PLAN'EAT

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Deliverable D1.1
State of the art of the European food system and behaviour transition

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DELIVERABLE PLAN'EAT – D1.1
State of the art of the European food system and behaviour transition

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DEM	Demonstrator, pilot, prototype, plan designs	
DEC	Websites, patents filing, press & media actions, videos, etc.	
DATA	Data sets, microdata, etc.	
DMP	Data management plan	
ETHICS	Deliverables related to ethics issues	
SECURITY	Deliverables related to security issues	
OTHER	Software, technical diagram, algorithms, models, etc.	

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Project abstract

The EU food system is under considerable pressure for change due to its negative climate, environmental and health impacts. Food system transition will require changing dietary habits of millions of Europeans. PLAN'EAT aims at advancing the scientific basis on factors influencing dietary behaviour and the health, environmental and socio-economic impacts of dietary patterns, and deliver solutions for transition through a transdisciplinary and multi-level approach.

PLAN'EAT will co-create data and interventions in a pan-EU network of 9 Living Labs and a Policy Lab. These living labs will focus on a broad range of population groups, varying according to age, culture, health and socio-economic status. PLAN'EAT entails four steps that feed into each other:

(1) A snapshot of European dietary patterns and food environments will be provided by respectively basing on existing data from 11 EU countries and by involving local population groups in LLs.
(2) Factors and drivers influencing dietary behaviour at macro- (food system), meso- (food environment) and micro- (individual) levels will be deeply investigated.
(3) A True Cost Accounting database and methodology will be developed and applied, for the first time, on dietary patterns, providing integrated insights into the diverse impacts of current and future diets, including possible synergies and trade-offs.
(4) A solution package will be co-developed with food chain actors, consumers and policymakers, including:
    - a Food System Dashboard, setting out context-specific food policy recommendations;
    - interventions targeting Farm to Fork actors, supporting farmers, food industries, retailers and food services to create suitable food environments;
    - personalised advisory tools to empower consumers; and
    - improved dietary advice, education and communication strategies to target populations at large.

PLAN'EAT will enable >58,500 European consumers to shift to healthier and more sustainable dietary patterns by 2032, reducing premature mortality by 20% and greenhouse gas emissions from local food supply chains by 23% in 39 EU areas.

Acronyms and abbreviations

Table 1: Acronyms and abbreviations

Terms	Definition
ASC	Aquaculture Stewardship Council
BCIs	Behavioural Consultation and Interventions
BCT	Behaviour Change Technique
CWGs	Consultation and Working Groups
DGE	German Nutrition Society
DONE	Determinants Of Nutrition and Eating
EF	Ecological Footprint
EFSA	European Food Safety Authoritiy
EPHA	European Public Health Alliance
EPI	Environment Policy Index
EU	European Union

EuroFIR	European Food Information Resource
F&V	Fruits and vegetables
FAO	Food and Agriculture Organization
FBDG	Food Based Dietary Guidelines
FCDBs	Food composition databases
FEE	Foundation for Environmental Education
GHGE	Green House Gas Emission
GWP	Global Warming Potential
IEO	European Institute of Oncology
INFORMAS	International Network for Food and Obesity/ NCDs Research, Monitoring and Action Support
INRAN	Istituto nazionale di ricerca per gli alimenti e la nutrizione
IR	Internal report
JPI	Joint Programme Initiative
LCA	Life-Cycle Assessment
LLs	Living Labs
MS	Member State
MSC	Marine Stewardship Council
NA	Not Applicable
NAOS	Strategy for Nutrition, Physical Activity and Obesity Prevention
NCDs	Non-Communicable Diseases
R&I	Research and Innovation (R&I)
RIVM	Rijksinstituut voor Volksgezondheid en Milieu
SDGs	Sustainable Development Goals
SFS	Sustainable food systems
SP	Standard Portion
SPG	Survey, Protocols, Guidelines
TIPPME	Typology of interventions in proximal physical micro-environments
UK	United Kingdom
UPFs	Ultra-Processed Foods
WHO	World Health Organization
WISH	World Index for Sustainability and Health

Interviews with experts from WHO and FAO

Nowadays we have been facing the negative consequences of food systems on the environment, social and health aspects. Joining forces at international levels is becoming one of the main factors to overcome these problems. To achieve this issue, following the PLAN'EAT approach, an interaction with experts of WHO and FAO was identified as the tool to gather global insights on this topic. Interviews with the WHO Director of the Department of Nutrition and Food Safety, Dr Francesco Branca and with Dr Patrizia Fracassi, Senior Nutrition and Food Systems Officer at FAO and additional written comments by Dr Lynnette Neufeld, Director of the Food and Nutrition Division were carried out.

Interviews with Dr Francesco Branca, WHO Director of the Department of Nutrition and Food Safety.

The WHO worked, in collaboration with FAO, on a publication that outlined the concept of sustainable and healthy diets. This concept is based on three dimensions: healthiness of the diet, environmental sustainability and cultural-economic sustainability. The starting point has been health, not only in relation to the prevention of non-communicable diseases, but also in terms of the promotion of well-being. To make a transition towards healthy and sustainable diets, it is necessary to act across the food system, from production to consumption. Environmental impact needs to consider the production of GHGs, the consumption of fresh water and crop land, the use of nitrogen and phosphorus fertilizers, the loss of biodiversity and the use of chemical compounds that contaminate the environment. Shifting consumption patterns towards largely plant-based diets is needed alongside improvement in production methods. To be able to feed about 10 billion people in the world by 2050, producing food with a lower environmental impact, it will also be essential to reduce food loss and waste, which is in addition a way to make the best use of the planetary resources. Regarding **specific nutrition recommendations,** WHO is developing a document that includes a general definition of healthy diets. No activities have been planned as yet to further develop the concept of sustainable and healthy diets. To define **specific strategies**, it is necessary to start from the 5 different pathways of interaction between food system and human health. The first pathway concerns the impact on human health attributable to the consequences of **unhealthy diets** (responsible for 8 million deaths every year), but also to **malnutrition** and **food insecurity**. The second pathway acts through **zoonotic diseases** and **the use of antimicrobials** that cause antimicrobial resistance. The third pathway is related to **contaminated food**, the fourth is the **environmental contamination** through chemicals compound, and the fifth **the health of food workers**.

WHO has been developing **guidelines of effective policies to r**eshape the food environment and support healthy food choices. The first policy area relates to **food and beverage taxation**, and the use of **subsidies** to make healthy food more affordable. A second area relates to the influence on consumer choices of **marketing** foods and beverages, especially marketing directed to children (i.e. all up to the age of 18). The third area aims to inform consumers through **front-of-pack nutrition labelling**, or interpretive labelling. The fourth area concerns the **provision of healthy food in public institutions** (e.g. schools, hospitals, public canteens, social protection systems). Public institutions have an incredible purchasing power and can influence the availability of food products. The fifth area relates to the **reformulation of food products,** through the choice of ingredients that industry is using in food. For each of these areas, WHO has made an analysis of effectiveness and cost-effectiveness, and the affordability of these measures for countries of different income levels. WHO has developed evidence-based guidelines, and implementation tools, and support countries to implement policies.

Taxation of Sugar Sweetened Beverages has now become an extremely popular policy, now implemented in almost 90 countries. The effectiveness of these policies depend on their design, including the rate of taxation and the products to which it is applied. For **marketing** there are recent guidelines, in which it is recommend that, in the first place, the policies of each country should be mandatory and not voluntary. There are now 28 countries that aim to reduce marketing of unhealthy food and beverages to children, but mainly through voluntary approaches. Regulations should cover marketing addressed to all children, up to the age of 18, not only until the age of 12-14, as some policies indicate. The WHO guidelines recommend that policies should be comprehensive, not only include traditional media, but also digital media, and aimed to reduce the persuasion power of marketing,e.g. forbidding the use of cartoon characters on food packaging. Furthermore, marketing regulations should be based on a publicly defined nutrient profiling model. An

implementation manual with UNICEF has also been developed, which explains step by step how to apply the recommendations (https://iris.who.int/bitstream/handle/10665/370355/9789240047518-eng.pdf?sequence=1). WHO has also developed an acceleration plan to stop obesity. Currently, 28 frontrunner countries has committed to take action and half of them have decided to establish regulations to restrict marketing foods to children (https://iris.who.int/bitstream/handle/10665/370281/9789240075634-eng.pdf?sequence=1).
WHO has developed a framework for **front-of-pack nutrition labelling**, that provides recommendations on how to design interpretive labelling schemes: align label information to countries' dietary guidelines; test the effect on consumers' food choices; discuss with stakeholders; use a nutritional profile developed by a publc institution. Currently, front-of-pack nutrition labelling systems are used in several countries, some of which are achieving excellent results in orienting consumers' choices towards healthier products (e.g. the warning label in Chile). Concerning **food provision in public institutions** WHO recommends aligning them to food-based dietary guidelines, to apply to all public venues and to all purchases done with public funds, inclusion social support services. Following the UN Food System Summit a coalition of school meals has been established, including over 90 countries (https://schoolmealscoalition.org/). About the **reformulation of products**, different actions have been set up. On industrial *trans-fats,* most countries have now established national policies. WHO conducted dialogues with food and ingredient manufacturers. Legislation should reduce the level of the trans-fat to less than 2% of the total energy intake. The largest food manufacturers have also committed to virtually eliminate partially hydrogenated vegetable oils (PHVO) from their products, including in countries in which specific laws have not been established and a large ingredient manufacturer has committed to exclude PHVO from their products by 2023. For *sodium,* WHO developed benchmarks in 60 categories of products, based on the lowest possible achievable level achieved by food manufacturers in different parts of the world. Food manufactures did not agree to make a global commitment to reduce sodium content to the level of the benchmarks.
In the context of **zoonotic disease transmission**, WHO is developing guidelines on traditional food markets, following an interim recommendation to ban the sale of live wild mammals. WHO has expressed a concern regarding **the use of antibiotics in animal production,** leading to antimicrobial resistance.

The replicability of policies. WHO makes recommendations based on experience of the countries, analysed with research tools. Recommended policies need to be considered in the **local context**. Countries deciding to adopt policies need to go through a national adaptation process and are invited to share their experience. **Regional policies are particularly helpful** given the interconnections of food system. The change in the food environment and in diet quality **need to be monitored** using qualitative and quantitative data. Good data are also needed **to address gaps** in knowledge and evidence.

Obstacles and barriers. Policy adoption and implementation may face challenges. **Conflicts of interests** are holding back the implementation of the policies. Economic interest may prevail on the public health benefits. WHO has developed a series of policy briefs that summarise the evidence for policies, the existing experience and available tools and explain what arguments are used by the opponents of the policies and what counterarguments are available.

Interview with Dr Patrizia Fracassi, Senior Nutrition and Food Systems Officer at FAO and additional written comments by Dr Lynnette Neufeld, Director of the Food and Nutrition Division.

In terms of what FAO is doing to achieve the transition towards healthier and more sustainable dietary behaviours there are **five relevant/important initiatives**. **First,** an important area of FAO's work on healthy diets is to support consensus building on what constitutes a healthy diet and what metrics should be used to measure it. FAO is also working closely with WHO to publish a joint statement about what constitutes a healthy diet – which is based on quite simple universal principles: adequacy, balance, diversity, and moderation. The universal principles of a healthy diet are translated into healthy dietary patterns that are contextually appropriate using food based dietary guidelines (FBDG). The **Healthy Diet Monitoring Initiative** (https://www.who.int/groups/who-unicef-technical-expert-advisory-group-on-nutrition-monitoring/healthy-diets-monitoring-initiative**),** which involves FAO, UNICEF and WHO, aims to enable country and global monitoring of the healthfulness of diets to inform policies and programs across a wide

range of sectors. As now healthy diets are not measured as part of SDG monitoring which is an enormous gap, given their critical importance for health and development. The **second** initiative concerns the **food system based dietary guidelines.** This work has been traditionally carried out by FAO, but now the approach is moving away from focusing only on consumer behaviour and is looking at the food systems including food environments and food supply. This is still a work in progress, but there has been an application in Ghana and Costa Rica. Linked to the concept of a healthy diet and the contribution of healthy diets towards the prevention of multiple forms of malnutrition, the **third** initiative supported by FAO and the World Bank aims to estimate the **economic costs of unhealthy diets in LMIC,** especially in contexts characterized by the double/triple burden of malnutrition. The "double burden" of malnutrition refers to: the co-existence of a high prevalence of undernutrition (as evidenced by child stunting, child wasting, child or women thinness) and adult or child overweight and obesity at country level; the co-existence of one or more individuals with wasting, stunting, or thinness and one or more individuals with overweight or obesity within the same household; and the co-existence of stunting and overweight within the same individual, which is increasingly observed among children under five years of age in some regions, especially in Latin America. Furthermore, with recent global estimates on micronutrient deficiencies, most LMICs are dealing with a "triple burden" of malnutrition. Micronutrient deficiencies can occur "at either end of the anthropometric spectrum" as well as in individuals with healthy weights. A healthy diet contributes to the prevention of multiple forms of malnutrition. Working on enabling healthy diets can help overcome the compartmentalization of the current work on nutrition where different forms of malnutrition are dealt with separately.
FAO is focusing on the nutrition and health economic losses of malnutrition attributable to unhealthy diets recognizing that there are other factors such as exposure to infections and obesogenic environments (including unhealthy behaviours) that contribute to malnutrition and NCDs risks. This activity aims to inform the True Cost Accounting of our current agrifood systems**,** which looks at the hidden costs on our health, environment, and society. An accurate picture of the nutrition and health economic costs of unhealthy diets is crucial to bring the discussion beyond the Ministry of Health, which usually shoulders the direct economic costs linked to treatment of malnutrition and other diet related NCDs. It is important to engage the Ministry of Finance and other Ministries in the agrifood sector to make the case for repurposing agrifood public policies and support healthy diets. from sustainable food systems. The types of policies depend on the food, dietary and nutrition situation. Indonesia is an example where there are high rates of undernutrition and overweight, obesity and diet related NCDs. In this context, it is important to create fiscal incentives to make healthier diets more accessible and affordable. Malawi is an example in Africa where significant agriculture subsidies are for maize as the main staple food to address food insecurity. However, the rate of overweight, obesity and NCDs is also growing in Malawi. Therefore, the repurposing of agrifood public policies will require increased incentives to support the demand and supply of non-staple nutritious food. FAO is focusing on rebalancing the food basket and creating the policy environment for diversification in the supply and demand to enable healthier diets.

The **fourth** initiative concerns **the school meals coalition** (https://schoolmealscoalition.org/). The coalition engages several partners, but FAO is leading work on developing and sharing resources through a School Food Global Hub that also includes country case-studies. In this context, FAO is setting school meal standards by looking at the health point of view, what is available and what is feasible, and what is also sustainable from a supply side. The work to develop school meal standards is currently carried out in Cambodia and Ghana. However, in many countries, even though school meals are on the political agenda, the school-system is not able to apply the standards due to limited resources and capacity.
The **fifth** initiative is the design of **agrifood systems pathways to healthy diets and the inclusion of dietary indicators to measure impact**. It is essential to start including individual dietary data to assess the impact of agrifood policies and programs, moving beyond the current focus on food insecurity and dietary data at household level. Work is ongoing on how to improve the design of pathways that link and align key agrifood actions with the aim of enabling healthier diets through improved availability, access, affordability, and consumption of safe and nutritious food as part of healthy diets. This approach aims to bring together a

variety of sectors to enable healthier diets while highlighting co-benefits and reducing trade-offs for economic development, climate change and other environmental impacts. FAO has tested this approach in seven countries in Africa and Asia. There are different initiatives looking at nudging healthy behaviors, starting with how the food is presented in institutional cafeteria. Through cross-divisional efforts and with the involvement of colleagues from nutrition and facilities management at both central and decentralized offices, FAO developed a **Healthy Food Environment** checklist, which was launched in all offices in 2022 and is now being monitored on an annual basis. In the first reporting year, 71% of FAO Offices completed the Healthy Food Environment Checklist. Moreover, there is an **accounting of food waste** in FAO HQ, which is analyzed every week by food group category, helping to understand which groups are wasted the most. These initiatives are very useful for bringing nutrition within the organization and making people understand what concepts are linked to health and sustainability within the work food environment.

The replicability of strategies. The content and the direction of these strategies can be contextualized for EU countries, where the monitoring of healthy diets might be closely linked with aspects of environmental sustainability, climate change mitigation and animal welfare.

What has been done at the food-system cooperation level:

1. FAO is trying to position nutrition together with environment and socio-economic aspects, considering alignments in terms of co-benefits or potential tradeoffs that need to be managed. We do not expect that nutrition and healthy diets will have priority, but at least we aim to make people aware that there are tradeoffs.
2. In general, the dietary aspects are the mandate of FAO compared with other agencies, looking at promoting healthy diets instead of specialized products. For example, while a specialized product might be required for the treatment of child acute malnutrition, a long-lasting solution should be found back to the family food and to the food-based approach for the prevention of malnutrition. Now is a good moment to set up preventive interventions and activities because of an increased focus on dietary aspects when discussing food systems transformation, even in humanitarian contexts. Particularly, the issue of sustainable healthy diets is where the nutrition community should come together, put together a few messages in a coherent way and work with other disciplines. There is a lot of interest in nutrition, but sometimes there is a lack of consensus and of a point of alignment.
3. Considering the work that has been done on the assessment of the contribution of livestock to food security, sustainable food systems, nutrition and healthy diets, in the first report FAO looked at the contribution of terrestrial animal source food, and reviewed all published food-based dietary guidelines to see what recommendations were given and to see how many countries have developed ranges to provide more quantitative recommendations. Red meat is one of the most interesting issues because it is related to excessive consumption, but at the same time inadequate consumption can jeopardize health functions. It is important to see which population groups receive the message and what kind of options are proposed within dietary recommendations. For example, in a recent expert consultation for European countries that was looking at the meat sector transformation, all proposed solutions were in terms of animal source food alternatives and cell-based meat. There was nothing on the dietary aspects. The discussion focused on substituting meat with another product without considering the aspect of healthy diets. There was no discussion on the quality and level of processing of the animal source food alternative products. Discussions on substitution are important, particularly for the EU, but a constructive dialogue should align the nutritional, environmental, socio-economic and political aspects.

Obstacles and barriers. The most evident obstacle that can be seen now is the fragmented space, even on the definition of healthy diets, which as mentioned we hope to change dramatically. More clarity and consensus is needed on the specific actions / combinations of actions across agrifood systems that will enable healthy diets while recognizing the context specificity and the need to engage several sectors and

stakeholders. If we are to elevate nutrition on the political level, this obstacle should be overcome, colliding coherent messages around this topic.

Executive summary

The deliverable on the state of the art and best practices of PLAN'EAT represents a reference document all along the project. Across all the document the constant concept to assess the current knowledge and interventions in the 11 European participants are reported. its goal is to collect and discuss data and results that have been gathered in this first year of work, giving an overview of the situation regarding what has been done to lead the transition towards healthier and more sustainable diets. The main topics discussed belong to the three-investigation level of the project: macro, meso and micro level. The document is divided in different sections, each analysing in depth specific topics/issues meaning dietary behavior, the policy instruments, the nutrition and the dietary patterns, and the needs and requirements of food system stakeholders.

Dietary behaviour. Researchers, policy makers, health insurances, and other societal actors are becoming interested in learning what determines food behaviours, and in supporting consumers who want to change their behaviour towards more healthily and sustainably way of life.

With the scope to detect what can improve dietary behaviour, behavioural scientific evidence was condensed on the potential to change dietary-related behaviour, by investigating the 9 different target groups considered in PLAN'EAT. While not all interventions and strategies are equally effective, there is general evidence that some Behaviour Change Interventions (BCIs) are able to change dietary related behaviours across different target groups. Concerning the question regarding which specific strategies work, for whom and in which settings, the evidence becomes less clear. The main problem that does not allow to easily compare the results of BCIs and find the best strategies for different population target groups is the lack of a standardised methodology. The analysis of these intervention studies can hence only be a first guiding step. Once a few possible strategies are selected, the original studies behind them should be checked and the contexts in which the strategies have been applied and tested should be analysed in detail, including aspects as the setting, the duration, the delivery type and further specifics of the target group.

Policy framework. Overall, the state of food policy is at best medium, but in most cases quite low. The field of environmentally sustainable food consumption policy instruments is underdeveloped. Overall, out of a potential maximum score of 25 for all policy indicators, the maximum any country scored on sustainability was 6, compared to a maximum of 18 for health, which is a large discrepancy. Moreover, there are quite some differences between countries. Belgium, the Netherlands and Germany collectively scored highest on health with 18/25, whereas the lowest scoring country was Greece with only 8/25. It is important to note however that countries with the highest frequency count for the presence or absence of a policy instrument do not necessarily have the best or most effective food policy: having more instruments but ones that lack effectiveness may constitute a poorer policy approach than having less but more effective instruments. Anticipating this issue, policy instruments along the Doern continuum were therefore also classified, which showed different degrees of coercion between policy domains and countries. What emerges from this picture is a policy approach on healthy and sustainable food consumption that is on the reluctant side, in terms of how coercive the policy instruments employed are – if present at all. While policy domains showed clear differences in the types of policy instruments employed (with food labelling being the least and food composition the most coercive), instruments with the highest degree of coercion (Public enterprise) were only present in two policy indicators and only within a small number of countries. For many policy indicators, there were very few countries that had Regulatory (i.e. more coercive) instruments in place. A lot of food policy, particularly in the Food provision policy domain, is focused on consumer education, which strongly relies on Exhortative instruments. Many scholars call for more regulatory policy instruments, specifically in the food retail domain where policy instruments are mostly lacking altogether. Considering this large gap of instruments in the domain of food retail in particular, future research could study barriers for the establishment of such policy, for instance building on the commercial determinants of health (and here also sustainability) literature that focuses on the systemic roles of commercial actors in shaping (food) policy.

