## 7.1: Appendix 1: Literature review

### 7.1.1: **Literature review protocol & keyword hits**

**Scoping review of published and grey literature relating to transparent, resilient, and fair food systems:**

A literature review will be conducted to develop an understanding of the root cause of the problems around achieving a fully transparent, resilient, and fair food system; identify and evaluate existing sector-level roadmaps and horizon-scanning reports from across the world available in the public domain; review university and start-up innovations to capture the ‘technology push’ dimension; review the activities, operations, and programmes occurring at country, European, and global levels to create a fully transparent, resilient and fair food system.

To find and select this literature the following criteria for inclusion and exclusion of studies in the review will be used:

* The article is published in English
* The full text is available for viewing
* The article was published from 2015-2022\*
* Both published and grey literature from (1) scientific journals (2) government (3) non-governmental organisations (NGO’s) and published industry, corporate or charity reports related to the food system (4) activities, programmes and funding opportunities related to a fully transparent, resilient, and fair food system

\*The timeframe of 2015 to 2022 was selected as this is in line with the adoption of The Sustainable Development Goals (SDGs) in 2015 by the 193 United Nations member states. The SDGs were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet and ensure that by 2030 all people enjoy peace and prosperity.

The search strategy for identification of relevant studies includes:

|  |  |
| --- | --- |
| **Source** | **Name** |
| Scientific databases | Web of Science, Scopus |
| Reliable web-based internet sites | Government departments (government policy and framework documents at country, Europe and Global levels e.g. FAO, OECD | Non-governmental organisations | Universities | Research institutes | Corporates | Food businesses | Food Quality Programs |
| Technology push dimension1 | Portals with university and startup innovation e.g. [The EU Innovation Radar Platform](https://www.innoradar.eu/) - Database of projects funded under EIC pilot Pathfinder, Horizon 2020 FET-Open, FET-Proactive, FET Flagships  Recent patents - IP Open Access search tools\* including: Espacenet; Patenscope; Global Brand Database  Venture capital investments  Consortia and conference abstracts and policy proposals |
| IP Open Access search tools\* | Espacenet; Patenscope; Global Brand Database |
| Personal Contacts | EIT Food network and partner connections to existing national and international funding programmes |
| Other |  |

*\* High level analysis of IP tools only*

1[Horizon scanning methodology](https://reader.elsevier.com/reader/sd/pii/S0924224421006130?token=2F0D8C4E70406F7D135865E90CEA64ACA6EC009EED8A4BFFE031DAF2FD75A68E8AD9BD3CDBB6C20097529DC6EE0BF85A&originRegion=eu-west-1&originCreation=20220915134731) involves ‘signal spotting’: searching for promising trends and directions for research that are often found in recent patents, venture capital investments, policy proposals, and consortia and conference abstract

**Keywords**

|  |  |
| --- | --- |
| **Category | Topic** | **Key Words** |
| **Food System** | Food or Agriculture or aquaculture or beverage or Foodstuff or aliment\*, animal production, livestock |
| **AND Resilient, Transparent or Fair:** | “Food Security” or“Food Integrity” or Resilient or Transparent or “food fraud” or safety, or quality, or ethic\*, or livelihood, “Animal Welfare” or scarcity or available\* or access or utilization or stability or “food dessert”, or sustainability, or clean, or translucid, trustworthy, objective, or “Food insecurity” or “Food poverty” |
| **AND Interventions:** | Roadmap or Strategy or Barrier or Opportuni\* or Initiative or Funding or Programme or Activit\* or Intervention or Technolog\* or “Horizon Scanning” or Policy or Education or “Public Engagement” or Communication or “Business Creation” or Innovation or transformation or “food system approach” or AMS or “agriculture market information system” or synerg\* or tradeoff or “spill over effects”or **“**responsible agriculture”, intensification or digital or technology, or lifecycle analysis, meta\*, or “Food policy” |
| **Other?** | “Systematic literature review” or “systematic review” or “critical review” or roadmap, or report, or revis\*, or survey, |

The following hits was retrieved using these key words and combination of key words in Web of Science:

Table

Description automatically generatedTable

Description automatically generated

A picture containing diagram

Description automatically generated

Text

Description automatically generated

As a result of the large number of hits this literature review will use the [Horizon scanning methodology](https://reader.elsevier.com/reader/sd/pii/S0924224421006130?token=2F0D8C4E70406F7D135865E90CEA64ACA6EC009EED8A4BFFE031DAF2FD75A68E8AD9BD3CDBB6C20097529DC6EE0BF85A&originRegion=eu-west-1&originCreation=20220915134731) outlined by Glaros et al. and thus will:

* + - 1. Focus on (1) most relevant and (2) highly cited, peer reviewed literature. The review will analyse the Top 50 papers listed in order with these two filters applied separately (i.e. the Top 50 relevant papers and the top 50 highly cited papers. We foresee there to be overlap in the top 50 papers within each of these two filters).
      2. This will be followed by research gap identification for any further literature searches that may be required.

[You can find the full list of papers retrieved from this keyword search on Web of Science here.](https://www.webofscience.com/wos/alldb/summary/e5db6a6c-c73b-4bb5-bec7-802a40016672-54b882df/relevance/1)

**Data synthesis**

The literature was critically analysed in order to identify the most powerful areas of intervention in the next 3-5 years that will allow a fully transparent, resilient and fair food system by 2050, including which: (1) indicators of food insecurity should EIT Food prioritise (2) Which populations in Europe are most likely to experience these indicators (3) Which causes of food insecurity should EIT Food prioritise (4) Which factors contributing to food integrity should EIT Food prioritise and (5) Which consumer-industry relationships should EIT Food prioritise for efforts in building trust and public understanding and why? The data extracted from the literature review was also tabulated based on drivers, market trends, opportunities, capabilities, and enablers to a fully transparent, resilient, and fair food system. These factors, combined with interview and questionnaire results, fed into the draft roadmap landscape for the road-mapping workshop

