businesses and on off-farm employment is often missing, which means that the contribution of women to the performance of farm businesses remains invisible.

[19] Information is available at: Intellectual property (IP) statistics and analysis - OECD.

Women as workers

43. Systematic reviews on evidence gaps related to the participation of women as workers across food systems[20] generally have a geographic focus limited to low- and middle-income countries (LMICs) and rural agricultural areas. They do not consider all the roles women take throughout the food value chain, and often focus on academic research needs rather than data needed to directly inform policies (Njuki et al., 2021[94])) (LEAD, 2021[95]).

44. Information on women's participation along the food supply chain in OECD countries is not sufficiently detailed beyond the farm gate to allow for analysis of gender differences along supply chains. Data on women's employment in food manufacturing and services is incomplete. Moreover, sex-disaggregated data is especially scarce within selected subsectors, such as aquaculture and fishing value chains and agricultural inputs (Kruijssen, McDougall and van Asseldonk, 2018[96]; Puskur et al., 2021[97]; WorldFish, 2020[98]; Polar et al., 2021[99]).

45. Data on conditions under which women's employment takes place is limited and fragmented. At the company-level, some civil society organisations collect data on gender inclusion across food systems in order to track progress on gender equality goals. This data is crucial to monitor and evaluate the effectiveness and impacts of programmes and to compare progress towards gender equality goals across countries.

Women as consumers

46. In OECD countries, national surveys on food intake are largely disaggregated by sex (Giner and Brooks, 2019[48]). The Food Systems Dashboard (Fanzo et al., 2020[3]) provides detailed data on nutritional status and dietary intake by sex across the world. However, sex-disaggregated information on consumer behaviour related to food acquisition, food preparation, meal practices, and food storage is not available in the Dashboard as it is largely fragmented across research institutions, national statistics agencies, private stakeholders, and civil society (Giner and Brooks, 2019[48]).

47. Among OECD countries, the United States, the United Kingdom, and Switzerland collect gender-specific evidence on food demand and behaviour Individual-level data on food insecurity of women is missing, especially in high-income countries

3.2.2. Gender in food systems policies: knowns and unknowns

What do we know about gender in food systems policies?

48. As part of the Beijing Platform for Action adopted at the Fourth United Nations World Conference on Women in 1995, gender mainstreaming[21] was established as a

[20] The Leveraging Evidence for Access and Development (LEAD) initiative produced in 2021 an evidence gap map (EGM) on gender in agriculture and food systems. The analysis (https://cgspace.cgiar.org/handle/10568/114123) is based on a systematic review of 752 studies using qualitative, quantitative and mixed method designs with a geographic scope of low- and middle-income countries.

[21] Gender mainstreaming is the process of assessing the implications for women and men of any planned action, including legislation, regulations, policies or programmes, in all areas and at all levels. It is a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality (OECD, 2018[149]).

strategy to reach gender equality. This approach to policymaking takes into account gender equality and both women's and men's interests and concerns at all stages of policy processes. The FAO sees gender budgeting[22] as an essential tool to mainstream gender equality in agriculture and rural development policies (FAO, 2018[100]). In the OECD area, Spain (FAO, 2018[100]; Ministry of Health, Social Services and Equality of Spain, 2017[101]) and Canada (The Government of Canada, 2021[102]) have applied gender mainstreaming to their agricultural and food policies.

49. Giner et al. (2022[35]) describe several policies addressing gender inequality in OECD countries. Countries across the OECD tend to use a combination of instruments to support women as workers and entrepreneurs in food systems. Policy instruments can be food systems-specific tools with the aim of:

- *Supporting the rights and needs of women in family farms*: for example, by extending social welfare to spouses in family farms, or by raising awareness on risks specific to women in food systems,
- *Supporting access to land and equipment* with the introduction of shared ownership policies and the facilitation of information sharing about land ownership,
- *Supporting access to finance and markets* by offering payments targeted at women or designed with a gender lens.

50. Economy-wide policy tools that are not specific to food systems are implemented across OECD countries to enhance the contributions of women as workers and entrepreneurs across food systems. These tools deal with time spent on providing unpaid care work, gender equality in businesses, enhanced visibility of women, specific education and training needs, and improving the attractiveness of rural areas.

Evidence gaps on gender in food systems policies

51. Evidence gaps on gender in food systems policies concern:

- *The effectiveness and impacts of policy instruments:* Strong *ex ante* and *ex post* gender evaluative frameworks are necessary to effectively drive change towards gender equality (Downes, von Trapp and Nicol, 2017[103]). Governments can use *ex post* gender impact assessments to measure the impact and effectiveness of policies introduced to advance gender equality. The results of these assessments can be used to evaluate the cost-effectiveness of measures introduced and revaluate resource allocations. Some mechanisms to conduct *ex ante* gender impact assessment have been successfully implemented in Spain, Canada and Colombia. *Ex post* gender impact assessments are, however, not yet available for recently implemented food systems-related policies.
- *Methodological aspects:* The International Initiative for Impact Evaluation[23] (3ie) also points to numerous evidence gaps on methodologies to measure the effectiveness of policy instruments that are designed to advance gender equality in food systems.

[22] Gender budgeting involves using the tools, techniques and procedures of the budget cycle in a systematic way to promote gender-responsive policies and gender equality.

[23] Information is available at https://www.3ieimpact.org/.

3.2.3. Addressing evidence gaps: a roadmap

52. Gender evidence gaps in food systems relate to both the general baseline of gender impacts in food systems and to the effectiveness of policy responses. The roadmap in Figure 3.3 identifies different consecutive steps to be undertaken by policy makers to overcome them. (Giner, Hobeika and Fischetti, 2022[35]) highlights how Colombia has successfully implemented this roadmap over the last decade.