Nutrition and dietary patterns. In terms of dietary guidelines, Italy, Netherlands (except for physical activity) and Spain (except for general behavioural advice) seem to be the countries with a most complete approach. In addition, other countries can be considered good examples. For Sweden, except for the lack of specific/direct food category recommendations, the structure widely covers several other aspects. Greece has a well-defined structure for recommendations that covers different population groups. As far as concerning food consumption patterns in around 10 years the best improvements were observed for Netherlands and France (fruit and vegetables and legumes increase) and Germany (legumes increase and alcohol decrease), while Italy and Hungary worsened the food consumption of fruit, vegetables, meat and alcohol. Regarding the environmental aspects of food consumption, France and Sweden set up studies to analyse the shift of the population dietary intake towards healthier and more sustainable pattern, while France, Italy, Ireland, Spain, Sweden and Germany assessed the environmental impact of food through different methodologies.

Requirements and needs among food system stakeholders. What are the requirements and need of the agri-food system actors (primary producers, food industries, food services, restaurants and retailers), the educational systems, the healthcare professionals, the policy makers and citizens are varied. The common agreement concerns the need to have a vertical collaboration between the various actors involved in the process of production/processing/sale/distribution of food products and to obtain government interventions to facilitate the transition to a healthier and more sustainable system through financial support and consumers education.

1. European status quo and context

1.1 Our food systems are locked in “positive” feedback loops

Food systems have a lot on their plate:

1. EU food systems are responsible for around one third of greenhouse gas (GHG) emissions, most of which comes from animal-based food (EEA, 2019).
2. Food systems are expected to cope with resource scarcity (including water) and land degradation and desertification, while feeding a growing world population.
3. Meanwhile, in the EU, nearly 59 million tonnes of food (131 kg/inhabitant) are wasted annually, 69% of which at household, food service and retail levels, corresponding in total to 132 billion euros (Eurostat, 2022). At the same time, around 32.6 million people cannot afford a quality meal every two days (Eurostat, 2021).
4. Current diets tend to aggravate forms of malnutrition (over-nutrition, under-nutrition and micronutrient deficiencies), which in turn cause several Non-Communicable Diseases (NCDs, such as cardiovascular diseases, cancer, diabetes), which account for 71% of all deaths.
5. Each food system presents financial and power imbalances, reinforcing gaps in equity, accessibility, inclusion and marginalising vulnerable groups and rural areas. Power is mainly concentrated in the hands of a few multinational agri-food industries (Clapp, 2021).

Food systems need to move away from their current "positive" feedback loops, where effects also act as causal agents on their own origin while **accentuating** disruptions, to "negative" feedback loops, where disruptions are **mitigated**.

To achieve this, food systems need to be unlocked, at every level and in every dimension (political, socio-economic and technological). All the interactions within food systems, the interdependencies of their

outcomes and the consequences of each solution must be assessed and considered, notably to identify synergies[1], **leverage points[2]**, lock-ins[3] and trade-offs.

1.2 Changing dietary behaviour: a key leverage point

According to the Intergovernmental Panel on Climate Change (IPCC), dietary change can have a major positive impact on climate change mitigation, human health, land degradation and food security.

1. A transition to diets in line with food based dietary guidelines (FBDG), that take environmental aspects into account, could reduce the total carbon footprint of food by around 30-45% (Trolle et al. 2022, *studies in Denmark, Sweden, UK, The Netherlands*). The main activator and catalyst for this reduction is switching to **plant-based diets**, with limited animal-based food consumption, and promoting sustainably produced foods with low GHG emissions (IPCC, 2019). The mitigation potential of dietary changes is estimated as 0.7 – 8 $GtCO_2$ eq per year by 2050.
2. According to the EAT Lancet Commission, a shift from unhealthy diets to the planetary health diet (mostly plant-based) can generate significant co-benefits for human health and prevent 11 million premature adult deaths per year (EAT 2019).
3. Improved dietary choices and reduced overconsumption, food losses and waste can reduce competition for land. By 2050, dietary behaviour changes could free several million km^2 of land. Combined with improved value chain management, they can contribute to eradicating poverty and eliminating hunger while promoting good health and wellbeing.

Current approaches to improve dietary behaviour in a food system mostly focus on individual responsibility (Savona et al. 2017). Yet, several factors influencing behaviours are not directly actionable by consumers, especially by vulnerable groups (e.g. low income, people with NCDs). To effectively reverse trends through tailored interventions, the dynamic and complex interplay of environmental, social, cultural and behavioural factors needs to be better understood. Key leverage points must be identified at 3 embedded levels: the **macro-level** (food system), the **meso-level** (food environment) and the **micro-level** (individuals). Joint actions of all the different food system actors on whom transition ultimately depends must then be implemented at micro-meso-macro levels and across governance levels (local/regional/national/EU, (sub)urban/rural).

1.3 What is already in place?

MACRO-LEVEL

The connections between policies, macro-economic mechanisms, infrastructures and other constitutive elements of food systems have long been recognised. However, the complexity of food systems and of their feedback loops have usually constrained studies to siloed approaches, such as the value-chain development approach or the market systems approach, which either tackle only one objective or only one sub-system (FAO). On the contrary, an integrated food system analysis adopts a holistic approach to the assessment of agri-food-systems, as well as their interactions with adjacent systems, such as the financial system. At the European scale, the Farm to Fork strategy and several Member States (MS) have embraced this approach (e.g., Sweden, Norway, Ireland, France, the Netherlands and Finland, Pineda et al., 2022, SAPEA 2020). Several other EU initiatives and projects aim to promote sustainable food systems policy frameworks, such as:

[1] "Synergies are where transformations in parts of the system may lead to improvements in several outcomes and for several stakeholders" (SFS, 2023, p. 13).

[2] "Leverage points are where changes in one part of the system may produce large transformations across the whole system and its outcomes" (SFS, 2023, p. 13).

[3] "Lock-ins are for instance established structures and strong economic or cultural interests of some stakeholders that block desirable transformations for others" (SFS, 2023, p. 13).

- **Food 2030**, which provides the policy framework to accelerate the transition to sustainable and resilient food systems. It brings together research and innovation (R&I) activities from different fields and disciplines to address interconnected challenges. The project CleverFood is developing the Food 2030 Online Platform to organise a joined-up approach to transforming food systems. It will host the FOOD 2030 Project Collaboration Network and the FOOD 2030 Connected Lab Network.
- The **Milan Urban Food Policy Pact** is an international agreement among 270 cities from all over the world, committed to develop sustainable food systems. Its main goal is to foster city to city cooperation and best practices exchange. It constitutes the foundation of the Food Trails project, which supports 11 municipalities in developing and implementing sustainable, healthy and inclusive food policies, in line with the Farm to Fork Strategy and the Food 2030 Policy.
- The **Sustainable Food Systems (SFS) Partnership for People, Planet and Climate** will be launched at the beginning of 2024 by the European Commission, to accelerate the transition to healthy and sustainable diets and resilient food systems (SFS, 2023). This Partnership will co-fund R&I activities, monitor progress, showcase best practices and seek synergies in Europe, providing input to the Legislative Framework on SFS. The project FoodPaths is developing a prototype, as a first visualisation of how the partnership might function from 2024.
- The **EU Platform on Food losses and Food Waste** aims to support all food system actors in preventing food waste, by defining concrete measures, sharing best practices and evaluating progress. Its second mandate started in 2022 for a duration of 5 years.
- The **EU Code of Conduct** on Responsible Food Business and Marketing Practices sets out voluntary actions that signatories – food processors, food service operators and retailers – can voluntarily commit to, in order to improve their sustainability performance.
- The Joint Programme Initiative (JPI) for a **Healthy Diet, Healthy Life (HDHL)** gathers 17 countries to align national R&I strategies and fund new research, to prevent or minimise diet-related chronic diseases.

The SFS Partnership strategic R&I agenda (SFS 2023) highlights that:

→ Ensuring an **equal** access to food for all, and especially for vulnerable populations, while reducing inequalities is an essential **mitigation strategy**. This can be done by improving access to healthy and sustainable food outlets, securing land tenure, internalising environmental costs in the price of food, introducing food vouchers, remunerating ecosystem services and strengthening local and community collective action.

→ It is essential to implement **public health policies** aimed at improving nutrition, e.g. increasing the diversity of food sources in public procurement, health insurance, financial incentives, food based dietary guidelines and awareness campaigns, in order to influence food demand and reduce healthcare costs. Health programs and NCDs prevention must go beyond individual responsibility and adopt a more systemic approach.

Gaps to address *(extracted from the SFS Partnership strategic R&I agenda (SFS 2023 – p. 33-36)):*

→ "How society and policymaking are organised with regards to food, and the strengths and weaknesses of different governance arrangements".

→ "There is a need to support local food policy experiments, to assess the effectiveness of corporate responsibility strategies, the uptake of sustainability standards, and to encourage the full integration of agroecology into food systems".

→ "Effective policies need consistent representations of the systems and useful data to monitor their state and evolution".

→ More consistency is needed in the different bodies of knowledge and knowledge instruments considered by different policy sectors.

→ "There is a need to co-create governance solutions that can improve coordination between sectors (e.g. agriculture, food, health, environment), parts of the value chain, levels (local/national/EU/global), functions (science, policy, civil society) and scientific disciplines. Initiatives are required to foster integration between policies."

→ With regards to the private sector's sustainability performance, common rules must be defined to build trust, notably on "methodologies, quality of data, choice of indicators, disclosure of data, priority setting and communication".

→ Power dynamics must be better apprehended notably to re-balance the distribution of value throughout the supply chain.

→ The civil society should be more empowered to participate in policy processes, notably on knowledge co-production and decision making. It is also crucial that the resulting decisions are reflected in formal policy and institutional frameworks (Bornemann & Weiland, 2019).

→ The civil society should take centre stage, considering their demonstrated role to drive change (e.g. Let's Food, ...), and studies should examine "how they can bring entrepreneurship and leadership towards transformative governance, and how their role could be strengthened through more information (for example, on the true cost of food)".

MESO-LEVEL

The transition towards healthy and sustainable dietary behaviour is a joint effort which requires the active involvement of all food value chain actors, from production to processing and food supply. According to the Sustainable Food Systems Partnership (SFS) R&I agenda (SFS 2023), several strategies can be promoted such as:

- **Diversification** of the types of foods offered, in line with FBDGs, and the types of resources used (e.g. biodiverse, agro-ecological), with the goal to align supply and demand.
- **Re-localisation and adapted logistic schemes** resulting in rescaling, delocalizing and efficient smaller-scale food manufacturing (in the field or at home) and supplying. The goal being to re-connect more citizens to the value of resources and food production.
- **Circularity** to close nutrient cycles and through an efficient usage and consumption of resources, energy, water, food products and by-products and through a limited use of packaging. The goal should be to aim for zero edible food waste and to recycle all inevitable waste (e.g. through composting & soil amendment).
- **Digitalization of processes and food supply chains** notably to reduce waste and inefficiencies along value chains.
- **Novel food processing methods** that limit the use of additives and other cosmetic agents (e.g. aroma), seek optimal health properties of food and preserve the freshness and health potential of natural raw materials, with minimal processing of protein, carbohydrates etc.
- **Food design** of more climate-neutral food products, still delivering the necessary food properties and functionalities according to culturally-diverse consumer preferences, trends, nutritional needs and food safety.

Every link in the food chain can lead to changes in climate and environmental outcomes of food consumption. Synergies that can support multiple positive outcomes need to be identified.

Knowledge gaps *(extracted from the SFS Partnership strategic R&I agenda (SFS 2023, p. 21, 26)):*

→ "Understanding barriers and identifying drivers and incentives for transitions towards sustainable food value chains."

→ "Understanding the advantages and disadvantages, co-benefits and trade-offs of innovative, delocalised, mild and targeted processing and supply schemes for circular, low environmental footprint (e.g. reduced use of packaging materials) and diversified (agro-ecological) production schemes; while considering different population groups and different geographic contexts and levels (local, national, etc.)."

→ "Understanding socio-cultural and appreciation factors on the different possible technological, social, economic and organizational innovations within food environments, notably with regard to the innovations potential in changing citizens dietary behaviour."

→ "Know-how to create enabling food environments, e.g. via government mechanisms, incentives and disincentives, legal frameworks and regulatory instruments, the diversification of foods produced, distributed and consumed", with minimum health, environmental and socio-economic impact.

MICRO-LEVEL

In 2020, the European Commission launched a survey: Eurobarometer – "Making our food fit for the future" to map the factors influencing food buying and eating habits and to assess the actual state of citizens' understanding of healthy and sustainable diets. 27, 237 citizens were interviewed across the 27 EU Member States. Results indicate that:

- When purchasing food, Europeans prioritise **taste**, **food safety** and **cost** over sustainability concerns (e.g. origin, processing, ethics, animal welfare, environmental and climate impact).
- For Europeans, sustainable food means **nutritious and healthy** (41%), produced with little or no use of pesticides (32%) and affordable for all (29%).
- Two thirds of Europeans say that they eat a healthy and sustainable diet **most of the time** (56%) or always (10%), but responses vary greatly by country.
- The factors that are the most likely to help Europeans adopt a sustainable diet are:
    - the **affordability** of healthy and sustainable food (49%),
    - having healthy, sustainable food choices **available** where they usually shop for food (45%),
    - clear information on **food labelling** regarding a product's environmental, health and social impacts (41%). To this regard, consumers consider that there should be one logo to help them choose healthy sustainable food (85%).
- Food producers and manufacturers are seen as **key actors** in making the food system sustainable, followed by national governments.
- Nearly eight in ten (79%) consider that marketing and advertising that do not contribute to healthy, sustainable diets should be **restricted**.

Zoom on food labelling (extracted from the SFS Partnership strategic R&I agenda (SFS 2023 p. 29))

"The issue of food labelling is contentious and struggles with lack of harmonized criteria and methods. There are ongoing practical and research-based efforts to develop labelling schemes for food products (Animal welfare, Climate, Organic, Sustainability,) at EU and national levels and studies of consumer appreciation (Futtrup et al., 2021; Majer et al., 2022). There are some examples of nationally coordinated labelling schemes but also many private labels of single issues (by retailers and/or manufacturers). However, **the diversity of labels might cause confusion and lack of trust**. There are yet few attempts to combine labelling of different issues, for example to provide information on climate impact and nutritional value of the same products. The Farm to Fork strategy includes an ambition of developing a sustainable labelling framework that covers, in synergy with other relevant initiatives, the nutritional, climate, environmental and social aspects of food products. However, the scientific basis for combining so many different aspects of sustainability is not in place, neither is the knowledge of how consumers may appreciate a holistic label (Futtrup et al., 2021). The sustainable food labeling legislative proposal is part of the foreseen sustainable food systems framework."

Gaps to address:

Although much is known about the factors influencing dietary behaviour, the interactions between these factors and the resulting behavioural decisions are still far from fully understood (Dacremont et al. 2019). Little attention has been paid to the role of food contexts, i.e. how, where, when, why and with whom we eat (Bisogni et al. 2007); to the interplay between social agents (e.g. peers, siblings), culture and context; and to the distinction between habitual and intentional eating behaviour (Rees et al. 2018). Yet, these are of utmost importance as the attitude/intention/behaviour gap needs to be filled for a successful behavioural transition. Most interventions and literature focus on either changing intentions/conscious behaviour or habits/automatic behaviour, but none investigate the interplay of both.

MULTIPLYING MULTI-LEVEL EFFECTS

All around the world, **dietary guidelines and recommendations** are available at national level to inform and guide citizens towards healthier food habits. However, there are several limits to their effectiveness: i) their knowledge and use by citizens have been reported to be restricted; ii) the influence of the food environment on citizens' eating habits is most of the time underestimated and iii) the way information is provided is not

effective in encouraging people to eat healthily and sustainably (Ares et al. 2018). Moreover, any change in eating patterns, consumer perceptions and behaviours must be sensitive to diverse nutrient needs of vulnerable groups, like pregnant women, children, elderly and people with NCDs. **Personalised nutrition** allows interventions to target advice based on individual nutrient requirements, food preferences and socio-economic circumstances. Studies have shown that compared to 'generic' dietary health messages, personalised dietary advice produces larger and more appropriate changes in dietary behaviour than a conventional approach (Celis-Morales et al. 2017). Artificial Intelligence (AI) recommendation systems can provide personalised dietary plans through the modelling of user profiles, dietary behaviours and experts' knowledge (Chen et al. 2018). The project Protein has developed a personalised nutrition and physical activity recommendation system but without considering yet the environmental, sustainable, affordable and culturally acceptable aspects of diets.

On another note, several **education programmes** have already been implemented in various European schools and countries (e.g. National Programme for youth food education and interventions) to foster healthy and sustainable dietary behaviour. The Foundation for Environmental Education (FEE) has also developed the Eat responsibly programme supporting eco-schools in 9 EU countries in exploring ways to make more responsible food choices. The success of educational interventions to foster a long-term behaviour change depends, among others, on their ability to i) accommodate diverse viewpoints (e.g. traditional and indigenous knowledge), ii) strengthen the learner notion of being a part in a multi-stakeholder effort, iii) support the learner with transformational skills and iv) strengthen the role of schools as catalyst for environmental change within the community.

Gaps to address *(extracted from the SFS Partnership strategic R&I agenda (SFS 2023 p. 20-21)):*

→ "Study among consumers the feasibility, safety, acceptability and effectiveness of translating sustainable dietary guidelines into **long-term** practice in the population."

→ "Define a **baseline** for dietary change by analysing current food consumption data, through harmonised individual food intake methods, and comparing the diets of different population groups (according to age, gender, income and region). *EFSA (2022) is currently supporting 36 dietary surveys on children and/or adults from 18 EU Member States to harmonise dietary intake survey methods and build a common database on EU food consumption."*

→ "Improve the environmental and climate **impact assessment** of food, by evaluating diets rather than individual products, and by considering more sustainability criteria, such as nutritional value and circular economy."

→ "Develop **FBDG** as a key instrument to guide policy, private sector and citizens, and as a communication and dissemination tool for health and education professionals. A Methodology Guide is needed on how to develop or revise existing FBDG in Europe taking into consideration international principles for sustainable diets, cultural, socio-economic and environmental conditions in Member States (MS). The possibility of adjusting FBDGs to groups of individuals with specific needs, such as vulnerable populations (children, the elderly, people with NCDs) should also be explored."

→ "Understanding the best approach to **enable and motivate consumers** to make informed and sustainable food choices and disseminate this approach to all actors in the food system. Citizens' current food strategies should be considered as baseline (e.g. moderation, diversity, whole foods, targeted environmental impact and acceptance of new solutions operated at meso-level)."

→ "Studying the potential impact that dietary changes may have on **food safety**, for example human exposure to biological and chemical hazards, and to known and new contaminants."

→ "Understanding the **interrelationships** between food additives, microplastics, veterinary drug and pesticide residues, the gut microbiome and human health."

2. Zoom on the 11 EU Member States considered in PLAN'EAT

2.1 Dietary behaviour

2.1.1 FACTORS INFLUENCING DIETARY BEHAVIOUR

Western societies are commonly facing great challenges – such as the increase in non-communicable diseases or climate change – which are directly or indirectly caused by human behaviour. Researchers, policy makers, health insurances, and further societal actors hence have an interest in learning what determines these behaviours, and to support consumers who want to change their behaviour towards living more healthily and sustainably.

Consumers have been steadily interested in healthy, and to some extent increasingly in sustainable food consumption. This, however, does not always translate to healthy decisions. The so-called intention-behaviour gap is visible for pro-environmental behaviour, meaning that intentions can explain behaviour only partially (Bamberg & Möser, 2007). A meta-analysis across different behaviours shows that medium-to-large changes in intentions lead to only small-to-medium changes in behaviour (Webb & Sheeran, 2006). Accordingly, current large-scale efforts to help people change their behaviour, which often focus on educational and informational strategies, are not always successful. While education and consumer knowledge are important, and arguably necessary for making informed healthy and sustainable choices, they are not sufficient.

According to the 'Determinants Of Nutrition and Eating' (DONE) framework (Stok et al., 2017), there are multiple further determinants that influence food choice, within individuals (e.g. taste preferences, religion, mood, habits), between individuals (e.g. social norms, family food culture or cultural traditions) in the physical environment (e.g. availability and affordability of different food option or food labelling) and at policy level (e.g. governmental regulations or industry influence). Research regarding reduced meat consumption for example indicates that further barriers above and beyond the difficulty to acquire reliable information hinder a transition to more plant-based diets. These are, among others, social prejudice towards plant-based meals and social representations of meat as the central component of many dishes, a lack of social support for dietary changes, meat attachment, frequent meat-eating habits or hedonic feelings towards meat consumption (Graça et al., 2019).

2.1.2 INTERVENTIONS IMPROVING DIETARY BEHAVIOUR

In a first step, to tackle a broader range of barriers beyond knowledge, it is therefore necessary to widen the repertoire of behaviour change strategies to include the wealth of strategies beyond education that the behavioural sciences have developed and researched. There are two prominent frameworks, which are not specific to food, that list a variety of strategies: the Behaviour Change Technique Taxonomy (v1) (BCT taxonomy v1) (Michie et al., 2013) and the typology of interventions in proximal physical micro-environments (TIPPME) (Hollands et al., 2017). Such strategies are e.g. goal setting, self-monitoring, feedback and reinforcement (BCT taxonomy v1) or changing packaging, placing less healthy options further away from seating or entrance and marking shopping trolley space to indicate designated space for fruit and vegetables (TIPPME).

METHODOLOGY

Behavioural scientific evidence was condensed on the potential to change dietary-related behaviour, by investigating the 9 different target groups considered in PLAN'EAT: Young Children (<6 years), Children & adolescents (6-18 years), Young adults (18-30 years), Pregnant women & young parents, General population – middle-aged adults, From work to retirement, Elderly (65+ years). A systematic literature review was conducted as the base for an umbrella review and preliminary results obtained were compiled in an Internal Report (IR1).

RESULTS

The Tables Annex A present a selection of evidence for the effectiveness of existing behavioural change strategies as presented in IR1, which will be extended in the future and throughout the project. The Tables are the main results and should be consulted when looking for tested strategies. In the following, the general state of research is discussed.