### 7.1.2: Literature review results

#### Published literature:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Resilient food system published literature sources** | | | | | |
| **Author** | **Aim, Objective, Methodology** | **Key Findings | Information on intervention** | **Root causes or barriers to TRF Food system** | **Evaluation of scale and consequences of social and economic needs** | **Strategies to achieve fully transparent, resilient and fair food system** |
| **Tendall, D.M. et al. (2015)** “Food system resilience: Defining the concept,” Global Food Security, 6, pp. 17–23. Available at: https://doi.org/10.1016/j.gfs.2015.08.001. | Resilience and sustainability is a complementary concept, whole system perspective is required, not only change or transformation in one part of the system | key point of resilience is to provide sufficient, appropriate and accessible food to all, even under unforeseen disturbances, three dimensions of food security: availability, access and utilization | no-effective policy and management interventions, it has to be intervention between the components of the system |  | interdisciplinary exchanges and communication, introducing complementary concept of sustainability |
| **Béné, C. (2020)** Resilience of local food systems and links to food security – A review of some important concepts in the context of COVID-19 and other shocks. *Food Sec.* **12**, 805–822. <https://doi.org/10.1007/s12571-020-01076-1> | explore and discuss the concept of local food system resilience in light of the disruptions brought to those systems by the 2020 COVID-19 pandemic; focuses on low and middle income countries; | decision-makers, from the international down the local levels, were  poorly equipped to navigate the painful trade-off between health and  economy, and how, as a consequence (and as it is often the case), the  poor have been the ones who suffered the most from this. |  | the current threat to the food security of the millions of people affected by the COVID-19 crisis is not the result of the virus itself, but the consequence of the loss of income and purchasing power induced by the lockdown and shutting down of enterprises imposed by national/local governments. | Influencing factors: financial assets (savings, productive assets), social capital (connections), human capital (education, knowledge), reduce the adoption of bad responses, increase the adoption of good responses; (for ex. mobility restriction); bounce back better and faster after an impact (ability to recover); diversification, connectivity, and substitution |
| **Šūmane, S. *et al.* (2018**) “Local and farmers' knowledge matters! how integrating informal and formal knowledge enhances sustainable and Resilient Agriculture,” *Journal of Rural Studies*, 59, pp. 232–241. Available at: https://doi.org/10.1016/j.jrurstud.2017.01.020. | explore farmers’ knowledge and learning practices with a particular focus on the role of their informal knowledge and learning in constructing sustainable and resilient agriculture. | Sustainable and resilient agriculture is knowledge-intensive and requires location-specific knowledge. Farmers rely considerably on informal knowledge and learning modes. Local farmers' knowledge strengthens sustainability and resilience, yet remains undervalued. Knowledge networking and transdisciplinarity facilitate integration of diverse knowledge. | climate change, food security and resource depletion, |  | Local knowledge has relevance for agricultural sustainability and resilience as it tends to be holistic, dynamic and adaptive in character. considers local systems as a whole, taking into account their social, environmental and economic aspects, empirical and spiritual dimensions, it evolves over time, farmers adapt to dynamic local contexts. informal farmer and formal scientific knowledge need to be combined to achieve the best results and meet sustainability goals |
| **Schipanski, M.E. et al., (2016)** Realizing Resilient Food Systems, *BioScience*, Volume 66, Issue 7, Pages 600-610, https://doi.org/10.1093/biosci/biw052 | Combine range of strategies to improve supply chain resilience | general strategies for system transformation including gender equity, social justice into food security research and initiatives, increace of ecological processes, regionalization of food distribution, waste reduction, human nutrition |  |  |  |
| **Stone, J. and Rahimifard, S. (2018),** "Resilience in agri-food supply chains: a critical analysis of the literature and synthesis of a novel framework", Supply Chain Management, Vol. 23 No. 3, pp. 207-238. https://doi.org/10.1108/SCM-06-2017-0201 | use a systematic literature review (137 papers) to identify which multidisciplinary aspects of resilience are applicable to Agri-food supply chains (AFSCs) and to generate a novel AFSC resilience framework. | complexity of AFSCs and subsequent exposure to almost constant external interference means that disruptions cannot be seen as a one-off event: focus must be on overall impact on the ability of the supply chain as a whole to provide food security rather than to boost individual company performance. | vulnerabilities due to the limited shelf life of food, and variability in quality and availability of raw materials as organic products, challenged by an increased incidence of extreme weather linked to climate change; growing population, wants for greater amounts of meat, dairy and more heavily processed food; examples: politial conficts, export restriction, regulation chagnes, poor infrastructure maintenance, social risks (global population growht, social unrest, major illness, food fraud, food crime, industrial action) economic risk. (currency fluctuations, food inflation, energy price instability), environmental risks( region wiede, geologiac, biological, climatic disruption, climate change). on unique risk considerations: primary producer (loss of biodiversity, plant and animal disease, climate variability, downward pressure on margins), Processing (tight product standards, order lead times, delayed payment, threats to brand differentiation), distribution, packaging (declining customer base, pressure to reduce non-value adding fuctions), catering (threats to product margin, market concentration), retail (customer responsiveness, high stock turnover), cosumption (food availability, food access, food acceptability, reliability of supply). |  | intra-organizatioN: risk aware culture, redundancy, early warning, security, flexibility; Intra-supply chain: redundandy, adaptability, visibility, agility, flexibility, collaboration; |
| **Knickel, K. *et al.* (2018)** “Between aspirations and reality: Making farming, Food Systems and rural areas more resilient, sustainable and Equitable,” *Journal of Rural Studies*, 59, pp. 197–210. Available at: https://doi.org/10.1016/j.jrurstud.2017.04.012. | explores the connections between farm modernisation, rural development and the resilience of agricultural and rural systems. case studies are used; | The concept of resilience accentuates transformative capacity and co-learning.  Farm modernisation can follow very different pathways. Farmer-driven innovations and alternative practices are undervalued. Informal governance arrangements help to balance diverging interests. Research and policy need to go beyond traditional approaches. | contemporary food production is now largely decoupled from natural processes and much more dependent on industrially produced inputs and fossil fuels; drought in regions accustomed to low but relatively stable rainfall levels; the nutrient surpluses and the related eutrophication of ecosystems and groundwater bodies in regions with a high concentration of intensive indoor livestock production; and the current economic problems in capital-intensive dairy farming | observable decrease in the social-ecological resilience of farms and of rural communities in recent decades; local farmer-driven innovations can teach us much, especially since farmers focus on efficiently using the resources available. Farmers appreciate the feeling of working on a ‘common project’ where everyone participates and felt this makes them more effective, innovative and motivated | use location-specific experiential knowledge, limit borrowing and choose a modest technological upgrade, to give priority to local as opposed to extra-regional or export markets, and strive to maintain autonomy. being less dependent on energy-intensive technology, artisanal methods. Support from government can play a key role in both regional and farm-based efforts to strengthen resilience (collective initiatives, co-learning and co-innovation processes). |
| **Bullock, J.M. et al. (2017)** “Resilience and Food Security: Rethinking an ecological concept,” Journal of Ecology, 105(4), pp. 880–884. Available at: https://doi.org/10.1111/1365-2745.12791. | approaches for resilient food production in agricultural systems. | biotechnological approaches involve breeding crop and forage varieties that are less affected by perturbations; Yield shows greater resilience to climatic perturbations in more species-rich or more genetically diverse forage systems; improving soil condition, such as by agroforestry or adding organic matter; maintaining wild bee diversity to provide a resilient pollination; diverse crop rotations can aid yield resilience; nowledge transfer to and among farmers, building capacity and enhancing social networks; | Threats to food production are predicted to increase under climate change and land degradation |  | At the field scale, approaches include the use of mixtures of crop varieties, livestock breeds and forage species, polycultures and boosting ecosystem functions. Stress-tolerant crops, or with greater plasticity, provide technological solutions.farm scale, resilience may be conferred by diversifying crops and  livestock and by farmers implementing adaptive approaches in response to  perturbations. Biodiverse landscapes; egional to global scales, resilient food systems will be achieved by  coordination and implementation of resilience approaches among farms,  advice to farmers and targeted research. |
| **Seekell, D. *et al.* (2017)** “Resilience in the global food system,” *Environmental Research Letters*, 12(2), p. 025010. Available at: https://doi.org/10.1088/1748-9326/aa5730. | developed an indicator-based analysis of food systems resilience for the years 1992–2011. Approach is based on three dimensions of resilience: socio-economic access to food in terms of income of the poorest quintile relative to food prices, biophysical capacity to intensify or extensify food production, and the magnitude and diversity of current domestic food production. | socio-economic indicator has a large variability, low values in Africa and Asia. biophysical capacity is highest in Africa and Eastern Europe, i(high potential for extensification of cropland, yield gap closure); but has declined globally in recent years. The production diversity increased slightly, with even geographic distribution. Few countries had exclusively high or low values for all indicators. | limited natural resources, climate change, and environmental variability; disaster response cases (locally); globally: economic patterns and relationships rather than food security for individuals or households | resilience within food systems cannot be evaluated at a single scale; local, global, and cross-scale interactions must be included; with respect to both the short-term responses and the longer-term factors; Access to food is chiefly a socio-economic issue related to prices and income; Being poor does not necessarily imply food insecurity, but it does limit  options during periods of price spikes, crop failures for subsistence  farmers, or loss of assets such as livestock | more diverse systems are thought to exhibit higher aggregate stability  due to species asynchrony, portfolio effects, and other  mechanisms; esilience to be higher in countries where the poor have higher income  relative to food prices, compared to countries where the poor have low  incomes relative to food prices; |
| **Macfadyen, S. et al. (2015)** “The role of food retailers in improving resilience in Global Food Supply,” Global Food Security, 7, pp. 1–8. Available at: https://doi.org/10.1016/j.gfs.2016.01.001. | The role of retailer in improving resilience in global food supply | Protect waterways and future water resources, maintain and restore soil resources, encourage marginal productivity land to be removed from production, ensure producers use agrochemicals judiciously, encourage landscape-scale diversification, encourage sustainable livestock mangement practices, identify future crops and help farmers to produce them, identify products from high-risk region, identify products with environmental extenalities | low diversification | financial support conservation intervantions aimed at iconic farmland species and habitant, support provision of ecosystem services provide trainind and support for integrated management and area-wide management strategies, education of customer to focus mor on health and environmental aspects of food etc. |  |
| **Fan, S. et al. (2021)** “Food system resilience and covid-19 – lessons from the Asian experience,” Global Food Security, 28, p. 100501. Available at: https://doi.org/10.1016/j.gfs.2021.100501. | food systems in Asia have been proven relatively resilient when compared with other regions. outlook for food system resilience in a post-COVID-19 environment |  | declining availability of water and soil nutrients; loss of productive arable land due to degradation and urbanization; plant and animal biosecurity; unpredictable weather and changing climate, declining public trust and social license. |  | a region being relatively well served by road infrastructure, access to internet and mobile phones, and well-developed supply chains, |
| **Coomes, O.T. et al. (2019)** “Leveraging total factor productivity growth for sustainable and resilient farming,” Nature Sustainability, 2(1), pp. 22–28. Available at: https://doi.org/10.1038/s41893-018-0200-3. | describe two pathways for growth—technology-based and ecosystem-based—and link these in a heuristic framework that emphasizes sustainability and resilience outcomes in farming systems |  |  |  | very likely to increase resilience: Better market information and post-harvest management; Diversification (for example, crop rotations, rotational grazing, integrated crop– livestock systems) Potential: Precision inputs; Automation (drones, robotics and so on), Transgenics uncertain: Improved storage and transportation on farms, Specialization (larger plots, higher planting density, confined livestock operations, skill specialization) |
| **Valencia, V., Wittman, H. and Blesh, J. (2019)** “Structuring Markets for Resilient Farming Systems,” Agronomy for Sustainable Development, 39(2). Available at: https://doi.org/10.1007/s13593-019-0572-4. | relationship between farmer participation in Brazil’s National School Feeding Program and farm diversification and household autonomy, as key indicators of farm household resilience. semi-structured surveys to collect data on farm agrobiodiversity, management practices, and farm household autonomy, and we conducted land use history assessments | the national school feeding program drove: (1) transitions on family farms from low agrobiodiversity, input-intensive farming systems to diversified farming systems (i.e., horticultural production) and (2) a significant increase in the cropped area under diversified farming systems. | diversified farming systems have received minimal public and private investments |  | Diversified farms can support greater biodiversity and multiple ecosystem functions such as soil nutrient cycling and enhanced nutrient retention, pest control, and carbon sequestration; Houshold autonomy: food and nutrition security, increased auto - consumption, reduced external input dependency, reduced dependence on volatile commodity marekt; medatd Markets: structured demand for diversified agriculutral products, incentives or agroecological practices, stable income; farm diversifiation: increased agrobiodiversity, agroecological practices, enhanced ecological processes; |
| **Jacobi, J. et al. (2018)** “Operationalizing Food System Resilience: An indicator-based assessment in Agroindustrial, smallholder farming, and agroecological contexts in Bolivia and Kenya,” Land Use Policy, 79, pp. 433–446. Available at: https://doi.org/10.1016/j.landusepol.2018.08.044. | understanding of resilience be applied to food systems; assessment of the interaction and coexistence of food systems; | contexts in the two countries differ greatly, we identified several common trends that appear to be undermining food system resilience in both settings; identified indicators for food system resilience. | strong disparities in income and access to productive resources; competition for water, land, and labor; exclusion from markets; and low human capital and feedback mechanisms in locally based, traditional food systems |  | Diversity of crops and breeds, natural capital, human capital, social capital, physical capital, reflective and shared learning, functioning feedback mechanisms, use of traditional-local knowledge, knowledge of threats and opportunities, decentralizsation, local consumption of production, |
| **Brzezina, N., Kopainsky, B. and Mathijs, E. (2016**) “Can organic farming reduce vulnerabilities and enhance the resilience of the European Food System? A critical assessment using system dynamics Structural Thinking Tools,” Sustainability, 8(10), p. 971. Available at: https://doi.org/10.3390/su8100971. | conventional farming hugely depends on public support - improved productivity - low prices for food in Europe. ; ; use system dynamics structural thinking tools to identify the vulnerabilities of the conventional food system that result from both its internal structure as well as its exposure to external disturbances. evaluate whether organic farming can reduce the vulnerabilities | organic farming has some potential to bring resilience to the European food system, but it has to be carefully designed and implemented to overcome the contradictions between the dominant socio-economic organization of food production and the ability to enact all organic farming’s principles—health, ecology, fairness and care—on a broader scale. | soil degradation, nutrient runoff, greenhouse gas (GHG) emissions, biodiversity loss, pesticide-born health damage and socio-economic decline in rural communities | european consumers rely on a complex system, in which conventional farmers, driven by profit maximization, are continuously intensifying, specializing, standardizing, expanding their operations and becoming even more dependent on the application of off-farm sourced modern tools such as chemicals to manage fertility and pests, diesel-powered machines, biotechnology and proprietary seeds | one potential solution is organic farming (principle: “health”, “ecology”, “fairness” and “care”.) but: is at risk for falling into the same systemic pitfalls through a process of conventionalization; certification as one of the main intervention proposed by the EU, for instance, will not be sufficient: does not interfere with the production growth drivers and thus does not change the nature of any of the feedback mechanisms! low external input system with inter alia diversification and nutrient cycling, have better financial performance and diversity of markets |
| **Toth, A., Rendall, S. and Reitsma, F. (2015)** “Resilient Food Systems: A qualitative tool for measuring food resilience,” Urban Ecosystems, 19(1), pp. 19–43. Available at: https://doi.org/10.1007/s11252-015-0489-x. | food resilience in the context of urban environments and aims at developing a qualitative tool for measuring it | review of food system models and assessment tools, a new food system model for resilience analysis has been developed, used on the Christchurch example | "food from nowhere” has reconfigured food relationships dramatically, and made us vulnerable and less likely to recognise the signals of food system failure before they reach crisis point; complex political and economic forces | the model can be applied at a range of scales, from an individual, to a small community or entire city. The model does not take into account the macro level processes across a complete urban environment, rather focusing on units of the food system that pertain to a pattern of consumption, production or distribution. Lower values of R indicate higher resilience. Increasing numbers of nodes and links within the model decrease the resilience. | new approach for assessing the resilience of food systems; diagnostic tool to support the evaluation of the resilience of a food system, |