Figure 3.3. Closing evidence across gaps on gender and food systems: A roadmap

Step 1: Highlighting gender issues in policies related to food systems	What are the needs, barriers and contribution of women working in food systems?
	Which costs and benefits are associated with considering their needs and supporting positive contributions?
	Which synergies and trade-offs exist between different policy areas and outcomes?
	=> Mainstreaming gender-budgeting
Step 2: Identifying and closing evidence gaps	Which evidence do I need to assess their needs, barriers and contributions?
	What data is available/ missing for the assessment? How can I best collect it?
	=> Collecting sex-disaggregated data and funding research
Step 3: Developing and impementing policy instruments that address gender inequality in food systems	What needs do women have to overcome barriers and contribute to food systems?
	What policy instruments are most relevant and effective to overcome identified barriers/ to support identified benefits?
	Which evidence do I need to assess costs, benefits, trade-offs and synergies of responding to women's needs?
	=> Selecting and implementing relevant policy instruments
Step 4: Monitoring and evaluating policy impacts and effectiveness	How does the policy impact women and men?
	How effective is the policy in achieving policy goals?
	What data do I need to measure impacts/ policy effectiveness?
	=> Collecting data on gendered impacts and policy effectiveness
Step 5: Adjusting policy responses in place and how they are managed	What goal needs to be addressed with the policy intrument?
	Which policy instruments are most relevant and fit for purpose?
	Which adjustments are needed?
	=> Assessing the options and selecting/adjusting relevant instruments

Source: (Giner, Hobeika and Fischetti, 2022[35]).

53. As for any other types of policies, the first step is to apply a gender lens when developing policies related to food systems. The second step is to identify and close evidence gaps on gender and food systems. With proper research funding, this can be done by collecting sex-disaggregated data to better understand women's contributions to food

systems and potential synergies and trade-offs across the different dimensions of the food systems' triple challenge.

54. The third step is to develop and implement a mix of policy instruments that address gender inequality and support women in food systems. These instruments are selected according to their capacity to actually overcome identified barriers or to support identified benefits. Synergies and trade-offs with other policy areas need to be evaluated.

55. The fourth step is to monitor and evaluate policy impacts and their effectiveness. This must be done at the national and international level to track progress on commitments and to compare the performance of countries. At the national level, *ex ante* and *ex post* gender impact assessment are useful tools.

56. The final step is to adjust policy responses that deal with gender aspects related to food systems. Some countries concentrate on enhancing and recognising women's contributions to the agriculture sector. Other countries have developed a policy mixture to enhance gender equality across all sectors. In all cases, the adjustment of the set of policy instruments needs to consider ethical, organisational and budgetary aspects, as well as effectiveness.

3.3. Overcoming evidence gaps on environmental impacts along food supply chains[24]

57. Food systems account for a significant share of global environmental pressures such as greenhouse gas (GHG) emissions, water pollution, and biodiversity loss (IPCC, 2019[104]; IPBES, 2019[105]; Poore and Nemecek, 2018[106]). Addressing these pressures will require action not only by agricultural producers, but also by other supply chain actors, consumers, and policy makers. Detailed evidence about environmental impacts along food supply chains is useful to inform these efforts.

3.3.1. Environmental impacts along food supply chains: knowns and unknowns

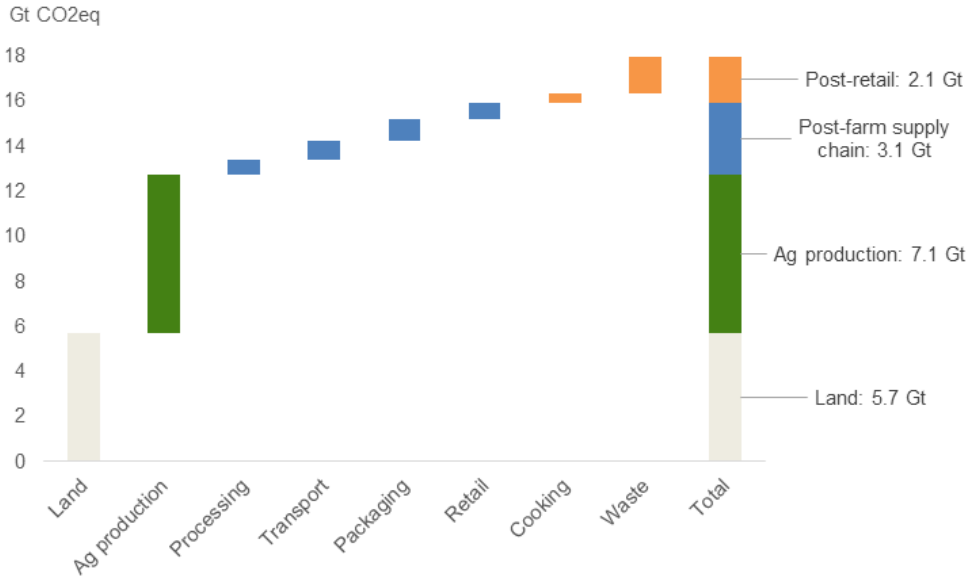
58. Evidence on environmental impacts along food supply chains can shed light on the stages and products which have the greatest impact; on the issue of heterogeneity among producers; and on the role of international trade.

Which stages make the greatest contribution to overall impacts?

59. The available evidence shows that environmental impacts of food systems occur mostly through land use and/or agricultural production, with much smaller contributions of other stages of the food supply chain (Poore and Nemecek, 2018[106]). For example, Crippa et al. (2021[107]) find that globally, 71% of food systems' GHG emissions occur either through land use or agricultural production (Figure 3.4). At the same time, they find that the relative importance of supply chain stages varies across countries; the post-farm supply chain plays a larger role for industrialised countries. Tubiello et al. (2022[108]) find that emissions generated outside of agricultural land (i.e. pre- and post-production processes) are increasingly important.

[24] This section is based on Deconinck and Toyama (2022[110]) and Deconinck and Hobeika (2022[131]).