While not all interventions and strategies are equally effective, there is general evidence that some Behavioural Consultation and Interventions (BCIs) are able to change dietary related behaviours across different target groups. Concerning the question which strategies work, for whom and in which settings, the evidence becomes less clear. The Tables in Annex A (from A1 to A6) give some answers to this question by providing an overview over strategies that have been tested for specific target groups (such as children, pregnant women or young parents, the general population). Still, a substantive amount of research studies and systematic literature reviews miss reporting in detail on e.g., specific sub-groups for which the BCI was particularly (un)successful, or exact settings characteristics that contributed to BCI success or failure.

Further open questions remain regarding the persistence of effects, since not all interventions measure long-term effects at larger follow-up intervals. Likewise, due to a large variety of different outcome variables and combinations of them in the research, it remains unclear whether it is for example better to target one specific outcome such as fruits and vegetables (F&V) consumption, or whether to design interventions with a lifestyle perspective targeting multiple outcome behaviours within and across behavioural domains (e.g. including physical activity behaviours).

Lastly, even though there is a rapidly expanding evidence base, its complexity and non-standardised way of reporting makes it difficult to navigate (Michie et al., 2017). Intervention designs vary greatly in their characteristics, namely the applied BCTs, the combinations of various strategies, the target group and selected settings, the mode of delivery, the timing etc. On top of such a complexity and variation in intervention designs, there is no standard way of reporting these designs and the results. Consequently, inconsistent and incomplete reporting complicates a synthesis of existing evidence even further (Flodgren et al., 2020). Reporting at review level is equally unsystematic and inconsistent, with some reviews reporting their findings by outcome variable and others by intervention strategy. A lack of standardised and commonly acknowledged terminology aggravates these problems.

2.1.3 DISCUSSION AND FUTURE ACTIONS

Taken together, it is of utmost importance to see Annex A as an overview of which strategies have been tested, and as a compilation of literature to look for further information regarding these strategies. The tables can only be a first guiding step in which strategies to choose. Once a few possible strategies are selected, it is essential to check the original studies behind them and understand in detail in which contexts the strategies have been applied and tested, including such aspects as the setting, duration, delivery type and further specifics of the target group.

2.2 Policy framework

To contribute to the INFORMAS work, PLAN'EAT examined what current food policy interventions exist regarding healthy and sustainable consumption in its 11 countries. The focus was on: i) the extent to which governments have adopted explicit food policies; ii) what goals they focus on; and iii) what instruments and calibrations they specifically use and apply.

2.2.1 ANALYTICAL FRAMEWORK

CONCEPTUALIZING FOOD POLICY EFFORTS

While there is increasing consensus that the food system needs changing to address current health and sustainability challenges, how to achieve such a change through food policy is a heavily debated question (Lang & Barling, 2013). Food policy can be defined as “how policy-making shapes who eats what, when and how; and of whether people (and animals) eat and with what consequences” (Lang et al., 2009, p.26),

showing how an essential part of food policy consists of food consumption behaviour. However, how to address the need for consumer behaviour to change is politically delicate (Lang & Barling, 2013).
National governments vary considerably in the types of objectives and policy interventions they implement. Whereas some governments have adopted explicit integrated food policies, most have not. Food **policy goals** refer to aims or targets set by governments, either within an overarching food (systems) strategy or within relevant sectoral policies, such as "Reducing obesity by 30% by 2035". To achieve such policy goals, accompanying food **policy interventions** are essential, i.e. more specific actions or instruments employed by governments, such as subsidies for school lunches or a taxation on sugar.
To get a better understanding of existing policy interventions on food consumption, in the 11 EU member states represented in the project, three levels of analysis were distinguished: food policy domains, food policy indicators and food policy instruments.

Food policy domains:

The policy domains are based on the INFORMAS Healthy **Food Environment Policy Index (Food-EPI)**, with some modifications. INFORMAS refers to the International Network for Food and Obesity/NCDs Research, Monitoring and Action Support, which developed the Food-EPI in 2014 to monitor, benchmark and support governments actions (Harrington, 2020). Of the 56 countries actively doing Food-EPIs, the INFORMAS reports have been finalised for more than twenty countries across the globe, and once at EU level. Zooming in on our 11 project countries, only Poland, the Netherlands, Ireland and Germany have conducted and finalised a Food-EPI, and in France, Belgium and Spain this process is still ongoing. Moreover, the Food-EPI was developed specifically for health aspects of food policy, whereas our study also looks at sustainability aspects, so had to be slightly modified.

Zoom on Food Policy domains

Food Policy domains can be defined as **"**components of the political system and/or settings organized around substantive [food-related] issues [that] differ the target health goal/behaviour i.e. food or physical activity" (Harrington, 2020, p.12). In this report, the following food policy domains were distinguished:

- **Food prices**: refers to food pricing, with measures like taxes and subsidies to promote healthy and/or sustainable food and limit unhealthy and unsustainable food choices.
- **Food retail**: refers to the power of governments "to implement policies and programmes to support the availability of healthy foods and limit the availability of unhealthy foods in communities (outlet density and locations) and in-store (product placement)" (Harrington J.M., 2020, p.19).
- **Food provision**: refers to healthy and/or sustainable food service policies in settings funded by government (such as schools and other public sector settings) and encouragement of private sector to promote healthy and/or sustainable food choices.
- **Food promotion/advertising**: refers to policies to reduce the impact (exposure and power) of promoting unhealthy and/or unsustainable foods to children across all media and in places where children gather. For our purposes, we have also added a specific indicator on meat promotion, for all ages.
- **Food labelling**: refers to "consumer-orientated labelling on food packaging and menu boards in restaurants to enable consumers to easily make informed food choices and to prevent misleading claims" (Harrington, 2020, p.12).
- **Food composition**: refers to government systems that ensure that processed foods should minimise energy density and so-called 'nutrients of concern' (salt, (saturated, trans) fat, added sugar) (Harrington, 2020).

Food policy indicators:

Next, we distinguish a subset of **(food) policy indicators** to indicate the presence of specific policy efforts within a food policy domain, again derived from the INFORMAS Food-EPI with some slight modifications. For instance, food composition is measured by the presence of population intake targets and/or standards

around unhealthy and/or unsustainable foods (e.g. salt, fats and sugar), but also by whether monitoring systems exist to keep track of these targets and/or standards.

Example of the policy indicator

Food retail policy domain: 1) zoning laws and policies are robust enough for (local) governments to ensure that there is a ready availability of outlets selling fresh fruit and vegetables; 2) zoning laws and policies are robust enough for local governments to place limits on the density or placement of quick-serve restaurants or other outlets selling mainly unhealthy and/or unsustainable foods in communities; 3) there are existing support systems to encourage food stores to promote the in-store availability of healthy and/or sustainable foods, and to limit the in-store availability of unhealthy and/or unsustainable foods

Food policy instruments:

Finally, we further distinguish even more specific types of **(food) policy instruments** used within a policy indicator. Policy instruments are means of government interventions that can differ in their calibration, i.e. in what specific numbers, targets or timelines they propose, as well as in their degree of coercion, i.e. the extent to which an instrument is mandatory. In this report, a common public policy conceptual framework is used which is called the Doern continuum, which classifies instruments along their degree of coercion (from self-regulation to public enterprise).

Zoom on the Doern Continuum, a typology categorizing policy instruments

To understand what policy instruments exist in the realm of healthy and/or sustainable food consumption, it is important to be able to further distinguish between different kinds of policy instruments. A well-known typology for policy instruments is the so-called 'Doern continuum', based primarily on Doern and Phidd (1983). This typology categorises policy instruments according to 'degrees of legitimate coercion' that the state applies. In this continuum, private behaviour through self-regulation of the private sector is the least coercive, and public ownership stands on the other side of the continuum. Private behaviour refers to the category with the lowest degree of legitimate coercion, where implementation of policy goals is left to private actors, through self-regulation agreements. Next, the category of Exhortation can roughly be interpreted as referring to information- and education-based policy instruments, which can also be characterised as having a relatively low degree of coercion. The middle category of Expenditure is when the state starts giving out subsidies to third parties to achieve their policy goals (e.g. through food-related research grants or subsidising training programs around healthy and/or sustainable food). Next, Regulatory instruments are on the more coercive side of the spectrum, with financial measures like taxes, tariffs and fines (e.g. a sugar tax). Finally, the most coercive category is public ownership, which is when the state for instance buys up private assets or provides a service through government bodies (i.e. when caterers in schools are also in public service).

2.2.2 RESULTS PER COUNTRY

The table with the situation for Health (H) and Sustainable (S) Policy Indicators for each following country is reported in the Annex B1. There is a total of 25 indicators, which each can be marked for health and/or sustainability. Overall, the maximum score any country had for health was 18/25, while the highest score for sustainability was much lower at 6/25. Data collection regarding the situation in each country was carried out by the partners from November to January through the filling of a policy guidance document template (Annex B2) and through a literature review.

BELGIUM

Belgium has a national food strategy called Federaal Voedings- en Gezondheidsplan (Federal Nutrition and Health Plan), and the 3 regions in Belgium also have a regional food strategy (Flanders: Go4Food, Wallonia: Food Wallonia, Brussels: Good Food Strategy 2). The national food strategy has four main policy goals for healthy and sustainable food consumption (FOD Volksgezondheid, 2016):

- Encouraging a balanced and varied diet;
- Reducing the prevalence of overweight and obesity;
- Improving the health of the population;
- Encouraging sustainable food production and consumption practices.

Among the 11 countries involved in this study, Belgium meets the most policy indicators for both health (18, same score as Germany and the Netherlands) and sustainability (6, same as France, the Netherlands and Sweden). The national dietary guidelines take both health and sustainability into account. The Table in Annex B1 shows Belgium's scores on each policy indicator. This figure only shows whether a policy indicator was present, and further specifies what type of policy instruments are present in Belgium, based on the Doern continuum. Belgium generally has a very similar pattern to the Netherlands and France in terms of which policy indicators are present, and there are no specific policies that are only present in Belgium and not in other countries.

FRANCE

France has had a national food strategy since 2001, which was extended in 2006, 2011 and 2019: Programme National pour l'Alimentation (National Food Program, PNA) 2019-2023 – Territoires en Action, which covers both health and sustainability aspects of food (Ministère de l'Agriculture et de l'Alimentation, 2019). Its main aims are to:

- Take into account social justice, food education for young people and the fight against food waste;
- Specify the procedures for involving local authorities to ensure the territorial anchoring of this policy (notably through Territorial Food Projects[4]);
- Encourage the development of short circuits and geographical proximity between agricultural producers, processors, distributors and consumers;
- Propose action in the field of education and information to promote food balance and diversity, local and seasonal products as well as the nutritional and organoleptic quality of the food supply, in the compliance with the National Health Nutrition Program;
- Plan actions for the supply of collective catering, both public and private, with seasonal agricultural products or products bearing official signs of quality and origin (SIQO), especially from organic farming.

Although France does have a national food strategy, there is also some criticism on France's nutrition policy, stating that the focus has been very heavily placed on consumers by providing them with information and education, which is a rather limited scope (Friant-Perrot, Garde, & Chansay, 2017). Still, as our analysis shows, France also scores relatively high on policy indicators for both health (n=17) and sustainability (n=6), with most indicators being present in all domains except for food retail. The national dietary guidelines take both health and sustainability into account. France is the only country that has relatively strong (regulatory) instruments for two food promotion/advertising indicators: on promotion of unhealthy/unsustainable food to children in the media as well as in places where children gather. They are also among the five countries regulating vending machines in these locations. France also has a relatively high number of strong (regulatory) instruments in the policy domain of food provision, which is particularly due to the so-called 'Egalim law' (Law for the balance of trade relations in the agricultural and food sector and healthy, sustainable food accessible to all) that requires catering in schools and other public sector settings to comply with health and sustainability standards (i.e. 50% of their purchases in sustainable food, defined by law as having to include 20% organic and 30% foods under certain quality signs) (Assemblée Plénière, 2018). This law will also be extended to the private sector from January 1st 2024 onwards. Discussions are in progress to define an environmental labelling which will also consider the impact of ultra-processed foods.

[4] Territorial Food Projects (TFPs) were introduced by the Law on the future of agriculture, food and forestry (2014) to bring together all the local food system actors and develop sustainable and resilient territorial food systems. There are currently more than 400 TFPs in France, mainly lead by public authorities (e.g. communities of municipalities, metropolises). PLAN'EAT's Living Lab INRAE Auvergne-Rhône-Alpes is part of a Territorial Food Project.

To foster accessibility to healthy and sustainable food, notably for low-income citizens, the Social Security Food Project is being developed since 2019, based on the French healthcare insurance system. It is based on 3 pillars: universality of the process, food democracy, and funding via social contributions. It aims to provide food vouchers worth up to 150 euros a month per person, and it is under experimentation in several areas in France (Montpellier, Paris, Bordeaux, etc.).

GERMANY

Germany does not have a national food strategy yet, but is planning on finalising and adopting a nutrition strategy in 2023, which also includes sustainability aspects and will revolve around these three core points (Landwirtschaft, 2022):

- Create a health-promoting and sustainable nutrition environment;
- Promote resource- and climate-friendly approaches;
- Promote healthy and sustainable eating habits.

Additionally, Germany does have a national strategy to decrease food waste and is considered a frontrunner in food waste management (Helander, Bruckner, Leipold, Petit-Boix, & Bringezu, 2021). Von Philipsborn et al. (2022) have conducted a Food EPI study within the INFORMAS framework for Germany, which provides an assessment of the levels of implementation of each policy indicator in the policy domains of INFORMAS (note that these are slightly different from the framework used in this study).
Based on this study, Germany scores relatively high on health (n=17) and somewhat lower on sustainability (n=3) policy indicators. The national dietary guidelines take both health and sustainability into account. What makes Germany stand apart is that it is the only country that has some instrument on the policy indicator on Food-related income support for healthy and/or sustainable food in the Food prices domain. While other countries do have food-related income support, none specifically focuses on health and/or sustainability, while the German government has had a successful pilot project referred to previously called the IN FORM project, which provides seminars at food banks. Furthermore, also within the Food price domain.
In terms of future policy, the German government is currently reviewing whether its national eco-label Blauer Engel (currently not in use for food) could also be used for catering and canteens. More future policy includes a ban on all advertising accessible by children of unhealthy food including sweets and items with a high salt, fat and sugar content.

GREECE

Greece currently does not have a national food strategy and does not have specific policy goals stated for healthy and sustainable food consumption. Greece is also on the lowest end of the comparison with other countries, with a total of 8 policy indicators present for health and none for sustainability. Greece's national dietary guidelines only take health and not sustainability into account. The Greek guidelines are among those guidelines recommending the highest suggested intake of fruits and vegetables, as the lowest suggested intake (for children 1–3 years) is >300 g/d, and adolescents more than 1000 g/d (Kastorini et al., 2019). What is clear is that policies at schools around healthy food are relatively well-developed, with vending machines being prohibited and school lunches having nutritional requirements. Greece does not have any future food policy plans.

HUNGARY

Hungary currently does not have a national food strategy and does not have any policy goals for healthy and/or sustainable food consumption. With 12 indicators for health and 3 for sustainability, Hungary scores relatively low in terms of number of indicators present, particularly for health. For the policy indicators in place, the Hungarian government generally does have a monitoring system present (with the exception of food provision shows, which is not the case for all countries. The national dietary guidelines take both health and sustainability into account. Hungary is among six countries with a sugar tax on products exceeding a certain sugar threshold value. Belc et al. (2019) studied the effectiveness of this tax and note that it decreased the mean consumption of these taxed products by 4%.

In terms of policy instruments, like France, Hungary has relatively strong (regulatory) instruments for the food provision policy indicators on policies in schools and public sector settings. Kiss, Popp, Oláh, and Lakner (2019) describe some issues around the development of national legislation on school lunches in with overall uptake among schoolchildren being very low. Problems included a lack of communication between government and stakeholders and the lack of nutritional or food-related skills among kids to understand the reasons for changing the menu. The legislation was eventually modified in 2016 after public pressure, reducing some requirements around dairy and salt.
Looking towards the future, the Hungarian government has proposed legislation on the protection of origin of agricultural products which may be relevant towards local food consumption. Hungary already has a number of governmental decrees on this protection of origin of agricultural products.

IRELAND

Ireland has a national food strategy called Food vision 2030, which involves both health and sustainability aspects of food. It has four main 'missions' (Government of Ireland, 2021):

- A climate smart, environmentally sustainable agri-food sector;
- Viable and resilient primary producers, with enhanced wellbeing;
- Food that is safe, nutritious and appealing, trusted and valued at home and abroad:
- An innovative, competitive and resilient agri-food sector, driven by technology and talent.

The Food EPI conducted for Ireland in the context of INFORMAS in 2019 (Harrington J.M., 2020) shows that Ireland is doing 'medium' well for 36% of the policy indicators, particularly in the domain of Food prices.

For the present study, Ireland scored relatively well on presence of policy indicators on health (n=16) but low on sustainability (n=0), despite including sustainability aims in its food vision. The national dietary guidelines take only health and not sustainability into account. What makes Ireland stand apart in terms of food consumption policy is that it currently is the only country that has a voluntary menu board label for catering and restaurants. Moreover, Ireland is one of the six countries having implemented a sugar tax, specifically on sugar sweetened beverages.

The degree of coercion of the policy instruments within the different policy indicators vary mainly between exhortative and regulatory instruments, with exhortative (i.e. not mandatory) instruments being the most present. In terms of future food policy, the government is considering adding sustainability elements to their national Healthy Eating Guidelines, but this is only in the preparation phase.

ITALY

Italy currently does not have a national food strategy, and also does not have any specific policy aims for healthy and sustainable food consumption. The national dietary guidelines take both health and sustainability into account. Italy scored relatively low on the policy indicators for health (n=10) and sustainability (n=2). Within the domain of food composition and specifically population intake targets regarding salt in bread, Cuenca et al. (2020) assess the Italian policy and note its success in lowering dietary salt intake. They found that the total salt intake was reduced by 3,000 tons per year, which was achieved in collaboration with food producers, especially bread-makers. This indicator is fulfilled through a combination of self-regulation as well as through Exhortative instruments. Italy has relatively few stronger regulatory instruments present in all of the policy domains. The Italian government has not specified any future food policy plans.

NETHERLANDS

The Netherlands currently has no national food strategy. It does have some policy goals for healthy and sustainable food consumption (Ministerie van Volksgezondheid, 2018; Staghouwer, 2022):

- Less obesity (from 50 to 38% of adults by 2040);

- Having more people eat more according to the Dutch dietary guidelines;
- Changing the balance of consumption of animal-based and plant-based protein from the current 60/40 ratio to 50/50 in 2030;
- Halving food waste in 2030, compared to food waste in 2015;
- Enlarging the offer and consumption of organic food.

The national dietary guidelines take both health and sustainability into account. The Food-EPI conducted by Djojosoeparto, Kamphuis, Vandevijvere, and Poelman (2022) for the Netherlands shows that most policy indicators are rated as either very low, low or medium. This study, which is less elaborate and just rates the presence or absence of policy indicators rather than their effectiveness, shows that the Netherlands scored the highest (along with Belgium and Germany) with 18 health indicators and 6 for sustainability (see Annex xxx). Many of these policy indicators are however captured by policy instruments with a relatively low degree of coercion. According to Seidell and Halberstadt (2020) Dutch national policies heavily rely on self-regulation by stakeholders like retail, restaurants and the food industry. Actual regulatory policies on public spaces like schools or hospitals are missing. By contrast, the Netherlands is the only country that has some form of policy instrument for the Food retail indicator on support systems for food stores, which takes place through subsidies provided to a foundation called Dutch Cuisine, that stimulates the food service industry in the Netherlands to offer more vegetables and less meat. Future policy plans include a ban on marketing of unhealthy foods and drinks to children.

POLAND

Poland currently does not have a national food strategy. In its National Health Programme, it has a number of operational goals for healthy food consumption for the strategic overall goal of increasing of the healthy years of life length and the decrease of social health inequalities (Rozporzadzenie Rady Ministrów, 2021):

- Prevention of overweight and obesity;
- Prevention of addictions;
- Promotion of mental health;
- Environmental health and infectious diseases.

The national dietary guidelines take both health and sustainability into account. The Food EPI conducted for Poland by Romaniuk et al. (2022) demonstrates that most policy indicators score as very weak, weak or moderate policy. Only three indicators score as strong policy: Restricting unhealthy food promotion where children gather (Food promotion); Food subsidies to favour healthy foods (Food prices); and Policies in schools promoting healthy food choices (Food provision). The results of this study, which again only focuses on presence or absence of policy instruments rather than evaluating effectiveness in discussions with experts as the formal Food-EPI did, show that Poland scored relatively high on health (n=16) and low on sustainability (n=2). Poland is the only country that qualifies for the indicator on minimised tax to promote healthy and/or sustainable food (Food prices), with a policy against food waste that allows any business with extra food can make a food donation to food banks without any tax burden. In terms of specific food policy instruments, Poland has a relatively high number of stronger, i.e. Regulatory instruments in place. Future food policy plans for Poland include regulations on advertising unhealthy food to children and subsidising supply chains for organic food products.

SPAIN

Spain has a national food strategy: Strategy for Nutrition, Physical Activity and Obesity Prevention (NAOS). It has the following main objectives (Ministry of Health and Consumer Affairs, 2016):

- To promote policies and plans of action aimed at improving eating habits and increasing physical activity in the population. These policies should be sustainable, integral and reach a wide section of the society;
- Population awareness and information campaigns about the positive impact on health of a balanced diet and regular physical activity;
- To promote nutritional education at home, at school and in the community;

- To stimulate the practice of regular physical activity in the population, with special emphasis on schools;
- To favour a framework of collaboration with companies in the food industry to promote the production and distribution of products which contribute to a healthier and more balanced diet;
- To make professionals in the National Health System more aware in order to foster the systematic detection of obesity and problems of overweight in the population;
- To monitor the proposed measures and evaluate the results obtained as a consequence of the Strategy.