| **Hecht, A.A. et al. (2019)** “Urban Food Supply Chain Resilience for crises threatening food security: A qualitative study,” Journal of the Academy of Nutrition and Dietetics, 119(2), pp. 211–224. Available at: https://doi.org/10.1016/j.jand.2018.09.001. | To identify factors that may be associated with organization-level food system resilience, how these factors may play out in disaster response, and how they may relate to organizations’ confidence in their ability to withstand disruptive events. in-depth interviews with representatives of key food system businesses and organizations identified by means of stratified purposive sampling and snowball sampling. | 10 factors for resilience: formal emergency planning; staff training; staff attendance; redundancy of food supply, food suppliers, infrastructure, location, and service providers; insurance; and post-event learning. Organizations that were larger, better resourced, and affiliated with national or government partners typically demonstrated more resilience factors compared with smaller, independent, and non-profit organizations. | extreme weather to political unrest. |  | organizations that are larger, better resourced, and affiliated with national or government partners typically demonstrate more resilience factors compared with smaller, independent, and nonprofit organizations. Smaller and independent organizations often engage less in formal preparation and often lack backup infrastructure. The mission-driven and family-run nature of many smaller, independent organizations, however, may compensate in part for their lack of formal preparation, with more dedicated staff and thus better attendance. procurement of foods with lower greenhouse gas footprints. |
| **Vieira, L.C. et al. (2018)** “Unpacking components of sustainable and Resilient Urban Food Systems,” Journal of Cleaner Production, 200, pp. 318–330. Available at: https://doi.org/10.1016/j.jclepro.2018.07.283. | 58 papers included in the review process, to identify components related to the health, social economy, environment and governance domain | Urban food system can be resilient but can sustainable, better connection and information exchange between urban-rural area, waste management, reasonable use of resources for food production, sustainability and resilience as the impact on climate change in urban food system, healthy food, having strong local food economy | transfer of knowledge and information, | people are unaware of the origin of their food = social, ecological and economic components of food systems remain unsustainable | Improve the transfer of knowledge towards healthy food and transparency, decrease carbon |
| **Sanderson Bellamy, A. et al. (2021)** “Shaping more resilient and just food systems: Lessons from the covid-19 pandemic,” Ambio, 50(4), pp. 782–793. Available at: https://doi.org/10.1007/s13280-021-01532-y. | lessons learned from covid-19 pandemic, shaping the system towards resilient | people-centred approach needed for resilient and sustainable future |  |  | balance between large scale industrial partner and small ecological producers, control large scale retailars and regional food distribution, community supported agriculture, involvement civil society in food system, public funding to support local infrastructure and organization, enhance link between small-scale farms and their communities- collaboration and partnership (local government and producers) |
| **Spiker, M.L. et al. (2020)** “Cultivating sustainable, resilient, and healthy food and water systems: A nutrition-focused framework for action,” Journal of the Academy of Nutrition and Dietetics, 120(6), pp. 1057–1067. Available at: https://doi.org/10.1016/j.jand.2020.02.018. | Education and training, research transfer into practice, policy, Practice | shape and deliver dietary guidance, improve food and nutrition security and water security, align food production and nutrition, optimize supply chain and food environments, reduce waste |  |  |  |
| **van Delden, S.H. et al. (2021)** “Current status and future challenges in implementing and upscaling vertical farming systems,” Nature Food, 2(12), pp. 944–956. Available at: https://doi.org/10.1038/s43016-021-00402-w. | Vertical farming system as a part of resilient food chain |  |  |  |  |
| **Zhao, G., Liu, S. and Lopez, C. (2017)** “A literature review on risk sources and resilience factors in agri-food supply chains,” Collaboration in a Data-Rich World, pp. 739–752. Available at: https://doi.org/10.1007/978-3-319-65151-4\_66. | aim to address two key questions about agri-food supply chains: (1) What are the main risk sources in the agri-food supply chains? (2) What are the key resilience factors that can be designed in an agri-food supply chain? using systematic literature review, classification of risk sources, resilience factors |  | global agri-food supply is vulnerable to risks and disruption in unstable business environment; | climate change, soil degradation, pest outbreaks and population growth. Antibiotic Resistance, Weather-Related Risks and Natural Disasters,  Policy and Institutional Risks,  Unethical Issues in Agri-Food Supply Chains, | maintain soil resources, encourage sustainable practices in livestock management and protect water resources;  Traceability,  Inter-organisational Knowledge Management,  Supply Chain Collaboration,  Supply Chain Risk Management Culture, Agility (a strategic ability that assists organisational rapidly to sense and respond to internal and external uncertainties via effective integration of supply chain relationships), |
| **Rijsberman, F. (2017)** “The key role of the Meat Industry in transformation to a low-carbon, Climate Resilient, sustainable economy,” Meat Science, 132, pp. 2–5. Available at: https://doi.org/10.1016/j.meatsci.2017.04.013. |  | Meat scientists have a major role to play in the necessary transformation of global agri-food systems towards a new model of green economic growth that is climate resilient, sustainable and provides green jobs. | climate change, Pollution, particularly air pollution, local geo-politics, insecurity, water scarcity; food production in developed countries: In the US a large share of corn is turned into biofuel, worldwide roughly half of all cereals produced are now fed to farm animals; Agri-food systems are the source of about a quarter of all greenhouse gas emissions |  | producing “healthier” meat – lower fat, and either fully organic, chemical and anti-biotic free; Government in setting the right incentives, requiring labeling with improved consumer information, |
| **Thorsøe, M. et al. (2020)** “Responding to change: Farming system resilience in a liberalized and volatile European dairy market,” Land Use Policy, 99, p. 105029. Available at: https://doi.org/10.1016/j.landusepol.2020.105029. | how farming systems in five European countries have reacted to the emerging instability of the milk market. quantitative data from case studies in the five countries. | Market liberalization and price volatility drive changes in all farming systems.  Price volatility results in poor adaptive capacity of dairy farms. Strategies for dairy farming systems are conditioned by strategies of processors. Systems respond with different strategies despite comparable regulatory framework. Dairy market trends may have long-term impact on land use. | Although milk prices are volatile, production is quite inelastic, and it is difficult to adjust production from one month to the next. | European farming systems are very heterogeneous and differ substantially in size, organization, and the use of technology, thus responding differently to changing conditions. dairy farming system is a multi-layered organization spanning several spatial scales that are subject to their own complex dynamics, and when conditions change all actors have to adjust their position in the system | older farming systems: self-sufficient and have lower debt levels; in high-tech modern systems: demand large investments, implying a high share of fixed costs, and require production at full capacity to service loans;; Dairy farming systems are also slow to adjust, therefore stable market conditions are needed, or alternatively a strategy to manage price volatility is needed |
| **Bender, K.E. et al. (2022)** “Consumer behavior during the COVID-19 pandemic: An analysis of food purchasing and management behaviors in U.S. households through the lens of Food System Resilience,” Socio-Economic Planning Sciences, 82, p. 101107. Available at: https://doi.org/10.1016/j.seps.2021.101107. | national survey data from July 2020 to understand the food acquisition, preparation, and management strategies that households implemented in response to the pandemic. | Added home cold storage capacity risks undermining upstream food system resilience; Improvement of in-home food skills supports food system resilience & sustainability. | upstream food supply chain disruptions but also to panic buying and/or hoarding by consumers |  | enhanced cooking and food management skills and increased cold food storage capacity and capacity utilization represent typical individual strategies to improve resilience; |
| **Umar, M., Wilson, M. and Heyl, J. (2017)** “Food Network Resilience Against Natural disasters: A conceptual framework,” SAGE Open, 7(3), p. 215824401771757. Available at: https://doi.org/10.1177/2158244017717570. | conceptual framework that highlights the importance of logistics, collaboration, sourcing, and knowledge management; literature review | supply chains can develop certain capabilities such as agility, adaptability, and alignment within the four supply chain domains of logistics, collaboration, sourcing, and knowledge management. | Natural disasters are major cause of supply chain disruptions, Less food is produced and prices rise dramatically due to shortages, thereby increasing the food security concerns all over the world; climate change will trigger more severe weather events | Crops are destroyed, and infrastructure and transportation also get badly disrupted. Food prices increase, often dramatically, and retailers and other supply chain players do not get supplies on time, all effecting the local community badly. food contamination is what retailers and their suppliers are most afraid of because it can destroy their brand image | strengthening local community resilience is very important:local food stocks, through local shelter, by supporting local community groups (retailers), and by making sure of good local governance by authorities. be based on technical and policy combinations. |
| **Röös, E. et al. (2021)** “Moving beyond organic – a food system approach to assessing sustainable and resilient farming,” Global Food Security, 28, p. 100487. Available at: https://doi.org/10.1016/j.gfs.2020.100487. | studied a farm aiming to move beyond organic and become “a sustainable farm of the future”,. Method to assess contribution to global sustainability at farm level proposed. Indicators include food security, climate impact and farm resilience. | over a 5-year period, the farm improved on the food security and resilience indicators included in the assessment (e.g., number of persons fed per hectare, diversity of products, and connections), while producing food at greenhouse gas intensity similar to regional averages. . Contribution to food security increases with crops grown for human consumption. Diversity in products and relations can buffer weather and market related shocks. Building relations with a diversity of actors to achieve sustainability goals, and increased outreach in terms of spreading knowledge on how farmers can act to enhance biosphere stewardship |  | conversion to organic farming under the assumption of sustained food demand would considerably increase agricultural land expansion:detrimental effects from deforestation: To be globally ‘responsible’, organic farms thus have to achieve higher yields and/or alter the ratio of feed and food crops grown (more food, less feed), without jeopardizing local environmental gains. | resource-efficient way, minimizing the negative impacts per unit product. produce more human-consumable crops, for ex: missions of greenhouse gases per kcal produced’ showed a steady decrease as more crops for human consumption were introduced on the farm over the years; uses both modern crop high-yielding varieties and landraces with lower, but reliable, yields; the farmer earns income from services he provides, such as giving talks and engaging in expert commissions, and b) the stable income from EU Common Agricultural Policy (CAP) payments. diversification can be a viable economic strategy for farms. facilitate exchange of crops, animal feeds, and manure, but also pursue joint routes to market, knowledge exchange, and joint identity as a movement or a cooperative. |
| **O’Connor, D. et al. (2016)** “Living with insecurity: Food security, resilience, and the World Food Programme (WFP),” Global Social Policy, 17(1), pp. 3–20. Available at: https://doi.org/10.1177/1468018116658776. | they examine the ‘turn’ toward resilience in the practices and policies of the World Food Programme’s (WFP) | resilience is one of a family of security strategies through which the WFP seeks to govern food security; Resilience, while championed as part of an overall solution to a range of ills afflicting human populations today, aims only to equip people and populations with the capacity to live with the instabilities of a neoliberal food system without questioning, destabilizing, or resisting the very sources of socio-economic and political instability. |  |  |  |
| **Modernel, P. et al. (2019)** “Grazing management for more resilient mixed livestock farming systems on native grasslands of southern South America,” Grass and Forage Science, 74(4), pp. 636–649. Available at: https://doi.org/10.1111/gfs.12445. | effects of grazing management on herbage and animal production were assessed at paddock level, and how technological and structural variables relate to the production and economic performances at farm level. | farms with higher incomes and low proportions of sheep in the herd withstand drought better; pre-drought status of the herbage mass/height should be considered: an increase of one cm in herbage height reduces the impact of drought on herbage accumulation rate by 20% | climate change: water deficits are expected: educe plant growth, biomass and primary productivity; decrease livestock feed intake, weight and reproductive performance; increase farm production costs; reduce income for farmers; affect rural communities; and even affect nation-scale economies | force farmers to sell cattle at a low price, resulting in economic loss, or may cause the death of animals | weather forecasts and early warning systems provide farmers with relevant information needed to face an upcoming drought and to make mediating decisions; managing herbage allowance at the paddock level increases resistance of herbage accumulation and animal weight to drought. |
| **Bizikova, L. et al. (2015)** “Climate Resilience and Food Security in Central America: A practical framework,” Climate and Development, 8(5), pp. 397–412. Available at: https://doi.org/10.1080/17565529.2015.1064806. | food systems resilience in the context of climate change; tests a framework in 20 communities in Honduras and Nicaragua; | contributions from supporting systems, institutions and processes are crucial to ensure overall food system resilience; framework helped to reveal the dependence of community food security, and especially food utilization and access | Climate variability and change threaten food security both directly – for example, by reducing crop yields – and indirectly – for example, by disrupting the systems and infrastructure that people use to access food (food trade, storage and access to markets) |  | necessary systems include natural resources and their management, critical infrastructure, (transport, power, communication, storage.), key institutional policies, participation in decision making; it is important to increase household and community subsistence, local markets and food storage; institutions must be strengthened to build capacities and monitor trends in food security, health and disease, and emergency preparedness |
| **Reisch, L.A. (2021)** “Shaping healthy and sustainable food systems with Behavioural Food Policy,” European Review of Agricultural Economics [Preprint]. Available at: https://doi.org/10.1093/erae/jbab024. |  |  |  |  | rebalance angiculture sector subsidies, Rebalance agriculture sector R&D, promote production of a wide range of nutrient-rich foods, ensure food moe along value chains more efficiently improving accessibility and resulting in lower cost and less lost, reduce cost for tech and innovation, adjust tax and subsidies on key foods, regulate advertising and marketing in costumer food choices |
| **Pappa, I., Illiopoulos, C. and Massouras, T. (2019)** “On Sustainability of a Dairy Sector in Crisis,” Int. J. Food System Dynamics, 10(2), pp. 130–150 . Available at: https://doi.org/http://dx.doi.org/10.18461/ijfsd.v10i2.08. | Based on empirical data, we analyse the overall sustainability of the dairy sector based on the innovation capacity of the sector and the sustainability of the relationship of the key actors, such as dairy farmers and processors.  Additionally, a theoretical approach addressing ‘relationship sustainability’ and the factors affecting this construct  is proposed. | deficit in innovation capability and an inadequate sustainability  level of the relationships within the dairy secto | - Structure of the sector with mainly small farms  ‐ Lack of liquidity and access to funding  ‐ High age level of milk farmers  ‐ High production cost  ‐ High reliance on purchased animal feed  ‐ Low level of cooperate spirit  ‐ Lack of collective structures and inter‐professional bodies  ‐ High imports of lower cost dairy products  ‐ Lack of proper stockbreeder training and education  ‐ Low social recognition of stockbreeder’s profession to   revitalize it  ‐ Global competition and imitation of characteristic Greek   dairy products | Prospects in greece: Strong tradition in milk production and processing, specially   sheep and goat milk  ‐ High number of dairy animals  ‐ Production of high quality dairy products  ‐ Production of products well known worldwide, like Feta   cheese or Greek yogurt  ‐ High per capita consumption for dairy products (mainly   cheese)  ‐ Young people moving from urban to rural areas seeking   employment  ‐ Strong and competitive dairy industry | policy recommendations include fostering of collaboration, starting at  the farmer level through guidance and support for the creation, management, and governance of  producer organizations. For this, a clear and simple legal framework is crucial to replace the existing  unstable legal environment. Strong  and  viable  Producer  Organizations  will  lower  production  and  transaction  costs,  increase  the  bargaining  power  of  farmers  and  contribute  to  equitable  power  distribution  among  the  actors  of  the  chain. |
| **Muchenje, V., Mukumbo, F.E. and Njisane, Y.Z. (2018)** “Meat in a sustainable food system,” South African Journal of Animal Science, 48(5), p. 818. Available at: https://doi.org/10.4314/sajas.v48i5.3. |  |  |  |  |  |
| **Berner, S. et al. (2019)** “Roadmapping to enhance local food supply: Case study of a city-region in Austria,” Sustainability, 11(14), p. 3876. Available at: https://doi.org/10.3390/su11143876. |  |  |  |  |  |