Figure 3.4. Food systems GHG emissions by supply chain stage, 2015



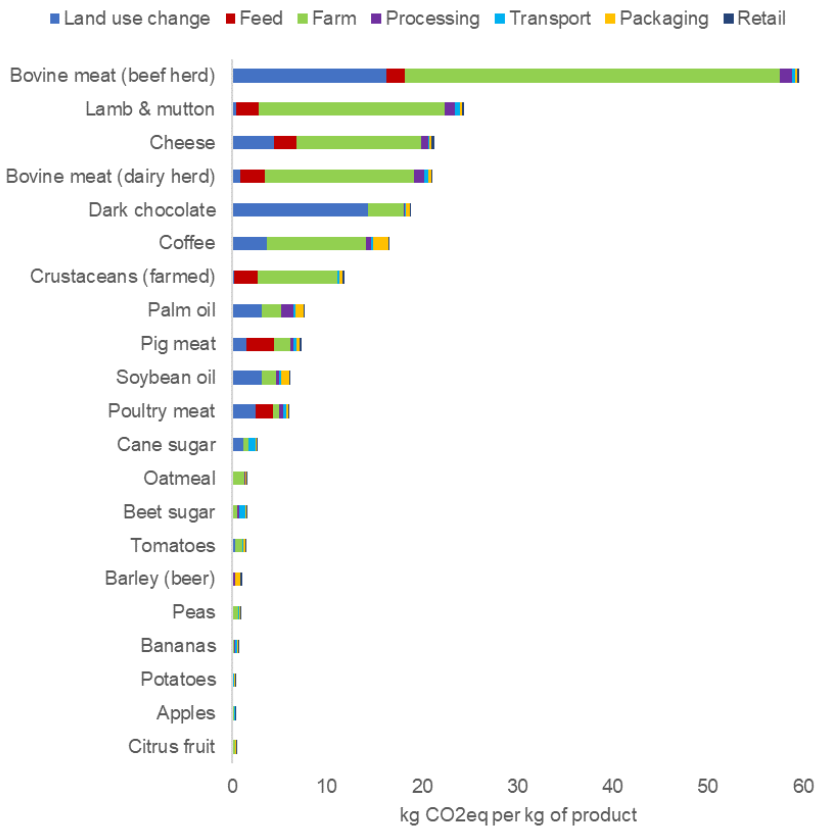
Source: Crippa et al. (2021[107]), using the mapping developed by Ritchie (2021[109]).

Which products have the greatest impact?

60. Life-cycle assessments (LCAs) are increasingly used to study the environmental impacts of food products. Deconinck and Toyama (2022[110]) discuss the LCA methodology as applied to food supply chains, and its main findings.

61. Figure 3.5 shows median GHG emissions per kg of food for selected products, including a breakdown per stage of the supply chain, based on a synthesis of food LCAs by Poore and Nemecek (2018[106]). As this figure shows, products differ greatly in their GHG emissions intensity, with beef derived from pure beef herds showing a considerably higher GHG emissions intensity than other products. Figure 3.5 also shows that land use change (LUC) and on-farm GHG emissions typically account for the vast majority of food-related GHG emissions. The ranking of products is fairly similar for the other environmental impacts covered by Poore and Nemecek (2018[106]): acidification, eutrophication, land use, and scarcity-weighted water use.

Figure 3.5. GHG emissions intensity for selected food products

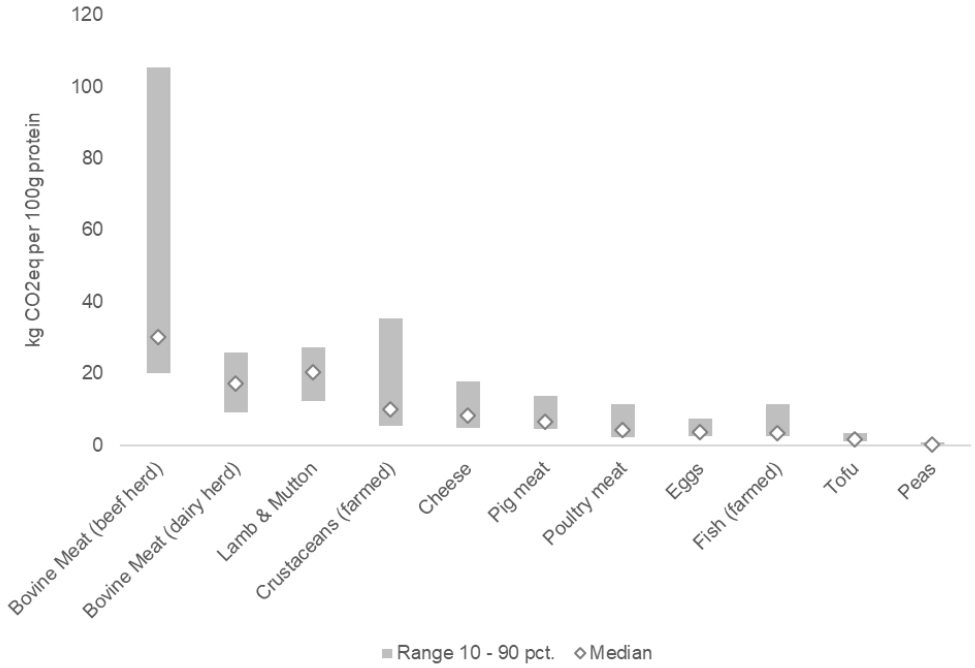


Note: Data represent global median greenhouse gas emissions in kg CO2eq per kg of food (retail weight, excluding waste).
Source: Poore and Nemecek (2018[106]).

How important is heterogeneity among producers?

62. While average environmental impacts differ across products, for the same product these impacts can vary considerably across producers, both between and within countries. Figure 3.6 demonstrates this heterogeneity using the example of GHG emissions per 100g of protein, for different protein-rich products. The chart shows the median GHG emission intensity globally, in addition to a range indicating the variation between the bottom 10% and the top 10% of production.

Figure 3.6. Variation in global GHG emissions intensities of protein-rich products



Note: Figure shows the median and 10th to 90th percentile range of greenhouse gas emissions intensities in kg CO_2eq per 100g of protein.
Source: Poore and Nemecek (2018[106]).

63. As Poore and Nemecek (2018[106]) note, high variation across and between products is also found for other environmental indicators such as land use, acidification, eutrophication, and water use. For maize, wheat and rice, impacts from producers at the 90th percentile are more than three times as large as those from producers at the 10th percentile. With the exception of land use, the same heterogeneity is found even within major producing regions. Across all products, Poore and Nemecek (2018[106]) report that 25% of global production is responsible for more than half of all environmental impacts. Other studies have similarly found evidence of important heterogeneity (e.g. Escobar et al. (2020[111]) on Brazilian soy supply chains).

What is the role of international trade?