Spain's national dietary guidelines take both health and sustainability into account. Zooming in on sustainability, González-García, et al. (2020) compared the Spanish dietary guidelines to the Mediterranean diet and the Southern European Atlantic Diet and reported that better scores for both the carbon and water footprint were found for the Spanish recommendations analysed than for the other two diets. Spain's scores on policy indicators in terms of health (n=14, average) and sustainability (n=4, relatively high compared to other countries' scores). Spain is among only four countries that do have some policy for encouraging and supporting private companies to provide healthy and/or sustainable food in the workplace (along with Belgium, Ireland and the Netherlands). The Table in Annex B1 on the types of policy instruments employed for the relevant policy indicators, showing that Spain on average has a tendency for more exhortative instruments. Future food policy plans include a new legislative draft on banning marketing unhealthy food for children, and a decree to promote healthy and sustainable eating in schools, aimed at public, state-subsidised and private second-cycle nursery, primary, high school, vocational education centres.

SWEDEN

Sweden has a national food strategy called "A National Food Strategy for Sweden – more jobs and sustainable growth throughout the country". Its main objectives are as follows (Ministry of Rural Affairs and Infrastructure, 2017):

- Rules and regulations should be designed to support the overall objective of a competitive and sustainable food supply chain in which production increases;
- Consumers should have a high degree of confidence in food and be able to make informed and sustainable choices, for example with respect to local and organic production. The market for food should be characterised by efficient competition. Swedish food exports must be given the opportunity to grow so as to meet demand in relevant markets;
- The objective for the strategic area 'Knowledge and innovation' is to support the knowledge and innovation system so as to contribute to increased productivity and innovation in the food supply chain and the sustainable production and consumption of food.

Additional national health-related aims are to (Folkhälsomyndigheten, 2022):

- Limit the accessibility of unhealthy products;
- Increase the accessibility of health promoting products, environments and activities;
- Strengthen the health promotion and prevention work with lifestyles in welfare organizations.

The Swedish national dietary guidelines take both health and sustainability into account. Sweden is the only country that actually analysed and incorporated environmental impacts of individual foods into the derivation of their eventual dietary guidelines (Bechthold, Boeing, Tetens, Schwingshackl, & Nöthlings, 2018). Sweden got relatively low scores on health (n=13) and high on sustainability (n=6) policy indicators. Regarding food labelling, Sweden is the only country in this study with a voluntary front-of-pack nutrition label that is not the NutriScore. The Keyhole label which was developed by the Swedish Food Agency in 1989 and revised in 2021, and is also used in Denmark, Norway, Iceland, Lithuania and North Macedonia (Wanselius et al., 2022). What furthermore makes Sweden stand out is that it is the only country that has a policy on zoning laws on placement of quick-serve restaurants (Food retail), which is national law that is used by municipalities to regulate where snack bars or kiosks are allowed to be built or where food trucks can sell food – although as mentioned, it could be stricter in terms of specific calibrations to also regulate the presence of these restaurants near for instance schools.

In terms of future food policy, the Swedish government has instructed the National Food Agency to investigate and create the conditions needed for an agreement within the food industry to reduce salt and sugar content in food, as well as to produce a knowledge base on how the intake of energy-dense and nutrient-poor foods can be further reduced.

2.2.3 DISCUSSION AND FUTURE ACTIONS

The policy framework study set out to map existing policy indicators and specific instruments within a number of policy domains relevant to healthy and/or sustainable food consumption in 11 European countries. What becomes clear in general terms is that the field of sustainable food consumption policy instruments is highly underdeveloped. Overall, the maximum score for all policy indicators (25) was 6 for sustainability, compared to a maximum score of 18 for health. This shows the large discrepancy between healthy and sustainable food consumption instruments. However, an important side is that instruments adopted for health reasons may also have positive sustainability effects, such as eating more unprocessed products and more fruits and vegetables (plant-based products). Additionally, because of our choice to use and slightly tweak the INFORMAS framework as our basis which was developed for healthy food environments, it could be that some more specific sustainable food policy indicators may have been missed. For instance, further research into food waste policy indicators could be relevant as another sustainable food policy indicator. As discussed before, there are quite some differences between countries on how they score on the presence or absence of policy indicators. Belgium, the Netherlands and Germany collectively scored highest on health with 18/25, whereas the lowest scoring country was Greece with only 8/25. Our classification of policy indicators per country along the Doern continuum showed different degrees of coercion employed by the state, as well as differences between governments. For instance, France has relatively more coercive instruments – embedded in regulation and even in the category of Public Enterprise when it comes to school catering – across most food policy domains. By contrast, a country like the Netherlands is relatively low on the more coercive instruments and mostly favours exhortative and expenditure instruments. Generally, the cluster of Belgium, the Netherlands and France also had quite similar policy instruments for each policy indicator. This finding corresponds with recent research into policy styles in food policymaking, which has showed differences in the longer-term modes of policymaking and instrument preferences between governments (Candel, Parsons, Barling, & Loudiyi, 2021).

What emerges from the total picture outlined in the above results sections is a policy approach on healthy and/or sustainable food consumption that is on the reluctant side, in terms of how coercive the policy instruments employed are – if even they are present at all.

Djojosoeparto, Kamphuis, Vandevijvere, Murrin, et al. (2022) also call for the EU to strengthen its food policies to improve food environments. Using the INFORMAS policy domains (Djojosoeparto, Kamphuis, Vandevijvere, Murrin, et al., 2022) arrive at a top 5 of priority policy actions for the EU that have been drawn up in discussions with experts. Next to the EU, another essential governmental level to involve is the local or regional government, which especially in some countries have considerable competences (e.g. Bundesländer in Germany). This goes in particular for zoning laws in the food retail domain to limit unhealthy and unsustainable food (outlets), which eventually will have to be implemented at municipal level.

To conclude, it should be noted that these findings came from an analysis that used data gathered from partners that may have not always represent the actual situation in each country. However, considering that the same methodology was applied for all the countries and two review methods were applied, the final results can be considered an useful comparison tools on which set up the next steps in the macro-level of PLAN'EAT, which will be to develop a systems map of the European food system to identify leverage points for policymakers (T2.2), and eventually to develop food system solutions through food policy labs in all 9 Living Labs (T4.1).

2.3 Nutrition and dietary patterns

The following section provides an overview of the situation in PLAN'EAT countries regarding 4 topics related to nutrition:

- Food composition databases
- Food based dietary guidelines (FBDGs)
- Food consumption
- Eating habits

Country-specific data was collected from partners through the SPG1 template (Annex C1). They were asked to gather data and to fill in the template in around four months (from October 2022 to November 2023)

Results were also summarised per country in clear and visual snapshots (Annex E), which can be reused by **any kind of stakeholders** who would have the overview of the country for these specific topics. The snapshots will be published on the project website.

2.3.1 FOOD COMPOSITION DATABASES

Food composition databases (FCDBs) provide detailed information on the nutritional composition of food products (energy intake, macronutrients, micronutrients, etc.). Their role is to assess the nutritional balance quality of diets, through interconnection with food consumption data, with an emphasis on the adequacy of human nutrient intake (Elmadfa & Meyer, 2010).
Some facts on the 11 PLAN'EAT countries:

- All the countries participating in PLAN'EAT have their own food composition database, except for Ireland who is using the UK database.
- These FCDBs seem to be constantly updated for most countries, except for Hungary (last update was in 2005) and for Greece (last update in 2004).
- To build up the databases, different techniques were used, including:
    - chemical analysis (the process to identify, separate and quantify food components to understand its composition),
    - the use of composition values from other country datasets,
    - the use of data from scientific literature/branded foods/labels.

The present analysis pointed out that in general, the food composition databases across the PLAN'EAT countries contain valuable and useful data. However, there is still space for improvements, and for constantly updates together with starting to add the idea to include other important information, as the environmental impact, in the dataset outputs.

ZOOM on EuroFIR

The European Food Information Resource (EuroFIR) is an international, member-based, non-profit Association which collects many European food composition databases. The databases included in EuroFIR are coded by FoodExplorer, a harmonised system that allows for comparing component values amongst foods from different countries' datasets linking foods and nutrients through harmonised data description (LanguaL). Regarding the EuroFIR FoodEXplorer system, the majority of countries participating in PLAN'EAT are included, except for Hungary, Germany, and Greece that in the EuroFIR network is included with a database not used anymore in the country. The UK database used in Ireland is included in the FoodEXplorer list. Since the increasing interest raised during the last years regarding the negative environmental impact of food production, the project partners were asked to indicate the inclusion of the environmental issue in the datasets. The answers highlighted the fact that this aspect has not been addressed so far. However, two countries developed a database that contain this information. In France, the Agribalyse database provides reference data on the environmental impacts of agricultural and food products consumed in the

country through the use of the LCA methodology. In Italy, the environmental impact of 102 foods using 50% of Italian studies that assess the GHG emissions for food products (Ferrari et al., 2020) was created as a reference and starting point for next developments increasing the use of local data.

2.3.2 FOOD-BASED DIETARY GUIDELINES (FBDGS)

Food-based dietary guidelines (FBDG) are a tool used worldwide with the aim of accompanying the consumer towards healthier eating habits and lifestyles. FBDGs are developed on the basis of an accurate revisions of the major available scientific evidence on the relation to nutrition and health. In 1998, following a close collaboration between FAO and WHO, a document entitled "*Preparation and use of food-based dietary guidelines*" (FAO, 1997) was published, recognised as the basis for the development of country guidelines. Over the years different FBDG have been published, not only at national level but also transnational (such as Nordic Nutrition Recommendation (Christensen et al., 2020)), in which common themes and differences can be highlighted.
For what concerns the recommendations, all the PLAN'EAT participants dietary guidelines are completed for most of the food category, identified in table 2 as the most important for a healthy and sustainable diet. These food categories are included in the WISH (World Index for Sustainability and Health) scoring system created to evaluate the healthiness and sustainability of the dietary patterns (Trijsburg et al., 2020). The WISH is based on the EAT-Lancet recommendations for a healthy and sustainable diet in the general population with global applicability across multiple settings. This index is used in D1.2 to assess PLAN'EAT countries dietary pattern in comparison with the EAT-Lancet recommendations.
The approach adopted for the development of FBDGs is different across the countries with very general recommendations for countries providing detailed advice related to the frequency and the quantity of food to be consumed.

Some facts on the 11 PLAN'EAT countries:

- The majority of the assessed countries include the portion size or the serving size for each food group.
- For Hungary, Ireland, Netherlands the recommended portions are identified with domestic example quantifications such as one fruit/vegetable, a cup, a hand, etc. (less specific in terms of quantities, but very helpful for consumers).
- France and Sweden do not have specific quantitative recommendations (neither in terms of grams or servings) for the majority of food groups.

Analysing the specific recommendations, a focus has been made on:

- fruit and vegetables,
- legumes,
- meat,
- whole-grain products,
- sugary products,
- alcoholic beverages.

Generally, **fruit and vegetables** recommendations are in line with WHO guidelines (5 servings/day-at least 400 g) (WHO, 2019). In particular, the recommendations are specific either in terms of servings or quantities for all countries except for France, that reports only the frequency of consumption per day. For the fruit and vegetable group the discrepancies among the countries should be pointed out such as Belgium, Germany and Sweden that include **legumes** in this food group. Better defined recommendations for legumes in terms of frequency and quantity of consumption, instead, are put in place for Greece, Italy, Netherlands, Poland and Spain. In addition, dietary guidelines that emphasise that legumes are good alternatives to meat are those of Belgium, France, Hungary, Italy, Netherlands and Poland.
Most of the countries recommend limiting **red meat** consumption, indicating the maximum of servings/times per week or to not exceed 500 g/week, except for Germany that does not have a specific recommendation. The nutritional recommendation for red meat is presented in all the countries, while Spain indicates only to prefer white meat. All countries, except Germany and the Netherlands, identified the consumption of white

meat as the preferred category to choose. **Processed meat** recommendations emphasised that in general the guidance principle is to limit or avoid this food category consumption, even though for France and Germany the only recommendations consist of identifying the maximum portion per week, rather than sending a direct message to avoid it.

Whole-grain products are recommended as the preferred choice in all the analysed countries.

Recommendations for **alcoholic beverages** are not included in Belgium, Hungary, Poland and Spain dietary guidelines. These countries, except for Hungary, have set up awareness campaign and recommendations to limit alcohol consumption, that however are not included in their dietary guidelines. Specific recommendations (quantities and/or times) are included in France, Greece, Italy and Netherlands.

Finally, for **sugary products/beverages** it is advised to reduce/limit the consumption in all countries.

Table 2: Recommendations for the adult population in countries participating in PLAN'EAT.

	Belgium	France	Germany	Greece	Hungary	Ireland	Italy	Netherlands	Poland	Spain	Sweden
Fruit and vegetables	250g of fruit and 300g of vegetables/day	5 fruit and vegetables/day	400g vegetables (3 serv) and about 250g fruit (2 serv)/day SP vegetables: 200g and fruit: 100-150g	3 servings of fruit and 4 servings of vegetables/day SP vegetables: 150-200g raw/cooked and fruit: 120-200g	At least 5 portions/day: 3-4 portions of vegetables/1-2 portions of fruit (at least 1 portion should be fresh/freshly cut) SP: 1 large pepper, tomato, 1 large apple or peach or 1 medium bowl of lettuce or 80 g dry or 120 g fresh/frozen pulses or 1 cup of berries or 2 dl smoothie	5-7 servings/day SP: 1 medium size fruit, 2 small fruits, ½ cup cooked vegetables, 1 bowl salad	3 of fruit and 2 ½ of vegetables times/day SP fruit: 150g and vegetables: 200g	250g of vegetables and 200g of fruit/day SP vegetables: 50g and fruit: 100g	400 g/day ¼ of plate is fruit; ¾ of plate is vegetables	3 servings of fruit at least and 2 servings of vegetables/day SP vegetables: 150-200g and fruit: 120-200g	500 g/day three fruits and two large hands-full of vegetables
Legumes	Included in the vegetables consumption Consume legumes every week	At least twice a week; can replace meat but to be combined with cereals	Listed under fruit and vegetables SP: 70 g uncooked or 125g cooked	3 servings/week SP: 150-200g of cooked legumes	At least once a week (included in the vegetables consumption)	2 servings/day* SP: ¾ cups	3 times/week SP: dry legumes: 50g; fresh legumes: 150g	2-3 servings/week SP: 60g	2-3 times/week SP: 50 g; dry portion	4 servings/week SP: 50-60g raw	Included in the fruit and vegetables recommendations
Nuts	15-25 g/day	A handful/day	Nuts as a substitute of one fruit portion SP: 25g	1-2 servings/day SP: 18 almonds, 6 whole walnuts, 3 tablespoons of sunflower seeds	2-3 times/week SP: small handfuls of nuts, unsalted almonds, hazelnuts, oilseeds such as pumpkin seeds	2 servings/day* SP: 40 g	2 times/week SP: 30g	15-25g/day	30/40 g/day	3 or more servings/week SP: 20-30g	A couple of teaspoons of various nuts and seeds/day
Grain-based foods whole grains	At least 125g/day of whole-grains	At least one portion of whole-grain starchy food/day	200 – 300g bread or 150 – 250g bread and 50 – 60g cereal flakes and 200 – 250g potatoes (cooked) or 200 – 250 g pasta (cooked) or 150 – 180 g rice (cooked)/day Prefer whole-grains	5-8 serving of refined and whole-grain cereals/day SP: 1 slice or 30 gr of bread, 1⁄2 cup of cooked pasta or rice, 1⁄2 of breakfast cereals, 1 medium potato: 120-150g cooked	3 times/day at least one portion out of three should be whole-grain SP: 1 piece of sweet bread dough or 1 medium slice bread/brioche bread or 12 tablespoons (200g) cooked pasta/rice or 3 tablespoons of breakfast cereals	3-5 servings/day SP: 1 cup cooked rice, pasta, noodles or cous cous, 2 thin slices whole meal bread Enjoy whole grains at each meal	Bread 3 1/2 times/day SP 50g; Pasta, rice, etc. 1 1/2 times/day SP: 80 g Prefer whole-grain products	Bread 4-8 slides/day; SP: 35 g 3-5 servings/day of cereal products and potatoes; SP: tablespoon of cereals: 50 g; medium potato: 70 g At least half of whole-grain grain products every week.	90 g 3 times/ day of whole grain cereals	3-6 servings/day SP: 40-60 g bread, 60-80 g pasta, rice Prefer whole-grain products	70 g/day for women and 90 g/day for men of whole-grain products

Meat Red meat Processed meat White meat	Maximum 300 g/week of red meat Maximum 30 g/week of processed meat 1-3 times/week (including eggs/meat substitutes) Limit the consumption of red meat, especially processed meat. Red meat can be replaced by e.g. legumes, fish, eggs or poultry	Prioritize poultry and limit red meat to 500 g/week Charcuterie: limit to 150g/week	Not more than 300-600g/week SP of red meat 100-150 g; SP of cured meat: 15-25g Red meat has a bigger environmental impact	1 serving of lean red meat/week SP: 120-150g of cooked meat 1-2 servings of white meat/week SP: 120-150g of cooked meat). Processed meat: as few as possible.	Choose lean variants more often. Consume not more than 350-500g/ week of cooked/ steamed/fried red meat (e.g. beef, pork). Processed meat only occasionally, in small amounts.	2 servings/ day* SP: 50-75 g (beef, lamb, pork, poultry) Limit processed salty meats	Once/week of red meat SP: 100g 2 times/week of white meat SP: 100g Limit the consumption of processed meat (occasionally consumption)	Max 500g/week of which max 300g of red meat SP: 100g/day excluding processed meat and eggs Limit the consumption of red and processed meat.	Not more than 350-500 g of red meat and processed meat/week For the white meat: choose lean poultry meat (e.g. chicken, turkey) without the skin	0-3 servings/week for meat, preferring the white meat SP:100-125g For processed meat: reduce or even avoid consumption	≤500 g red meat and charcuterie/week Prefer poultry, Reduce the consumption of processed meat
Fish	1-2 times/week (oily fish once/week)	2 times/week of which once fatty fish	1-2 times/week SP: sea fish 80–150g or fatty fish 70g	2-3 servings of fish and seafood/week SP: 150g of cooked fish or seafood	At least once/week Prefer local fish (e.g. trout, catfish, bighead carp).	2 servings/day * SP: 100 g	2 times/week SP: 150g	1 serving/ week, preferably fatty fish SP:100g	2 times/week SP: 100-150g	3 servings/week SP: 125-150g	2-3 times/week
Dairy products Milk Yogurt Cheese	250-500 ml/day of dairy	2 times/day of dairy	Every day Milk and dairy 200-250 g/day Cheese 50-60 g/day	2 servings/day SP: 250ml of milk, 200 g of yogurt, 30 g of seasoned cheese, 60 g of fresh cheese	Every day SP: 200 ml milk/yoghurt/ kefir or 50 g cottage cheese or 30 g cheese)	3 servings/day SP: 200ml of milk, 125 g of yogurt, 25 g of cheese	Milk/yogurt 3 times/day SP: 125 ml/125 g Cheese 3 times/day SP:100g fresh; 30 g seasoned	2-4 servings/day of milk and dairy SP:150 g Cheese SP: 40 g/day	Prefer low-fat products	3 servings/day SP: milk: 200-250 ml; fresh cheese 85-125 g; seasoned cheese 40-60 g; 125 g yogurt	Prefer low-fat dairy products
Eggs	1-3 times/week (with poultry/meat substitutes)	NA	Maximum 3 times/week	At least 4 times/week	Replace meat with other protein sources, including eggs	2 servings/day*	3 times/week SP: 50 g	2-3 times/week SP: 50 g	NA	4 times/week SP: 50-60 g	Good alternative to red meat
Alcoholic beverages	NA (awareness campaigns were developed)	Not more than 2 times/day (not every day)	Not recommended	During meals; not more than 2 glasses/men and 1 glasses/women	NA	Have 2–3 alcohol free days a week	Occasionally (standard portion: one alcoholic unit e.g. one glass of wine, one beer 0.33 cl) (avoidance is recommended)	Do not drink alcohol, or at least not more than one glass/day	NA (not included in the guidelines) for those who drink alcohol: 10 g/day for women and 20 g/day for men; a patient with elevated triglycerides should abstain from alcohol; those who abstain from alcohol should not drink to prevent cardiovascular disease	NA (not included in the guidelines: 1 glass for women/2 glasses for men per day)	Limit the consumption (According to the Nordic Diet Recommendations:: the intake of alcohol should not exceed 10 g alcohol/day for women and 20 g alcohol/day for men)
Sugary foods	Consume as few drinks with added sugars as possible and choose water instead	Limit the foods rich in sugar	Avoid added-sugar products/sugar	Limit added-sugar products/sugar	Limit added-sugar products/sugar	NOT every day	Occasionally	Out of the wheel of five	Reduce the consumption	Avoid the consumption	Less sugar products
Oils/fats	Prefer non-tropical oils, spreadable fats and soft or liquid cooking fats	Prefer olive, walnut, rapeseed oil	Prefer rape oil (also walnut, flax, olive oil)	Prefer olive oil (4-5 times/day; SP: 15 ml	Less fat for cooking, prefer oils	Rapeseed, olive, canola, sunflower or corn oils (in a very small amount)	3 times/day SP: 10 ml	Spreadable and cooking fats (not specified) SP: 35-65 g	NA	Olive oil in every meal (10 ml)	Choose cooking fats as rape seed oil or liquid fats made from rapeseed oil

Link	Belgium	France	Germany1 Germany2	Greece	Hungary	Ireland	Italy	Netherlands1 Netherlands2	Poland1 Poland2	Spain	Sweden

**the recommendations are: choose two servings of one of foods includes in the Meat, poultry, fish, eggs, beans and nuts food groups. For Italy, recommendations were identified for three types of energy requirements: 1500 kcal, 2000 kcal and 2500 kcal; the table reported recommendations for the baseline diet of 2000 kcal; the guidelines included also the reference portion for each food category. SP: standard portion*

POPULATION TARGET GROUPS

Eight out of 11 PLAN'EAT countries have specific recommendations for population groups and for varied physiological conditions:

1. **France**: children and teenagers; the elderly; women before, during and after their pregnancy, and during breastfeeding.
2. **Greece**: women during pregnancy, breastfeeding and menopause period; infants, children and adolescents; adults aged more than 65 years.
3. **Hungary**: children aged 6-17 (extra recommendations for healthy infants (0-12 months) (EMMI, 2019), young children aged 1-3 (data not available; information gathered from the partners) and people aged more than 60 (OGYE'I, 2019).
4. **Ireland**: extra recommendation (not included in the guidelines) for children (FSAI, 2020) and older adults (FSAI, 2021).
5. **Italy**: women including childbearing age, conception period, pregnancy, breastfeeding and menopause; school children; adolescents; the elderly; sportive/athletes.
6. **Netherlands**: babies; children; adolescents; young adults; elderly and very elderly people. In addition, FBDG were developed for pregnant and lactating women, for subgroups with a high physical activity level, for no meat consumers and people with non-Western food habits (e.g. people with Turkish, Moroccan and Surinamese backgrounds living in the Netherlands (Brink et al., 2019).
7. **Spain**: women during pregnancy and breastfeeding; the elderly; specific recommendation on energy drinks for people under 18 years old and on physical activity by age group: children, adolescents, adults and elderly people.
8. **Sweden**: women during pregnancy and breastfeeding; babies and children; the elderly.