| **Karakoc, D.B. and Konar, M. (2021)** “A complex network framework for the efficiency and resilience trade-off in Global Food Trade,” Environmental Research Letters, 16(10), p. 105003. Available at: https://doi.org/10.1088/1748-9326/ac1a9b. | developed a complex network framework to assess the relationship between efficiency and resilience of food trade for the last half century | There is a competitive relationship between efficiency and resilience when only network topology is considered. However, a cooperative relationship between efficiency and resilience exists when the intensity of trade connections is accounted for. Policy makers can use this framework to evaluate the relationship between efficiency and resilience in critical supply chains | Increased connectivity of global food trade increases its efficiency at the expense of its resilience to spreading risk, | Investments in transportation infrastructure and trade agreements have helped to increase the connectivity between nations: may enable consumers to access food from a variety of sources in the event that a major exporter is disrupted; but may enable production shocks and export restrictions to be transmitted to importers | NA |
| **Mushtaq, S. et al. (2020**) “Creating positive synergies between risk management and transfer to accelerate food system climate resilience,” Climatic Change, 161(3), pp. 465–478. Available at: https://doi.org/10.1007/s10584-020-02679-5. | resilience-based conceptual framework for integrating risk management and risk transfer strategies ; |  | fast climate change; if risk management and risk transfer strategies are not carefully integrated, there is potential to undermine adaptive capacity (e.g. insurance subsidies may dissuade farmers from investing in climate adaptation) and result in reduced resilience; costs for adaptation outweight benefit of adaptation; small farmers might not be able to afford insurance for climate caused risks | food waste is an ethical issue, since 800 million people suffer from hunger worldwide. increased communication, knowledge diffusion, and training about how to build resilience and improve food waste reduction practices among different agents can have a social impact. | four key principles: (1) pro-active investments in farmer climate adaptation rather than re-active disaster relief, (2) structuring of government subsidies around insurance and climate disaster relief to incentivise farmer climate adaptation, (3) rewarding farmer efforts towards climate adaptation with cheaper insurance premiums for those farmers that invest resources into climate adaptation and (4) recognising investments in the integration of farm climate adaptation and risk transfer schemes within the broader context of future climate disaster risk management and global food security |
| **Costa, F.H. et al. (2022)** “Does resilience reduce food waste? analysis of Brazilian supplier-retailer Dyad,” Journal of Cleaner Production, 338, p. 130488. Available at: https://doi.org/10.1016/j.jclepro.2022.130488. | Empirical analysis in retailer-supplier dyad of four retail chains was carried out to identify the relationship between the elements of resilience and food waste reduction (fruits and vegetables). | Financial health and redundancy increased the level of food waste., Flexibility can reduce or increase food waste; Collaboration, communication, flexibility, innovation, knowledge management, leadership, security technologies and supply chain design contributed to food waste reduction. |  | food waste is an ethical issue, since 800 million people suffer from hunger worldwide. increased communication, knowledge diffusion, and training about how to build resilience and improve food waste reduction practices among different agents can have a social impact. | resilience in the agriculture sector can improve the use of land, labor and food security |
| **Brassesco, M.E., Pintado, M. and Coscueta, E.R. (2021)** “Food system resilience thinking: From Digital to integral,” Journal of the Science of Food and Agriculture, 102(3), pp. 887–891. Available at: https://doi.org/10.1002/jsfa.11533. |  | circular economy (sustainability), resilience value chain (policymakers, development agencies, agribusinesses, farmers), resilience diet and consumption (reduction of food losses and waste, shifting toward healthy diet, Integrated food system |  |  |  |
| **van Wassenaer, L. et al. (2021)** “Food system resilience: Ontology development and impossible trinities,” Agriculture & Food Security, 10(1). Available at: https://doi.org/10.1186/s40066-021-00332-7. | provides a multidisciplinary evaluation of the literature to identify common themes that prevail in food system resilience debates and the challenges to reach a unified conceptualisation; provide insights into some of the main issues and tensions; PRIMA-protocol in selecting and documenting the literature as specified in Moher et al. Literature search: 1) Resilience AND ‘food system’; (2) ‘Food systems’ AND ‘extreme event’; (3) Ontology AND Resilience. Content analysis using text-mining software LeximancerFootnote5 | Food system resilience definitions, ontology development, challenges: The "Trilemma" of resilience research, | Interdisciplinary communication between different fields, The challenge is to identify context-specific challenges and policy options using the ‘resilience lens’ and translating the concept into measurable indicators. |  | investigate the social, environmental, and economic trade-offs implied in policy strategies towards resilience at various levels of food systems and among different actors or groups of actors |
| **Varyvoda, Y. and Taren, D. (2022)** “Considering ecosystem services in food system resilience,” International Journal of Environmental Research and Public Health, 19(6), p. 3652. Available at: https://doi.org/10.3390/ijerph19063652. | Patterns of ecosystem services-based strategies were revealed that can be introduced to cope and adapt to climate-related natural hazards at the smallholder food system level. | food system diversification, technological innovations and nature-based practices, and traditional and indigenous knowledge operationalized across the food system components have a potential for sustaining smallholder resilience in the face of natural hazards. The empirical illustrations suggest that smallholder farmers have a higher resilience capacity and maintain their food systems by ecosystem services utilization. | prevalence and severity of natural hazards, exacerbated by an insufficient support for regulating ecosystem services | promoting ecosystem services-based responses that benefit smallholder farmers | Promoting Food System Diversification, Increasing Cohesion between Technological Innovations and Nature-Based Solutions, Utilizing Traditional and Local/Indigenous Knowledge, |
| **Menconi, M.E., Stella, G. and Grohmann, D. (2022)** “Revisiting global food production and consumption patterns by developing resilient food systems for local communities,” Land Use Policy, 119, p. 106210. Available at: https://doi.org/10.1016/j.landusepol.2022.106210. | Development of Food self-sufficiency index | outcome for resilience- improving technical solutions, improving the communities involvement, improving agro-biodiversity, using complex system approaches in food planning |  |  |  |
| **Hedberg, R.C. (2021)** “An instrumental‐reflexive approach to assessing and building food system resilience,” Geography Compass, 15(7). Available at: https://doi.org/10.1111/gec3.12581. | develop an approach to resilience that deploys empirical assessments to provide instrumental knowledge of food systems, but also engages reflexively with empirical findings to consider how they interact with entrenched power relations across multiple scales | approach to resilience that, provides significant utility for farmers and food system workers, and gives support for dismantling unjust and exploitative structures in our current food systems. | land dispossession, political instability, patriarchy, ethnic violence, malnutrition, poverty, labor exploitation, | frameworks for instrumental-reflexive assessments of food system resilience focusing on either soil, biodiversity, or nutritional resources | Instrumental-reflexive approach to food system resilience offers a powerful framework that captures the strengths of resilience science and provides robust support for the necessary work of building more just and equitable food systems. |
| **Walsh, L. (2022)** “Regional Food System Resilience in Ireland: A ‘potato effect,’” Regional Studies, Regional Science, 9(1), pp. 172–176. Available at: https://doi.org/10.1080/21681376.2022.2046496. |  | Ireland depends on European imports of potatoes, mainly from the UK. graphic of imported potatoes, vegetables and fruits to Ireland | Brexit will impact almost solely potato import; they want to explore how local production and imports from more far away countries could function |  |  |
| **Herrera, H. and Kopainsky, B. (2022)** “Using microworlds for policymaking in the context of resilient farming systems,” Journal of Simulation, pp. 1–25. Available at: https://doi.org/10.1080/17477778.2022.2083990. | explore the conditions for a scenario that finds a compromise between environmental and socioeconomic goals with the aim of finding sustainable futures for meat producers in Europe. concept of resilience as a framework to understand how meat production systems may adjust to the challenging environmental, social, and political conditions |  |  |  |  |
| **Merkle, M. et al. (2021)** “How does market power affect the resilience of food supply?,” Global Food Security, 30, p. 100556. Available at: https://doi.org/10.1016/j.gfs.2021.100556. | how shocks are potentially mitigated or amplified by the increasing consolidation of market power in globally interconnected food supply chains; examples from the UK; | Homogenous processes, low functional diversity, rigid contracts, low autonomy, and low redundancy can imply low resilience.  Financial capacity, flexibility, robust logistics, and cooperation can help mitigate shocks and thus increase resilience. Resilience can be overlooked if only consumer prices are considered. The external costs of food systems require regulation. | extreme weather, unsustainable agricultural practices, political crises affecting trade, and pandemics. The impact of power imbalance on food system resilience is completely dependent on the powerful firm. without accountability for social or environmental consequences, powerful retailers can be detrimental. powerful firms fail to a transmit information about ecological impacts and, by extension, to promote ecosystem resilience. | Market concentration and vulnerability; Firm size: a trade-off between infrastructure and flexibility: (small scale firms might be more flexible than larger ones). Conflicts between efficiency and resilience; Costs and benefits of power imbalances; Competition vs. cooperation |  |
| **Karan, E.P., Asgari, S. and Asadi, S. (2022)** “Resilience assessment of centralized and distributed food systems,” Food Security, 15(1), pp. 59–75. Available at: https://doi.org/10.1007/s12571-022-01321-9. | investigation the relationship between the degree of centralization of food system and their resilience to disruption in the supply of energy, water or labour using a quantitative method. |  |  | shortage of labour in the sector |  |
| **Marusak, A. et al. (2021)** “Resilient regional food supply chains and rethinking the way forward: Key Takeaways from the COVID-19 pandemic,” Agricultural Systems, 190, p. 103101. Available at: https://doi.org/10.1016/j.agsy.2021.103101. | it presents 7 case studies of regional food supply system in the US that adopted logistics best practices to enable them to provide customers with convenient and safe supply during the covid-19 emergency |  |  |  |  |
| **Himanen, S. J., P. Rikkonen, and H. Kahiluoto. (2016).** Codesigning a resilient food system. Ecology and Society 21(4):41. https://doi.org/10.5751/ES-08878-210441 | Delphi method, to identify key determinants of adaptive capacity for food system actors, utilization of operating environment of industrial European counties, Method: brainstorming workshop with food system actors | institution and policy rigidity to changes, fast adaptations of actors (balance between max profitability and being resilient in a long term |  |  |  |
| **Renard, D. and Tilman, D. (2019)** “National Food Production Stabilized by crop diversity,” Nature, 571(7764), pp. 257–260. Available at: https://doi.org/10.1038/s41586-019-1316-y. | evaluate a complementary possibility—that greater diversity of crops at the national level may increase the year-to-year stability of the total national harvest of all crops combined. 5 decades of data on annual yields of 176 crop species in 91 nations | greater effective diversity of crops at the national level is associated with increased temporal stability of total national harvest. Crop diversity has stabilizing effects that are similar in magnitude to the observed destabilizing effects |  | increasing national effective crop diversity may be an additional way to address this challenge. |  |
| **Sandström, V. et al. (2022)** “Food system by-products upcycled in livestock and aquaculture feeds can increase global food supply,” Nature Food, 3(9), pp. 729–740. Available at: https://doi.org/10.1038/s43016-022-00589-6. | data on global food system material flows for crop, livestock and aquaculture production, focusing on feed use and the availability of by-products and residues; analysed the potential of replacing food-competing feedstuff—here cereals, whole fish, vegetable oils and pulses that account for 15% of total feed use—with food system by-products and residues | Considering the nutritional requirements of food-producing animals, including farmed aquatic species, this replacement could increase the current global food supply by up to 13% (10–16%) in terms of kcal and 15% (12–19%) in terms of protein content |  |  |  |
| **Nicholson, C.C., Emery, B.F. and Niles, M.T. (2021)** “Global relationships between crop diversity and nutritional stability,” Nature Communications, 12(1). Available at: https://doi.org/10.1038/s41467-021-25615-2. | 55 years of data across 184 countries, we assemble 22,000 bipartite crop-nutrient networks to quantify nutritional stability by simulating crop and nutrient loss in a country, and assess its relationship to crop diversity across regions | positive, saturating relationship between crop diversity and nutritional stability across countries, but also show that over time nutritional stability remained stagnant or decreased in all regions except Asia |  |  |  |
| **Kummu, M. et al. (2020)** “Interplay of trade and food system resilience: Gains on supply diversity over time at the cost of Trade Independency,” Global Food Security, 24, p. 100360. Available at: https://doi.org/10.1016/j.gfs.2020.100360. | Impacts of international food trade on multiple indicators of food system resilience are assessed over last three decades | Food supply diversity increased at the cost of increased dependency on food imports. Production diversity decreased in major exporting countries Increased dependency on food imports combined with drop in trade partners might lead to vulnerability on food shocks. |  |  |  |
| **Clay, N., Garnett, T. and Lorimer, J. (2019)** “Dairy intensification: Drivers, impacts and alternatives,” Ambio, 49(1), pp. 35–48. Available at: https://doi.org/10.1007/s13280-019-01177-y. | review the drivers and impacts of dairy intensification; assess three frameworks—sustainable intensification, multifunctionality, and agroecology | four prominent concerns about dairy intensification: the environment, animal welfare, socioeconomic well-being, and human health. |  |  |  |
| **Springmann, M. et al. (2018)** “Options for keeping the food system within environmental limits,” Nature, 562(7728), pp. 519–525. Available at: https://doi.org/10.1038/s41586-018-0594-0. | analyse several options for reducing the environmental effects of the food system, including dietary changes towards healthier, more plant-based diets, improvements in technologies and management, and reductions in food loss and waste. | show that between 2010 and 2050, as a result of expected changes in population and income levels, the environmental effects of the food system could increase by 50–90% in the absence of technological changes and dedicated mitigation measures, |  |  |  |
| **Grafton, R.Q. et al. (2019)** “Realizing resilience for decision-making,” Nature Sustainability, 2(10), pp. 907–913. Available at: https://doi.org/10.1038/s41893-019-0376-1. | define social-ecological resilience as a property of social-ecological systems that includes at least three main characteristics — resistance, recovery and robustness (the ‘three Rs’) | offer practical, systematic guidance about how to realize resilience. |  |  |  |
| **Zurek, M., Hebinck, A. and Selomane, O. (2021)** “Looking across diverse food system futures: Implications for climate change and the environment,” Q Open, 1(1). Available at: https://doi.org/10.1093/qopen/qoaa001. | We synthesize key drivers of food systems and their impact on food system outcomes. We distil trends and strategies identified across the reports and their scenarios and discuss the diversity of ‘sustainability pathways’ and ‘solution spaces’. | Resource protection and adaptation balanced with significant greenhouse gas emission reductions are vital to food system transformation. There is less consensus on the choice of change options and how to address potential trade-offs. |  |  |  |
| **Zurek, M. et al. (2018)** “Assessing Sustainable Food and nutrition security of the EU Food System—an integrated approach,” Sustainability, 10(11), p. 4271. Available at: https://doi.org/10.3390/su10114271. | (1) nutrition and diet, environmental and economic outcomes together with social equity dimensions and (2) system interactions across country, EU and global scales; n integrated analytical approach and new ways to communicate this complexity outside science | The Sustainable Food and Nutrition-Visualizer, designed to communicate complex policy change-impacts and trade-off questions, enables an informed debate about trade-offs associated with options for change among food system actors as well as in the policy making arena. |  |  |  |
| **Röös, E., Bajželj, B., Smith, P. et al. (2017).** Protein futures for Western Europe: potential land use and climate impacts in 2050. Reg Environ Change 17, 367–377 https://doi.org/10.1007/s10113-016-1013-4 | The scenarios were as follows: intensive and efficient livestock production using today’s species mix; intensive efficient poultry–dairy production; intensive efficient aquaculture–dairy; artificial meat and dairy; livestock on ‘ecological leftovers’ (livestock reared only on land unsuited to cropping, agricultural residues and food waste, with consumption capped at that level of availability); and a ‘plant-based eating’ scenario. For each scenario, ‘projected diet’ and ‘healthy diet’ variants were modelled. Quantified the theoretical maximum carbon sequestration potential from afforestation of spared agricultural land | land use could be cut by 14–86 % and GHG emissions reduced by up to approximately 90 %; yearly carbon storage potential arising from spared agricultural land ranged from 90 to 700 Mt CO2 in 2050; artificial meat and plant-based scenarios achieved the greatest land use and GHG reductions and the greatest carbon sequestration potential; The ‘ecological leftover’ scenario required the least cropland as compared with the other meat-containing scenarios, but all available pasture was used, and GHG emissions were higher if meat consumption was not capped at healthy levels. |  |  |  |
| **Röös, E. et al. (2017)** “Greedy or needy? land use and climate impacts of food in 2050 under different Livestock Futures,” Global Environmental Change, 47, pp. 1–12. Available at: https://doi.org/10.1016/j.gloenvcha.2017.09.001. | Land use and greenhouse gas emissions for different livestock futures are modelled. Two dietary variants are modelled: a projected following trend and a healthy one | Available cropland will not suffice in 2050 for any diet without yield increases. Intensification of livestock reduce land use and emissions. A reduction of animal products will substantially reduce land use and emissions. |  |  |  |