64. The past decades have seen strong growth in agro-food trade (OECD, 2020[112]; FAO, 2020[113]; Barrett et al., 2022[114]). The importance of trade depends on the commodity: it is particularly high for tropical commodities such as cocoa, coffee or tea (where almost all of production is exported), but considerably lower for most other agricultural commodities (OECD/FAO, 2021[115]). While trade plays an indispensable role in the global food system, an important share of food supply chains operates within a single country.

65. Several studies have tried to quantify the role of international trade in environmental impacts of food supply chains (see Deconinck and Toyama (2022[110]) for an overview of different approaches). Hong et al. (2022[116]) find that 25% of the economic value of global agricultural production, 22% of agricultural land, and 27% of emissions are "embodied" in trade. Trade is thus linked to a significant share of the environmental impacts of food systems, although most impacts are related to purely domestic flows. Trade-based approaches also make it possible to distinguish consumption-based and

production-based environmental impacts: accounting for trade flows can help quantify environmental impacts related to consumption of goods produced abroad, and environmental impacts incurred at home for goods consumed abroad. Sandström et al. (2018[117]) show that consumption-based emissions of EU diets are 40% higher than production-based emissions, with about one-third of total emissions incurred outside of the European Union (notably in Latin America). Conversely, Zu Ermgassen et al. (2020[118]) find that exports of Brazilian beef were linked to only about 13-14% of beef-related deforestation in the country.

66. To the extent that supply chains can adapt, the results discussed above may be misleading (Godar et al., 2016[119]). For example, Busch et al. (2022[120]) show that an EU import ban on high-deforestation palm oil from Indonesia would have only a limited effect on deforestation, in part because more than half of the trade flows of high-deforestation palm oil would shift to other countries.

Assessment of evidence gaps

67. There is a large and growing body of evidence shedding light on environmental impacts along food supply chains, but important evidence gaps persist. These include gaps related to the products, impacts, supply chain stages, and geographies covered in existing studies. The importance of heterogeneity of food supply chains suggests that there are also gaps regarding the granularity of existing evidence. Moreover, the dynamism of food supply chains underscores the importance of understanding how production, consumption, and trade would adapt to policy interventions.

Products and impacts

68. Reviewing studies on environmental impacts of food products published between 2008 and 2018, Halpern et al. (2019[121]) demonstrate that significant evidence gaps exist both in terms of products and impacts covered. Among the impact categories, energy use and biodiversity impacts are particularly under-studied. For biodiversity, this applies both to on-farm biodiversity and to biodiversity effects of induced land use change. Moreover, the analysis of greenhouse gas emissions in LCAs typically does not capture changes in soil carbon, as there is currently no consensus on how this should be quantified (Joensuu et al., 2021[122]).

69. Impacts are sometimes measured directly, but in other cases they are calculated based on data on the physical inputs and outputs of the system being studied. Such conversions are done through so-called characterisation factors or models, which differ in how they model impacts (see Rosenbaum et al. (2017[123]) for a review). Variability and heterogeneity are also important: for example, the same amount of water extraction might be unproblematic or highly problematic depending on local water scarcity. Accounting for such geospatial heterogeneity is an important area of work in impact assessment methods (Boulay et al., 2017[124]).

70. Studies on the environmental impacts of food ideally study a wide range of impacts, to make it possible to identify synergies or trade-offs. To facilitate interpretation, impacts are sometimes weighted, aggregated, or grouped together; any approach inevitably involves value choices (Rosenbaum et al., 2017[123]). Moreover, any evidence gaps in life-cycle assessments also carry over to analyses which try to aggregate or weigh impacts.

Supply chain stages

71. By definition, a life cycle assessment intends to take a view of the entire life cycle of a product or process. However, the use and end-of-life stages are often neglected. Only

26% of the studies examined by Vidergar et al. (2021[125]) included these stages. This is problematic as a large share of food production is wasted at the use stage (UNEP, 2021[126]). Food waste has direct environmental impacts (e.g. methane emissions from landfills), so excluding food loss and waste from LCAs leads to an underestimate of actual environmental impacts associated with providing nutrition to consumers.[25]

Geographies

72. Existing studies are concentrated in high-income countries, with notable gaps for Africa and Central Asia (Poore and Nemecek, 2018[106]; Cucurachi et al., 2019[127]). The analysis of trade flows often aims to cover all global trade, although even here the level of detail for some regions may be limited, and countries may be grouped together in aggregates. These approaches often include e.g. the People's Republic of China (hereafter "China") or the United States, but have gaps in coverage for Central America, Africa, the Middle East, and Central Asia (Cantele et al., 2021[128]).

Heterogeneity and dynamism

73. The intrinsic heterogeneity of food production suggests that food LCAs should use detailed information wherever feasible, rather than relying on extrapolation or broad averages (Notarnicola et al., 2017[129]; Lathuillière et al., 2021[130]). Estimates can be based on primary research, but often researchers combine this with input from scientific or technical literature, or specialised databases. Primary data clearly have the advantage of being able to capture the heterogeneity in impacts across different producers and production regions, and hence greatly increase the validity of the study. Databases, by contrast, often face difficulties in capturing the heterogeneity of food systems. Notarnicola et al. (2017[129]) point out that databases used in food LCAs tend to lack spatial or temporal detail.

74. Moreover, food supply chains may change frequently in response to e.g. weather, policy changes, or changing consumer preferences. This stands in contrast to the rather static nature of most available estimates. These can provide an accounting of the situation at a moment in time, but they are not necessarily a good guide to predicting what will happen after an intervention. So-called consequential approaches exist which model explicitly how consumption and production decisions and trade flows would change following an intervention, but these require additional assumptions (Deconinck and Toyama, 2022[110]).

75. The lack of representation of spatial, temporal and practice-based heterogeneity in LCA databases limits the quality of evidence that can currently be generated by LCAs. For food LCAs, the University of Oxford and the World Wildlife Foundation have developed the HESTIA platform, providing a standardised and structured format for users to upload data that is then validated and made available in open access.[26]

[25] This raises the broader question of how nutritional considerations can be included in food LCAs (e.g. whether the functional unit of food LCAs should be defined in terms of nutritional benefits to consumers rather than in terms of physical products). Recent work by FAO is exploring methodological options for *nutritional* LCA (nLCA) studies, defined as LCA studies where the provision of nutrient(s) is considered as either the main function or one of the main functions of a food item (FAO, 2021[147]).

