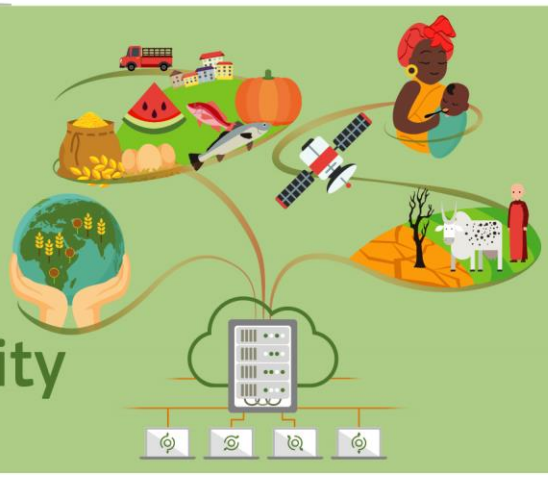
The European Commission's Knowledge Centre for Global Food and Nutrition Security



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Knowledge Review: Sustainable Food Systems

The European Farm to Fork Strategy and the Communication "Towards a comprehensive Strategy with Africa" announce that the EU will support the global transition to resilient, safe, and sustainable food systems (SFS), to address the challenges of nutrition and food security. The transition towards SFS in developing countries will also contribute to the achievement of the objectives of the international dimension of the EU Biodiversity Strategy and the new EU Circular Economy Action Plan. In September 2021, the UN Secretary-General will convene a Food Systems Summit with the objective to boost the transition toward SFS, to resolve hunger, reduce diet-related disease and heal the planet.

Considering this political agenda, the purpose of this Knowledge Review is to provide to policymakers and practitioners key knowledge about SFS in a concise document. This Knowledge Review is based on seventeen recent reports listed below. Among them, seven are from the United Nations (UN) organisations. To find sustainable solutions to global challenges, the EU promotes strong cooperation with UN organisations, and has acknowledged the important role of the Committee on World Food Security (CFS), and its High Level Panel of Experts on Food Security and Nutrition (HLPE), in formulating evidence-based policy recommendations for the global governance of food security, nutrition, and sustainable food systems. Six publications have a stronger focus on research and this reflects the importance of improving the interface between science and policy. Two publications provide deeper insights into the economic aspects of food systems and two have been selected from independent and influential think tanks.

The choice of publications has also be influenced by the necessity to cover all dimensions of food systems (production, processing, and consumption of food) including transversal issues such as food losses and waste.

The Knowledge Review consists of selecting, extracting, organizing and articulating the key messages of these reports. **This Knowledge Review therefore does not necessarily reflect the position of the JRC and the European Commission**. These seventeen reports represent a small part of the literature available on SFS and consequently the knowledge presented here is not exhaustive. This Knowledge Review use verbatim quotes without quotation marks for formatting reasons. However, all sources have been systematically indicated.

[R1]: Catalysing science-based policy action on sustainable consumption and production: the value-chain approach and its application to food, construction and textiles. UNEP 2021
[R2]: Making Better Policies for Food Systems – OECD 2020
[R3]: Food systems everywhere: Improving relevance in practice – Inge D. Brouwer, John McDermott, Ruerd Ruben 2020
[R4]: Transformation of our food systems –the making of a paradiam shift- IAASTD 2019
[R5]: Future Food Systems: For people, our planet, and prosperity – Global Panel on Agriculture and Food Systems for Nutrition 2020
[R6]: Food Security and Nutrition: Building a Global Narrative towards 2030 – HPLE 2020
[R7]: Addressing Food Loss and Waste: A Global Problem with Local Solutions – World Bank 2020
[R8]: Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition - HLPE 2019
[R9]: Sustainable Healthy Diets Guiding Principles – FAO, WHO 2019
[R10]: Nutrition and food systems. HLPE 2017
[R11]: Food from the Oceans: How can more food and biomass be obtained from the oceans in a way that does not deprive future generations of their benefits? High Level Group of Scientific Advisors 2017
[R12]: Food losses and waste in the context of sustainable food systems – HPLE 2014
[R13]: Food system impacts on biodiversity loss. Three levers for food system transformation in support of nature - Chatham House 2021
[R14]: Natural resources and food systems: Transitions towards a 'safe and just' operating space – SCAR 2020
[R15]: CIRAD is committed to sustainable, resilient and inclusive food systems – CIRAD 2021
[R16]: Achieving Sustainable Agricultural Practices: From incentives to Adoption and Outcomes- IFPRI 2021
[R17]: Towards a Sustainable Food System - Moving from food as a commodity to food as more of a common good - Group of Chief Scientific Advisors – March 2020