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| **Fair Food System published literature sources** | | | | | |
| **Author** | **Aim, Objective, Methodology** | **Key Findings | Information on intervention** | **Root causes or barriers to TRF Food system** | **Evaluation of scale and consequences of social and economic needs** | **Strategies to achieve fully transparent, resilient and fair food system** |
| **Gracia-Arnaiz, M. (2022)** “The precarisation of daily life in Spain: Austerity, social policy and food insecurity,” Appetite, 171, p. 105906. Available at: https://doi.org/10.1016/j.appet.2021.105906. | The effect of economic crisis on ways of eating of precarious people; participant-observation ethnography ; | Substantial changes in food procurement and eating practices; Strategies include buying different foods, shopping  less often and/or in different stores, seeking out cheaper brands, preparing simpler dishes, growing food and  recycling leftovers. Their food itineraries reflect increasing reliance on charities, although a common alternative  is meals prepared outside the home by family, neighbourhood, activist organisations or themselves. Too reliance on charitable and humanitarian  organisations. | 1-The austerity policies to reduce public spending have accelerated the processes of dispossession and precariousness: social class continues to be the ma main explanatory variable for unequal access to food. 2-There is a lack of official data at local, regional and state level on how the scarcity of resources affects daily nutrition and how structural inequalities are translated into forms 3-The government does not acknowledge that food insecurity exists as a permanent phenomenon |  | Participatory initiatives become political spaces to rethink the distribution of food |
| **Deaton, B.J. and Scholz, A. (2022)** “Food security, food insecurity, and Canada’s national food policy: Meaning, measures, and assessment,” Outlook on Agriculture, 51(3), pp. 303–312. Available at: https://doi.org/10.1177/00307270221113601. | AIM-understanding the potential of Canadian Federal Government's Food Policy (CFP) in addressing food insecurity issue.  OBJECTIVE - reviewing the CFP's programmatic contents, in order to evaluate their potential in contrasting severe food insecurity  METHODOLOGY - analysis of CFP's food insecurity definition; project analysis | 1. Projects to combat food insecurity must work on increasing household income or reducing food prices for food-insecure households, articulating their measures according to the intensity of food insecurity (marginal, moderate or severe). This variation has implications for both the design and evaluation of programmes.  For this reason, the article proposes a roadmap for decision-making based on the relationship between income, food prices and food insecurity at various levels of intensity to guide public administration in the evaluation of projects, following three simple questions: (i) will the project significantly increase income or reduce food prices and (ii) will food insecure people really participate in the programme and, if so, which subgroup of food insecure people should participate in the programme?  2. An additional consideration is the variation of food insecurity  by geography and ethnicity of food insecure families (intersectional approach). | 1. Asymmetric interests in shaping interventions. Being motivated  by the public good, many will have intense interests  in these policies; conversely, ulterior motives of personal  gain or interests might steer programmatic efforts in a  manner that is counter-productive to increasing economic  access to food for the most vulnerable. 2. unclear definitions of what constitutes food insecurity in CFP, that doesn't consider: - relations with   other concerns (e.g.) poor health outcomes  and high health care costs; - variability of intensity (low, medium, high) | High relevance | i) very thoughtful and precise focus on the definition of food  security, its measure, and assessment. The responsibility for  this deliberative approach falls primarily to the government  ii) the government is also responsible for making sure that the intended beneficiaries — the food insecure themselves — are a central consideration; |
| **Blackmon, L. et al. (2021)** “Rapid development of a decision support system to alleviate food insecurity at the Los Angeles Regional Food Bank amid the Covid‐19 pandemic,” Production and Operations Management, 30(10), pp. 3391–3407. Available at: https://doi.org/10.1111/poms.13365. | To describe a DSS (Decision Support System)  co-developed by LARFB, Salesforce, and UCLA based on asking: (a) suppliers to distribute food boxes directly to agencies (shelters, food pantries, and soup kitchens); and (b) food banks to serve as “virtual intermedi- aries” to coordinate supply and demand between suppliers and agencies | The DSS improved the efficiency of the LARFB operations and relieved the extra workload created by the virtual supply chain. Without this DSS, it would have been impossible for the LARFB to coordinate the food distribution for the Box Program as the volume continued to grow. Also, this DSS reduced the time for LARFB to manage the Box Program so that they can continue to manage their regular food distribu- tion to feed more people living with constant food insecurity. | Unless one can change the current practice, there is no economic incentive for distributors and LARFB to collaborate. | High | This DSS made LARFB to coordinate the food distribution for the Box Program as the volume continued to grow. Also, this DSS reduced the time for LARFB to manage the Box Program so that they can continue to manage their regular food distribu- tion to feed more people living with constant food insecurity |
| **Sharma, A. et al. (2022)** “Adopting a systems view of disrupting crisis-driven food insecurity,” Public Health, 211, pp. 72–74. Available at: https://doi.org/10.1016/j.puhe.2022.07.007. | Minimizing food insecurity during the next crisis will require coordinated efforts across the system  (macro-meso-micro levels) to spur social innovation that would potentially bring food to those in need. In this short communication, we explore this notion of a system-wide approach at the macro level (policies, regulations, and national programs), meso level (organizational and intersectoral), and micro level (household and individual) through analysis of existing literature. | There is a critical need to re-evaluate  and design the current strategies, centered around emergency  preparedness, creating avenues for partnerships and community  engagement. Systematic efforts need to happen across the macro,  meso, and micro levels of our society. Eventually, these efforts will  need to be synchronized, to avoid delicacy, and to ensure synergies,  thereby maximizing the impact by leveraging available resources. |  |  | MACRO LEVEL: Strengthening food production and distribution; Short and long term financing for food producers; Education; Active donation programs; Zoonotic disease prevention; MACRO LEVEL: Strengthening food production and distribution  Short and long term financing for food producers  Education  Active donation programs  Zoonotic disease prevention  National food waste prevention initiatives; MESO LEVEL: Identifying potential stakeholders: Local farms, producers, and food businesses; Non-profit organizations and networks; Storage transportation and distribution; Local schools; Community based organizations; Increased resilience of the local food systems; Minimize supply chain disruptions; Market and institutional structure; Increase donations; Maintaining inter- organizational relationships; Practical food waste prevention initiatives; MICRO LEVEL: Financial and administrative support for communities; Set up food banks and community kitchens; Increased engagement within communities; Identify food insecure individuate; Promotional program from food banks and community kitchens; Politically acceptable policies and price incentives; Investing in indigenous foods |
| **Barons, M.J. and Aspinall, W. (2020)** “Anticipated impacts of Brexit scenarios on UK food prices and implications for policies on poverty and Health: A Structured Expert Judgement Approach,” BMJ Open, 10(3). Available at: https://doi.org/10.1136/bmjopen-2019-032376. | To investigate food price drivers for household food security and its health consequences in the UK under scenarios of Deal and No-deal for Britain’s exit from the European Union. To estimate the 5% and 95% quantiles of the projected price distributions | When combined in proportions used to calculate Consumer Price Index food basket costs, median food price change for Brexit with a Deal is expected to be +6.1% (90% credible interval −3% to +17%) and with No-deal +22.5% (90% credible interval +1% to +52%) | a low food budget leads to increasingly poor diet suggests that demand for health services in both the short and longer terms is likely to increase due to the effects of food insecurity on the incidence and management of diet-sensitive condition | Medium | Stop the increasing of food prices |
| **Brannen, J. and O'Connell, R. (2021)** Families and food in Hard Times: European Comparative Research. London, UK: UCL Press. | i)To describe how parents (especially mothers) living on low incomes in wealthy societies manage to feed their children ii) to describe the relational and material support network of families iv) how a lack of resources make children and mothers feel when they cannot live or eat according to a socially acceptable standard of living and whihc is the role of school meals iii)to give an operational definition of food poverty iv)comparative study of three European countries (UK, Portugal and Sweden) | i) Contextualized and multidimensional definition of food poverty (material, social and psycho-emotional) ii)household composition has consequences on the probability of being food poor, especially when families include children or immigrants components iii)intersectionality in the distribution of food poverty in the population iv)support network, when it exists, is fundamental for making ends meet v)school meal reduces inequalities vi)food poverty is gendered vii)children and parents experience social exclusion and isolation because of their condition of food poverty | i)Lack of social policies ii)welfare retrenchment iii) labor market insecurity iv)neoliberal conception of welfare v)de-politicization of food poverty, | High relevance | i) In acheiving environmental and social justice, international collaboration will be essential and national governments and local infrastructure and communities will need to work together. ii)An alternative economic logic that recognises the centrality of reproductive work to livelihoods and invests in social as well as physical infrastructure must be a central priority. Rethinking of the common wealth iii)strong citizenship narrative needs to be created that is rooted in communities and institutions such as political parties, unions and civic associations which give meaning to collective identity iv)Children living in poverty should be at the forefront of long- term  strategies and the political agenda. |
| **Dailey, A. et al. (2022)** “Responding to food insecurity and community crises through Food Policy Council partnerships in a rural setting,” Progress in Community Health Partnerships: Research, Education, and Action, 16(2S), pp. 39–44. Available at: https://doi.org/10.1353/cpr.2022.0037. | Describe the progress in a community food policy council partnership by presenting the elements of success in facilitating policy change and programs that have helped respond to a variety of challenges, including the COVID-19 crisis. | The primary elements that have contributed to sustaining the work of the local food policy council include having a common agenda; collaboration; maintaining independent but mutually supporting member organizational goals; valuing those who are most impacted; and continuous communication  The creation of the ACFPC was a direct result of Support Circles families sharing their stories of food insecurity with other community members and organizations, making it clear that existing food assistance programs were not adequately addressing the full scope of the need. By valuing and listening to those most affected, the ACFPC was able to bring people and  organizations working independently on local foods and food access issues together to create a common food access agenda. By keeping this common agenda at the center of the LFPC’s work, member organizations have independently changed institutional policies and procedures, which have affected community-level operations, policies and local awareness about food issues.  Listening to participant’s voices about how to foster dignity and autonomy in food choices, the organization was able to remodel the food pantry space to offer a shopping experience similar to going to a  retail store, allowing families to choose the foods they prefer.   The primary elements that have contributed to sustaining the work of the local food policy council include having a common agenda; collaboration; maintaining independent but mutually supporting member organizational goals; valuing those who are most impacted; and continuous communication  The creation of the ACFPC was a direct result of Support Circles families sharing their stories of food insecurity with other community members and organizations, making it clear that existing food assistance programs were not adequately addressing the full scope of the need. By valuing and listening to those most affected, the ACFPC was able to bring people and  organizations working independently on local foods and food access issues together to create a common food access agenda. By keeping this common agenda at the center of the LFPC’s work, member organizations have independently changed institutional policies and procedures, which have affected community-level operations, policies and local awareness about food issues.  Listening to participant’s voices about how to foster dignity and autonomy in food choices, the organization was able to remodel the food pantry space to offer a shopping experience similar to going to a  retail store, allowing families to choose the foods they prefer.   The primary elements that have contributed to sustaining the work of the local food policy council include having a common agenda; collaboration; maintaining independent but mutually supporting member organizational goals; valuing those who are most impacted; and continuous communication  The creation of the ACFPC was a direct result of Support Circles families sharing their stories of food insecurity with other community members and organizations, making it clear that existing food assistance programs were not adequately addressing the full scope of the need. By valuing and listening to those most affected, the ACFPC was able to bring people and  organizations working independently on local foods and food access issues together to create a common food access agenda. By keeping this common agenda at the center of the LFPC’s work, member organizations have independently changed institutional policies and procedures, which have affected community-level operations, policies and local awareness about food issues.  Listening to participant’s voices about how to foster dignity and autonomy in food choices, the organization was able to remodel the food pantry space to offer a shopping experience similar to going to a  retail store, allowing families to choose the foods they prefer. |  | New members have identified a steep learning curve and that the council could facilitate better communication by creating orientation packets and assigning mentors to interested potential new partners. | shared goals, informal  norms and open structure has contributed to sustained representation on the council from many  local organizations- |
| **Fox, R. and Frye, J. (2021)** “Pivoting in the time of COVID-19: An in-depth case study at the nexus of food insecurity, resilience, system re-organizing, and caring for the community,” Frontiers in Communication, 6. Available at: https://doi.org/10.3389/fcomm.2021.674715. | AIM - growing  literature on resilience, understanding how communication processes can support  adaptive crisis behavior, organizational restructuring, building  resilience, and creatively advancing food security.   OBJECTIVE - to identify lessons learned by the activity in contrasting food insecurity and enhancing food justice of Crystal Bridges Museum of American Art during the pandemic that might be useful for other  organizations who seek to foster meaningful engagement with the  public, especially in times of crisis.  METHODOLOGY - textual  analysis of in-depth evaluation materials produced by Crystal  Bridges Museum (based on data collected before, during and after the project) to identify barriers and facilitators to achieving their objectives + qualitative interviews with 5 museum employees on the  communication, operations and logistics of the project | 1. Food insecurity and food justice are not the same and are not overlapping/interchangeable.   2. food insecurity and food justice needs can be addressed through communicative and organisational processes even by actors who do not traditionally have such competence (e.g. a museum).  3. this innovative outlook has led to new ways of listening to community needs and increasing community involvement.  4. these new forms move away from traditional ways that construct beneficiaries as dependent, disempowered clients of projects instead of partners   5. to do this, it is necessary to think and act as agents of sustainable development, not organisations responding to an emergency, activating partnerships with other organisations. | 1. Conventional approaches to food poverty, in particular in emergency situation (Covid-19), imply potentially conflictual relationships among organisations. | Medium relevance | i) dealing simultaneously with food security and food justice |
| **Godrich, S.L., Barbour, L. and Lindberg, R. (2021)** “Problems, policy and Politics – Perspectives of public health leaders on food insecurity and human rights in Australia,” BMC Public Health, 21(1). Available at: https://doi.org/10.1186/s12889-021-11188-8. | This study aimed to: explore perspectives from public health nutrition experts on the usefulness of drawing on the international human right to food, and associated mechanisms, to address food insecurity; identify potential roles of key stakeholders in Australia to implement a rights-based approach; and examine barriers and enablers to achieving the right to food in Australia. Methods: Qualitative in-depth interviews were conducted with key informants | Findings affirm that, while novel is starting to be used more in the Australian public health context, human rights language may not be widely useful for improving food security in Australia currently. Moreover, study respondents suggested the government should lead legislative changes. | Barriers to change include a lack of wide-spread awareness of what a human rights-based approach to food security is, lack of enforceable human rights law as a mechanism for change, and a siloed working approach in a “corporatised” charitable food sector. | In order to gain traction, the issue of food security must be framed with more publicly clear language to non-academic workers. | The government should lead legislative changes; the not-for-profit sector should act as connectors between government and community members, the research sector could support food insecurity monitoring and evaluation, legal professionals should assist with the framing of human rights terminology and citizens should drive the political agenda, holding government to account. |
| **Abebe Gurganus, E. et al. (2021)** “Stakeholders’ perspectives on the current status of partnerships between the food banking and healthcare systems to address food insecurity in the U.S.,” Nutrients, 13(12), p. 4502. Available at: https://doi.org/10.3390/nu13124502. | The research examined food banking stakeholders’ views on the current state of partnerships between food banking and healthcare systems to address the social determinants of food insecurity. The study utilized both semi-structured interviews and open-ended responses from a national survey of food bank directors. | Two major themes emerged from the data: (1) Stakeholders from the healthcare and food banking systems are currently coordinating to achieve collective impact on addressing SDOH, and (2) Food bank-healthcare partnerships are leveraging a variety of resources and vested interests within the medical community. | Social Determinants Of Health are the root causes of both food insecurity and associated health issues. To address SDOH, food banking stakeholders’ need to engage healthcare sector partners | In order to challenge SDOH, the research recognized that the healthcare sector is expanding, both in the resources that different partners can bring to the table, as well as their motivations to do so. This reality has implications for how food banks may frame and message partnership opportunities to healthcare groups. | This study provides contributes by highlighting the significant partnerships that are taking place at the interface of the food banking and healthcare sectors. It also brings to the forefront the views of food banking stakeholders, regarding their perspectives on food insecurity. |
| **Gyasi, R.M., Phillips, D.R. and Adam, A.M. (2020)** “How far is inclusivity of financial services associated with food insecurity in later life? implications for health policy and sustainable development goals,” Journal of Applied Gerontology, 40(2), pp. 189–200. Available at: https://doi.org/10.1177/0733464820907441. | This study investigates how financial services inclusion (FSI) may affect food insecurity among older Ghanaians and seeks to identify any modifying roles of age and gender in the associations. Data were analyzed for 1,200 adults aged 50+ years. Generalized linear models with a logit link function examined associations and interaction terms. Average FSI score was 1.9 (SD = 1.8), and the prevalence of hunger and breakfast skipping were 35.6% (95% confidence interval [CI]: [32.9%, 38.4%]) and 28.8% (95% CI: [26.3%, 31.5%]) respectively | Development of policies to empower older people economically through increased financial literacy and easier access to financial services may help actualize the Sustainable Development Goal 2 | When savings are absent, the use of services such as taking of loans had no effect on experiencing food insecurity in this older Ghanaian sample | High | Our results underline the importance of both composite and service-specific inclusion for lowering the odds of food insecurity. |
| **Hartline-Grafton, H. and Hassink, S.G. (2021)** “Food insecurity and health: Practices and policies to address food insecurity among children,” Academic Pediatrics, 21(2), pp. 205–210. Available at: https://doi.org/10.1016/j.acap.2020.07.006. | to describe the prevalence of and risk factors for food insecurity among chil- dren, consequences of food insecurity for children, federal nutrition programs that improve household food security and child health, and actions paediatricians can take in their practice and through advocacy to meaningfully address food insecurity among children. | Food insecurity has serious consequences on the health, development, and well-being of children, and has negative effects on the health care system and economy | Paediatricians can support and improve the health of their patients, as well as children across the nation, by addressing food insecurity and its root causes at the practice level and through policy advocacy. | High | Pediatricians can engage in advocacy in a number of ways during program reauthorization and other legislative opportunities, such as writing an op-ed in their local news- paper about food insecurity and time-sensitive legislation, providing expert testimony to legislators about the conse- quences of food insecurity and the importance of the fed- eral nutrition programs for their patients, or submitting written comments to government agencies during public comment periods on proposed rules that could harm or improve federal nutrition programs. |
| **Hines, C.T., Markowitz, A.J. and Johnson, A.D. (2021)** “Food insecurity: What are its effects, why, and what can policy do about it?,” Policy Insights from the Behavioral and Brain Sciences, 8(2), pp. 127–135. Available at: https://doi.org/10.1177/23727322211032250. | This article aims at summarizing what is known about the effects of food insecurity on child development. It then considers how food insecurity harms children and explores both direct pathways through child health and indirect pathways through parenting and parent wellbeing. Finally, after reviewing existing policies for reducing food insecurity, the research provides suggestions for new policies and policy targeted research. | Food insecurity influences child development both directly via nutrition and indirectly, through parental depression, parenting stress, and parenting practices. In addition, parental hunger itself may play a role. Hunger among adults can increase aggressive behaviour and negative emotion, suggesting that hunger’s physiological effects may influence how parents interact with their children. | The emotional strain that parents experience alongside economic hardship and food insecurity may undermine their ability to engage in warm, sensitive, and responsive behaviors with children. As child–caregiver interactions are the engines of early development, compromised parent–child interactions will impede child outcomes | Children experience more internalizing and externalizing problems during periods when they find themselves in conditions of more intense food insecurity, which provides strong evidence that food insecurity predicts damaged children’s behaviour. | First, programs should expand to ensure they reach the youngest children. Indeed, existing evidence highlighted the influence of early food insecurity on development, and particularly on social-emotional skills, which are highly predictive of long-term well-being. Second, food assistance programs should aim to reduce parent distress and support the family system because there is indirect pathway between food insecurity and development through parenting and parent wellbeing. |
| **Laska, M.N. et al. (2021)** “Sociodemographic and health disparities among students screening positive for food insecurity: Findings from a Large College Health Surveillance System,” Preventive Medicine Reports, 21, p. 101297. Available at: https://doi.org/10.1016/j.pmedr.2020.101297. | to assess sociodemographic and health disparities among two- and four-year post-secondary students screening positive for food insecurity, using one of the largest relevant health surveillance databases available | Findings highlighted stark disparities, with notably high positive screening rates of food insecurity among non-Hispanic Black (43%), transgender/non-binary (42%) and first-generation (33%) students | FI is inextricably tied to economic factors, and students who screened positive for Food Insecurity reported lower parental income, more student loans and more credit card debt than their counterparts. | High | The challenge for higher education decision-makers now is to rapidly discern how best to address the growing needs of underserved students. Numerous state and federal bills addressing college Food Insecurity are also under consideration,(Laska et al., 2020b, Laska and Fleischhacker, 2020) and public health professionals can play an important role in advocacy and dissemination of sound evidence. |