The guidelines of Germany and Poland provide only general recommendations for healthy adults. A special case is that of the Belgian dietary guidelines (Superior Health Council, 2019) which are built up and adapted at regional level by the individual competent authorities. The Gezond Leven Institute is responsible for the Flanders region (Gezond-leven, 2019) and for the Wallonia region the classical food pyramid that contains quantitative recommendations for food groups is used as guideline (Wallonia pyramid) (for the Brussels region: data are not available).

BEHAVIOURAL ADVICE

Recommendations on physical activity are present in all countries analysed as a part of the FBDG or as extra recommendations (e.g. Ireland and the Netherlands) (Table 3). Some countries such as Germany, Greece and Ireland have shorter recommendations encouraging citizens to stay active and control their weight. Other countries have more comprehensive advice suggesting daily movement (walking, taking stairs, changing position, etc.) to be combined with regular daily physical activity for at least 20-30 minutes (only the Netherlands recommends at least 1 hour of moderate daily physical activity).
As shown in Table 3, the most complete recommendations are those of Italy, Hungary, Spain and Sweden that differentiate the duration and the intensity of physical activity by age groups.

Table 3: Recommendations on physical activity in countries participating in PLAN'EAT.

	Recommendations on physical activity
Belgium*	*Information available only for Flanders region: Change position every 30 minutes, do as much as possible low-intensity physical activity, do more exercise daily and do high intensity exercise weekly.
France	Physical activity to achieve at least the equivalent of 30 minutes of fast walking per day (take the stairs, running errands on foot, etc.).
Germany	Control your weight and stay active.
Greece	Be physically active every day. Maintain a healthy body weight.
Hungary	Regular physical activity should be a lifelong program for everyone. Adults should exercise or do some sporting activity for at least 30 minutes, and children for at least 60 minutes a day. Encourage your children to lead a physically active life. It is never too late for the middle-aged or the elderly to change their lifestyles. Choose a type of exercise that you enjoy.
Ireland**	**Extra Recommendations from Healthy Ireland: Staying active (Starting, Walking, Running, Cycling, Active Parenting, Activity for Seniors, Protect Your Skin, Summer Ready).
Italy	Physical activity for the adult population: moderate activity (least 2.5 hours) or powerful exercise (or 1 hour and 15 minutes) per week + exercises that build muscle (at least twice per week). For kids/adolescents: kids and adolescents (5-17 years old) at least one hour per day of moderate-powerful + 3 times a week powerful activity to reinforce muscles and bones (games moving or sportive activities). The elderly (65 years and older), just like adults, are advised to perform specialised balance exercises to prevent falling.
Netherlands***	***Extra recommendation from National Nutrition Center: Exercise moderately intensity for at least 60 minutes every day. This does not have to be for 1h at a time. You can also exercise for 20 minutes three times a day.
Poland	Be active (walk, take the stairs, do some active housework) and be physically active at least 30 minutes a day (Walk at least 5 000 steps a day; walk at least 10 000 for your health).
Spain	Physical activity for ages groups: for adults at least 150-300 minutes of moderate aerobic activity, or at least 75-150 of vigorous intensity; for children under 1 years: the more activity the better; 1-2 years: minimum 180 minutes; 3-4 years: minimum 180 minutes, of which at least 60 minutes of moderate to vigorous activity; 5-17 years: minimum 60 minutes of moderate aerobic activity; over 65: activities to enhance strength and balance.
Sweden	30 minutes a day of physical activity (stay active); for children: 60 minutes; for elderly: find your balance.

References: Belgium, France, Germany1 Germany2, Greece, Hungary, Ireland, Italy, Netherlands Poland1, Poland2, Spain, Sweden

Besides the recommendations on physical activity, many countries also highlighted general advice regarding healthy eating behaviour. Most of the countries involved in PLAN'EAT focus on:

- the number (from 3 to 5), the regularity, the variety and the weekly organisation of meals;
- the need to take quality time to consume meals (not in front of the computer, television, phone, etc.);
- the preparation of home-cooked meals with fresh ingredients and healthy methods;
- the importance of having a healthy and balanced breakfast.

France, Hungary, Italy, Ireland, Netherlands and Sweden present other behavioural suggestions:

- **France** focuses on nutrition labels (i.e.., Nutri-score), the origin of products (preferably local and organic) and their seasonality; protect children and adolescents from exposure to unrecommended food and drink advertising.
- **Hungary** adds information on food safety and the importance to read the label carefully to know the ingredients, the energy and the nutritional content of foods.

- **Ireland**, among the behavioural recommendations, includes enough sleep and rest, and spend time in nature, etc.
- **Italy** presents special recommendations for specific target groups (e.g. breakfast options for children); information on how the consumer can ensure food safety through appropriate preservation methods; the structure and the main components of nutrition labels; different smoking recommendations for target groups; methods to reduce household food waste; advice on how reduce daily environmental impact of food choices.
- **The Netherlands** includes information on how to handle food safely and hygienically and to prevent food waste, on the origin of products (preferably local and organic) and their seasonality, on sustainable nutritional labels.
- **Sweden** includes information about organic *vs.* conventional farming, nutrition labels (e.g. Keyhole symbol, frozen foods *vs.* fresh food and intake restrictions based on health and the environment).

SUSTAINABILITY ISSUE

In the latest revisions of national dietary guidelines different countries have added information regarding the sustainability of consumers' food choices, in addition to the advice on the health impact of diets. However, Greece and Ireland lack this kind of information while other countries have placed this issue among the main topics of the guidelines, highlighting that there is an urgent need to shift towards healthier and more sustainable dietary patterns.

In the **Italian** dietary guidelines, the sustainable aspects are included in the Directive n.13 "The sustainability of the diet: everyone can make a contribution". Regarding food choices, it was recommended to consume more plant-based products (such as fruits, vegetables, legumes and cereals) and fewer animal-based products, limit the consumption of meat, preferring the white type (chicken, rabbit) respect to the red one (pork, beef), and indicating which type of animal food products should be preferred (e.g. chicken, eggs, milk, yogurt, ricotta cheese, small Mediterranean fishes, etc.) in order to combine high nutritional value, low cost and environmental protection. Regarding behavioural advice it is recommended: cooking techniques with low environmental impact (e.g. steam or microwave), preferring the consumption of seasonal, local and organic food products, trying to limit the impact of food packaging (e.g. product with less or recycled packaging, paying attention to the information on the label, throwing away the packaging correctly) and reducing household food waste by adopting specific anti-waste strategies.

For the **Dutch** guidelines (the “Wheel of Five"), environmental impact is considered as one of the key pillars of the guidelines and is calculated on foods that are normally consumed in the country through a modelling method. The optimisation model of food consumed was used to provide the maximum recommended level of intake of foods of animal origin with high Green House Gas (GHG) emissions. This evaluation resulted in punctual recommendations such as: reduce meat consumption to a maximum of 500g/week (replacing it with nuts, legumes and eggs), consume 2-3 servings of dairy products per day and eat fish (only) once a week. Additionally, practical recommendations are given to help consumers to make more sustainable choices, such as examples of weekly menus that include four days with meat and three with meat alternatives, recommendations regarding the consumption of local and seasonal fruits and vegetables, prevention strategies against food waste, and providing information on animal welfare and sustainable labels.

The **Swedish** FBDGs have been considered in the 2016 FAO Report (FAO, 2016) a reference model to integrate the topic of sustainability into national dietary guidelines, providing a guidance on how to eat healthy with a low environmental impact. In the process of developing the guidelines, the health and environmental perspectives were taken into consideration with also a focus on the animal protection aspects (NFA, 2022). Sustainability issues are highlighted in each section of the guidelines, where advice for most ecofriendly food choices were reported. The main addressed topics are related to the increase of consumption of seasonal fruits and vegetables high in fibre, seafood and mussels, whole grains, rapeseed and olive oils (lower environmental impact than palm oil); on the other hand, it was pointed out the reduction of consumption of dairy products, red and processed meat, and products high in sugar. The Swedish guideline includes information about the Keyhole symbol, created by the National Food Agency that can help consumers to find healthy and sustainable food products.

In the latest revision of the **Spanish** guidelines, external experts of sustainable food systems were included in the scientific panel that worked on the recommendation’s development process. The sustainability issue

is included in all the Spanish guidelines and, as for the Swedish model, in each food group the most sustainable choices are highlighted. Other sustainability considerations have been added, such as: the reduction of products that are transported by air, the promotion of cooking techniques with low environmental impact, the reduction of food waste and packaging (especially plastic), the preference for fair and local products, and animal welfare.
Environmental aspects are broadly addressed in the 10 **German** rules of the German Nutrition Society (DGE, 2021) that identify what a healthy and sustainable diet is. For each rule there is an annex on sustainability aimed to encourage German citizens towards more sustainable choices. As a novelty, respects to previous version of the guidelines, in the present German document reference is made to the EU organic logo (EC, 2018) and the state organic seal (Bio-Siegel (oekolandbau.de)) that can help German consumers in choosing more sustainable products; the labelling of the Marine Stewardship Council (MSC) (MSC, 2023), the Aquaculture Stewardship Council (ASC) (Get Certified - Producers - ASC International (asc-aqua.org) and organic certifications such as the Naturland "Wild Fish" seal (Naturland, 2023) regarding the choice of fish and “Fair trade market” (Fairtrade Internazionale) for products such as coffee, tea and cocoa.
In the FBDGs of **Belgium, France, Hungary** and **Poland**, a specific focus on sustainability as for the guidelines of the above-mentioned countries is not present. This subject was introduced mainly as a general consumer orientation towards a consumption of more plant-based and less animal products (especially meat), more local, seasonal and organic food products. For France, a 20% reduction in ultra-processed foods is also included.

FOCUS ON FBDGs
RECOMMENDATIONS: Greece, Italy, Netherlands, and Spain have the most complete FBDGs in terms of recommendations for the adult population. Hungary and Ireland have a good model, but some sections are to be deepened.
POPULATION GROUPS: recommendations for Italy, Greece, Netherlands, Spain (except for the younger’s) and Sweden cover all the population groups and varied physiological conditions. Germany, Poland, and Belgium present recommendations only for healthy adults.
BEHAVIOURAL ADVICE: Hungary, Italy, Poland, Spain, and Sweden have complete recommendations for physical activity. To be improved: Germany and France. To be added (behavioral advice included in extra recommendations): Ireland and Netherlands. France, Hungary, Ireland, Italy, Netherlands and Sweden guidelines include recommendations on other behavioural advice.
SUSTAINABILITY ISSUE: Spain and Sweden present information in all the guidelines; the Netherlands based the guidelines on sustainable studies; Italy presents a dedicated chapter; Germany is a good example of a possible strategy to help consumers making sustainable choices.

2.3.3 SHIFT TOWARDS HEALTHIER AND MORE SUSTAINABLE DIETS

Positive environmental and health outcomes could be obtained by the adoption of a plant-based diet together with the reduction of animal-based foods and of ultra-processed products rich in added sugar and salt (Aleksandrowicz et al., 2016) (Wilson et al., 2019). It was observed that, among foods associated with improved health conditions (whole grain cereals, fruits, vegetables, legumes, nuts, olive oil, and fish), all except fish have the lowest environmental impact. Foods associated with the highest environmental impacts—unprocessed and processed red meat—are also regularly associated with increases in disease risk (Clark et al., 2019).
To analyse the main plant-based habits among PLAN’EAT countries, the proportion of the population who follow a **flexitarian**, **vegetarian** and **vegan** diet was investigated (Kent et al., 2022). These diets were identified as the representative of three level of meat-consumption reduction: the flexitarian characterised by a low consumption of animal-based products (Derbyshire, 2017), the vegetarian characterised by the avoidance of meat consumption (International Vegetarian Union, 2013) and the vegan, characterised by the avoidance of any animal-based products (NHS, 2022). Hereafter the trends regarding these three models across the PLAN’EAT countries were analysed. The reported data were collected from different sources not always nationally representative, reporting self-perceptions rather than a precise assessment, and without univocal definitions; hence it is important to consider these results as estimates. However, it is also important

to highlight that this data can reflect the general situation in each country, representing a good starting point for reflection.
Germany and Netherlands have the highest proportion of flexitarian dietary pattern, that, added to the percentage of vegetarians and vegans, reach around the 50% of the population. Also, in France there is a relevant proportion of flexitarians (30%). In other countries the prevalence of flexitarians corresponding to 10-15% of the population was found.
Germany and Ireland reported the highest percentage of people who follow vegetarian and vegan diets (around 10% of the population). On the other hand, in Belgium, Hungary, Spain and Sweden less than 16% of consumers declared to follow the mainly plant-based models (meaning the sum of all the patterns) (Table 4).

Table 4: % of flexitarians, vegetarians and vegans in countries participating in PLAN'EAT.

	Belgium	France	Germany	Greece	Hungary	Ireland	Italy	Netherlands	Poland	Spain	Sweden
Flexitarians	10.1%	30%	44 %	15%	9%	16%	NA	43%	No data	10.8%	10%
Vegetarians	1.6%	4%	7%	2%	2%	8%	5.4%	4-6% (3% vegans)	8.4%	1.4%	4%
Vegans		3%	1%	2%	1%	2%	1.3%			0.8%	1%

References: Belgium; France; Germany; Greece; Hungary; Ireland; Italy; Netherlands; Poland; Spain; Sweden.

TRENDS IN FOOD CONSUMPTION

Providing an adequate level of nutrition for the entire world population and protecting the ecosystem are the greatest challenges of the present time, and the situation is going to worsen due to the continuous increase of the world population (9.8 billion in 2050 and 11.2 billion in 2100) (United Nations, 2017). From a health perspective the problem is twofold: on one hand the concern is related to overnutrition and dietary risk factors (in 2017, 11 million deaths were attributed to dietary risk factors (GBD, 2017; Diet Collaborators, 2019)) on the other hand in 2021, 828 million people were affected by hunger (+46 million vs. 2019) (FAO, IFAD, UNICEF, WFP and WHO, 2022). At the same time the global food system has a high impact on the environment and on the erosion of natural resources (land use, water consumption and air pollution). Based on this, in 2019 the EAT-Lancet Commission presented the Planetary Health Diet, a set of recommendations aimed at reducing health risk factors and GHG emissions caused by the food system. A plant-based diet in which whole grains, fruits, vegetables, nuts and legumes would represent the highest proportion of the foods consumed, and where meat and dairy products have a significant lower proportion (Willet et al.,2018).

METHODOLOGY

To make an overview of consumption trends, each country participating to PLAN'EAT was asked to provide a 10-years' comparison of the food consumption data. Due to the lack of recent data, this comparison was possible only for seven countries. Information and the methodologies about the surveys used to make the comparison are shown in the Table 5 below.

Table 5: Information (methodology and method(s) of dietary assessment) on surveys used to assess food consumption trends in seven countries participating in PLAN'EAT.

	Survey	Methodology	Method of dietary assessment
France	NutriNet-Santé (2014 vs. 2018)	Food intakes were assessed among 18108 participants of the NutriNet-Santé cohort in 2014 and 2018 (The sample is not representative of the population due the number of women and people >50 years)	Food Frequency Questionnaire
Germany	DGE report (2016 vs. 2022)	Data from FAO Food Balance Sheet	-

Hungary	EFSA (2003)	Food intake was assessed among 1360 people with random sampling from the general population census.	Food record
	EFSA (2018)	Conducted according to the EFSA EU MENU methodology, food intake was assessed among 2689 people with a random sampling from the National Household Budget Survey following multistage stratified sampling.	Food record and 24-hours dietary recall
Italy	EFSA (2005)	Food intake was assessed among 3323 people with random sampling from the telephone book.	Food record
	EFSA (2018)	Conducted according to the EFSA EU MENU methodology, food intake was assessed among 1203 people with a random sampling from fieldworkers' local lists compiled from municipality registries, local schools' and general practitioners' registries, following multistage stratified sampling.	24-hours dietary recall
Netherlands	RIVM (2007-2010)	Food intake was assessed among 3819 people from a representative consumer panel.	24-hours dietary recall
	RIVM (2019-2021)	Food intake was assessed among 3570 people from a representative consumer panel.	24-hours dietary recall
Poland	Household budget survey (2010 vs. 2020)	Data from Household Budget Surveys.	-
Spain	Informe de consumo alimetario (2014 vs. 2021)	Data from Household Food Consumption Panel.	-

For completeness, the trend for Belgium and Sweden (as shown in the last two columns of Table 6) were also added, even though the year time span was near to 20 years limiting the comparability with other countries. It was not possible to analyse trends for Greece and Ireland that do not have two surveys on food consumption to compare.
In addition to this evaluation, a parallel in-depth analysis focused on legumes, meat and ultra-processed food consumption in around 10-years was made. For meat, differences among red, white and processed meat were not reported as no such information was available for most studies. Data was gathered from literature studies, reports and market-place surveys and the trends are evaluated in percentage.
In addition to that a focus on ultra-processed foods (UPFs) was carried out in consideration that numerous epidemiological studies highlighted the relation between their excess consumption and the increased risk of negative health outcomes (Elizabeth et al., 2020; Chen et al., 2020). Moreover, UPFs were also associated with environmental deterioration linked to the resources used in production and processing (Anastasiou et al.,2023). UPFs consumption is not included in the national consumption surveys; hence for this information data were gathered from literature studies. It has to be said that these figures came from national surveys carried out between the 2010 and the 2016. Thus, they may not be completely representative of the current situation for each country.

TRENDS

As shown in Table 6, for the seven countries listed above, **fruit and vegetable** consumption decreased in most of the cases, despite the worldwide recommendations emphasize increasing their intake. The World Health Organization (WHO) recommends a minimum consumption of fruit and vegetables for the adult population of 400 g/day. In Hungary, Italy and Spain, a reduced consumption was observed, while an increase was registered only in France and the Netherlands. Once again, even for typical sources of **carbohydrates** (pasta, rice, cereals and bread), an increase in general consumption was observed only in France and the Netherlands, while a decrease was detected only in Italy.

Milk consumption tended to decrease, except in Hungary, although worldwide guidelines recommend daily consumption of milk in consideration of its nutritional composition (proteins of high biological value, minerals and vitamins).
The situation regarding the consumption of animal and plant proteins varies greatly among countries. The encouraging data is that the consumption of **legumes** has remained stable and has increased in France, Germany and the Netherlands. Even though the replacement of meat with legumes is something that has already started (Henn et al., 2022), few studies have assessed this trend and for this reason it was not possible to make a focus.

Table 6: Food consumption changes in seven (+ Belgium and Sweden*) PLAN'EAT countries (yellow=increased consumption; blue=decreased consumption; grey=stable consumption; white= lack of data to compare).

	France NUTRINET SANTE' (2014-2018)	Germany DGE REPORT (2016-2022)	Hungary EFSA (2003-2018)	Italy EFSA (2005-2018)	Netherland RIVM (2007/2010-2019/2021)	Poland HOUSEHOLD BUDGET (2010-2020)	Spain INFORME DE CONSUMO ALIMENTARIO(2014-2021)		Belgium EFSA* (2004-2014)	Sweden EFSA* (1998-2010)
Fruits										
Vegetables										
Pasta, rice, ecc..										
Bread										
Meat										
Processed meat										
Fish										
Legumes										
Eggs										
Milk										
Dairy products										
Potatoes										
Alcoholic beverages										
Sweets										

**Belgium and Sweden have older data than other PLAN'EAT countries.*

References: France, Germany, Hungary 2003, Hungary 2018, Italy 2005, Italy 2018, Netherlands, Poland, Spain 2014, Spain 2021, Belgium 2004, Belgium 2014, Sweden 1997, Sweden 2010

Meat consumption has increased in Germany, Hungary and Italy (in which the consumption of processed meat increased too).

- **Meat focus:** The in depth-analysis showed that most of the consumers have reduced the consumption of meat, while in specific countries an increase, as in Hungary and Italy, or a stabilisation of the intake was observed. Discrepancies were observed among the analysis reported in Table 6 respect to the present data as an effect of the different methodologies used for the estimations (e.g. for Germany). The focus on total meat consumption in PLAN'EAT countries in around 10 years are reported in Table 7.

Table 7: Meat consumption changes in countries participating in PLAN'EAT.

	Belgium	France	Germany	Greece	Hungary	Ireland	Italy	Netherlands	Poland	Spain	Sweden
Total meat	-10-25%*	+0.4%	-18.5%	No data	+10%**	No data	+10%	-4%	-8.5%	-8%	-8.5%

** data gathered from purchases statistics*
***data refers to a shorter period of time: 2015-2019*
References: Belgium; France; Germany; Hungary; Italy: comparison between the two national consumption surveys (EFSA food consumption database); Netherlands; Poland; Spain; Sweden.