Key Knowledge

- A multitude of highly diverse food systems coexists and each individual food system is unique. Solutions for the transition toward SFS need to be context-specific.
- SFS are food systems that provide sufficient healthy food accessible to all, are respectful of the environment, culturally acceptable, equitable, and resilient to shocks.
- Reports underline the unsustainability of many current food systems: they encourage unhealthy diets, they generate large quantities of food losses and waste, inequalities, and they have substantial negative impacts on the environment (biodiversity loss, natural resources depletion, and significant contribution to climate change).
- There are wide gaps between policies that the evidence suggests would be effective and the policies that are currently adopted in many countries. For rational decision-making, policies should be based on comprehensive performance metrics, covering all the impacts of agriculture and food systems.
- Accounting for the "true cost" of food and realigning incentives toward nature positive production systems are among the key parameters for the transition towards SFS.
- Fiscal policies, by adjusting taxes and subsidies to make healthy and sustainably produced food more affordable to more people and to discourage the consumption of ultra-processed food, sugar sweetened beverages, could be a powerful lever for the transition towards SFS.
- Regulation of food procurement can play a key role in supporting sustainability practices along the food value chain, for example by simultaneously promoting local sustainable products and healthy diets. Action by cities and local authorities will be at least as important as national efforts.
- Food purchasers have considerable power to drive change through the choices they make, but this is only possible if there are affordable products sustainably produced, adequately labelled, and that the information is trusted.
- Dietary change (including reducing meat consumption) is indicated as a necessary global enabler to allow widespread adoption of nature-friendly farming without increasing the pressure to convert natural land.

Food Systems: Definitions

[R6] proposes the following definition of food systems: "A food system gathers all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the output of these activities, including socio-economic and environmental outcomes".
It exists a multitude of highly diverse food systems underpinned by climate, natural conditions, the history of territories and human societies [R1][R15]. Each individual food system is unique and is defined by the mix of food produced locally, nationally, regionally or globally [R13].
There is a shared understanding across publications on the attributes of SFS and [R6] lists the following ones:

- Productive and prosperous (availability of sufficient food);
- Equitable and inclusive (access for all people to food and to livelihoods);
- Empowering and respectful (all people can make choices and exercise voice);
- Resilient (stability in the face of shocks);
- Regenerative (sustainability in all its dimensions); and
- Healthy and nutritious (nutrient uptake and utilization).

[R1] lists three big categories of stakeholders in food systems and highlights main trends.

Producers: Globally, there are 2 billion of producers [R15] and 85% of the farms are less than two hectares. Farmers in food systems are in a structurally weak position [R17]. Their share of profit in the food value chains has consistently fallen over recent decades. Farmers have limited capacity to negotiate with food companies. Many farmers in traditional food systems suffer from a lack of infrastructure [R1]. [R6] highlights the trade-offs between food security and energy needs in recent decades with a significant shift towards animal feed, timber and biofuels.

Consumers: The consumption decisions of 7 billion individuals globally are to a large degree influenced by the food environment in which they live (food markets, supermarkets, restaurants) as well as the influence of advertising and cultural norms. A growing number of consumers leave in urban areas and largely purchase (ultra) processed, packaged and easy-to-prepare food from all over the world, with greater environmental impacts and harmful consequences for human health [R1]. Changes in food consumption habits include out-of-home consumption and home delivery [R3]. [R3] recommends that more attention should be given to the social, economic, biological and psychological determinants of food choice, as they are drivers for food systems change. Consumers have limited information on the consequences of their consumption behaviour [R1]. However, [R5] considers that food purchasers have considerable power to drive change through the choices they make. Indeed, [R8] note that consumers can exert pressure to close market failures through their purchasing decisions, but this is only possible if there are affordable products sustainably produced, adequately labelled, and that the information is trusted.