| **Men, F., Urquia, M.L. and Tarasuk, V. (2021)** “The role of provincial social policies and economic environments in shaping food insecurity among Canadian families with children,” Preventive Medicine, 148, p. 106558. Available at: https://doi.org/10.1016/j.ypmed.2021.106558. | To examine the association between provincial policies and economic environments and likelihood of experiencing food insecurity among households with children. | Higher sales tax and median wage predicted higher likelihood of food insecurity among above-LIM households. | Additionally, the higher odds of food insecurity among lone-parent and racialized families documented here highlights the need for research analogous to Shaefer et al. (2020) to explore potential differential effects of federal and provincial policies for specific subgroups. | High | Policies that increase minimum wage, reduce taxes, and create jobs may help alleviate food insecurity. |
| **Mui, Y. et al. (2021)** “Acquisition, mobility and food insecurity: Integrated food systems opportunities across urbanicity levels highlighted by COVID-19,” Public Health Nutrition, 25(1), pp. 114–118. Available at: https://doi.org/10.1017/s1368980021002755. | This study aimed to address the geographic patterns of food insecurity during the pandemic and their relationships with economic and mobility barriers across urbanicity.  The research was carried out relying on a national survey to investigate food-related experiences | The findings regarded the rural areas, where food-insecure individuals affirmed to purchase food from supercentres, reinforcing prior reports of the declining presence of local and independently owned grocery stores in rural towns in favour of the consolidation of larger sellers. In urban areas, there is increasing requests for local food, even outpacing those in rural areas. | It is not possible to set up solid solutions if only short-term food aid is taken into consideration; indeed, it has mitigated some acute food supply chain and economic disruptions, but it missed in fixing long-term solutions, which are imperative to address the root causes of food insecurity. If systems fail to plan for long-term structural changes, they will perpetuate pre-existing disparities in barriers to food acquisition that are likely to vary by levels of urbanicity | Food-insecure adults in urban area are constrained by the limited availability of culturally preferred foods. Overall, about one in four food-insecure adults reported transportation as a limitation to food acquisition, though this barrier did not vary significantly by urbanicity. | It is necessary to shorten supply chains, and create a reliable network in which there is a clear source of food, that may help both in empowering economic development and promoting the re-circulation of community income |
| **Reeves, A., Loopstra, R. and Tarasuk, V. (2021)** “Family policy and food insecurity: An observational analysis in 142 countries,” The Lancet Planetary Health, 5(8). Available at: https://doi.org/10.1016/s2542-5196(21)00151-0. | Are family policies (eg, cash transfers from governments that aim to support households with children) associated with reduced food insecurity? 142 countries  for 2014–17: multilevel analyses on the association between the presence of family policies for households with children  and the probability of reporting moderate or severe food insecurity | On average, moderate or severe food insecurity is  higher in households with at least one child younger than 15 years than in households with no children/ However, the additional risk of food insecurity among households with children is lower in countries that provide financial support  (either means-tested or universal) for families | In some countries, family policies have been cut back in the past decade and such retrenchment might expose low-income households to increased risk of food insecurity. |  | Increase income transfers for families with childern |
| **Steiner, J.F. et al. (2018)** “Food insecurity in older adults in an integrated health care system,” Journal of the American Geriatrics Society, 66(5), pp. 1017–1024. Available at: https://doi.org/10.1111/jgs.15285. | To estimate food insecurity prevalence and develop a statistical prediction model for food insecurity. | Of 130,208 older adult members between January 2012 and December 2015, 50,097 (38.5%) completed food insecurity screening, 2,859 of whom (5.7% of respondents) reported food insecurity. | This predictive model failed to identify many older adults who might benefit from referral to community-based food resources. | High | Specific individual characteristics, and a model based on those characteristics, can identify older adults at higher risk of food insecurity. System-level interventions will be necessary to connect older adults with community-based food resources. |
| **Walters, V.M., Garden, E. and Chamberlain, K. (2021)** “Beyond markets: Food poverty and the Non-commercial Food System,” Food, Culture & Society, 24(5), pp. 694–711. Available at: https://doi.org/10.1080/15528014.2021.1885593. | The study addresses the noncommercial food system in one region of Auckland. Moreover, it explores the goals and objectives that motivate actors to participate in the non-commercial food system, the activities they engage in, and their potential contribution to reducing food poverty. Further, it considers how working primarily outside the market-exchange system presents challenges to the scope, scale and sustainability of non-commercial food activities. | i)The non-commercial system is not necessarily independent o the commercial system, with many activities encompassing components and relationships in synergy to the commercial system. As an example, food banks frequently utilize donations of food from the commercial sector; food recovery projects rely on locating waste and out-of date food discarded by commercial operators, and community gardens seek and receive donations of plants and fertilizer from the commercial sector. ii) Actors face challenges related to resource constraints which limit the scope, scale, reach, and sustainability of their activities. | The non-commercial food groups are heavily dependent on volunteers and find it difficult to broker strategic relationships and secure external funding. Moreover, AFNs are insufficiently resourced to be sustainable and cannot ultimately remove food poverty for people living in impoverished circumstances. | State should ensure sufficient public funding is available to support the activities of third-sector actors. Moreover, State should address the systemic and structural determinants, such as quality affordable housing, adequate welfare provision, living wages, and the availability of affordable and nutritious food | Good strategy should foresee to conceptualize not-for-profit actors and their initiatives as operating within a “system” rather than as discrete initiative; this would bring to higher consideration of the contribution and challenges of the noncommercial food system in West Auckland for reducing food insecurity and food poverty. |
| **Barlow, P. et al. (2020)** “Liberal trade policy and food insecurity across the income distribution: An observational analysis in 132 countries, 2014–17,” The Lancet Global Health, 8(8). Available at: https://doi.org/10.1016/s2214-109x(20)30263-1. | To expand on previous work by doing—to our knowledge—the first empirical test of whether individuals living in countries with more liberal trade policies are less likely to be food insecure, and whether this association varies across country groups and household-income groups | The relationship between liberal trade policy and food insecurity varied across countries and households. Liberal trade policy was predominantly associated with lower food insecurity in high-income countries but corresponded to increased food insecurity among the world’s poorest households in low-income countries. | This measure should not be interpreted as specific to any particular sector, such as agriculture. | High | They found that liberal trade policy is, in the right conditions, associated  with lower food insecurity and thus might also help to alleviate associated health consequences. |
| **Candel, J.J. (2019)** “What’s on the menu? A global assessment of MUFPP signatory cities’ Food Strategies,” Agroecology and Sustainable Food Systems, 44(7), pp. 919–946. Available at: https://doi.org/10.1080/21683565.2019.1648357. | i) This study assesses the number of MUFPP cities that have developed food strategies and the choices local policymakers make in the design of these strategies | i)of all cities that have signed the MUFPP, about a quarter have also developed local strategies to steer food systems in desired directions ii)there seems to be an increase in the adoption of urban food strategies in recent years, which may be caused by the MUFPP and associated policy diffusion iii) | i)lack of local competencies with respect to supply and distribution as well as a possible knowledge gap about local food flows | High relevance | i)cities that signed MUFPP have to implement real policies related to the objectives of the Pact |
| **Gajda, R. and Jeżewska-Zychowicz, M. (2020)** “Elderly perception of distance to the grocery store as a reason for feeling food insecurity—can food policy limit this?,” Nutrients, 12(10), p. 3191. Available at: https://doi.org/10.3390/nu12103191. | The aim of the study was to assess the perception of food insecurity by the elderly in relation to their perception of the consequences of high and short distances to access food purchasing points. To do so, a cross-sectional quantitative survey was carried out, and, to select the research participants, the study sample was constructed using the snowball method. | The study found that restrictions in the availability of food, were more often associated with declaring concerns related to the availability of food, while slightly fewer people reported specific changes related to the availability of food in their households. Men reported greater problems with satisfying food security resulting from the availability of food purchase places. Indeed, the large distance from shops was conditioned by socio-demographic characteristics and conditioned food purchases. | The lack of shops nearby and the unfunctional public transport services, especially for people who do not drive, are key points of the failing possibilities for individuals to age autonomously. | It is known that the demand in the food desert areas is too small to encourage businesses to open new stores in places; hence, elderly are kept in a condition of lack of physical access to food. Therefore, to increase the sense of their food security, it would be necessary to develop other channels of distribution in food-insecure areas. | Online grocery sales may not be suitable for older people due to their limited use of modern technologies and little confidence in them. Thus, government-supported food distribution programs seem to be a good solution, especially in various situations of food shortage, primarily those resulting from financial problems. However, it is still necessary to develop solutions whose introduction should be preceded by research on their acceptance amongst older people. |
| **Miller, D.P. and Thomas, M.M.C. (2020)** “Policies to reduce food insecurity: An ethical imperative,” Physiology & Behavior, 222, p. 112943. Available at: https://doi.org/10.1016/j.physbeh.2020.112943. | Relying on the Capability Approach and Social Empathy Model the article proposes an ethical framework characterized by four principles: (1) embrace compassion, (2) create opportunity, (3) consider essential needs, and (4) promote knowledge and empathy. The framework means to show the necessity of an expansion-oriented approach to food and nutrition assistance policy. A SNAP evaluation is carried out to assess the validity of the framework within the four principles. | SNAP is an effective antipoverty program because it reaches the greatest number of Americans. Comparably, SNAP does less well with respect to its ability to cultivate knowledge and empathy. Indeed, the structure of the program does not acknowledge the necessary resources to prepare healthy foods, and benefits do not vary across areas with vastly different costs of living. Still, they do not meet families’ food needs throughout the month | Food policies shall rely on empathy to counter shame and stigma, which have long been associated with receipt of public assistance. This includes recognizing individuals’ dignity and freedom and conveying trust in and respect for food assistance beneficiaries by enhancing freedom to make individual food choices. | The benefits show on one side the inadequacy of the US social welfare system in meeting the needs of low-income families; on the other side, they demonstrate that SNAP and other nutrition programs are necessary. Nonetheless, a far broader series of supports may be helpful to restructure the food aid measures: universal basic income and universal health insurance programs characterized by ease of access, straightforward recertification and elements to limit stigma. | Researchers outline a series of recommendations to keep SNAP functioning: Electronic Benefits Transfer cards should be maintained as well as freedom of choice for recipients, both of which reduce stigma and assure dignity. Moreover, it is essential to restore benefits to recent immigrant families. Lastly, public marketing strategies are necessary to educate the public and policymakers about the challenges of achieving food security and to reduce stigma about receiving food assistance. |
| **Purdam, K. and Silver, D. (2020)** “Social policy and embedded evaluation: Assessing the impact of a food insecurity project in the United Kingdom,” Social Policy & Administration, 54(7), pp. 999–1015. Available at: https://doi.org/10.1111/spol.12583. | A social policy intervention focused on tackling food insecurity amongst vulnerable people is examined and the benefits and challenges of using an embedded approach to evaluation are considered. The research draws on a case study of a food insecurity intervention aimed at supporting people in the United Kingdom living on low incomes. The aim of the intervention was to help participants develop their cooking and food budgeting skills and so help them reduce the risks of food insecurity. | The intervention findings suggest that the classes had helped to re-engage the participants with food and cooking. The intervention had a positive impact on their lives including feeling more confident about cooking, having improved their skills, and being able to take food home to share with family and friends. The participants gained confidence and a sense of empowerment that helped reduce feelings of social isolation and provided a means for connecting with wider society in a positive way. | Many of the participants face acute problems including long-term poverty, for which policies aimed at tackling food insecurity need to go beyond cooking and food budgeting skills. As a result, individuals may never meet the opportunity of joining positive food-related experiences, due to essential exclusion from social opportunities. | The embedded approach to the evaluation aided the gathering of detailed evidence, which documented the underlying and often long-term daily challenges the participants were facing. As previous research has highlighted, tackling food insecurity needs to go beyond cooking and food budgeting classes and address long-term poverty, austerity, insecure employment, rising living costs, low pay, and cuts to welfare and public services |  |
| **Carrillo-Álvarez, E. et al. (2018)** “Food reference budgets as a potential policy tool to address food insecurity: Lessons learned from a pilot study in 26 European countries,” International Journal of Environmental Research and Public Health, 16(1), p. 32. Available at: https://doi.org/10.3390/ijerph16010032. | The aim of this article is to present the development of cross-country comparable food reference budgets in 26 European countries, and to discuss their usefulness as an addition to food-based dietary guidelines (FBDG) for tackling food insecurity in low-income groups. | Along the paper, we show how that food reference budgets hold interesting contributions to the promotion of healthy eating and prevention of food insecurity in low-income contexts in at least four ways: (1) they show how a healthy diet can be achieved with limited economic resources, (2) they bring closer to the citizen a detailed example of how to put FBDG recommendations into practice, (3) they ensure that food security is achieved in an integral way, by comprising the biological but also psychological and social functions of food, and (4) providing routes for further (comparative) research into food insecurity. | having access to better data, including price data and comparable food consumption surveys in all EU Member States | High | Substain the food reference budgets to offer a useful tool for the promotion of healthy eating and prevention of food insecurity |
| **Cornia, G.A. (2018)** “Eradicating poverty by the year 2030: Implications for income inequality, population policies, food prices (and faster growth?),” Journal of Globalization and Development, 9(2). Available at: https://doi.org/10.1515/jgd-2018-0023. | AIM - to exam whether the planned eradication of poverty to the year 2030 part of the Sustainable Development  Goals strategy is compatible with the trends expected over the next 15 years in key economic variables  such as GDP growth, population growth, income inequality and food prices. METHODOLOGY - comparative-static, poverty-accounting model that allows to simulate to 2030 the impact on SDG1 (poverty  eradication) of favorable future improvements equal to best results recorded for such variables during the last 30 years.   This model is not a forecasting tool. Rather, It is a pedagogical, comparative-static, poverty-accounting model based on a consistent  framework. It aims at alerting the national and global policy-makers about the maximum achievable improvements  to reach SDG1 by 2030 under the business as usual scenario, and assuming realistic policy changes that  ought to be introduced to increase the probability of reaching such objective. | 1. even under the most favorable assumptions – between 14  and 16 countries (mainly from Africa) out of the 78 analyzed will not reach the SDG1 target: the basic conclusions of the “comparative-static poverty-accounting model” are that – given  the IMF growth projections 2016–2022 that we extended to 2030 – 20–25 percent of the 78 developing countries  analyzed, especially those of Sub-Saharan Africa, will not meet SDG1 even assuming best practice improvements  in income inequality and fertility rates, and no food price crises. Barring exceptional events, further  improvements in PHR (poverty headcount ratio) due to these factors seem implausible. For several developing countries, poverty eradication  requires a growth acceleration | 1. Such approach does not deal directly with other factors that have been shown to affect the incidence of  poverty, such as education, access to health, taxation, social cohesion and so on (loss of explanatory power).  2. Another limitation of the model is that changes in the “immediately relevant determinants of  poverty” are considered to be linearly independent from each other, an assumption that may not always be  verified in reality.  3. in view of the heterogeneity of the poor countries, it is almost impossible to  come up with a common list of pro-growth/pro-poor policies.   4. concrete agreement on  many pro-growth and pro-poor policies remains elusive. And so may remain an agreement on a comprehensive  policy framework supporting the achievement of SDG1. | High relevance | For many developing countries, poverty eradication requires accelerated growth. Therefore, in order not to leave these countries behind, achieving SDG1 by 2030 requires an equitable acceleration of GDP growth. |
| **Fleischhacker, S., Parks, C.A. and Yaroch, A.L. (2019)** “Addressing food insecurity in the United States: The role of policy, systems changes, and environmental supports,” Translational Behavioral Medicine, 9(5), pp. 827–836. Available at: https://doi.org/10.1093/tbm/ibz131. | Overview of the historical, contemporary, and potential future approaches for using policy, systems changes, and environmental supports (PSE) to address food insecurity om the basis of law and literature review | It is needed to strengthen the uptake and expansion of policy, systems changes, and environmental supports changes into clinical, organizational and policy contexts, particularly those with the highest likelihood of impacting the dietary patterns and feeding practices of underserved populations | Lack of monitoring of food habits, lack of education, lack of safe and healthy food availability |  | Practice: Implementing policy, system changes,  and environmental supports require multisectoral  and multilevel intervening strategies including  stronger connections with: (a) the research community to understand their impacts and how best  to scale up and adopt where needed; and (b)  policymakers to ensure effective translation of  evidence-based approaches and the appropriate  authorities and appropriations to implement and  continually evaluate these strategies.  Policy: Legislative and executive actions can  strengthen public health impacts of our federal  food and nutrition assistance programs and additional investments in research and evaluation are  needed to better understand the role of policy,  system changes, and environmental supports in  helping to address food insecurity, reduce chronic  disease, and promote health equity.  Research: More rigorous research and evaluation is needed to better understand the role of  policy, system changes, and environmental supports in addressing food insecurity, reducing  chronic disease, and promoting health equity. |
| **Fleischhacker, S., Parks, C.A. and Yaroch, A.L. (2019)** “Addressing food insecurity in the United States: The role of policy, systems changes, and environmental supports,” Translational Behavioral Medicine, 9(5), pp. 827–836. Available at: https://doi.org/10.1093/tbm/ibz131. | To provide a brief overview of the historical, contemporary, and potential future approaches for using  policy, systems changes, and environmental supports (PSE) to address food insecurity in the United States | Implementing policy, system changes, and environmental supports require multisectoral and multilevel intervening strategies including stronger connections with: (a) the research com- munity to understand their impacts and how best to scale up and adopt where needed; and (b) policymakers to ensure effective translation of evidence-based approaches | More rigorous research and evaluation is needed to better understand the role of policy, system changes, and environmental sup- ports in addressing food insecurity, reducing chronic disease, and promoting health equity. | High | Legislative and executive actions can strengthen public health impacts of our federal food and nutrition assistance programs and additional investments in research and evaluation are needed to better understand the role of policy, system changes, and environmental supports in helping to address food insecurity, reduce chronic disease, and promote health equity. |
| **Galli, F., Cavicchi, A. and Brunori, G. (2019)** “Food waste reduction and food poverty alleviation: A system dynamics conceptual model,” Agriculture and Human Values, 36(2), pp. 289–300. Available at: https://doi.org/10.1007/s10460-019-09919-0. | i)Based on available literature and reflections on previous research examining food banks in Italy, we develop a system dynamics conceptual mapping ii) to model a set of relations and dynamic mechanisms associated with variables relevant to food waste generation, food recovery for social purposes and food poverty alleviation | i)avoidable surplus food production should be the target for food prevention measures and that the food donation system should target non avoidable surplus, in order to prevent fostering some level of surplus food production for social purposes ii)Third sector reliance (or dependency) on surplus food should be considered carefully (e.g. to avoid shortage of food) and closely planned to avoid excessive reliance and limit the sensitivity to possible fluctuations along the process of waste reduction within the food system iii), structural food surplus destination for social purposes would challenge food banks in managing logistics and the storage of donations | i)move from an approach based on offering food to the poor towards an approach that responds to the demands, needs and the aspirations of disadvantaged people | High relevance | i)overcome emergency based food assitance measures ii)avoid the reliance of food assistance measures on food waste |
| **Roggio, A.M. (2018)** “A systems thinking approach to the integration of food insecurity policy,” Journal of Public Affairs, 19(3). Available at: https://doi.org/10.1002/pa.1862. | The research discusses the stakeholders’ experiences, meaning to address food insecurity, using systems thinking, and exploring how stakeholders’ perception of the problem shapes publicly view, and provides solutions to household food insecurity. To do so, it displays the results of a June 2017 food policy symposium, regarding how a system dynamics model of food policy might provide additional clarity, as it highlights the particular gaps in understanding food insecurity. | There are virtually no efforts being made to increase the flow of households out of a state of food insecurity, nor are there efforts to enable them to stay secure and prevent recidivism to a state of food insecurity. | Experts’ symposiums show that “solutions” tend to cluster around the kinds of activities that are familiar; but this provokes that all of the solutions proposed by stakeholders fail to address the root causes of food insecurity. This is due to the fact that solutions tend to address emergency contingences; nonetheless, by reducing the visibility of the problem through temporary and emergency food aid programs, the problem becomes invisible, but it does not go away. |  | In systems regarding food insecurity, the inflow of poor household will increase the volume of people, which is only remedied by turning off the faucet (reducing the amount of people becoming food insecure) or pulling the drain plug (creating some assurance that households are not returning to a state of food insecurity, or in other words, creating sustainable solutions to food insecurity), effectively increasing the outflow. |