For other protein sources (**fish, eggs** and **dairy products**) have generally decreased or remained stable at national level. In Poland and Spain the consumption of all animal-based proteins (when reported) has decreased or remained stable in the last years. Only in France and Italy an increase in fish consumption was observed.
Finally, only in Germany a reduction in the consumption of **alcoholic beverages** at national level was observed, while in Hungary and Italy an increase was reported.

- **UPFs Focus:** For the evaluation of **ultra-processed** food consumption**, instead of national survey comparison applied with the methodology in Table 5**, literature data were analysed to describe the situation of PLAN'EAT countries. According to the latest NOVA classification, ultra-processed food (UPF) is identified as **'**Formulations of ingredients, mostly of exclusive industrial use, that result from a series of industrial processes (hence 'ultra-processed'), many requiring sophisticated equipment and technology' (Monteiro et al.,2019). Overall, around 20-40% of daily energy comes from the UPFs (Table 8). The lowest level of UPFs consumption can be found across Mediterranean countries such as **Greece, Italy,** and **Spain** while the highest level was identified in **Germany** and **Sweden**. An UPFs consumption corresponding to 20-30% of daily energy intake is largely compatible with significant increased risks of chronic diseases and early mortality risk, that is the reason why a focus on this product consumption should be a point to address.

Table 8: % of daily energy intake that comes from UPFs in countries participating in PLAN'EAT (adult population).

	Belgium	France	Germany	Greece	Hungary	Ireland	Italy	Netherlands	Poland	Spain	Sweden
UPF	29.6%	34%	38.5%	21.9%	NA	33.6%	17.3 %	Around 30% (61% UPF-UPD)	NA	25.2%	42.2%

References: Belgium; France 1, France 2; Germany; Greece; Italy; Ireland; Netherlands; Spain; Sweden.

To conclude, even though these findings were not related to the adequacy of consumption in relation to nutritional recommendations, and for this reason, they do not say if the consumption is in line or not respect to the dietary guidelines, this overview summarised a general consumption tendency for each PLAN'EAT countries towards the food categories analyzed.

THE ENVIRONMENTAL IMPACT OF FOOD CONSUMPTION

In the recent years, countries have started to study different aspects related to food consumption at national level with a particular reference to the impact they have on the environment. Due to the methodologies and different sources used for these assessments, it is difficult to compare the environmental impact as reported in the studies of the PLAN'EAT countries. However, in the section below, the most significant studies related to this issue are reported.
Most studies assessing the impact were carried out in **France**. Main relevant aspects could be summarised as follows:

1) environmental impact of the food consumption of French population could be reduced through a lower use of animal products (red and white meat, cheese) and a higher use of plant-based and organic foods (fruits and vegetables) (Brunin et al., 2022; Seconda et al., 2018);
2) the characterisation of the environmental pressures and impacts related to the level of adherence to the EAT-Lancet recommendations among French adults (Kesse-Guyot et al., 2018), and the development of a Sustainable Diet Index (SDI) that includes nutritional, environmental, economic, sociocultural as well as nutrition-related pathology risks such as cancer and cardiovascular disease were carried out (Seconda et al., 2019; Seconda et al., 2020).
3) a holistic index called the "3V Rule" was developed (Fadet and Rock, 2020). The index is based on three generic dimensions governing the diet-global health relationship, and that includes the animal-plant ratio (15% daily of animal calories, Végétal= plant-based), the degree of food processing (maximum 15% daily of ultra-processed food calories, Vrai=real, with low level of UPFs) and food diversity (Varié=varied, preferably organic, local and seasonal). The 3V rule was applied to the comparison between INCA1, INCA2 and INCA3 food consumption studies pointing out that among a representative sample of French population the animal products consumption is still higher than that recommended, the UPFs consumption is too high and there is still an insufficient food diversity.
In **Ireland**, national food consumption surveys for children, teenagers and adults were used to assess blue water use (L) and GHGE ($kgCO_2$ eq) (Kirwan et al., 2023). The main results showed that the median GHGE were 2.77, 2.93 and 4.31 kg CO2eq, and freshwater use per day was 88, 144 and 307 L for children, teenagers and adults, respectively. The environmental impact of the Irish population has exceeded the planetary limit for GHGE by at least 148 % for all population groups, but not that of the use of blue water. The food groups that contributed most to GHGE were meat and meat alternatives, eggs, dairy and dairy alternatives and starchy staples (10-20%); while for the use of blue water: meat and meat alternatives in children; salty, snacks, nuts and seeds in adolescents; and eggs, dairy and dairy alternatives in adults.
In **Italy**, based on data of the INRAN 2005-2006 national survey, a database was developed in which the nutritional composition of the 921 food products consumed at national level and GHGEs were linked. Besides, linear programming was used to develop diets for males and females, aged 18–60 years, to reduce the GHGE. The main results showed that the climate impact of the optimised diet (based on national recommendations) was lower than that of the average Italian food intake (1.9 *vs.* 4.0 kg CO_2 eq/day for males and 1.6 *vs.* 3.2 kg CO_2 eq/day for females). This means that a reduction in emissions of 43% for males and 50% for females is possible with acceptable changes in food consumption patterns, following Italian nutritional recommendations (Ferrari et al., 2020).
Spain, based on detailed data on per capita food purchases by the population available through official statistics from Ministerio de Agricultura, Pesca y Alimentación, Muñoz, I., et al (2010), assessed the Life Cycle Assessment (LCA) of 864 kg food/person/year (98% of total purchases by weight). The main results showed that the net global warming potential (GWP) related to feeding an average Spanish citizen during a year is 2.1 tons of CO_2 eq, in particular derived from the food production stage. The highest contributors are meat and dairy products (54% of the total GWP for food production). LCA was used also in **Sweden** and **Germany** to identify and assess the environmental impacts of national food consumption. In Sweden, consumption was evaluated based on FAO Food Balance data. The results showed that the impact of Swedish consumption is about 21 million tons of CO_2 eq emissions, equivalent to 1.9 tons of CO_2-eq per capita emissions (the study only covers the consumption of primary food categories and not meals). Among the scenarios considered to reduce GHGE, the one that foresaw the reduction of meat consumption is the most feasible (Martin and Brandão, 2017). In Germany, the analysis shows that food consumption emits 2.7 tons of GHGE per person each year, based on data from "German in-house food basket" (Eberle and Fels, 2016).
In **Hungary,** the results of an exercise of diet optimisation of a dietary survey on a representative Hungarian sample showed that a dietary shift (~32%) consisting of a reduction of meat and dairy products resulted in a considerable total dietary water footprint decrease (women: 18%; men: 28%) (Tompa et al., 2022).

ZOOM on 'Sustainable Food Monitor' in Netherlands

The Netherlands is the only PLAN'EAT country having a monitoring programme on the consumption of sustainable food products. Since 2011, Wageningen University published the "Sustainable Food Monitor", commissioned by the Ministry of Agriculture, Nature and Food quality. The Sustainable Food Monitor

measures the consumers' spending on products with a sustainability label through three sales channels: supermarkets, food services (hospitality industry and catering) and specialist stores for sustainable foods. The latest results, published in 2021, show that Dutch consumers spent 9.5 billion euros on sustainable food (environment, animal welfare and/or social aspects), +12% compared to 2020. In the Food sector, it was observed an increase of 6% of sustainable product purchases in comparison with 2020, while supermarkets registered an increase of 14% corresponding to the highest contributor to the total spending on sustainable food.

SHIFT TOWARDS MORE SUSTAINABLE DIETS

Among PLAN'EAT countries, specific studies that focused on the eating habits shift towards healthier and more sustainable diets were identified for Ireland, Netherlands, Sweden and Spain.

In **Ireland**, a baseline study aimed to quantify the environmental impact of daily diets across population groups using nationally representative food consumption survey (2010) and can be considered a reference from which it will be possible to monitor progress towards sustainable diets. The results showed that the environmental impact of food consumption exceeded the planetary boundary for GHGE for all the population groups, but not the boundary of water use (Kirwan et al., 2023). In the **Netherlands,** considering the latest national food consumption data (2012-2016), a reduction of GHGE to 12-16% with respect to the current level is considered a strategy to improve the sustainability and health of the diet, without compromising protein adequacy and diet quality (Heerschop et al., 2023). In **Sweden,** a comparison of food consumption through a 14-years' time spam (from 2000-2004 to 2014-2018) showed a decreased trend in GHGEs from animal-based foods in all age groups with a smaller increase from plant-based sources in younger groups only. For all age groups, GHGEs from discretionary foods decreased (Mehlig et al., 2021). In **Spain,** the study of potential intervention in Spanish eating habits to shift the consumption towards EAT-Lancet recommendations pointed out that, to achieve this goal, a significant decrease in animal source foods (dairy products, meat, fish and seafood, pastry and ready-meals), and an increase in plant-based foods (vegetables, pulses, soy foods, starch-based products, nuts, oils and fats) would be necessary. Particularly, beef meat and dairy reductions have a significant potential for transitioning to low carbon and low water footprint eating habits in Spain (Cambeses-Franco et al., 2022).

FOCUS ON SHIFT TOWARDS HEALTHIER AND MORE SUSTAINABLE DIETS

TREND IN FOOD CONSUMPTION

Positive changes: Netherlands and France increased the consumption of fruits and vegetables, carbohydrates and legumes. Germany increased legumes and decreased meat and alcohol consumption.
Negative changes: Italy and Hungary decreased fruits and vegetables consumption and increased meat and alcohol consumption.
UPFs consumption is lower in the Mediterranean countries.

ENVIRONMENTAL IMPACT ON FOOD CONSUMPTION

To assess the environmental impact, some of PLAN'EAT countries applied different approaches. France, Ireland and Italy assessed the sustainability of consumption on a representative sample (France NutriNet Santè; Ireland and Italy: national survey). The limitations consist of the fact that Ireland and Italy used old survey as reference (while France applied more recent data). Spain, Sweden and Germany used LCA on food purchasing/balance sheet.. Hungary used the application of the Water Footprint, while Greece used the application of Ecological Footprint.

SHIFT TOWARDS MORE SUSTAINABLE DIETS

France and Sweden evaluated the shift; Ireland, Netherlands and Spain evaluated what is necessary to reduce the environmental impact (which changes) through the shift.

2.3.4 RECOMMENDATIONS, SUCCESSFUL INTERVENTIONS, TOOLS AND MONITORING STRATEGIES

Based on the analysis results, different actions were identified as possible future PLAN'EAT activities.

RECOMMENDATIONS

How the FBDGs could be improved

- **Recommendations** should indicate the frequency (precisely) and the servings (with generic servings and domestic measurements instead of quantities in grams), should be targeted for different population groups (at least for what concerns general guidelines/recommendations) and should have specific sections on sustainability.
- There would be an alignment with **EAT LANCET recommendations** in terms of products to prefer (typology) and sustainability aspect. In addition, adaptation to local contexts should be carried out.
- A relevant **improvement** of nutritional recommendations should consider national socio-cultural aspects, which vary according to individual preferences, family budget, local foods and cuisine. Nutritional recommendations must be converted into realistic and individual food choices, which must consider intrapersonal and interpersonal factors of the reference population's group.

IMPROVEMENT STRATEGIES

- **Choosing legumes as one of the best strategies to healthy and sustainable diet:** It has been acknowledged that the adoption of healthier food habits is a difficult target to achieve by consumers' low health/nutrition literacy (Magrini et al., 2018). The lack of skills, knowledge of balanced nutrition, perceived difficulties such as access and availability, knowledge of recipes and the perception of low nutritional quality and limited taste of a meat-free diet are the most highlighted barriers reported by European consumers regarding the adoption of plant-based diets (Perez-Cueto et al., 2022). The reported difficulties of consumption are particularly relevant for legumes (Marinangeli et al., 2017) that were claimed as a food item of difficult management in terms of cooking skills, time-constraints (e.g. long soaking or cooking time) that have been pointed out as significant barriers to their regular consumption (Havemeier et al., 2017). In addition, the consumption of legumes is often limited for the effect of the potential gastrointestinal discomfort that determines the exclusion of these foods from the diet (Hall et al., 2017). Finally, the preference of legumes with respect to animal-based alternatives (such as meat) can be limited considering the scarce awareness of the impact that a high consumption of animal products have on the environment (Hartmann and Siegrist, 2017). Consumers underestimate the environmental impact of meat consumption/production and have a low willingness to change meat intake habits (Hartmann and Siegrist, 2017).
  For this reason, legumes consumption should be promoted making consumers more aware on the potential benefits of this type of products. The focus could be on sharing recipes and cooking practices that can be used in order to overcome the difficulties that consumers usually reported (e.g. what legumes choose in case of gastrointestinal diseases; how many meals can be cooked; how to improve the taste of legume dishes in order to not be monotonous). For the environmental issue, instead, key messages could be spread showing graphically the impact of the same amount of legumes and meat consumption.
- Identifying and developing appropriate **protein sources** to avoid micronutrient deficiencies and to orientate consumption towards low environmental impacts alternatives (in some cases, the quantity of legumes and pulses to be eaten to replace animal proteins can contribute similar levels of environmental impact of meat production).
- Evaluating the **quality and the environmental impact of the dietary recommended pattern**, as the Netherlands did for its nutritional guidelines. In fact, it has been highlighted that a higher diet quality (based on nutrients or adherence to dietary guidelines) is not automatically associated with lower GHGE (i.e. low-GHGE diets were often high in sugar and other simple carbohydrates and low in essential micronutrients) (Biesbroek et al., 2023; Payne at al., 2016).

SUCCESSFUL INTERVENTIONS

In recent years, the awareness of institutions on the need to carry out interventions aimed at promoting healthy and sustainable food models in suitable places received growing attention. Most of these interventions have focused on the younger population groups (from kindergarten to university), as school interventions can have a wider impact producing positive effects also on the nutritional knowledge of families.

It would be ideal if an expert staff was trained to educate children in schools (from kindergarten onwards) about how to have healthy, sustainable lifestyles, including good nutrition (such as the Mediterranean pattern of diet), cooking skills, eating behaviour, sustainability, plant-based food consumption, and regular physical activity.

Despite the clear difficulty in implementing interventions in **kindergarten**, Mikkelsen et al. (2014) highlighted a clear possibility to improve children's eating habits, particularly on increasing fruit and vegetable consumption. Unfortunately, the number of interventions carried out in this age group is still too small, making it an area for future structured projects.

On the other hand, there are numerous interventions in **primary school** (Patra et al. 2023), which can vary from a single lesson with an expert to a structured and prolonged approach. The most successful activities focused on:

- changing attitudes towards healthy food choices and choosing/sourcing local and seasonal food products through lessons, visiting local farmers and creating a school garden.
- increasing fruit and vegetables consumption through nutritionists' session and interactive play.

For **adolescents** (from middle to high school), the best school interventions are performed when educational media are used to deliver health messages, the availability of healthy foods in school is increased, and individualised, computer-based feedback with normative information about eating behaviours are incorporated (Clavert et al., 2019; Silveira et al., 2011). Another successful tool can be identified in the use of web app interventions, that has led to positive results by improving the eating habits of young adults towards a healthier and more sustainable diet (Ghammachi et al. 2022).

For what concerns **university** students, a combined intrapersonal approach such as using personalised letters and newsletters, interviews, emails and nutritional website, should be the best strategy (Deliens at al. 2016).

Another suitable place to promote healthy and sustainable dietary pattern in the adult population is the **workplace**, since it is where people spend most of their day. It has been highlighted how the intervention granted in a work environment in the form of nutrition and health education, meal replacement and/or supplements, physical activity and type of intervention combined improving nutritional knowledge, clinical health status, fruit and vegetable consumption and food diversity (Rachmah et al. 2021). Besides this, nutritional and physical activity interventions in the workplace have also brought an improvement in several other related outcomes (such as absenteeism) (Grimani et al. 2019). However, interventions in the workplace are still few, carried out with different methodologies, which do not always lead to positive results and for which the economic impact is not yet clear (van Dongen et al. 2011). On the other hand, while interventions to improve employees' eating habits are in place, very few projects have included the issue of food sustainability in the workplace. For this reason, PLAN'EAT interventions should focused also on the adult population and particularly, on the workplace environment.

TOOLS

To achieve the aims of changing the eating habits of the population towards healthier and more sustainable dietary patterns, several tool can be identified as valuable tools:

- **Creating a common eco-label.** The need to focus on this label is related to the fact that nutritional values/information is still included on the food packaging while that regarding the sustainability is still missing and can better help the consumers to improve their food choices, having a positive effect on the selection, purchase and consumption of more environmentally sustainable food and beverage products (Potter et al. 2021). These labels are already present in Germany (different logos on foods from sustainable fishing, local, organic, etc. in the guidelines).
- **Food based dietary guidelines** are a primary policy tool used to improve health and sustainability worldwide (Amorim et al., 2022) and can also be used as the basis to develop food and agriculture

policies. The main problem related to national guidelines is the lack of adherence by the target population. Their graphical representation would allow people to understand the main messages representing a possible key quickly and easily to expanding knowledge in all population groups (Hess et al., 2012).

- **Web App** with mobile functionalities that collects nutritional and environmental impact information of food products included in a meal. For both nutritional and environmental aspects, an adequacy level should be applied to help consumers making responsible choices. The food categories added in the app should not be very specific but should represent a useful reference for consumers to know the environmental and health impact of their choices. The mobile App should be developed by experts having nutritional and environmental expertise and should be presented in a clear and easy way, based on the apps already present in the market (Klimateller https://www.klimateller.de/ ; Yuka: https://yuka.io/en/ ; Mylabel: https://www.mylabel.io/#download ; EcoScore: Présentation - Eco-score (score-environnemental.com))
- A particular theoretical tool is the **Citizen science,** a participatory research method that actively involves citizens in scientific discussion to generate new knowledge or understanding. This type of method, based on the commitment of communities in the collection and/or co-creation of data, is currently being tested in the PLAN'EAT project in the 9 LLs. Through this collaborative approach it is possible to identify which interventions can be used on a large scale, what to improve or to eliminate (Oakden et al. 2021).

MONITORING STRATEGIES

The monitoring phase at local, national and European level is essential to evaluate the changes at the population level and to assess the (in)effectiveness of the policies that are implemented at community level.

- To carry out a constant and structured monitoring of the eating habits of the European population, **surveys** at national level are necessary to be carried out at regular intervals and with the same methodology. The EU MENU methodology of EFSA was conceived with this purpose. Data production is a costly exercise and frequent production of national data is difficult to realise. A possible strategy could be to carry out the assessment on smaller samples at more frequent interval of time (i.e., every 4 years). In this way, it would be possible to assess the trend of food consumption and the effectiveness of food policies in the short term.
- Another monitoring method could be linked to the direct comparison between **food consumption vs. food recommendations** at national level. This comparison could allow to evaluate how close or distant the consumption of the population is from the expert recommendations and in order to implement or modify political actions and interventions to make the population more adherent to the guidelines.
- One of the main problems related to the assessment of the **environmental impact** of the food system at European level is the limited comparability of the data from different countries due to the use of different methodologies (e.g. Life Cycle Assessment, Ecological Footprint, etc.) and different data sources (i.e. FAO Food Balance Sheet, EFSA database, Household Budget Survey, etc.). To achieve structured monitoring, it is essential to standardise the methodology for data acquisition and analysis (as EFSA did for the collection of food consumption data).
- A good strategy for monitoring, not based on population consumption, but on consumer purchases that take place at various levels is the **"Sustainable Food Monitor"** in the Netherlands, which could also be exported and expanded to the other countries involved in the project. The monitoring of sustainable purchases allows us to understand the trend and attention of the population towards sustainability. The limit of this methods is related to the fact that the “ecological label” is still not widespread in EU countries; hence the monitoring should be carried out having a list of sustainable foods to be assessed.

2.3.5 DISCUSSION AND FUTURE ACTIONS

The analysis presented in this section allowed to collect the main nutrition actions/activities set up in PLAN'EAT countries during the last years. From this overview it seems that some countries are working more proactively to lead the transition towards healthier and more sustainable diets, but any of them is focusing on achieving this goal through a comprehensive approach. In particular, the analysis emphasized the most interesting and involved actions that pursue this transition. Summarizing, for what concerns the dietary guidelines in terms of nutritional recommendations, population group advice, physical and behavioural advice and sustainability, Italy, Netherlands (except for physical activity) and Spain (except for general behavioural advice) seem to be the countries with the most complete approach including large parts of the above-mentioned aspects.

As far as concerning food consumption patterns in 10 years the best improvements were observed for Netherlands and France (fruits and vegetables and legumes) and Germany (legumes and alcohol), while Italy and Hungary worsened the food consumption of fruits, vegetables, meat and alcohol. To conclude, the environmental aspects related to food consumption were analyzed by different studies, such as France and Sweden that evaluated the shift of the population dietary intake towards healthier and more sustainable pattern, while France, Italy, Ireland, Spain, Sweden and Germany assessed the environmental impact of food consumption through different methodologies.

In addition to the analysis of the main results, this section had the aim to identify approaches for the future activities of the PLAN'EAT project. In particular, following the discussion of what actions should be adopted, the two fundamental achievements consist of the implementation of food based dietary guideline's messages (i.e. through the creation of graphics that facilitate consumer understanding), together with the identification of the best intervention strategies for each population group.

3. Requirements and needs among food system stakeholders

SPG2 (Surveys, Protocols, Guidelines) is the survey build up to investigate the needs, requirements and the initiatives concerning the food chain stakeholders to foster dietary behaviour changes and to improve food environments. The survey was addressed to the food chain actors - primary producers, food industries, retailers, food services and restaurants - belonging to the Consultation and Working Groups (CWGs) and the Living Labs (LLs), to healthcare professionals (LLs and EPHA network) and educational systems (LLs and FEE), to policymakers (EPHA network) and to citizens (selected by PLAN'EAT participants).

METHODOLOGIES

The SPG2 structure and content varies depending on the actor targeted.