The middle stages: These are food processing and packaging companies, as well as food retail companies. They are big players in terms of value added and employment, especially in developed countries and increasingly also in developing countries due to the trend of "supermarketisation". The highly competitive food retail sector has made food much more affordable for consumers but has had considerable consequences for other groups in the food supply chain, in particular food producers [R17].
A consolidation – and a vertical integration - of food processing and retail companies is observed [R1][R6]. These large private players dominate food value chains by setting standards and contracts in terms of size, quantity, quality, and price of food produced by farmers. According to [R1][R17], they have a disproportionate influence across both primary production and final consumption and to a large degree shape both what food farmers produce and sell and what food consumers buy and eat.
However, [R15] underlines that medium-sized food enterprises still represent the majority in food systems.

The Challenges in Food Systems: Why do we need more SFS?

[R1] groups current challenges in food systems in three broad categories.

The type of food produced and consumed and the central question of the sustainability of food choices and diets

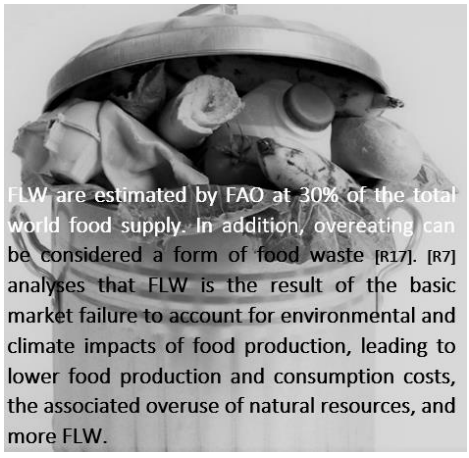
[R13] introduces the so-called 'cheaper food' paradigm. The more food produced, the cheaper food becomes, and the more consumed (and wasted). Low food prices - due to an externalisation of environmental and social costs - has encouraged two unsustainable trends:

- Greater consumption of resource-intensive foods such as animal products and processed foods by high-income households;
- Greater consumption of calorie-dense and nutritionally poor foods by low-income households.

Several reports note as well that people suffering from hunger in recent years has increased and that the COVID-19 crisis has exacerbated the situation. As a result, we observe the widespread co-existence of contrasting types of malnutrition [R1][R4][R5][R6][R9][R14][R15][R17]:

The burden of diet related disease has considerably increased – second leading risk factor for deaths - and is the highest in the low- and middle-income countries [R9].

The quantity of food produced and consumed and the central question of losses and waste (FLW)



[R12] makes a distinction between food losses, occurring before consumption level regardless of the cause, and food waste, occurring at consumption level regardless of the cause. In middle and high-income countries, most of the FLW occur at distribution and consumption level (e.g. 50% of the food wasted occurs at household level in European countries [R17]) In low-income countries, due to lack of storage capacity, poor storage conditions, and a lack in transport capacity, FLW are concentrated at production and post-harvest. Per-capita FLW peaks at 280–300 kg/cap/year in Europe and North America and amounts to 120–170 kg/cap/year in sub-Saharan Africa and South/Southeast Asia. Globally, FLW are responsible for 8 percent of annual global GHGEs [R7].

[R12] notes that, at processing level, quality standards (as to shape, size, and weight) that are imposed by the processors, retailers or target markets can lead to produce remaining un-harvested if they don't meet those standards. At retail level, date labelling - not necessary linked to food safety issue- is a major cause of FLW.

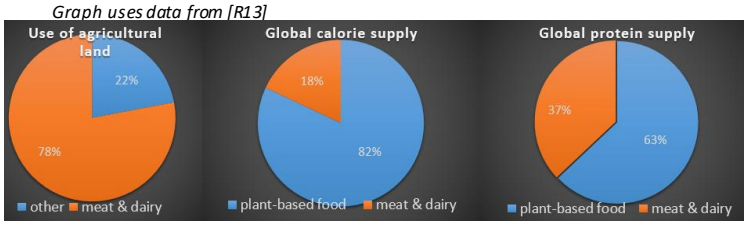
Box 1: Why do we need to eat less meat?