| **Battersby, J. and Watson, V. (2019)** Urban Food Systems Governance and poverty in African cities. Abingdon, Oxon: Routledge. | Better interpret the FAO definition of food security in order to better understand the drivers of urban food insecurity and its connections to the multi-dimensional nature of urban poverty. | Food insecurity is both a manifestation and a driver of poverty. Discourses around food security must shift away from a production focus towards a wider food systems approach, and a global governance is needed to engage food security.   The production bias must no longer dominate, with access and utilization attracting far greater attention.   The scale and locality of action must shift, with the urban and city-regional scales increasing evident as areas of research, identified need, and  governance intervention. |  |  | A refocusing and rebalancing of the four pillars to enable policy makers to develop urban policies and programmes in an integrated manner that engage food insecurity in all its dimensions is needed.  Multiple intersections exists between food, poverty,and the urban, so a refined understanding of urban food insecurity’s drivers and potential points of policy, planning, and programmatic  intervention is needed. Responding to urban food security requires not just policy attention and appropriately scaled policy, but also consideration of a number of  urban management activities, from health to urban planning, to transport and infrastructure planning. The multi-dimensional and multi-scalar nature of food security means that if these domains do not appreciate that food security is part of their mandate, the dimensions of food security will remain siloed and the impact of any intervention diluted. |
| **Battersby, J. and Watson, V. (2019)** Urban Food Systems Governance and poverty in African cities. Abingdon, Oxon: Routledge. | The chapter organizes itself around a discussion about the value of the FAO’s Four Pillars of Food Security as a basis to develop urban food security policy and programming | It makes a case for linking analysis of food security to analyses of food systems and urban systems more broadly in order to develop more appropriate policies and programmes. | The majority of research on food security and food poverty conducted in Africa focuses its attention solely at the household scale. | High | Considering food insecurity as the outcome of the interaction of households and wider food and urban systems factors |
| **Cassar, E.M.C. (2018)** “Hunger and fullness: How high-poverty urban students experience school food policy,” Urban Education, 57(8), pp. 1387–1414. Available at: https://doi.org/10.1177/0042085918805147. | This study uses observations and interviews in three high-poverty urban schools to investigate how participants experience school food policy in their daily lives. | i) “hungry” feelings are common experiences for low-income students and affect their experiences in schools. ii) students recognize with unanimous agreement what foods were “healthy” and “unhealthy” and how they made participants feel after eating. iii) students expressed similar concerns about the ways in which food impacted their ability to learn. iv) in contrast, students consistently described “Fresh & Healthy Progrm” as healthier. | Students generally felt that “Traditional Lunch Services” breakfasts and lunches alone did not “fill them up” or sustain them throughout the day. Many students felt hungry and compensated by eating a second meal or unhealthy snacks, such as chips. Many also found that feelings of hunger interfered with their ability to pay attention in class due to stomachaches, headaches, and lethargy, echoing the literature on food insecurity. | National School Lunch Program does not consider the concepts of freshness and fullness in its policies; rather, it focuses on quantitative measures like nutrients and calories, allowing highly processed foods to “count” as healthy, and overlooking important impacts on student engagement and learning as a result. |  |
| **Choate, B., Pallant, E. and Shipe, D. (2017)** “Teaching to end hunger: Critical analysis of food systems and poverty,” World Sustainability Series, pp. 941–953. Available at: https://doi.org/10.1007/978-3-319-63007-6\_58. | AIM - The purpose of the paper is to describe a course designed to teach undergraduate students critical thinking skills necessary to tackle the United Nations’ 2030 Agenda for Sustainable Development. Following a full description of the class, there is an analysis of the short-term and slightly longer-term outcomes for students that have taken the class with special attention to how skills acquired in this class could be applied to combating global poverty, inequity, and malnourishment. | 1. The need to provide a cadre of groups and individuals with strong skills in critical thinking about food systems through an interdisciplinary approach, experiential  learning and multimodal instructions.   2. The course presented could be a sort of prototype in order to teach to end hunger, through:   - participation, field trip and laboratory reports;  - different topics ranging from crop information and action; processins and transforming crops into food; food distributio; soil science and entomology. Thsese topics are integrated with the social aspects of food, including policy, food security and food access. | 1. lack of awareness and knowledge of the dynamics and functioning of food systems | Medium relevance | Increase studentts' knowledge and skills related to food systems in order to achieve Agenda 2030 and SDGs |
| **Galli, F., Hebinck, A. and Carroll, B. (2018)** “Addressing food poverty in systems: Governance of food assistance in three European countries,” Food Security, 10(6), pp. 1353–1370. Available at: https://doi.org/10.1007/s12571-018-0850-z. | This paper contributes to enrich the debate about the analysis of governance relations in food assistance initiatives across different European countries (Italy, The Netherlands and Ireland). By approaching food assistance from a systems perspective, we further the understanding of these initiatives and their modes of governance. | while food assistance functions have managed to find innovative and collaborative governance solutions to address the very immediate issues rather effectively, they do not negate the need for food system transformation to address the ultimate reasons for food poverty | The inability of food assistance to address root causes, leads to some unavoidable points for reflection that need to be addressed: the first being their need to balance the short­term goal of distributing surplus foods, with the long­term goal of food poverty reduction. | High | The first opportunity being that food assistance initiatives go beyond mere emergency food poverty relief. This finds its origin in being at the interface of food­, welfare­ and third sector systems and food banks’ ‘ethical sense making’. Connected to this, we see food banks’ active boundary spanning activities as an opportunity, especially when many states move towards more de­centralised and neo­liberal governance systems |
| **Hammelman, C. (2017)** “Urban migrant women’s everyday food insecurity coping strategies foster alternative urban imaginaries of a more Democratic Food System,” Urban Geography, 39(5), pp. 706–725. Available at: https://doi.org/10.1080/02723638.2017.1382309. | It argues that in low-income urban communities these everyday strategies can further their demands for autonomy in determining what foods they produce and consume | Migrant woman devise alternative urban imaginaries of a more democratic food system. | Lack of food sovreignity | Medium | Give more power to migrant community to promote democratic way of food management |
| **Hasegawa, T. et al. (2018)** “Risk of increased food insecurity under stringent Global Climate Change Mitigation Policy,” Nature Climate Change, 8(8), pp. 699–703. Available at: https://doi.org/10.1038/s41558-018-0230-x. | i) multiple model assessment on the combined effects of climate change and climate mitigation efforts on agricultural commodity prices, dietary energy availability and the population at risk of hunger | i)Food insecurity can be directly exacerbated by climate change due to crop-production-related impacts of warmer and drier conditions that are expected in important agricultural regions ii), efforts to mitigate climate change through comprehensive, economy-wide GHG emissions reductions may also negatively affect food security, due to indirect impacts on prices and supplies of key agricultural commodities | i)be aware of potential negative outcomes of climate change mitigation policies on food security on a global scale | High relevance | i)Combining climate policies with measures to improve nutritionally valid diets could promote food security and simultaneously reduce poverty and improve health conditions, increasing resilience of the food production systems to climate change and contributing to environmental sustainability |
| **McIntyre, L. et al. (2018)** “A social network analysis of Canadian Food Insecurity Policy Actors,” Canadian Journal of Dietetic Practice and Research, 79(2), pp. 60–66. Available at: https://doi.org/10.3148/cjdpr-2017-034. | Relyong on quantitative research, this paper aims to: (i) visualize the networks of food insecurity policy actors in Canada, (ii) identify potential food insecurity policy entrepreneurs (i.e., individuals with voice, connections, and persistence) within these networks, and (iii) examine the political landscape for action on food insecurity as revealed by social network analysis. | Networks of Canadian food insecurity policy actors exist but are limited in scope and reach, with a paucity of policy entrepreneurs from political, private, or governmental jurisdictions. The networks are divided between food-based solution actors and income-based solution actors, which might impede collaboration among those with  differing approaches to addressing food insecurity. | There is a lack of policy action on food insecurity in Canada, which could be due the presence of silos within the network, where action is clustered by region and approach. These divisions could specifically impede policy action beyond the regional sphere particularly when actors collectively and across regions cannot agree on framing of the problem—for example, in food or income terms. | i)There are ego-centred networks that are connected to each other, with policy entrepreneurs occupying a role in connecting smaller clusters in the main network, particularly regional fragments. ii) There are dominant policy roles of actors in the networks which include academics and staff from nongovernmental and local charitable organizations. iii)Some networks are small, limited in scope and reach, and consist of actors from locally focused and charitable organizations. | Dietitians might address the barrier of different worldviews regarding food-based versus income-based approaches to addressing food insecurity, by supporting the efforts of the few mixed-approach policy entrepreneurs who are able to bridge divisions among other actors to leverage entrepreneurial gains |
| **Power, M. et al. (2018)** “The incompatibility of system and lifeworld understandings of food insecurity and the provision of food aid in an English city,” VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations, 31(5), pp. 907–922. Available at: https://doi.org/10.1007/s11266-018-0018-7. | Drawing on a Habermasian framework, efforts are put to understand how the system rationalities of service providers and the experiential nature of lay knowledge relate. The research is carried out using qualitative methods, and research participants are purposively sampled among White British and Pakistani women in or at risk of food insecurity. | First data examination regarded the system definitions of the nature of need and its implications. Then, the second data examination addressed the structural causes of food insecurity and the recognition of the potentialities of social solidarity to respond to systemic factors. Service providers tend to pathologise the ‘food poor’, disregarding the subjectivities of service users and subverting communicative competence. In other words, food aid, given by food banks, does not offer new political narratives for emancipation | Due to the severe shift of responsibility for welfare from the state to individual citizens, there was a moving of welfare measures towards economic and social austerity which has been presented as a necessary step to restore economic productivity This broke out in critical referring of needy individuals as “poor citizens” who are not self-sufficient and financially independent. | Relying on food banks is risky in terms of social implications due to the potential threat of shame; both relatively affluent participants and those who described experiences of acute food shortages and anxieties around food sufficiency affirmed that sometimes avoided to rely on food banks to get essential needs. Consequently, food banks are incapable of promoting new tools for emancipation, if addressed and shown as mere charity opportunities. |  |
| **Wheeler, B. (2018)** “Non-prescribed spaces, creativity and narrative formation: A systems-based examination of a community art group exploring food poverty,” Ethnography and Education, 13(3), pp. 359–376. Available at: https://doi.org/10.1080/17457823.2017.1422132. | The research examined the relationship between the ‘user-led’ ethos of the Brighton Unemployed Centre Families Project (BUCFP) and the emergence within it of creatively working and self-managing groups, examining how an environment that did not adhere to a prescribed use of space might enable groups to make sense of their experiences. The research used ethnographic methods and a theoretical framework informed by systems theory, to explore the group’s experiences of food poverty. | The research demonstrated by which ways the group provided community members with a space in which to examine, define and make legitimate their experiences and how this can be thought of as an educational and community knowledge-building practice that has important implications, particularly for notions of well-being. |  | Low | It is possible to consider that in allying themselves with an existing visual narrative, group members developed an ability to resist stigma through creating a symbolic allegiance. Art-making was thus useful both in its generative ambiguity and in its enabling the delivery of a formalised message that resisted stigmatisation within a wider cultural landscape. |
| **Bartfeld, J. and Men, F. (2017)** “Food insecurity among households with children: The role of the State Economic and Policy Context,” Social Service Review, 91(4), pp. 691–732. Available at: https://doi.org/10.1086/695328. | To explore the correlates of geographic and temporal variation in food insecurity from 2002 to 2014, using data from the Current Population Survey’s Food Security Supplements. | We find substantial evidence that the state economic and policy contexts play a role and that the link between policy characteristics and food security outcomes varies in plausible ways among households with differing levels of economic vulnerability. | There are a potentially vast number of potential contextual influences on food security, of which we have only included a limited subset. | High | the importance of the safety net—both food assistance and broader employment- linked programs and policies—to the well-being of vulnerable families |
| **Pérez-Escamilla, R. et al. (2017)** “Food security measurement and governance: Assessment of the usefulness of diverse food insecurity indicators for policy makers,” Global Food Security, 14, pp. 96–104. Available at: https://doi.org/10.1016/j.gfs.2017.06.003. | i)assess the validity of measure scales of food insecurity | i)No single indicator captures all dimensions of the food insecurity construct ii)The diverse food insecurity indicators available complement each other | i)Improving food security governance depends largely on the identification of food insecurity (FI) indicators that are useful for policy makers to improve their targeting and monitoring efforts | High relevance | i)policies implemented considering existing data on food insecurity are more effective ii)making rational decisions about the best FI indicators to use can be a daunting task given the many options available |
| **Vilar-Compte, M., Gaitán-Rossi, P. and Pérez-Escamilla, R. (2017)** “Food insecurity measurement among older adults: Implications for policy and Food Security Governance,” Global Food Security, 14, pp. 87–95. Available at: https://doi.org/10.1016/j.gfs.2017.05.003 | i)Perform a systematic literature review identifying how food insecurity has been measured and how it affects policies, and assess through a psychometric analysis, if experience-based food security scales (EBFSS), can adequately monitor food security governance among older adults | i)academic attention is mainly centered in the aging-nutrition intersection, while policy and evaluation epistemological academic communities are not yet focusing heavily on this area ii)Research has focused mainly in studying the determinants of food insecurity among older adults or in assessing the impacts of older adult programs in the prevalence of food insecurity iii)This body of literature also documented the association between food insecurity or food insufficiency on medication adherence and underuse | i)the ecological context surrounding older adults is complex and requires to be addressed through intersectoral policies operating at different levels ii)systematic review and primary psychometric analyses support the use of EBFSSs for assessing food insecurity among older adults or in households where older adults live. These scales have been identified as having SMART properties that are helpful for policy decisions and improving food security governance | High relevance | Among older adults, food security governance, can be fostered by an ecological and multisectorial perspective, and by using valid monitoring instruments |
| **Bottiglieri M., Toldo A., Pettenati G Bottiglieri, M., Pettenati, G. and Toldo, A. (2016)** “Toward the Turin food policy. good practices and Vision.” Available at: https://doi.org/10.3280/oa-156. | i)to promote a food policy for Torino ii) to individuate good practices in Torino's food system | i) agood food planning could leverage major improvements in aregion’s quality of life and bottom line for a modest cost and effort ii)give concretness to the right to healthy and nutritious food | i)lack of a local food policy ii)lack of a common vision/mission, which involves every actor of the food system | High relevance | i)policy making ii)multi actor strategy iii)citizen involvment iv)roght based approach to policies |
| **McIntyre, L. et al. (2016)** “Household food insecurity in Canada: Problem definition and potential solutions in the public policy domain,” Canadian Public Policy, 42(1), pp. 83–93. Available at: https://doi.org/10.3138/cpp.2015-066. | i)The objective of this study was to bring to light legislators' construction of household food insecurity data set of debate texts | i)legislators' fundamental problematization of food insecurity w of insufficient income but that certain groups were of greater policy ii)s, legislators' statements needed  to link income-related food insecurity to global and local food supply systems issues to be exercised iii)One policy solution legislators touted to address competing financial needs was to reduce the gap between the prices of essential goods and the economic resources available to people facing food insecurity | i)Consensual agr on structural mitigation strategies for household food insecurity is likely to require a shift in sy who is deserving of attention ii)address prices for essential goods or services included publicly funded housing, publicly funded child care, and re-instituting price controls on rent | High relevance | by an ecological and multisectoral perspective, and by using valid monitoring instruments. |
| **McIntyre, L., Patterson, P.B. and Mah, C.L. (2016)** “A framing analysis of Canadian household food insecurity policy illustrates co-construction of an intractable problem,” Critical Policy Studies, 12(2), pp. 149–168. Available at: https://doi.org/10.1080/19460171.2016.1253491. | This paper examines how HFI is framed in Canadian legislative sessions and how the framing process renders the problem ‘intractable’. We assembled verbatim extracts from the legislative session records of the Canadian federal government and the provinces of British Columbia, Nova Scotia, and Ontario from 1995 to 2012. | Household Food Insecurity has thus become so imbued with irreconcilable conflict that rival parties have co-constructed it as an intractable policy problem resulting in scant policy solutions | Household food insecurity (HFI), lack of access to food because of financial constraint, is a persistent and growing problem in Canada. | Medium |  |
| **Kaur, S. and Kaur, H. (2015)** “Combating Food Insecurity: Implications for Policy,” Global Economic Cooperation, pp. 103–118. Available at: https://doi.org/10.1007/978-81-322-2698-7\_7. | AIM - to analyse broad economic and regulatory measures  that affect food insecurity.  OBJECTIVE - to analyse, specifically, four policies related to contrast food insecurity:  i. Agricultural productivity  ii. Subsidies and safety nets  iii. Surge in biofuel demand, and  iv. Variations in foodgrains stocks-to-use ratio  METODOLOGY - data and trend analysis | 1. Sustained growth in agricultural productivity is  indispensable for resolving issues of food insecurity.  2. Social safety nets and protection programmes play an essential role in situations such as food crises  3. deeper reforms  in policies designed by international organizations and developed country governments are required.   4. coordinated and collaborative efforts are required  that bring about reforms attacking the structural weaknesses of the global food system.   5. policies that accelerate agricultural productivity in a sustainable  manner, support appropriately designed targeted interventions, discourage biofuel  expansion and encourage the maintenance of sufficient buffer stocks are required | 1. the developed world and international organizations have shied away from tackling  the broader structural economic dimensions of the food crisis with bold regulatory  reforms, and instead have pressed for initiatives that smooth markets by increasing  food production and encouraging information flows, and that create mechanisms to  cope with volatility such as assistance and risk management.  2. focus only on production, information and mechanisms to cope with price  volatility, rather than the broader economic and regulatory measures that affect  food security, viz. an appropriate biofuel policy and desirability of maintaining an  adequate stock-to-use ratio. | High relevance |  |
| **Lambie-Mumford, H., & O'Connell, R. (2015).** Food, poverty and policy: evidence base and knowledge gaps. SPERI Report. SPERI Working Papers. | i) to translate research on food insecurity into policy actions in Uk ii)to understand the rise of food charity iii)to reflect on how to measure food insecurity iv)to acheive conceptual clarity | i)Moves towards direct measures of food insecurity and placing a high value on  the experiences of those directly affected ii)Maintaining and promoting methodological and disciplinary variety in the field,  in the pursuit of a highly rigorous evidence base iii)more sinergies between the concepts of food poverty/insecurity and other social challenges, such as environmental sustainability | i)lack of enough sinergy between research and policy makers/practitioners ii)fractured welfare policies | High relevance | i)Moves towards direct measures of food insecurity and placing a high value on  the experiences of those directly affected ii)Maintaining and promoting methodological and disciplinary variety in the field,  in the pursuit of a highly rigorous evidence base iii)more sinergies between the concepts of food poverty/insecurity and other social challenges, such as environmental sustainability |
| **Morgan, K. (2014)** “Nourishing the city: The rise of the urban food question in the Global North,” Urban Studies, 52(8), pp. 1379–1394. Available at: https://doi.org/10.1177/0042098014534902. | i)This article explores the rise of the urban food question in the Global North through the multiple prisms of theory, policy and political practice ii) First, it  explores the theoretical ways in which the food system is being framed in urban planning, urban political ecology and community food security iii)Second, it charts the rise of new urban foodscapes associated with urban agriculture and public health iv)y, it identifies a new urban food politics and asks if this constitutes a new social movement. | i)theory advancements helps to re-imagine the city as a socioecological space in which the traditionaldualisms – such as nature/society and urban/rural – are no longer allowed ii)In their different ways the new urban foodscapes aspire to be ‘sustainable’ in the sense that they explicitly seek to address one or more of the values of sustainability, be it health, ecology or justice. The article capture the multifunctional feature of food planning, urban agriculture and new urban health discourse iii) While some progress has been made in certain cities, it is hard to avoid the conclusion that such local efforts will remain partial and symbolic unless these cities can form a translocal urban food movement to leverage the power of the public realm to deliver more ambitious reform of the food system. | i)a multi-dimensional conception of the urban food question has the merit of doing justice to the multifunctionality of food, an attribute that gets lost when the urban food question is reduced to a purely needs-based nutritional agenda ii)the double burden of malnutrition – hunger and obesity – is increasingly assuming an urban form and these are pre-eminently social justice issues because mortality and morbidity are the ultimate inequalities in capitalist society ii)The new urban food coalition is a progressive step towards more just food systems, but it is under-resourced and its municipal partners are being eviscerated by a Conservative-led government in thrall to a pre-Keynesian creed | High relevance | i)need of a food planning, locally and nationally |
| **Kim, S. (2014)** “Exploring the endogenous governance model for alleviating food insecurity: Comparative analysis of food bank systems in Korea and the USA,” International Journal of Social Welfare, 24(2), pp. 145–158. Available at: https://doi.org/10.1111/ijsw.12114. | This article aims to theoretically suggest the endogenous governance model and to empirically demonstrate the validity of this model by comparing the governance of food banks in the USA and Korea. | Endogenous models of governance are effective in food banks policies |  | Medium | The governance model must reflect the endogeneity each society has |