[26] See https://www.oxfordmartin.ox.ac.uk/food-sustainability-analytics/ (consulted 3 Nov 2021).

3.3.2. Effectiveness of supply chain initiatives

76. Environmental impacts along food supply chains are affected by a wide range of actions by both private and public actors. A growing number of initiatives takes a "supply chain lens" or otherwise involves actors across multiple stages of the food supply chain. Deconinck and Hobeika (2022[131]) provide a detailed discussion of these initiatives. In general, there is not much evidence on the effectiveness of different supply chain initiatives, although some have been studied more thoroughly than others.

77. So far, no empirical evidence exists on the effectiveness of *due diligence* approaches for responsible business conduct in agricultural supply chains, although studies in the minerals sector suggest positive effects. Despite the growing importance of both voluntary and mandatory *disclosure*, only a handful of studies have evaluated its effectiveness. *Benchmarking* initiatives related to food supply chains are recent, and hence the lack of empirical evaluations is not unexpected. However, even on the business practice of benchmarking in general there is surprisingly little research. The impact of *corporate commitments* (such as science-based targets or zero-deforestation commitments) similarly deserves more research. Partly because of its longer history, a considerably greater body of evidence exists on the effectiveness of *voluntary sustainability standards and labels*. Yet as Traldi (2021[132]) shows, there is a mismatch between what is certified and what is studied, in the sense that some crops, standards, and countries are overrepresented in the literature relative to the importance of certified production, while others are underrepresented. Finally, both *environmental impact labelling* and *financial incentives by governments* have not been widely used (yet), which explains a relative dearth of empirical studies, although in both cases indirect evidence is available: for environmental impact labelling, this comes in the form of experimental evidence on consumer behaviour; for taxes and subsidies linked to life-cycle assessments the emerging literature simulating the effects of carbon border adjustments provides some insights.

78. Evidence on effectiveness also does not cover all important environmental impacts. For example, accounting for indirect land use change is difficult, and typically not included in assessments of effectiveness. The possibility of "reshuffling" of trade flows in response to policy measures is another example of a dynamic effect which needs to be taken into account in assessing effectiveness. The relative importance of global versus domestic value chains plays a role too: implicitly, many initiatives focus on consumption in high-income countries of products sourced from low- or middle-income countries. But one finding of trade-based methods to assess environmental impacts of food supply chains is that a large share of global environmental impacts is due to domestic consumption in the countries where these impacts take place. This does not necessarily mean that approaches focusing on global value chains are ineffective. Nonetheless, policy makers should keep in mind that improving environmental impacts of food systems will also require other approaches (e.g. technical assistance, capacity-building).

79. Tensions around facts, interests, and values are inherent in all food systems issues, and hence also in methodologies and initiatives on environmental impacts of food supply chains. An example is provided by discussions around environmental impact labelling in France (Deconinck and Hobeika, 2022[131]). The pilot projects to introduce such labels led to questions around the reliability of the data and methodologies used in life-cycle assessments (e.g. the use of product averages rather than specific data; the absence of information on on-farm biodiversity), but also touched on the relative weights assigned to different environmental outcomes. These discussions involved differences over values, but equally involved interests. Possible trade effects seem to have received less attention so far.

3.3.3. Addressing evidence gaps: A roadmap

80. While important evidence gaps exist, it is also clear that many initiatives are underway to generate new data and evidence. This includes the growing number of studies on environmental impacts of food, but also the growth in e.g. corporate disclosure initiatives, new technologies and datasets, and growing supply chain traceability. In parallel, there is a growing emphasis on measuring actual impacts and effectiveness, and towards more universal reporting and measurement (to avoid self-selection by firms).

81. Building on these trends, it is possible to envisage a future where extensive evidence is available on the environmental impacts of specific products; on the environmental performance of companies active in the sector; and on environmental impacts associated with not only a country's food production activities but also its consumption patterns (i.e. taking into account impacts embodied in international trade). This evidence would cover a wide range of products, impacts, and geographies, and would ideally capture the heterogeneity of food supply chains. It would be based on agreed methodologies and reporting standards to facilitate comparisons, and would serve as the basic infrastructure on which many possible initiatives (voluntary or mandatory) could be built. This evidence base would also serve as a baseline to monitor progress, and would help evaluate the effectiveness of different initiatives. Figure 3.7 provides a possible roadmap towards addressing evidence gaps along these lines.

82. A first step would be to create baselines of environmental impacts on at least three levels. On the product level, life-cycle assessments can be used to create harmonised LCA databases, such as the French Agribalyse database. Doing so will require further investments in overcoming evidence gaps mentioned earlier, as well as efforts to further harmonise methodologies and definitions. At the company level, governments can promote harmonised reporting standards and can consider mandatory reporting of environmental impacts at the Scope 3 (supply chain) level. At the country level, analysis of trade flows can be used to build consumption-based indicators, to complement existing production-based indicators. These three lenses could then be used for routine monitoring of environmental impacts related to food, and could serve as an infrastructure on which public and private initiatives (e.g. labelling schemes) could build.

83. A second step is to experiment with different (voluntary or mandatory) supply chain initiatives to learn what works. Governments can stimulate new initiatives (e.g. through pilot projects) and can help scale up promising approaches (e.g. by using their convening power). As noted, baseline data could be used to develop new initiatives. Given the heterogeneity and dynamism of food supply chains, it is important to make this "rebuttable", by considering the available data as a generic default value while allowing firms to provide more detailed information on their own impacts where these differ from the generic value. Over time, this also helps build a greater evidence base.

84. A third step is to invest in rigorous monitoring and evaluation. This should be embedded into policy processes and initiatives from the very beginning. Evaluation can use a variety of analytical approaches. Baseline data on product, company, and country level can be used to establish a first view on progress over time. But it is useful to complement this with methods to assess possible leakage or reshuffling effects, and to use more detailed analysis of specific initiatives, e.g. through randomized controlled trials (RCTs) and other techniques.

85. A final step is then to use the evidence generated, as well as insights from other countries, to adjust what is not working and to scale up what does. Importantly, this should also include an analysis of where evidence gaps remain and which investments could further reduce the most pressing gaps.