One example of a food issue associated with significant trade-offs and synergies is the production and consumption of large amounts of meat and other livestock products [R17]:

- *The ruminant livestock is a source of livelihood for millions of farmers and millions more along the value chain, and meat and dairy production contribute vital nutrients and vitamins to global food intake [R2];*
- *Reduction of livestock production and meat consumption can lead to changes in traditional rural landscapes and have an impact on cultural and social traditions [R17];*
- *With rising incomes, consumers tend to eat too much meat: European consumers eat 2.5 to 3 times as much meat as recommended by dieticians [R14];*
- *There are health risks associated with overconsumption of meat: cardiovascular, intestinal and other disease [R2][R14][R17];*
- *Cropping and animal husbandry occupy about 50% of the world's habitable land and the rapid expansion of animal farming has been behind much of this land expansion: 78% of the agricultural land is dedicated to farmed animals [R13].*
- *The conversion of natural ecosystems for crop production or pasture has been the principal cause of biodiversity loss [R13] and the livestock sector is a major source of environmental challenges such as climate change and water and air pollution [R2][R17];*
- *Livestock production generates animal welfare problems, zoonoses and the development of antimicrobial resistance [R17];*
- *These damages seems unreasonable compared to the role meat plays in feeding the world: meat and dairy products only contribute for 18% and 37% of calorie and protein supplies [R13].*

[R2] identifies that weakening consumer demand in developed countries for ruminant meat products for health and environmental reasons is an avenue worth exploring.

Graph uses data from [R13]



The way food is produced and the central question of the sustainability of production systems

Farming is now more intensified as a result of a model that assumed resources were infinite. This has given a spectacular boost to food production, but the cost has been massive ecosystem degradation, which is in turn threatening the viability of food systems [R15]. Several reports list the major environmental impacts of agriculture [R4][R5][R7][R9][R13][R14]:

- Over the past 50 years, the conversion of natural ecosystems for crop production or pasture has been the principal cause of biodiversity loss;

- Food systems contribute to a significant share of total anthropogenic GHG, estimated at 21-37% [R17], and within the agricultural sector, animal production is the largest source of greenhouse gas emissions;
- Detrimental nutrient and chemical emissions;
- Agriculture alone accounts for 70% of freshwater use;
- Food production has left 25% of the globe's cultivated land area degraded;
- Deforestation.

Beside these three main categories of challenges (unhealthy diet, high quantity of FWL, unsustainable production systems), additional reasons would request a transition to more SFS:

- There are many forms of inequality between stakeholders in the food systems: access to means of production, distribution of the value-added created, coalitions of power, etc. , with a negative impact on poverty reduction and food security for the most vulnerable people [R6][R9][R14][R17];
- Food safety risks, hazards, pests and emerging diseases – included COVID-19 [R6];
- World demographic dynamics: population is expected to grow by 3 billion people in the next 30 years and 70% would be living in an urban area. This will result in growing demand for food and process food, exacerbating previously listed issues if foods systems remain in status quo [R6][R7][R17];
- Climate change will affect production, processing, distribution and storage of food [R17].

Box 2: COVID-19 and food systems

COVID-19 is a zoonotic disease, meaning that it originated in non-human animals and passed over to humans. Novel zoonoses are a predictable consequence of new and close contact between species caused by the expansion of agricultural land into natural ecosystems. Coupled with the disruptive impacts of climate change, these forces destabilize ecosystems and give rise to new mixing between wild animals (including predators and prey, as well as their pests, parasites and pathogens), farmed animals and humans, allowing pathogens to move between species in new ways [R13]. COVID-19 increases poverty and limits access to food. The risk that COVID-19 is undermining sustainable development, especially sustainable food systems, has not yet been addressed (UNEP-2021).

Designing SFS policies: a challenging exercise

If food systems need to be transformed to enhance their resilience, sustainability and contribution to the health of people, economies, and our planet, designing policies to implement this transformation remains a challenge for several reasons:

- SFS policies require moving away from siloed agenda and integrating previously segregated sectors of production, processing, trade, consumption, social inclusion, environmental assessment, health, and human rights. This substantially extends the scope and complexity of the approaches [R4][R5];
- There is a multitude of food systems and therefore there is no one-size-fits-all policy. SFS policies need to context-specific [R15];
- The lack of comprehensive performance metrics, covering all the impacts of agriculture and food systems, is an obstacle to rational decision-making [R8];
- There are wide gaps between policies that the evidence suggests would be effective and the policies that are currently adopted in many countries (e.g. misaligned policy incentives including subsidies and food-related research and development) [R1][R2][R5][R7];
- The presence of powerful actors in food systems motivated by factors unrelated to food systems sustainability [R5];
- The standardization of diet -globally, 60% of calories come from just three grains: rice, maize and wheat- makes even more complicated to transform food systems [R14].