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| **Transparent Food System published literature sources** | | | |
| **Author** | **Aim, Objective, Methodology** | **Key Findings | Information on intervention** | **Evaluation of scale and consequences of social and economic needs** |
| **Schaarschmidt, S. et al. (2018)** “Reporting of traceability and food safety data in the culinary herb and Spice Chains,” Food Control, 83, pp. 18–27. Available at: https://doi.org/10.1016/j.foodcont.2016.11.029. | The survey of herb/spice businesses located within the EU or exporting dried herbs/spices to the EU on transparency and how information is reported | There is a widespread use of electronic systems for recording and processing of traceability/food safety data. However, automated capture of data and automated read-out/processing of reported data were rare. | Reporting of information is crucial to enable backward and forward tracing of food along the chain |
| **Wassmann, B., Siegrist, M. and Hartmann, C. (2023)** “Palm Oil and the Roundtable of Sustainable Palm Oil (RSPO) label: Are Swiss consumers aware and concerned?,” Food Quality and Preference, 103, p. 104686. Available at: https://doi.org/10.1016/j.foodqual.2022.104686. | To investigate the factors associated with labelling discrepancy and consumer awareness in the case of palm oil through an online survey. | Little to no consumers’ awareness and knowledge of (unsustainable) ingredients in products and corresponding ecolabels need improvement | The international Roundtable of Sustainable Palm Oil (RSPO) label is intended to guide consumers toward more sustainable palm oil product purchases. However, this is often not the case |
| **Cao, S. et al. (2022)** “A blockchain-based multisignature approach for Supply Chain Governance: A use case from the Australian Beef Industry,” Blockchain: Research and Applications, 3(4), p. 100091. Available at: https://doi.org/10.1016/j.bcra.2022.100091. | An exploratory case study to demonstrate the design, implementation, and evaluation of a blockchain-based multi-signature approach for data collection and validation in a beef supply chain. | The blockchain-based multi-signature approach can be used to digitally improve beef supply chain governance by enabling whole-of-chain transparency and trustworthy information sharing | The negative impacts of the COVID-19 pandemic on supply chain operations requires a collaborative ecosystem for holistic supply chain governance |
| **Yang, H., Song, H., Ding, Q.S. and Wang, H. (2022),** "Transparency, authenticity and purchase intentions: Chinese independent restaurants", International Journal of Contemporary Hospitality Management, Vol. 34 No. 11, pp. 4245-4265. https://doi.org/10.1108/IJCHM-10-2021-1290 | Study aims to investigate how business signals (transparency information and exposure) affect business transparency, food authenticity and, ultimately, purchase intentions. | The results suggest that revealing information on recipes and food supply chains positively affects business transparency | The outbreak of COVID-19 wreaked havoc on the restaurant industry, not only from the effects of lockdown but also for fear of biological infections in food supply chains |
| **Jagtap, S., Rahimifard, S. and Duong, L.N. (2019)** “Real‐time data collection to improve energy efficiency: A case study of food manufacturer,” Journal of Food Processing and Preservation, 46(8). Available at: https://doi.org/10.1111/jfpp.14338 | A case study of a beverage factory where the implementation of an IoT-enabled sensing technology based on the embodied product energy (EPE) model helped to reduce the energy consumption | Collection of real-time energy data within a food production system to support transparent and informed and energy-aware operational decisions | Transparency and claim of net zero or reduced footprint |
| **Thorpe, A. et al. (2022)** “Unpacking the tuna traceability mosaic – EU SFPAS and the Tuna Value Chain,” Marine Policy, 139, p. 105037. Available at: https://doi.org/10.1016/j.marpol.2022.105037. | This paper explains the rationale for the EU entering into Sustainable Fisheries Partnership Agreements | Paper demonstrates how that there are economic incentives for vessels to misreport, and clear traceability challenges as vessels fish several species and across several areas | Fishing several species across multiple SPFAs and over a large area poses clear challenges for traceability when there are incentives for misreporting |
| **Sabio, R.P. and Spers, E.E. (2022)** “Consumers' expectations on transparency of sustainable food chains,” Frontiers in Sustainable Food Systems, 6. Available at: https://doi.org/10.3389/fsufs.2022.853692. | Study aimed to better understand the role of transparency expectations and how they influence consumers' decision to consume sustainable food products. | Higher levels of transparency lead to higher levels of quantity and frequency of purchases of alternative and sustainable foods |  |
| **Palocci, C. et al. (2022)** “A search engine concept to improve food traceability and transparency: Preliminary results,” Foods, 11(7), p. 989. Available at: https://doi.org/10.3390/foods11070989. | The integration of data on food quality, safety, traceability, transparency and authenticity using a developed European Open Science Cloud | The model was used to develop and organise data relating to the traceability, authenticity, and transparency of olive oil, milk and fish supply chains as well as other parameters including nutritional quality, food safety, transparency and authenticity. | The most recent technologies is still limited due to poor data management |
| **Schröder, U. (2007)** “Challenges in the traceability of Seafood,” Journal für Verbraucherschutz und Lebensmittelsicherheit, 3(1), pp. 45–48. Available at: https://doi.org/10.1007/s00003-007-0302-8. | This review discusses the relevant regulations for traceability of seafood and gives a survey about the most important analysis techniques for characterizing seafood. |  |  |
| **Braun, J., Beckie, M. & Caine, K. (2020).** “Trust us, we feed this to our kids”: women and public trust in the Canadian agri-food system. Agric Hum Values 37, 495–507, https://doi.org/10.1007/s10460-019-10002-x | To ensure that Canadians understand “the real dirt on farming”—what farmers do, how they do it, and why | The agri-food industry and its modus operandi is perceived to be under threat from the Canadian public. The source of this pressure is from millennial moms, urban food activists, and the media | Consumers are increasingly demanding traceability, transparency and sustainability of the agri-food system. |
| **Power, A. and Cozzolino, D. (2020)** “How fishy is your fish? authentication, provenance and traceability in fish and seafood by means of vibrational spectroscopy,” Applied Sciences, 10(12), p. 4150. Available at: https://doi.org/10.3390/app10124150. | This article reviews the most recent applications of vibrational spectroscopy (near and mid infrared, Raman) combined with chemometrics to tackle tranparency and tracebility issues in the seafood and fish industries |  |  |
| **Jin, S., Zhang, Y. and Xu, Y. (2017)** “Amount of information and the willingness of consumers to pay for food traceability in China,” Food Control, 77, pp. 163–170. Available at: https://doi.org/10.1016/j.foodcont.2017.02.012. | This study employs random nth price auction to investigate consumers’ willingness to pay (WTP) for food traceability system | The results also showed that consumers were most interested in a food traceability system that provides quality certificates and details of the chemical fertilizers/pesticides used in food production. |  |
| **Sun, S., Wang, X. and Zhang, Y. (2017)** “Sustainable traceability in the Food Supply Chain: The impact of consumer willingness to pay,” Sustainability, 9(6), p. 999. Available at: https://doi.org/10.3390/su9060999 | This article addresses the sustainable traceability issue in the food supply chain from the sourcing perspective in which consumer willingness to pay for traceability is considered. | study showed willingness of consumers to pay for traceability. However, this may lead to an unintended consequence, such as a decrease in the provision of traceable food products. | Consumers are increasingly demanding traceability, transparency and sustainability of the agri-food system. |
| **Loureiro, M.L. and Umberger, W.J. (2007)** “A choice experiment model for beef: What US consumer responses tell us about relative preferences for food safety, country-of-origin labeling and traceability,” Food Policy, 32(4), pp. 496–514. Available at: https://doi.org/10.1016/j.foodpol.2006.11.006. | Choice experiments were used to analyze US consumers’ relative preferences and willingness-to-pay for these meat attributes in labeled ribeye beef steaks. | Consumers value certification of USDA food safety inspection more than any of the other choice set attributes, including country-of-origin labeling, traceability and tenderness. |  |
| **Jay-Allemand, C. et al. (2017)** “Detection of Biomolecules Using Surface Plasmon Resonance (SPR) Technology for Food Quality and Traceability,” in Food traceability and authenticity: Analytical techniques. 1st edn. Boca Raton, FL: CRC Press, p. 16. | The use of surface plasmon resonance for the detection traceability and authenticity of food in the supply chain |  |  |
| **Akhtar, M.T. et al. (2021)** “1H-NMR-based metabolomics: An integrated approach for the detection of the adulteration in chicken, Chevon, beef and donkey meat,” Molecules, 26(15), p. 4643. Available at: https://doi.org/10.3390/molecules26154643. | This work aimed to differentiate different meat samples on the basis of metabolites. The metabolic difference between various meat samples was investigated through NMR spectroscopy coupled with multivariate data analysis | Our results showed that NMR-based metabolomics is a powerful tool for the identification of novel signatures (potential biomarkers) to characterize meats from different sources | The increasing burden on the livestock industry has triggered the mixing of high-price meat species reulting in fraud |
| **Tsakiridou, E. et al. (2011)** “Purchasing fresh produce on the basis of food safety, origin, and traceability labels,” Journal of Food Products Marketing, 17(2-3), pp. 211–226. Available at: https://doi.org/10.1080/10454446.2011.548749. | to identify consumers' awareness, attitudes, and buying intention toward food quality cues such as transparency, certification, food safety, origin, and traceability in fresh produce (fruits and vegetables). | Results indicate that the most important factors affecting willingness to pay a premium are mainly related to positive attitudes toward healthy food, level of awareness, and, to a lesser extent, several socioeconomic characteristics. |  |
| **Barge, P. et al. (2014)** “Item-level radio-frequency identification for the traceability of food products: Application on a dairy product,” Journal of Food Engineering, 125, pp. 119–130. Available at: https://doi.org/10.1016/j.jfoodeng.2013.10.019. | Exploitation of radio-frequency identification systems for traceability, logistics as well as for anti-counterfeit purposes. | UHF technology is reliable only after 60 days ripening. HF system can be adopted at all different steps of cheese production process. |  |
| **Abad, E. et al. (2009)** “RFID smart tag for traceability and cold chain monitoring of foods: Demonstration in an Intercontinental Fresh Fish Logistic Chain,” Journal of Food Engineering, 93(4), pp. 394–399. Available at: https://doi.org/10.1016/j.jfoodeng.2009.02.004. | Validation of a RFID smart tag developed for real-time traceability and cold chain monitoring for food applications. | Application of RFID system along an intercontinental fresh fish logistic chain |  |
| **Palmieri, L. et al. (2009)** “Blueberry: Germplasm characterization and food traceability by the use of molecular markers,” Acta Horticulturae, (810), pp. 167–172. Available at: https://doi.org/10.17660/actahortic.2009.810.21. | To authentic blueberry cultivars using molecular markers | Discrimination of blueberry species from other plant species and genera (like Malus, Rubus or Ribes) was achieved using traditional PCR and Real Time |  |
| **Pradana, I.G., Djatna, T. and Hermadi, I. (2020)** “Blockchain modeling for Traceability Information System in supply chain of Coffee Agroindustry,” 2020 International Conference on Advanced Computer Science and Information Systems (ICACSIS) [Preprint]. Available at: https://doi.org/10.1109/icacsis51025.2020.9263214. | To propose a traceability system design for coffee commodity supply chains using the clustering approach | Activities occurring in the coffee commodity supply chain is complex and take place between 4 stakeholders, which is indicated by UM |  |
| **Zhang, M. et al. (2020)** “Consumer perception, mandatory labeling, and traceability of GM soybean oil: Evidence from Chinese urban consumers,” GM Crops & Food, 12(1), pp. 36–46. Available at: https://doi.org/10.1080/21645698.2020.1807852. | This study analyses consumers’ preference for the traceability of GM soybean oil. | The results show that about 56.5% of the respondents have a positive preference for the traceability of GM soybean oil. |  |
| **Barling, D., Sharpe, R. and Lang, T. (2009)** “Traceability and ethical concerns in the UK wheat—bread chain: From food safety to provenance to transparency,” International Journal of Agricultural Sustainability, 7(4), pp. 261–278. Available at: https://doi.org/10.3763/ijas.2009.0331. | This study examines the traceability systems that have emerged in the wheat to bread supply in the UK, and the ethical concerns that have emerged within this supply process. | The study reveals several ethical concerns within the supply chain are dynamic and evolving. |  |
| **D'Amico, P. et al. (2014)** “Seafood traceability issues in Chinese food business activities in the light of the European provisions,” Food Control, 35(1), pp. 7–13. Available at: https://doi.org/10.1016/j.foodcont.2013.06.029. | Seafood products collected from the market of the Chinese community of Prato (Italy) were assessed for the frequencies and types of non-compliance in the light of the requirements established by the European traceability legislation on fisheries and aquaculture. | 83% of the products checked had labels characterized by different irregularities. |  |
| **De Silva, D.A. et al. (2021)** “Clean vs dirty labels: Transparency and authenticity of the labels of Ceylon Cinnamon,” PLOS ONE, 16(11). Available at: https://doi.org/10.1371/journal.pone.0260474. | A mixed-method approach was employed to investigate the labels of 6 types of value-added forms of cinnamon; i.e. quills, powder, tea, breakfast cereals, confectionery and bakery and nutraceuticals which are used in USA, UK, Mexico, Japan and products of Sri Lankan cinnamon exporters. | Well equipped clean labels were found to be demanded by the modern cinnamon consumers. |  |
| **Song, S. et al. (2022)** “Assessing safety of market-sold fresh fish: Tracking fish origins and toxic chemical origins,” Environmental Science & Technology, 56(13), pp. 9505–9514. Available at: https://doi.org/10.1021/acs.est.2c00495. | A novel food safety tracking and modelling framework for quantifying toxic chemical levels in the food and the food origins was developed. | The framework was shown to successfully predict short-chain chlorinated paraffin level. Thus providing additional information to the food origin tracking system to enhance transparency and consumers’ confidence in the traded food they consumed. |  |
| **Bager, S.L., Singh, C. and Persson, U.M. (2022)** “Blockchain is not a silver bullet for agro-food supply chain sustainability: Insights from a coffee case study,” Current Research in Environmental Sustainability, 4, p. 100163. Available at: https://doi.org/10.1016/j.crsust.2022.100163. | To assess the potential of blockchain technology to promote sustainability in coffee supply chains through increased traceability and transparency and to identify barriers and opportunities for this. | Blockchain provided benefits but not a silver bullet for delivering agri-food supply chain sustainability. |  |
| **Anastasiadis, F., Apostolidou, I. and Michailidis, A. (2021)** “Food Traceability: A consumer-centric supply chain approach on Sustainable Tomato,” Foods, 10(3), p. 543. Available at: https://doi.org/10.3390/foods10030543. | To explore the level of consumer centricity in food supply chains under a traceability system. | Findings showed health, trust, quality, nutrition, and safety-related values to be significant for the consumers towards accepting a traceability system. |  |
| **Nep, S. and O'Doherty, K. (2012)** “Understanding public calls for labelling of genetically modified foods: Analysis of a public deliberation on genetically modified Salmon,” Society & Natural Resources, 26(5), pp. 506–521. Available at: https://doi.org/10.1080/08941920.2012.716904. | This article addresses public attitudes toward the possible introduction of transgenic salmon for human consumption. | A strong need for labeling for transparency and acceptance of genetically modified (GM) foods |  |
| **Vannozzi, A., Lucchin, M. and Barcaccia, G. (2018)** “CpDNA barcoding by combined end-point and real-time PCR analyses to identify and quantify the main contaminants of oregano (Origanum vulgare L.) in commercial batches,” Diversity, 10(3), p. 98. Available at: https://doi.org/10.3390/d10030098 | A combined approach based on both qualitative and quantitative cpDNA barcoding with end-point and real-time polymerase chain reaction (PCR) to assess the type and degree of contamination in commercial batches of common oregano. | High levels of contaminant were found in most of the commercial batches analysed |  |
| **Fernández-Ibáñez, V. et al. (2010)** “Development and validation of near infrared microscopy spectral libraries of ingredients in animal feed as a first step to adopting traceability and authenticity as guarantors of Food Safety,” Food Chemistry, 121(3), pp. 871–877. Available at: https://doi.org/10.1016/j.foodchem.2009.10.072. | The aim of this work was to build an NIRM reference spectral library on animal feed. | Near infrared microscopy spectral libraries of ingredients in animal feed was successfully for traceability and authenticity of animal feed |  |
| **Visioli, G. et al. (2021)** “Traceability of Sicilian durum wheat landraces and historical varieties by high molecular weight glutenins footprint,” Agronomy, 11(1), p. 143. Available at: https://doi.org/10.3390/agronomy11010143. | HMW-GS of different durum wheat Sicilian landraces (Timilia, Russello, Perciasacchi) and one historical variety Margherito were analyzed | High molecular weight glutenins (HMW-GS) was used as markers to trace the varietal and to verify the genetic purity of the grain and consequently of the flours, marketed and labeled as mono-varietal. |  |
| **Lawrence, S. et al. (2022)** “The 11 sins of Seafood: Assessing a decade of food fraud reports in the Global Supply Chain,” Comprehensive Reviews in Food Science and Food Safety, 21(4), pp. 3746–3769. Available at: https://doi.org/10.1111/1541-4337.12998. | This study examines reported seafood fraud incidents from the European Union's Rapid Alert System for Food and Feed, Decernis's Food Fraud Database, HorizonScan, and LexisNexis databases | Illegal or unauthorized veterinary residues were found to be the most significant issue of concern, with most reports originating from farmed seafood in Vietnam, China, and India |  |
| **Ding, Y. et al. (2020)** “DNA barcoding coupled with high‐resolution melting analysis for nut species and Walnut Milk Beverage Authentication,” Journal of the Science of Food and Agriculture, 100(6), pp. 2372–2379. Available at: https://doi.org/10.1002/jsfa.10241 | to develop an accurate and efficient method for detecting the authenticity of the raw materials used in walnut milk beverage | he results revealed that HRM analysis based on the psbA-trnH barcode sequence can be used to identify raw ingredients in walnut milk beverages | Adulterated walnut milk ingredients are often detected |
| **Ben Ayed, R. et al. (2022)** “Integration of innovative technologies in the Agri-Food Sector: The Fundamentals and practical case of DNA-based traceability of olives from fruit to oil,” Plants, 11(9), p. 1230. Available at: https://doi.org/10.3390/plants11091230. | The application of DNA-Based Technologies in Agri-Food Supply Chain for transparency and traceability of olive oil | The use of innovative approaches, including internet of things, big data analytics, artificial intelligence and blockchain, to authenticate and trace olive oil |  |
| **Cornelisse-Vermaat, J.R. et al. (2007)** “Food-allergic consumers' labelling preferences: A cross-cultural comparison,” The European Journal of Public Health, 18(2), pp. 115–120. Available at: https://doi.org/10.1093/eurpub/ckm032. | To establish if current food labelling practices are perceived to be adequate by food-allergic consumers | Food-allergic consumers were recruited in both the Netherlands and Greece | Recent changes in European food safety legislation have resulted in the implementation of statutory requirements regarding the traceability and labelling of 12 food allergens. |