Figure 3.7. Closing evidence gaps on environmental impacts along food supply chains: A roadmap

Step 1: Create baselines at product, company, and country level	At the product level: work towards harmonised LCA databases (cfr. Agribalyse)
	At the company level: promote harmonised reporting standards and consider mandatory reporting at Scope 3 (supply chain) level
	At the country level: develop consumption-based indicators to complement production-based data
	=> Developing a routine monitoring of environmental impacts related to food
Step 2: Experiment with different (voluntary or mandatory) supply chain initiatives to learn what works	Stimulate initiatives (eg pilot projects)
	Use convening power to accelerate uptake of promising approaches
	Build on baseline data to develop new initiatives or policies (procurement, labelling) - but make it "rebuttable"
	=> Stimulating a wide range of initiatives to maximise chances of success
Step 3: Monitoring and evaluating policy impacts and effectiveness	Embed evaluation into the process from the very beginning
	Use a variety of analytical approaches: - Baseline data to track progress over time at product, company, and country level - CGE analysis and global data to assess possible leakage/reshuffling effects - Targeted analysis (e.g. RCT) of specific initiatives
	=> Rigorously tracking progress and evaluating the effectiveness of policies and initiatives
Step 4: Adjusting policy responses in place and how they are managed	Use the available evidence to adjust what is not working and promote what does
	Share insights with other countries
	Identify where evidence gaps remain and how to address them
	=> Assessing the options and selecting/adjusting relevant instruments

4. Overarching insights from the deep dives

86. In addition to the specific analysis and recommendations in the three deep dives, it is possible to distil overarching insights about how to address evidence gaps in food systems.

4.1. Be proactive about investing in evidence

87. First, a proactive approach to investing in evidence can increase effectiveness and timeliness of policy responses. This is clear in the case of food insecurity: if policy makers hold off on evidence gathering until a crisis erupts, the evidence will come too late to inform effective policy responses. For slower-moving policy issues, there is still a good rationale for investing early, since building a robust evidence base may require investment in developing and harmonising methodologies and setting up data collection methods. As an example, recent policy developments in the European Union towards environmental impact labelling build on at least two decades of preparatory work (e.g. as part of the EU Product Environmental Footprint initiative). Alternatively, for some policy topics, the collection of information related to food systems can be part of a wider effort. For example, Colombia is developing an intersectional information platform on gender that includes the rural and agricultural sectors as part of its national plan to mainstream equal gender participation.

88. At the same time, it is clear that collecting evidence comes at a cost. For example, high-quality agricultural surveys or detailed individual food intake surveys require a

significant financial investment, and even maintaining and using existing data and evidence involves costs related to e.g. IT equipment, data storage, specialised software, and skilled staff (Deconinck et al., 2021[133]). Some form of cost-benefit analysis or prioritisation is therefore inevitable.

89. It is difficult to conduct a forward-looking cost-benefit analysis on investments in evidence, in part because it is hard to know in advance the benefits which future users may derive from better evidence, and what their best alternative would have been in the absence of that evidence.[27] Some statistical data collected decades or even centuries ago still proves useful today, as when long-run historical statistics on agricultural production inform studies on the impacts of climate change e.g. (Ashenfelter and Storchmann, 2010[134]; Gammans, Mérel and Ortiz-Bobea, 2017[135]). In other contexts, there may be an intrinsic value in achieving a greater understanding of an issue even apart from potential policy actions. One example is the role of gender in food systems, where the contributions of women as entrepreneurs, workers and consumers are difficult to acknowledge in the absence of evidence. Once such evidence is available, it may raise awareness and create greater sensitivity about possible gender implications of policy proposals, making it easier to consider both women's and men's interests and concerns at all stages of the policy process. It would however be difficult to quantify these benefits precisely.

90. Moreover, when evidence and data are made publicly available, a wide range of for-profit or civil society actors could develop creative applications of this information. This idea forms the basis for Open Government Data initiatives (Ubaldi, 2013[136]) which aim to unlock this value. In the United States, the U.S. Department of Agriculture (USDA) collects a wide range of interrelated data on food systems that enables thorough research and analysis on participation in and effectiveness of food assistance programmes by its Economic Research Service (ERS) and by academic researchers. ERS maintains the Research Reports & Articles database to ensure that research results are available to the public. Another example is the growing availability of data and evidence on environmental impacts in food supply chains, which can serve as the basis for a variety of (voluntary or mandatory) approaches. The French Agribalyse database, for example, provides a harmonised database of life-cycle assessments for 2 500 food products, which in turn has been used to develop environmental impact labelling schemes.

91. Because of the difficulties of accurately predicting the future benefits of investments in data and evidence, a better approach is often to start from the costs of data and evidence collection, and to ask whether it is reasonable to think that the benefits would exceed these costs. A key insight here is that data and evidence collection is in fact usually cheap relative to the decisions they inform. For example, Harford (2021[137]) points out that the budgets of national statistics agencies are typically only a fraction of a percent of the government budgets they help inform. Even if the data and evidence they gather improved the efficiency of government decision making by only a small fraction, the resulting benefit-cost analysis would therefore still be positive. Adding possible private and civil society uses of the data and evidence, as well as potential uses in the future, would only strengthen the investment case. Hence, there is usually a good economic case for greater investments in data and evidence, in particular on the effectiveness of policy interventions.

92. Innovations may also help reduce the cost of gathering evidence (World Bank, 2021[23]; OECD, 2019[24]; Baragwanath, 2021[25]). Examples include the use of apps as a low-cost and real-time method of asking consumers about their dietary intake, or the use of remote sensing (e.g. through satellites) to obtain highly granular, geospatially explicit earth observation data on e.g. biodiversity, land-use change, and water resources (Anderson

[27] For a theoretical derivation of the value of evidence in decision-making, see Lindley (1985[139]).

et al., 2017[138]). Moreover, *institutional* innovations can also help lower the cost of evidence-gathering. The government of Canada uses for example an analytical tool, the Gender-Based Analysis Plus (GBA+) tool, to assess expected impacts of policies on specific subgroups, including women. It might also be possible to structure public policies in a way which incentivises firms to disclose information, for example by linking taxes or subsidies to generic values of environmental impacts of products unless firms provide more detailed data on actual impacts.