To these difficulties should also be added a number of controversial issues on the transition pathways toward SFS:

- The right approach to sustainable agricultural production methods: agroecology versus sustainable intensification (e.g. precision farming) versus climate-smart agriculture [R6][R8];
- New Plant breeding technologies, such as genome editing, represents for citizens and consumers a major value-based concern. Some see them as an advancement over traditional agricultural biotechnology (e.g. biofortification through genetic engineering), while others are concerned about their environmental and social implications [R2][R6][R8];
- Digital technologies create opportunities for efficiencies (e.g. connecting producers and consumers), while raising questions about data privacy and ownership [R6][R8];
- Food processing techniques, such as preservation practices and fortification, have been important for improving food security and working towards various public health objectives. At the same time, there are well established associations between excessive intake of energy-dense and nutrient-poor processed foods and an increased risk of developing conditions of overweight, obesity, specific forms of cancer and other NCDs [R2];
- The "true cost" of food (see box 3).

Box 3: The "true cost" of food

In the transition towards more sustainable food systems, two narratives tends to oppose each over [R4]:

I) Scientific advances (e.g. genetic engineering) can boost productivity while taking into account resource scarcities and environmental problems;

II) Structural changes in food systems are needed, including the internalization of environmental externalities.

Several reports [R2][R5][R1][R7][R8][R13][R14] stress that a substantial barrier to premium pricing for sustainable produced food is that market prices usually do not include the cost of negative externalities associated with production, processing and distribution, nor reward the positive benefits of systems with positive ecological impacts. In these conditions, markets alone cannot foster the transitions towards SFSs by providing a comparative advantage to sustainably produced food. [R13] explains that internalizing the environmental and social costs of food production through fiscal measures (e.g. a carbon tax) is seen by many as threatening the food security of lower-income households and the poorest communities. In reality, low prices for calorie-dense, nutritionally poor foods encourage low-income households to follow a nutritionally suboptimal diet. The result has been a rapid rise in the incidence of overweight and obesity alongside continued micronutrient deficiency. Accounting for the true cost of food is thus necessary if incentives in food systems are to be realigned to promote environmental and human well-being. Where this would result in higher food prices, complementary policies will be needed to mitigate the risk of income-driven food insecurity [R13].

To overcome the challenging task of designing SFS, [R17] stresses that food should be seen more as a common good rather than just as a consumer good, and that it is necessary to adopt an integrated food systems strategy, and several reports list the following requirements [R2][R3][R5][R6][R8][R12][R15][R17]:

- Building a shared understanding of the facts (thanks also to comprehensive performance metrics of food systems);
- A systematic consideration of synergies and trade-offs across food and agriculture (e.g. the trade-off between the potential higher cost of healthy food production, incomes for food producers, and the affordability of such food for citizens [R17]);
- Balancing diverging interests, understanding power imbalances, and resolving differences over values, thanks to deeper insights into behavioural relationships;
- A strong leadership and robust policy processes. Best practices include rigorous ex-ante impact assessments, costs and benefits analyses, inclusive stakeholder consultation and deliberative approaches, while avoiding policy capture by special interests.

Opportunities and policy measures to support the transition toward SFS

The UN Food Systems Summit in 2021 defines the objectives of the transition toward SFS:

- Ensure access to safe and nutritious food;
- Shift to sustainable consumption;
- Boost nature-positive production;
- Advance equitable livelihoods;
- Build resilience to shocks and stress.

Many of the problems inherent in the food system are global and, like climate change, can only be tackled at a global level. However, actions are also vital at national and local levels. As food systems are situated in different environmental, sociocultural and economic contexts, and face very diverse challenges, solutions needs to be context-specific [R5][R6][R8]. [R1][R17] analyses that nearly 60% of the measures currently proposed are either at the production stage (mostly to reduce environmental impact) or at the consumption stage (mostly targeting food losses and waste, food safety and product information requirements, and sustainable diets) through a good mix of voluntary and regulatory measures. There is much less economic and fiscal measures (e.g. removal of harmful subsidies, tax differentiation; etc.).