- Food chain actors: 2 multiple choice questions (5 points likert-scale from strongly disagree to strongly agree, with the possibility to choose "NA") and 1 open question
- Healthcare professionals: 2 multiple choice questions (5 points likert-scale from strongly disagree to strongly agree, with the possibility to choose "NA") and 1 open question
- Educational systems: 2 multiple choice questions (5 points likert-scale from strongly disagree to strongly agree, with the possibility to choose "NA") and 1 open question
- Policymakers: 2 multiple choice questions (listing the answers according to the preferences) and 1 open question
- Citizens: 2 multiple choice questions (listing the answers according to the preferences) and instead the open question, a personal point of view was asked

The **first** multiple choice question, even though adapted to each context, includes the following subcategories asking what the actors surveyed need more: knowledge, vertical collaboration, horizontal collaboration and government actions.

The **second** multiple choice question investigates the expectations from PLAN'EAT project results.

The **open question** investigates the initiatives already (or to be) implemented by the survey (organization's) participants that have reached positive outcomes to shift towards healthier and more sustainable diets.

All the versions of the SPG2 questionnaire are reported in the Annex D (from D1 to D9).

WHEN AND HOW DATA COLLECTION TOOK PLACE

The data collection took place in two moments. Firstly, the survey was shared among the CWGs group (already set up) in May 2023. Secondly, the survey was spread across the other actors in June/July 2023, meaning the LL network, healthcare professionals, educational systems and citizens.

HOW THE RESULTS ARE PRESENTED

The results are presented below following this process: for the food chain actors a distinction was made between CWGs (ideally bigger companies) and the LLs (ideally smaller companies). Only for the retailers group the data will be presented aggregated due to recruitment difficulties. For the other actors, in case of different data collections for the same respondents (e.g. healthcare professionals from EPHA network and from LLs), the results were analysed together.
All the questionnaire are reported in the Annex D (from Annex D1 to Annex D9).
The text contains the main results in terms of numbers. The complete results are reported in the Annex D10.
All the initiatives already (or to be) implemented by the interviewed organizations are reported in the Annex D10 (Annex D10- Table 6, Table 12, Table 18, Table 24, Table 25, Table 27, Table 27, Table 28).

3.1 Food value chain actors

3.1.1 PRIMARY PRODUCERS

Zuidelijke Land- en Tuinbouworganisatie (ZLTO) is committed as a leader of the Primary Producers Consultation and Working Group (CWG). The survey involved the participation of 12 European Primary Producers from 7 countries (Spain, Italy, Hungary, Belgium, Netherlands, Greece, Poland) and with different food productions (vegetables, fruits, meat, honey, olive oil, sunflowers and wheat, wine, durum wheat, cotton, dairy products). The size of the companies was variable (from 1 to 3000 hectares), and the survey has predominantly been filled by owners of the organisations.
The CWG primary producers' results were then compared to those obtained by the data collection from Greece, Poland, Hungary, Spain and France LLs. The size of the companies was variable (from 6 to 1500 hectares), as were the types of products (olive oil and raisins, grains, fruits, cereals and legumes, dairy products, vegetables). Also, in this case the questionnaire was mostly completed by the owners.
The questionnaire is available at Annex D1.

KNOWLEDGE AND RESOURCES

The number of respondents who agree or strongly agree to the items of this question ranged from 67% to 100% (Annex D10-Figure 1) showing that to shift towards more healthy and sustainable food production there is a strong need to identify what a healthy, fair and sustainable food product is, and which claims are accepted, followed by covering additional costs to improve farming practices which got 92% positive responses. On the other hand, the respondents are less interested in advertising the organisation of public engagement activities to support existing production-consumption links and to create new ones and in making the right choice to change assortment of crops to provide a healthier and more sustainable food offer
The LLs primary producers do not see it as a priority respect to CWGs to identify what a healthy, fair and sustainable food product is and what claims are accepted (76% “agree” and “strongly agree” vs. 100% CWGs)) (Annex D10-Table 1).

VERTICAL COLLABORATION

The number of respondents who agree or strongly agree on the points of this question ranged from 75% to 100% (Annex D10-Figure2) highlighting that respondents need more vertical collaboration, particularly to produce healthier, fairer and more sustainable food products and to ensure consumer awareness of the real price/cost of these products (100% for both answers). Less interest was reported by consumer education about the impact of food products on health and the environment (17% of "Not Answer")
LL’s primary producers (Annex D10-Table 2) agree with CWG in most of the cases. However, it should be highlighted that 100% of the LLs strongly agree to ensure that consumers are aware of the real cost/price of

a healthy, sustainable and fair food product (vs. 50% of CWG) and to ensure a fair remuneration for farmers (vs.67% of CWGs).

HORIZONTAL COLLABORATION

The number of respondents who agree or strongly agree to the items of this question ranged from 74% to 100% (Annex D10-Figure3). All respondents agree on their need to share good practices, lessons learnt, feedback on experience in applying best farming practices. 8% of the sample disagree with asking policy makers to address regulatory barriers to shift the transition forward.
For what concerns the horizontal collaboration, 100% of LLs' primary producers (Annex D10-Table 3) strongly agree to join forces to ask policy makers to address regulatory barriers to the transition (instead of 83% of CWG's agreement).

GOVERNMENT ACTIONS

The number of respondents who agree or strongly agree to the items of this question ranged from 66% to 100% (Annex D10-Figure4). Primary producers strongly agree that governmental institutions should pay more attention to educating consumers about the real cost of healthy, sustainable and fair food products and to giving recognition when applying healthy and sustainable best farming practices (100%). Instead, 17% strongly disagrees with the agreement on an EU mandatory label for food products regarding their health, environmental and socio-economic impacts.
Regarding government actions, 100% of primary LL producers (Annex D10-Table 4) surveyed strongly agree or agree on the need for the government to ensure adequate remuneration for farmers as well as educate consumers about the real costs of such food products. Even for LLs, 37% disagree with an EU mandatory label for food products considering their health, environmental and socio-economic impacts.

PLAN'EAT PROJECT EXPECTATIONS

The number of respondents who agree or strongly agree to the items of Project's expectations ranged from 59% to 92% (Annex D10-Figure5). With 92% of positive answers were selected: identify trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food products through True Cost Accounting (TCA), identify micro-level factors influencing dietary behaviour across Europe and co-design solutions to improve food environments and foster behavioural change.
For what concerns LLs opinions regarding the outcomes of the project (Annex D10-Table 5), some differences were pointed out. With 75% of answers in agreement/strongly agreement the most selected outcomes were: identifying meso and micro level factors and setting up innovative tools to empower citizens to improve their dietary behaviour and being considered as a candidate to integrate the list of food outlets recommended at local level in the PLAN'EAT personalised app.

3.1.2 FOOD INDUSTRIES

Spread European safety and sustainability (SPES) is committed as a leader of the project's Food Industries Consultation and Working Group (CWG).
21 stakeholders from France, Sweden, Italy, Germany, Greece, and Spain responded to the survey with their views, according to their sector of reference and their professional background. Regarding the respondents of the survey, 10 out of 21 were SMEs, 8 were large company, 3 were start-ups. The products that the food industries investigated produce/process/distribute are various for each company, with a preponderance of beverages (4/21), dairy products (3/21) and beverages (3/21), followed by the other categories.
The CWG food industry results were then compared to those obtained by the data collection from Spain, Poland, Hungary, France, and Sweden LLs. The characteristics of the companies belonging to the LLs were 3 large company, 1 start-up, 1 SME and 1 association of industries. Food produced/processed/distributed are: sweet and savoury snacks; raw goat milk and cheese; cultivated meat; dairy products, plant-based products, baby- and clinical nutrition (incl. FSMP) products; vegetable food products.
The questionnaire is available at Annex D2.

KNOWLEDGE AND BEST PRACTICES

The number of respondents who agree or strongly agree to the items of this question ranged from 52% to 96% (Annex D10-Figure 6), indicating a wide variability in the needs of the group. Respondents showed a high interest in understanding how to manage the increase in cost related to the transition (90%) and how to design food products with a low impact (96%). However, the respondents are more aware on how to reduce ultra-processing of food products since 29% strongly disagrees or disagrees to the necessity to have more knowledge and best practices.
The LLs food industries' point of view (Annex D10-Table 7) is in part in line with the responses of the CWG in particular with regard to the answers of disagreement. Reduction in ultra-processing of food products achieved 40% of strongly disagree and disagree answers (vs. 29% for the CWG). The same percentage of disagreement, however, was also obtained in this case by a communication strategy to move consumers towards a food system transition (vs. 0% CWGs).

VERTICAL COLLABORATION

The number of respondents who agree or strongly agree to the items of this question ranged from 52% to 96% (Annex D10-Figure 7) showing attention of food industry actors towards sustainability, and its three pillars – economic, social and environmental impact. Vertical joint efforts are perceived as crucial by responders of the questionnaire. In fact, 96% of food industry actors who participated in the survey feel that it is important to ensure that consumers are aware of the environmental and health impacts of food products and 91% of the real cost/price of them. However, 19% does not believe that collaboration is necessary to change the sourcing and the composition of current food products to make them healthier, fairer and more sustainable.
In this case, the comparison between CWGs responses and those from LLs (Annex D10-Table 8) shows different priorities. Only 66% of respondents strongly agree or agree with the need for greater vertical collaboration to ensure consumers are educated/aware of the environmental and health impacts of food products (vs. 96% CWGs) and only half of the sample believe it is necessary to collaborate among all actors in the food supply chain for a joint transition to healthy and sustainable food environments with minimal additional costs (vs. 95% CWGs).

HORIZONTAL COLLABORATION

The number of respondents who agree or strongly agree to the items of this question ranged from 62% to 96% (Annex D10-Figure 8) highlighting a strong need for horizontal collaboration between industries, encompassing many general aspects, not just production patterns. The best topics were sharing good practices (96%) to shift to healthier, fairer and more sustainable food offer, and aligning in a joint transition to healthy and sustainable food environments (90%).
Also in this case the opinion of the LLs respondents (Annex D10-Table 9) is different from that of the CWG. Sharing best practices/lessons/feedbacks and aligning in a joint transition to create a healthy and sustainable transition obtained only 50% of positive responses ("strongly agree" and "agree"). The top two most important places (% of "strongly agree" and "agree") include the following answers: increasing the availability of healthy, sustainable and accessible food and sending a common message to consumers about the impact of food on health and the environment.

GOVERNMENT ACTIONS

The number of respondents who agree or strongly agree to the items of this question ranged from 62% to 90% (only one answer got the 19%) (Annex D10-Figure 9). Financial support or recognition from the government, when healthy and sustainable food practices are applied, was identified as fundamental by almost the entire sample (90%), together with the need to educate the consumer on the real price/cost of healthy, fair and sustainable food products (90%). On the other hand, 43% of respondents disagrees or strongly disagrees with increasing taxes for actors in the supply chain who do not respect sustainability standards.
The same scenario was observed for the LLs group (Annex D10-Table 10) where the government action to increase taxes of food value chain actors that do not respect best practices and do not considerably reduce their health, environmental and socio-economic impacts is not always needed (34% of "strongly agree" and "disagree" answers).

PLAN'EAT PROJECT EXPECTATIONS

For what concerns PLAN'EAT project expectations (Annex D10-Figure 10) four outcomes have obtained more than 90% agreement ("strongly agree" and "agree"): identifying trade-offs and best practices to reduce the impacts of food products (100%), setting up innovative tools for citizens (96%), co-designing solutions to improve food environment and foster behavioural changes (90%), setting up context-specific food policy recommendations to share at local, national, and European level (90%).
The LL food industries (Annex D10-Table 11) were in line with the data collected in the CWG.

3.1.3 FOOD SERVICES

Hungarian Hospitality Employers' Association (VIMOSZ) is committed as a leader of the project's Food Services Consultation and Working Group (CWG) and as a member of FoodServiceEurope.
The survey involved the participation of 23 European catering stakeholders (15 Hungarians and 8 other countries), of which 16 were represented by school canteens. The size and number of meals a day of the organisations was variable. The survey was compiled by different figures within the organisations (owner, regional manager, CEO, director, president, etc.).
The CWG food services' results were then compared to those obtained by the data collection from Spain, Poland, Hungary, Greece, France, Italy and Sweden LLs. The characteristics of the companies belonging to the LLs were also variable and in line with those coming from the CWGs. 9 out of 10 LL food services were school canteen ant the survey was compiled by different figures, from the head of department to the kitchen chef.
The questionnaire is available at Annex D3.

KNOWLEDGE AND BEST PRACTICES

The number of respondents who agree or strongly agree to the items of this question ranged from 74% to 100% (Annex D10-Figure 11). The need to understand how to guide the consumer to purchase healthier and more sustainable products was agreed by 92% of respondents. The same percentage also believes it is necessary to have more knowledge to identify what a healthy, fair and sustainable food product is.
From the point of view of LL food services (Annex D10-Table 13), several options obtained 100% of "agree" and "strongly agree" responses. In particular high percentage of "strongly agree" choices regarded identifying what is a healthy, fair and sustainable food product (78% of strongly agree vs. 35% for CWG) and understanding how to manage the increased costs associated with an enhanced offering (78% of strongly agree vs. for 57% CWG).

VERTICAL COLLABORATION

The number of respondents who agree or strongly agree to the items of this question ranged from 82% to 100% (Annex D10-Figure 12) showing how most respondents want to cooperate with other stakeholders in the food supply chain. The whole sample agreed with the need to join forces to undertake a transition to a healthier and more sustainable food environment with minimum additional costs (100%). 70% of the respondents strongly agree that more cooperation is needed at local/international level to ensure sustainable, traceable, certified and fair value chains.
In this case, the LLs food services (Annex D10-Table 14) all agreed on the need to have more vertical collaboration to change the origin and composition of our current food products to make them healthier, fairer and more sustainable (vs. 91% of the CWG).

HORIZONTAL COLLABORATION

The number of respondents who agree or strongly agree to the items of this question ranged from 82% to 96% (Annex D10-Figure 13) highlighting the necessity to have more horizontal collaboration to share good practices (96%), to join forces to influence policy makers (96%) and to increase the availability of healthy, sustainable and accessible food products (95%). The respondents were less interested in encouraging adherence to farmers' services and in a collective shift to a healthy and sustainable food environment (8% of "disagree" and "strongly disagree").

Comparing the LLs-CWG data, there are common ideas for the horizontal collaboration, where LLs expressed a higher need to send a common message to consumers regarding the impact of food on health and the environment (Annex D10-Table 15) (100% of "strongly agree" and “agree” vs. 91% for CWG).

GOVERNMENT ACTIONS

The number of respondents who agree or strongly agree to the items of this question ranged from 65% to 100% (Annex D10-Figure 14). Two responses received 100% of positive feedback, with 87% of participants that strongly agreed that the government should pay more attention to educate consumers from kindergarten to university about food and its environmental and health impacts, and 83% to get financial support for the costs of switching to a healthier and more sustainable food supply. Agreement is also found in all answers regarding the need to educate consumers about the real cost of a healthy, fair and sustainable meal. 21% of respondents disagree and strongly disagree with the idea of raising taxes on food value chain actors who do not reduce their environmental and socio-economic impacts.
The LL food services (Annex D10-Table 16) agree with the CWG for consumers education school program (100%), while consider more important the government intervention to overcome the obstacles linked to public procurement (100% of "strongly agree" and “agree” vs. 79% CWGs). LLs and the CWG also have the same opinion on the response on the tax increase that also sees LLs partly disagree (11%) or neutral (33%).

PLAN’EAT PROJECT EXPECTATIONS

Project expectations scored between 43% and 100% of "agree" and "strongly agree" by food services respondents (Annex D10-Figure 15). The three outcomes most selected were: identifying and sharing trade off with the use of True Cost Accounting (TCA) to reduce the health, environmental and socio-economic impact of food products (100%), supporting the creation of dietary advice to help consumers make healthier and more sustainable food choices (100%) and identifying micro-level factors influencing dietary behaviour (96%, with 39% of “strongly agree”).
Differently to CWGs' responses, the use of TCA was the answer with the lowest positive score in LLs sample (55% of "strongly agree" and “agree”). However, the LLs are more interested in understanding the factors influencing the micro and meso level across Europe and providing local authorities with targeted consumer interventions to encourage behavioural change in different target populations (89% of "strongly agree" and “agree”) (Annex D10-Table 17).

3.1.4 RESTAURANTS

Foundation for Environmental Education (FEE) is committed as a leader of Restaurant Consultation and Working Group (CWG). The survey involved the participation of 25 European restaurants from 10 countries (all PLAN’EAT countries except for Sweden). The group was divided into medium-sized companies (less than 250 employees) and small businesses (less than 50 employees) both for 44%.
The survey has predominantly been filled by restaurant managers and owners, some of whom also served as chef. Among the participating restaurants, the majority identified as bistros (13) and/or cafes (8), while a few offered buffet services (6), and some establishments categorised as gourmet (7), or speciality restaurants (5), and fast food (2) restaurants.
The CWG restaurant results were then compared to those obtained by the data collection from all the LLs except for Germany and Ireland. The sample was made of 3 microenterprises and 3 medium companies. 6 out of 7 respondents were owners or managers of the restaurants (or similar places) while only one was the chef. The type of restaurant varied from café to fast food.
The questionnaire is available at Annex D4.

KNOWLEDGE AND BEST PRACTICES

The number of respondents who agree or strongly agree to the items of this question ranged from 76% to 80% (Annex D10-Figure 16) indicating a high need to gain more knowledge in particular regarding cost management and ideas on how to build a healthier, fairer and more sustainable menu, both with 80% of positive feedbacks.
The LL restaurants (Annex D10-Table 19) shared the same ideas than those reported by the CWGs, even though the tendency is moved towards an agreement rather than a strong agreement. The exception

concerns the declared necessity to have more knowledge on how to guide consumers to purchase healthier, fairer and more sustainable offer (100% of answers, agree and strongly agree; respect to 76% of CWG).

VERTICAL COLLABORATION

The number of respondents who agree or strongly agree to the items of this question ranged from 84% to 96% (Annex D10-Figure 17) indicating the willingness of restaurants to collaborate with other actors of the food supply chain. Increasing the availability of healthy, sustainable and accessible meals, along with promoting local/national sustainable, fair, certified short value chains, scored the highest (96%).
Even in this case, the LL restaurant point of view (Annex D10-Table 20) is very close to that of the CWG group. The exception regards the collaboration for healthy and sustainable food environments (57% in LLs respect to 93% in the CWG). Instead, much agreement (100%) was reported for the collaboration to ensure that consumers are conscious of the environmental and health impacts of food products/meals (respect to 88% of CWG).

HORIZONTAL COLLABORATION

The number of respondents who agree or strongly agree to the items of this question ranged from 76% to 92% (Annex D10-Figure 18) highlighting interest in horizontal collaboration especially to share good practices (92%) and influence policy makers (92%).
Comparing the LL results (Annex D10-Table 21), the two groups seem to share the same ideas. However, more need was stated by the LLs regarding the collaboration to send a message to consumers on the environmental and health impacts of food products and meals (100% agreed in the LLs respect to 76% of CWG).

GOVERNMENT ACTIONS

The number of respondents who agree or strongly agree to the items of this question ranged from 88% to 92% (Annex D10-Figure 19). This suggest that they need more government actions to support the transition towards healthier and sustainable diets, in particular trough subsidies to support restaurant actions (92%, of which 76% of strongly agree answers) and consumer education about the real cost and the environmental and health impacts of healthy, sustainable and fair meal (72% and 76% of strongly agree answers, respectively).
For the government intervention, the situation is quite different in the two groups surveyed. In particular, the LL restaurants (Annex D10-Table 22) need government actions to recognise efforts when they apply sustainable activities (100% in agreement vs 88% of CWG), to apply taxes for those that do not reduce the health, socio-economic and environmental implications of their business (100% in agreement vs 88% of CWG) and to make consumers aware on the real healthy, sustainable and fair cost of a meal (100% in agreement vs 88% of CWG). On the contrary, the LL restaurants require less government interventions to make food chain actors compliant with healthier, environmental and socio-economic standards (71% in agreement vs 88% of CWG) and to educate consumers on health and environmental impacts of meals (57% in agreement vs 88% of CWG).

PLAN'EAT PROJECT EXPECTATIONS

Project expectations scored between 64% and 88% of "agree" and "strongly agree" by respondents (Annex D10-Figure). The three outcomes most selected were: identifying trade-offs and best practices to reduce the impacts of food products (88%) and identifying macro and meso-level factors influencing dietary behaviour (both 84%).
The most preferred ("agree" or "strongly agree") LL restaurant expectations from PLAN'EAT project consist (Annex D10-Table 23) of identifying macro-level factors influencing dietary behaviour (100%), followed by identifying micro-level factors (88%), set up specific tool for the citizens to guide them towards better food behaviour (88%) and co-creating solutions to improve food environments (88%).

3.1.5 RETAILERS

Council for Agricultural Research and Economics – Research Centre for Food and Nutrition (CREA) is committed as a leader of the Retailer Consultation and Working Group (CWG). At this stage, since the

recruitment process of retailers is still on-going (due to the strong barriers encountered in finding/convincing/involving retailers in participating to the project), and since only one member is currently included in the retailer's network, the CWG SPG2 answers were summed up to those obtained by LLs retailer groups.
This was done for two reasons: 1) if not, there would have not been the overview of retailer situation; 2) since all the respondents are representative of large/SMEs, it made sense to analyse the results altogether.
The 8 retailers come from all PLAN'EAT countries except for Germany, Greece and Ireland. For Italy, the retailers are represented by the CWG, while there is not a member of the Italian LL network. Five retailers belong to large companies and three of them to SMEs. Three retailers belong to the category of centralised markets, two are decentralised markets and the last two are small enterprises (one missing answer). Different professionals answered the survey: from sustainability responsible, to processor and seller and owner/store manager.
The questionnaire is available at Annex D5.