93. Pragmatic approaches can also reduce the cost of gathering data and evidence, for example by extending existing surveys or by linking existing datasets. In the United States, the Census of Agriculture revised in 2017 the demographic data collected to better capture the contributions of all persons involved in agricultural production including women. The deep dive on gender and food systems also highlights that countries can use Micro-Data Linking to better understand the extent and characteristics of female participation along the food value chain. This statistical method enables the combination of different data sources including specific surveys and administrative data and is useful in limiting respondent burden.

94. Still, given budget constraints some prioritisation of efforts is needed. Visualisations such as Evidence Gap Maps (EGM) could aid in this exercise. These tools could also be combined with foresight approaches involving a broad community of stakeholders to help identify and prioritise needs.

4.2. Collecting public data can make a difference

95. A second insight is that public sector efforts to gather evidence and data can have a distinct value added relative to efforts by the private sector, civil society, and academics. However, this value added is not automatic, but requires deliberate efforts.

96. As noted earlier, for several food systems issues, evidence exists but is fragmented across different actors (including different public sector actors) and different disciplines. Such fragmentation often goes hand in hand with methodological inconsistency, as different actors shape the evidence gathering process to best suit their own needs.

97. Public sector efforts can have a distinct value added here by defining common methodologies, by having a multidisciplinary approach and gathering more complete data than would be possible for other actors (e.g. through census data or administrative sources), and by adhering to strict quality and privacy protection standards. The added value of public sector efforts is further maximised if governments embrace an "open government data" approach (Ubaldi, 2013[136]), where as a rule all public data are made available, at the highest level of granularity, as quickly as possible, and in a format which makes them accessible and usable to the widest range of users for the widest range of purposes.

98. In Colombia, the Rural Women Directorate was created in 2010 as an entity of the Ministry of Agriculture and Rural Development to co-ordinate, design, and evaluate all projects related to food systems and rural development with a gender equality focus. The first task of the Directorate was to undertake a measurement exercise of women's contribution to the Colombian agro-food system including non-remunerated work. This exercise involved all Ministry's entities that were in charge of collecting information and was used to develop and implement a policy mix to support rural women.

99. In France, public sector efforts led to the creation of the Agribalyse database, which contains life-cycle assessment information on nearly 2 500 food products. The availability of this generic database greatly reduces the compliance costs for companies of environmental labelling schemes currently under discussion.

100. At the international level, there is considerable value added to be gained from public sector efforts to harmonise methodologies. Much progress has been made in developing internationally agreed methodologies for Sustainable Development Goals (SDG) indicators. However, these indicators are not all monitored regularly. The gender deep dive highlights that comparable information across OECD countries is only collected for three out of the 14 SDG indicators in the gender-food systems nexus, which prevents a good tracking of progress towards gender equality and women's empowerment in food systems. As shown in the deep dive on food insecurity and food assistance programmes across OECD countries, measurements of food insecurity based on the Food Insecurity Experience Scale, the official instrument used by the FAO to produce estimates of food insecurity prevalence in the context of SDG Target 2.1 monitoring, can differ widely from other measurements undertaken in OECD countries with other methods.

101. Developing better evidence often requires coordinated action by countries. For example, some initiatives are being developed to facilitate the comparison of food insecurity prevalence estimates. The FAO collaborates with the Economic Research Service of the USDA to allow meaningful comparisons of the severity of the food insecurity experience across countries and cultures. G7 countries agreed in December 2021 to principles supporting a vision of improved global food security monitoring and analysis. Greater international cooperation is also needed to overcome evidence gaps on gender and food systems, and to ensure that data is consistent and comparable.

4.3. Focus evidence-gathering on that needed to inform more targeted and more effective policies

102. Evidence is never complete, and as a result all policy decisions involve some degree of uncertainty. Better evidence is valuable precisely because it enables better decision-making. Keeping this ultimate goal in mind can help focus evidence-gathering efforts by asking whether and how an additional piece of evidence would enable better policy-making.

103. There are several aspects to this. First, more granular evidence can allow better targeted policies. Rather than implementing a one-size-fits-all policy, a more targeted policy might deliver the same or better outcomes without wasting policy efforts where they are not useful. The deep dive on food insecurity provides information on three types of food assistance programmes that have specific objectives and target groups. The programmes directly address food insecurity by providing meals to children in the case of school meal programmes, lowering the cost of food for food vouchers programmes and providing food parcels to people in need for food banks. In general, however, OECD countries would benefit from routine food insecurity measurements to help identify the population groups most in need of assistance. The innovative monitoring of food insecurity at the household level during the COVID-19 crisis helped inform policy making in almost real-time in the United States and Chile; other countries could benefit from replicating this approach.[28] The deep dive on gender and food systems describes policy instruments implemented in OECD countries to support female workers and female entrepreneurs in food systems and associated evidence needs; sex-disaggregated information can enable a

[28] Almost real-time monitoring in the U.S. was achieved through the US Census Bureau's Household Pulse Survey (https://www.census.gov/programs-surveys/household-pulse-survey/data.html). During the COVID-19 crisis, Chile ran different rounds of the COVID-19 Social Survey and its FIES-based food insecurity component (Observatorio Social, 2021). This information was used to create the Chilean Food Security Plan in March 2021 (Chilean Ministry of Social and Family Development, 2021).

better targeting of such policies. The deep dive on environmental impacts along food supply chains suggests that a large share of impacts occur in just a few stages of the supply chain (notably land use and agricultural production) and are concentrated in a few products (notably ruminant livestock products). Moreover, the evidence also shows a large heterogeneity of these impacts across different producers, suggesting that a targeted approach could reduce total impacts at a lower cost in terms of food security or farmer livelihoods.

104. Second, better evidence is needed on the effectiveness of policy instruments. As pointed out in the introduction, and as confirmed by the deep dives, there is often a significant evidence gap concerning the effectiveness of different types of interventions. In recent years, however, there have been more efforts to rigorously and systematically evaluate different approaches and to synthesise and share the findings. For example, the Evidensia platform (https://www.evidensia.eco/) summarises evidence from numerous studies on the effectiveness of supply chain initiatives in improving a range of sustainable development outcomes. The deep dive on gender and food systems reports on the experiences of several OECD countries in conducting ex-ante and ex-post gender impact assessments on food systems policies. Such analyses necessitate the development and monitoring of policy-specific sex-disaggregated indicators.