Measures at the production stage

Most reports prioritize the same measure: support diversified, resilient, nature-friendly, biodiversity-supporting production systems through agroecological farming [R4][R5][R6][R8][R10][R13]. [R5][R10] also insist on the necessity to support the production of nutritious food. [R17] highlights also the potential of technological innovation in the transition to food sustainability (e.g. precision farming; hydroponics, vertical gardens, or aquaculture on land). Novel foodstuffs such as insects or increased use of algae may also provide technological and social innovations towards extended sources of food [R17].

In order to boost nature positive production, [R4] lists a number of measures:

- Build capacity in agroecological research, extension and education;
- Support small and medium-scale farmers and their organisations;
- Establish supportive economic policies, financial incentives and market opportunities to overcome structural barriers;
- Strengthen institutional supports (e.g. secure access to land/seeds, establish equitable trade arrangements).

Box 4: Agroecology

Agroecology is increasingly promoted as being able to contribute to transforming food systems by applying ecological principles to agriculture and ensuring a regenerative use of natural resources and ecosystem services while also addressing the need for socially equitable food systems within which people can exercise choice over what they eat and how and where it is produced. Agroecological farming is typically associated with enhancing diversity: of farm outputs (genetics, agroforestry), land use across space (to improve biodiversity for ecosystem services) and time (e.g. crop rotations) [R13].

Five phases have been identified in making agroecological transitions towards more sustainable food systems. The first three operate at the agroecosystem level and involve:

- *increasing input use efficiency;*
- *substituting conventional inputs and practices with agroecological alternatives; and*
- *redesigning the agroecosystem on the basis of a new set of ecological processes.*

The remaining two steps operate across the whole food system and involve:

- *re-establishing a more direct connection between producers and consumers; and*
- *building a new global food system based on participation, localness, fairness and justice [R8].*

Agroecology is expected to contribute to [R8]:

- *Increased ecological resilience;*
- *Climate change mitigation and adaptation;*
- *Conservation of biodiversity and natural resources and protection of ecosystem services;*
- *Improved health and nutrition;*
- *Economic stability; and*
- *Increased social resilience.*

The adjustment of the agricultural support policies (subsidies and incentives) is a measure prioritized by several reports [R4][R5][R8][R10][R14]. Public support measures could include removing subsidies for synthetic inputs while giving incentives or redirecting subsidies for sustainable food production methods, and for managing multifunctional landscapes including wild species [R8].

Box 5: Incentives for sustainable agricultural practices

Achieving environmental sustainability in agriculture can provide important public goods, particularly in the form of ecosystem services. Different instruments can incentivise the adoption by farmers of sustainable agricultural practices [R16]:

- *Market-based incentives: they are of economic nature (e.g. changes in price of inputs and outputs, income transfers, etc.);*
- *Non-market-based incentives: mechanism such as technical support and technology transfers;*
- *Regulatory measures (e.g. certifications, environmental law and standards, cross-compliance, etc.);*
- *[R16] analyses that incentives that promote economic benefits are more likely to lead to the adoption of better practices in the short term, especially if they are voluntary. In the long-term, however, positive outcomes of these practices for the farm or the environment are prime motivators for their adoption.*

[R16] made some recommendations when designing and implementing incentives for sustainable agriculture:

- *They must be large enough to motivate a change in production practices;*
- *They must be simple, easy to understand and implement;*
- *They should be provided with complementary support: technical assistance and extension services.*

Beside agriculture, [R11] looks at the measures for sustainable fisheries and aquaculture and analyses that the ocean currently accounts for only a small proportion of human food – about 2% of overall calorie intake and 15% of protein intake. This contribution could increase with the expansion of marine aquaculture - notably of herbivore filter feeders (e.g. molluscs) - for direct human consumption or, together with cultivated algae, as a more ecologically efficient source of feed for farmed marine carnivores (e.g. finfish, shrimp, etc.).
Among the sustainable practices, exploiting the synergies between aquaculture and agriculture, through an agroecological approach is a promising option (e.g. "The rice–duck–fish system in Asia") [R8].

Measures at the processing and retailing stages

Measures targeting the food processing stage have the potential to make stronger links between how we produce and what we consume. The implementation of standards (e.g. animal welfare, carbon footprint), certifications and labels can support the adoption at the primary production stage of more sustainable farming and fishing practices, and provides consumers with the opportunity to make more sustainable food choices [R1][R8][R9][R17].
Mandatory measures such as the bans on the use of certain ingredients in processed food, the regulation of advertising and marketing (e.g. restrictions on the marketing of foods that are potentially unhealthy, regulation on health claims on food packaging, and the adoption a front labelling system that is easy to interpret, with transparent and comparable sustainability information) are also among the measures that could be envisaged [R2][R5][R10][R14][R17].
However, according to [R17], information provision, fact-based education, and awareness campaigns are on their own insufficient to achieve the required behavioural change towards sustainable consumer choices. Fiscal policies, by adjusting taxes and subsidies to make healthy and sustainably produced food more affordable to more people and to discourage the consumption of ultra-processed food, sugar sweetened beverages, could be a powerful lever [R2][R5][R10][R14][R17].
At the food service stage, several reports point that the regulation of food procurement (schools, hospitals, etc.) can play a key role in supporting sustainability practices along the food value chain, for example by simultaneously promoting local sustainable products and healthy diets [R1][R9][R10][R14].
Action by cities and local authorities will be at least as important as national efforts: Copenhagen is the first city that has reached 100% organic public canteens, supplied by around 25 000 hectares of organic farmland mainly around the city. Vienna has a network of organic urban gardens of around 860 ha that also supply public canteens. Rome serves around 1 million organic meals per day in public canteens. Private operators' initiatives (e.g. tourism businesses) may implement as well procurement policies to favour local, seasonal and organic products, plant-based menus, etc. [R1].

At the retailing stage, [R6][R17] proposes measures to support diverse, equitable, and shorter food supply networks and markets (e.g. farmers market) that are more resilient and help to overcome uneven trade, concentrated markets and persistent inequalities. Unfair trading practices could also be addressed more directly (e.g. European legislation on unfair trading practices)[R17]. Regulatory measures at local level to reduce access to foods high in fats, sugar and salt in and around schools are an effective strategy for improving the dietary intake of students [R17].

Measures at the consumption stage

[R13] sees dietary change as a critical lever to allow widespread adoption of nature-friendly farming without increasing the pressure to convert natural land.

[R9] defines sustainable healthy diets as dietary patterns that promote all dimensions of individuals' health and wellbeing; are less resources-intensive [R17]; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable. This calls to shift to diets based more on plants [R13][R17].

In order to promote healthy and diversified diets, the following measures are identified:

- Promote much greater consumer awareness of the planetary and health implications of food choices [R5][R8][R9][R14], in particular though mobile applications and tools that give consumers access to trustworthy sustainability information [R1][R14];
- Ensure affordability of heathy diets for low-income consumers through appropriate safety nets [R8][R9][R15];
- Develop nationally endorsed food-based dietary guidelines that define a healthy diet within a country-specific context not only to inform consumers about what to eat but to analyse in detail specific dietary gaps [R3][R5[R9][R10].

The specific measures to address FLW

[R17]explains that food waste can be addressed through reduction and valorisation strategies for unpreventable food waste (e.g. feedstock and bio-based products). [R7] explains that the best stage of the supply chain for policy to reduce FLW depends on the specific circumstances of the country, and that there are two main approaches to FLW policy:

- One approach is to target food systems as a whole (e.g. a tax on farming or on consumption);
- The other approach is to target FLW directly.

The following key measures are identified:

- Training and extension services for farmers [R7];
- Awareness campaigns for consumers [R12][R17];
- Financing storage systems or cold chains or food processing infrastructure in developing countries [R7][R12][R17];
- Promoting smart packaging (e.g. appropriate range of portion sizes), clarity of food date labelling, "smaller plate" and "doggy bag" practices in restaurants [R1][R12][R17];
- Addressing the standardization of the products (as to shape, size and weight) offered to consumers, which is a major cause of FLW in modern retailing systems. Products defined as non-marketable in standardized systems should be channelled through alternative distributions channels (e.g. food banks, local schemes to redistribute surplus food) [R12][R17].

APRIL 2021