105. Understanding the effectiveness of different types of policy intervention also requires better monitoring of existing policies. The deep dive on food insecurity and food assistance programmes across OECD countries presents evidence gaps related to food assistance programmes and their implications. For many food assistance policies currently in place it is difficult to find clear information regarding the associated budgetary costs, the actual participation of eligible households, and the organisation of these programmes that often involve multiple stakeholders at the local and national levels. The deep dive however highlights how digital technologies enable a simplified monitoring of food vouchers programmes. These vouchers are offered as electronic vouchers in the United States, the United Kingdom, Korea and Chile; which facilitates the monitoring and evaluation efforts. Moreover, while information sources exist to compare agricultural policies in international perspective, the same is currently not true for broader food systems policies.

106. Third, better evidence is needed on synergies and trade-offs, especially across different spatial scales, to make sure that efforts to improve food systems performance in one dimension do not accidentally make things worse in other dimensions. This in turn requires policy analysts to simultaneously assess the effects of a policy on a wide range of outcome variables rather than just a small subset. It also requires (where relevant) an analysis which takes into account possible system-wide adjustments, e.g. through trade linkages.

107. In the deep dive on environmental impacts, life-cycle assessments hold considerable promise in terms of systematically assessing environmental impacts of a product across a range of dimensions. However, some impacts (notably biodiversity) have so far not been studied sufficiently. And while a wealth of "attributional" (static) life-cycle assessments exists, only a handful have tried to take a "consequential" approach of estimating system-wide effects of changing consumption patterns, policies, or technologies. As shown in the deep dive on food insecurity and food assistance programmes across OECD countries, there is a synergy between food banks' assistance to vulnerable households and the sustainability dimension of the triple challenge by its impact on reducing food waste. A potential future dilemma for food banks, however, relates to their dependency on surplus food streams given the international commitment towards a reduction of food loss and waste. The deep dive on gender and food systems describes the potential positive impacts of addressing gender aspects and fostering gender inclusion on

the triple challenge. It reports on the experiences of Japan and Colombia in implementing a policy mix that targets several complementary objectives.

108. A less recognised evidence gap regarding trade-offs is the role of interests and values. When trade-offs exist, and where these cannot be resolved through a different choice of policy instruments, society faces a choice. In making this choice, policy makers not only need to understand the trade-off itself, but also what this means for the interests of stakeholders, and citizens' values and preferences. Yet information on this is rarely available in a systematic way. The deep dives on food insecurity and food assistance programmes across OECD countries and on gender and food systems describe however how policy decisions might be taken based on ethical considerations and human rights principles. One rare example where the issue has received attention is in contexts where different environmental impacts are aggregated in an overall score. This is the case for approaches which try to put a monetary value on each impact (which then allows aggregating the impacts), as well as for various efforts to introduce environmental impact labelling (where disparate impacts are aggregated into a single score). Both approaches force an explicit consideration of the relative weight to be assigned to different environmental impacts. More generally, making progress on food systems issues will require a better understanding of interests and values to enable informed choices when faced with trade-offs.

4.4. Use rigorous evaluations to adjust policies over time and to enable peer learning

109. Governments often use Regulatory Impact Assessments when contemplating new policies, including for food systems (OECD, 2021[1]). New initiatives often undergo ex ante assessments as highlighted in the deep dive on gender and food systems. As shown in the deep dive on environmental impacts, proposed environmental labelling schemes in Europe feature experiments to evaluate different label designs, for example. The deep dive on food insecurity and food assistance across OECD countries presents policy initiatives in Korea and New Zealand that have been first implemented as part of a pilot study and then expanded based on promising evaluations.

110. Yet there are typically fewer automatic mechanisms for rigorously evaluating the effectiveness and fit-for-purpose of existing policies. One risk is that policies may therefore fail to reach their potential or may waste scarce public funds compared to more effective approaches. A second risk is that the broader policy community (e.g. policy makers in other countries) are deprived of insights on what works. Rigorous evaluation should therefore be a standard element in the policy cycle, helping to generate evidence from existing initiatives to allow for learning and adjustment over time.

111. The deep dive on food insecurity and food assistance programmes across OECD countries provides an overview of the United States' experience in collecting data and evaluating food assistance programmes. As shown in the deep dive on gender and food systems, in Colombia, the Rural Women Directorate is now involved in the evaluation of the programmes that have been developed and implemented since 2010 to diminish the poverty rate of rural women, with the gender strategy of the land agency (Unidad de Planificación Rural Agropecuaria) already evaluated.

112. As noted, evaluation has an international component, as it allows for policy makers in other jurisdictions to learn more systematically from experiences elsewhere. The evaluation process itself could also be embedded in an international collaboration, to maximise this form of peer learning. For example, the Research Consortium for School Health and Nutrition, the evidence-generating arm of the School Meals Coalition, aims to

overcome evidence gaps related to school meal programmes by developing a benchmark for monitoring and evaluating school feeding policies.

5. Conclusion

113. There is a strong case for greater investment in overcoming evidence gaps for food systems. While this comes at a cost, the magnitude of the investment is often small relative to the decisions they can help inform. This is especially true when governments apply principles of Open Government Data, allowing civil society, researchers and businesses to further create value. While these stakeholders are also actively involved in generating data and evidence themselves, there is still an important added value of public sector efforts, e.g. by defining common methodologies, by gathering more complete data than would be done otherwise, and by adhering to strict quality and privacy protection standards. Public sector evidence-gathering efforts can be focused by asking whether and how an additional piece of evidence would enable better policy-making. This will often mean collecting more granular or more detailed information; studying the effectiveness of different policies, and monitoring which policies are currently in place; and analysing synergies and trade-offs of policies on a wide range of food systems outcomes. Evidence on how policies affect stakeholders' interests, and on citizens' values, are typically rare, but are important to make informed decisions when society faces a trade-off. Finally, the evidence-gathering process can be strengthened by making it a standard part of the policy cycle to rigorously evaluate existing policies. This can not only help adjust and improve those policies, but also enables peer learning.

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