KNOWLEDGE AND BEST PRACTICES

For what concerns the necessity to gain more knowledge, the situation is varied in relation to the different questions. The proportion of respondents that agrees whit the statements ranged from 29% to 72% (Annex D10-Figure 21). More than half of the sample need more knowledge to change their assortment towards healthier and more sustainable offer (63%), to guide consumers to improved offer (75%) and to find the right communication strategy to encourage consumers to healthy and sustainable products (72%). Referring to these two last statements, however there is a small proportion (13%) which does not express this type of need (disagree). In addition, around one third of the sample is informed regarding the ability to identify what is a healthy, fair and sustainable product (25% of disagreement).

VERTICAL COLLABORATION

For the collaboration among the food chain actors that belong to different levels, for most of the statements, it was expressed the need to reinforce/adopt vertical cooperation. The preponderance of people who agree or strongly agree ranged from 57% to 88% (Annex D10-Figure 22). The majority of answers implies the need of a strong collaboration (around 80%). Only the idea to join forces to reduce the costs for a healthy and sustainable food environment did not show the highest level of agreement, in particular 25% of respondents selected 'NA'.

HORIZONTAL COLLABORATION

For the collaboration among the food chain actors that belong to the same level, the number of respondents who agree or strongly agree ranged from 71% to 100% (Annex D10-Figure 23). It should be noted that the strongest agreement can be found in the retailer's intention to ask policymakers to address regulatory barriers to the transition (100%), followed by the increase the availability of healthy, sustainable and accessible food products (88%), as to direct the consumers towards these choices (88%).

GOVERNMENT ACTIONS

The percentage of respondents who agree or strongly agree with the necessity to have more government action ranged from 57% to 88% (Annex D10-Figure 24). The strongest support asked is to educate consumers on health and environmental impacts of food products/meals (100%), to receive financial support to find a balance and to offset the cost for the transition (88%) to consumers regarding the cost/price of healthy and sustainable products (88%) and to overcome barriers linked to public procurement (88%).

PLAN'EAT PROJECT EXPECTATIONS

Project expectations scored between 25% and 76% of "agree" and "strongly agree" by respondents (Annex D10-Figure 25) The three outcomes most selected were: identifying trade-offs and best practices to reduce the health, environmental and socio-economic impact of food products (76%), identifying macro-level factors influencing dietary behaviour (76%) and setting up consumer's intervention for local authorities to influence behavioural changes for different target groups.

3.2 Healthcare professionals

This section has the aim to give the overview of what the actual requirements and needs of healthcare professionals are. The questionnaire was divided in two sections: one for those who offer catering services, and one for those who do not have this kind of service. For this reason, the results will be reported separately for each type of actors surveyed.

The survey involved the participation of 18 healthcare professionals from France, Germany, Greece, Italy, Poland, Sweden and Spain, and were divided into who offers (9/18) and who does not offer catering services (9/18). Organisations were recruited through EPHA's network and through the LLs. For what concerns who offers catering, the sample is made of public hospitals (5/9), followed by private hospitals (2/9) and one catering company. The survey was filled by physicians (6) and nutritionists (3). Instead, for what concerns who does not offer catering, the type of organisation was varied, from public hospitals to academia and private practices. In this case, the majority of respondents were nutritionists (5/9), followed by physicians (2/9) and one researcher.

The questionnaire is available at Annex D6.

KNOWLEDGE AND BEST PRACTICES

Offering catering

Participants identified all those activities aimed to increase awareness or educate patients on specific topics (programmes to prevent new diseases, strategies and educational activities to choose more sustainable and heathier choices), together with the need to have more knowledge to set up menus with healthier, tastier and more sustainable products as those activities where more knowledge and education is needed (100% of agreement) (Annex D10-Figure 26).

Not offering catering

In this case, knowledge to lead the transition towards healthier and more sustainable behavior seems to be necessary for all the statements, from the educational/awareness programmes, to communication and implementation strategies (Annex D10-Figure 27).

VERTICAL COLLABORATION

Offering catering

Those who offer catering were asked to declare their opinion regarding vertical collaboration. 70% of respondents are committed to collaborating to provide healthier, tastier and more sustainable meals together with ensuring that patients choose these products (Annex D10-Figure 28).

HORIZONTAL COLLABORATION

Offering catering

The highest collaboration was requested to ask for policymaker interventions to address regulatory barriers to the transition (100%). However, even though 70% of respondents agreed, only 20% of them declared to strongly agree on sharing good practices and experiences to change dietary behaviours (Annex D10-Figure 29).

Not offering catering

Also in this case, the commitment to ask for policy intervention is requested by all the respondents. Nevertheless, it is to notice that there is more need to collaborate to share good practices and experience regarding the shift (100% vs 80% for who offers catering) (Annex D10-Figure 30).

GOVERNMENT ACTIONS

Offering catering

Healthcare professionals need to be supported financially (100% agree or strongly agree) by the governments to provide healthier, tastier and more sustainable offers, to implement behavioural change interventions and set up awareness campaigns (90% agreed) as well as to create food environments where healthier and more sustainable food offers are easily accessible (90% agree or strongly agree) (Annex D10-Figure 31).

Not offering catering

In this case, all the healthcare professionals declared that it is necessary to create food environments that provide healthy and sustainable choice easily accessible and affordable (100%) (data not shown).

PLAN'EAT PROJECT EXPECTATIONS

For what concerns PLAN'EAT outcomes, the four highest expectations (100% agree or strongly agree) were: the identification of macro and meso-level factors influencing dietary behaviour in Europe, the development of communication strategy for food acceptability and health policy interventions and the creation of tools for citizens that can improve their dietary behaviour (Annex D10-Figure 32).

3.3 Educational systems

The survey for the educational systems involved the participation of 25 educational institutions from Poland, Spain, France, Sweden, Italy, Ireland, Hungary, and Greece. Institutions were recruited through the FEE's network and through the LLs. The respondents are represented by 8 universities, 7 kindergartens, 6 primary schools, 5 secondary schools and 2 vocational education institutions. 52% of the institutions have more than 500 students. The survey was predominantly filled by teachers (17) and principals (7), and some have answered it together (3). We also have one Senior Education Advisor, School Counsellor and Green Campus coordinator responding to the survey.
The questionnaire is available at Annex D7.

KNOWLEDGE AND BEST PRACTICES

The number of educational institutions who agree or strongly agree to the items of this question ranged from 84% to 100% (Annex D10-Figure 33), indicating a strong need to gain more knowledge and best practices to collaborate with local food value chain actors, and educate students about the impacts of food on health and environment, its true costs, and how to make informed choices (all these statements represent 100% of agreement). Additionally, there is a need to enhance food offer in both canteens and vending machines (100%) accompanied by effective communication strategies to support students in making healthier and more sustainable food choices (96%)

VERTICAL COLLABORATION

The number of respondents who agree or strongly agree to these questions ranged from 88% to 96% (Annex D10-Figure 34). Therefore, it indicates a high need to collaborate with food supply chain actors to provide and guide students to choose healthier and more sustainable meals in canteens (96%) and to raise awareness about food waste (92%).

HORIZONTAL COLLABORATION

The range of educational institutions who agree or strongly agree on the four items in this question ranged from 88% to 100% (Annex D10-Figure 35). These results show a significant level of interest among educational systems to collaborate by sharing good practices and student feedback (100%), to develop a common strategy to increase the availability of healthy and sustainable food (96%) and to implement a common communication to nudge students' food choices (100%).

GOVERNMENT ACTIONS

The range of educational institutions who agree or strongly agree on the four items in this question ranged from 76% to 96% (Annex D10-Figure 36). This indicates the need for increased government actions to facilitate the transition towards healthier and sustainable diets. These actions encompass a range of measures including the development of an educational framework with a relevant curriculum (96%), financial support for project-based learning (96%), recognition to universities/schools for their efforts (96%), regulation concerning the consumption of animal-based products (96%).

PLAN'EAT PROJECT EXPECTATIONS

The number of educational institutions who agree or strongly agree to the items of this question ranged from 80% to 96% (Annex D10-Figure 37). The outcome that received the most interest was the creation of dietary advice for students to help them adopting healthier and more sustainable diets.

3.4 Policymakers

This section has the aim to give the overview of what are the actual requirements and needs of policymakers, gathered from EPHA's networks. The questionnaire was structured as those for the other types of actors, except for the scale of answers. In this case, the respondents were asked to rank their preferences, from the most preferred to the less preferred.
The questionnaire was answered by a total of 12 respondents. The majority of respondents were policymakers at the European Union level (8/12), while there were 1 national and 2 supranational respondents. Regarding the roles of the respondents, there were experts, administrator and managers.
The questionnaire is available at Annex D8.

KNOWLEDGE AND BEST PRACTICES

The respondents need more knowledge on identifying what a healthy, fair and sustainable food product looks like (42%), followed by understanding how to manage increased costs for a healthier, fairer and more sustainable food offer (25%) (Annex D10-Figure 38).

FOOD CHAIN ACTOR COLLABORATION

The involvement of food chain actors, meaning primary producers, industries, retailers, food services and restaurants, was mainly requested to increase the availability of healthy, sustainable and accessible food products (33%) and to engage in a common transition to healthy and sustainable food environments (25%) (Annex D10-Figure 39).

HORIZONTAL COLLABORATION

The collaboration between policymakers was requested more on addressing regulatory barriers to the transition towards healthier and more sustainable diets (25%) and on increasing the availability of healthy, sustainable and accessible food products (25%) (Annex D10-Figure 40).

INTENTIONS OF POLICYMAKERS AS GOVERNMENTAL ACTORS

As policymakers, respondents need more to agree on EU labels for foods regarding the health, environmental and socio-economic impacts (25%) and to overcome public procurement barriers (25%) (Annex D10-Figure 41).

PLAN'EAT PROJECT EXPECTATIONS

The highest expectation regarding PLAN'EAT outcomes concerns the identification of trade-offs and best practices to reduce health, environmental and socio-economic impacts of food systems through True Cost Accounting (67%) (Annex D10-Figure 42).

3.5 Citizens

This section provides a comprehensive overview of the main results and findings of the questionnaire administered to a sample of 478 European citizens from all countries involved in PLAN'EAT.
The questionnaire was disseminated on the PLAN'EAT official pages (Instagram, LinkedIn and Twitter) and by the project partners through personal and social channels. Being a convenience sampling, the final group of respondents is not equally distributed in all countries with a higher % of respondents from Italy, France and Greece.
The questionnaire is available at Annex D9.

CHARACTERISTICS OF THE SAMPLE

Figures 1 and 2 show the socio-demographic characteristics of the 478 respondents. Being a convenience sampling, the sample is composed mainly of women (66.3%) and people aged between 18 and 35 years (61.4%), with a low percentage of people over 55 (9.8%).

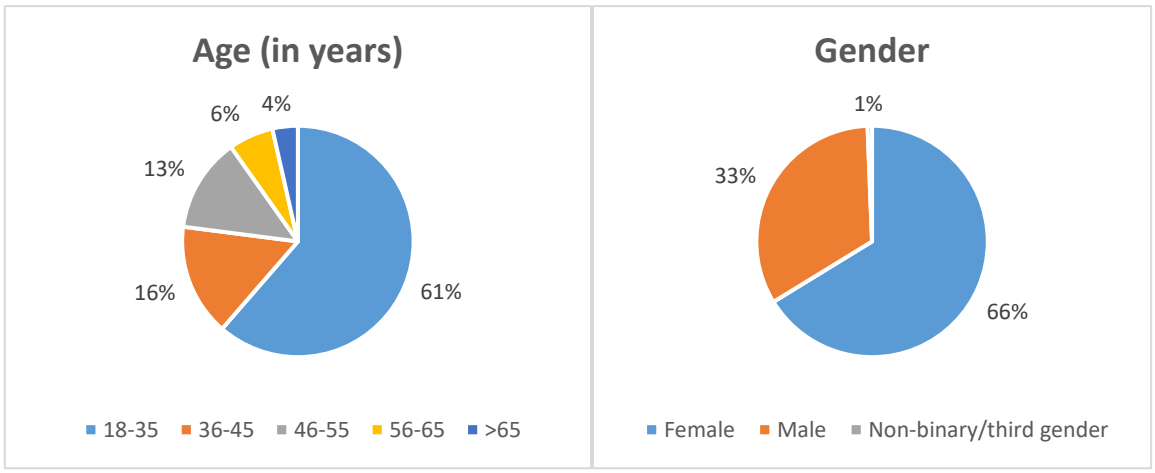

Figure 1 and 2. Age and gender of the sample.

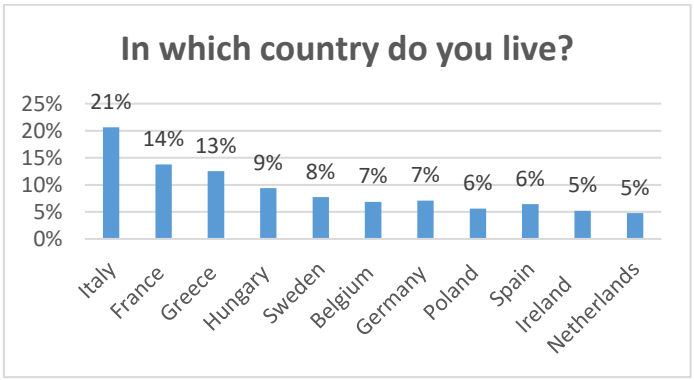

Figure 3. Sample distribution among PLAN'EAT countries.

KNOWLEDGE AND BEST PRACTICES

Consumers surveyed have declared that they needed more knowledge and best practices to change their eating behaviour to adopt or maintain a healthy and sustainable diet in the long term (20%), cook healthier, tastier and more sustainable meals (18%) and understand what factors influence their eating behaviour (17%). The results also show that there are more consumers who need to understand what a sustainable diet is than those who need more knowledge about what a healthy diet is (12% *vs.* 7%) (Figure 4).

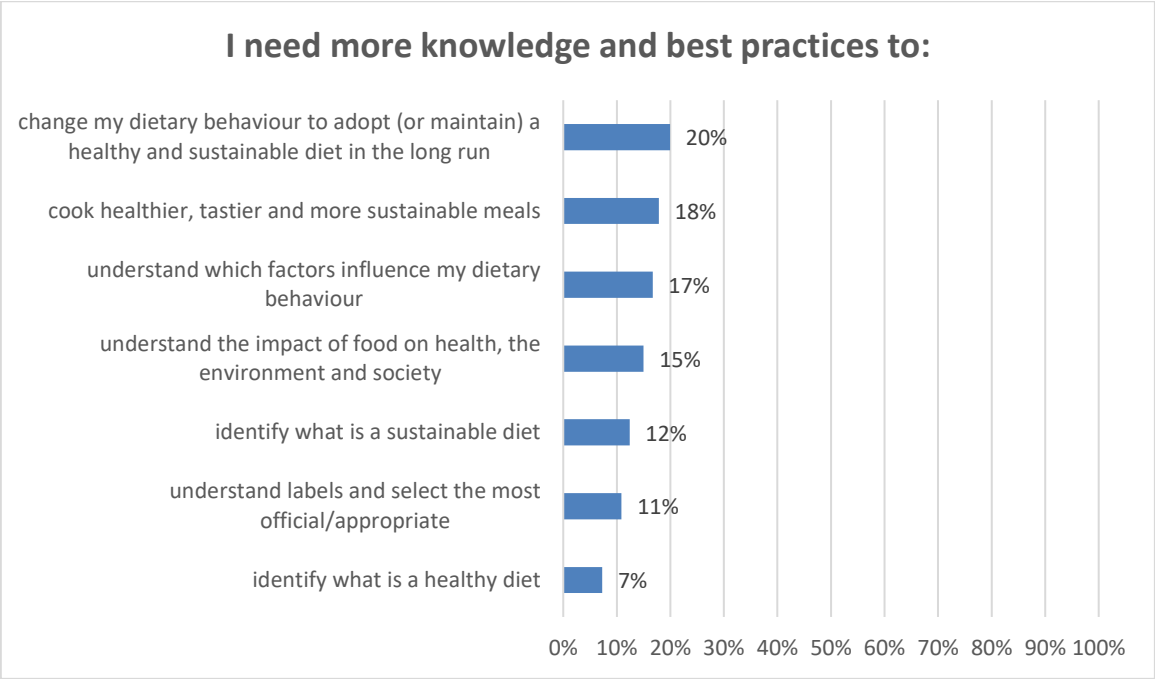

Figure 4. What citizens need in terms of knowledge and best practices (max 3 responses).

TIME, BUDGET or MOTIVATION/WILLINGNESS

As shown in Figure 5, the sample clearly highlighted the reasons that most prevent it from having healthier and more sustainable behaviours. More than 65% of respondents recognised a lack of motivation and willingness the obstacle to change their eating habits (66%) and to reduce unhealthy and unsustainable food products (73%). The lack of time was recognised by 62% of the sample as the main cause that does not allow to cook healthy, sustainable and tasty meals, while the need for more budget was highlighted as necessary to buy healthier and more sustainable products (55%) (Figure 5).

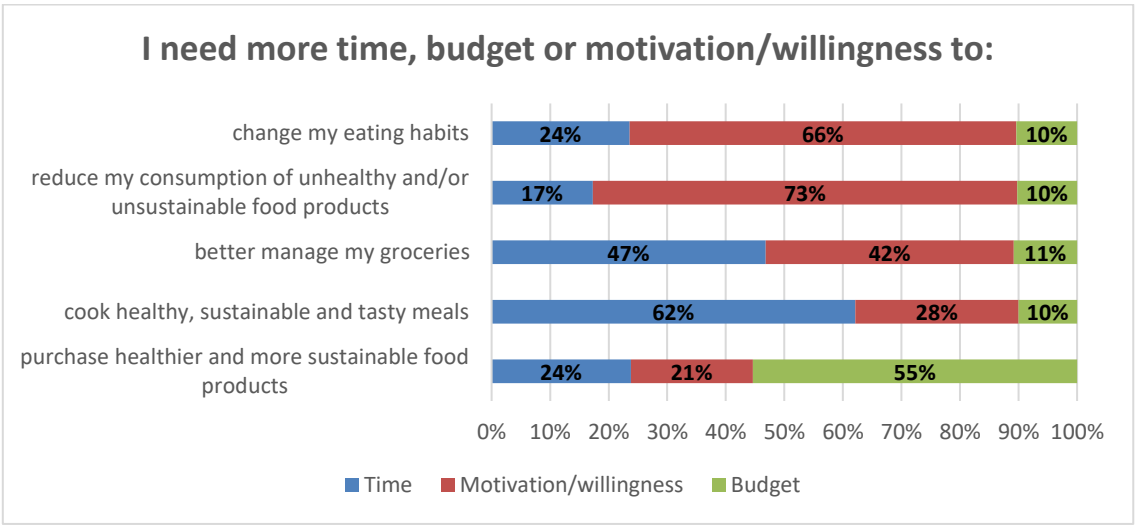

Figure 5. What citizens need in terms of time, budget, motivation and willingness (max 3 responses).

NEEDS FROM FOOD PROVIDERS (FARMERS, FOOD INDUSTRIES, RETAILERS, FOOD SERVICES and RESTAURANTS)

Around 20% of respondents agree on the need for food value chain actors to work with the aim of reducing the negative environmental impact of the food system (21%) and increase the accessibility and availability of healthy, sustainable and tasty food products (20%) (Figure 6). The idea that food providers should reduce the amount of food advertising is less common (11%).

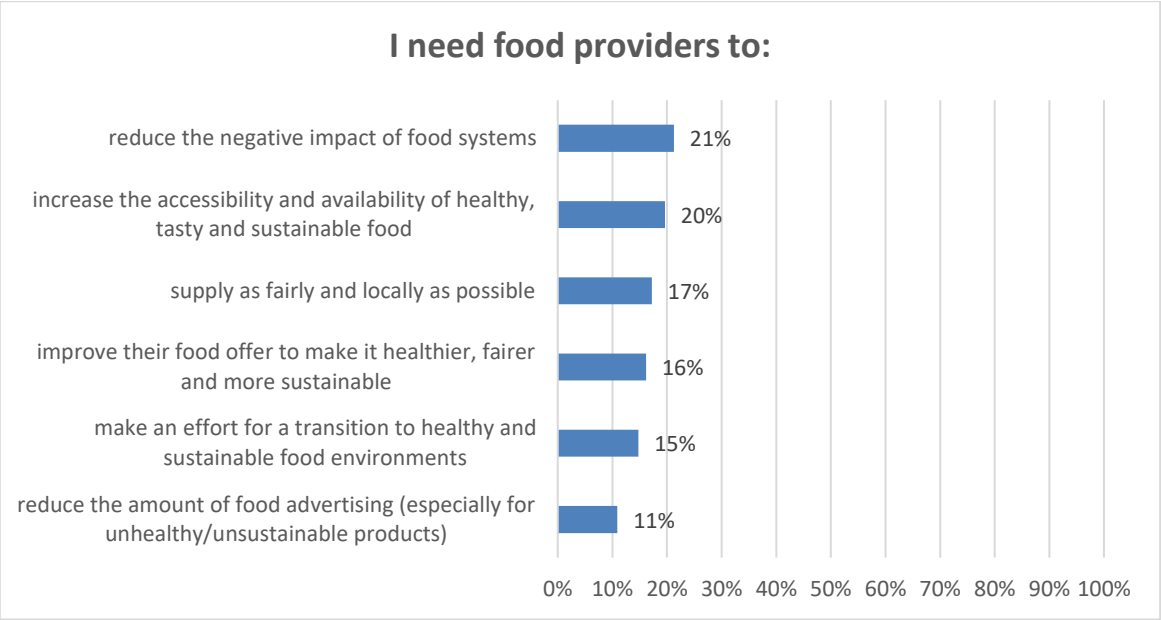

Figure 6. What citizens need form food providers (max 3 responses).

LOCAL/NATIONAL GOVERNMENT ACTION

As shown in Figure 7, it is clear that in order to change their eating behaviours, the respondents believe that government should decrease taxes on healthier and more sustainable food products (27%), followed by ensure accessibility to these types of products (20%).

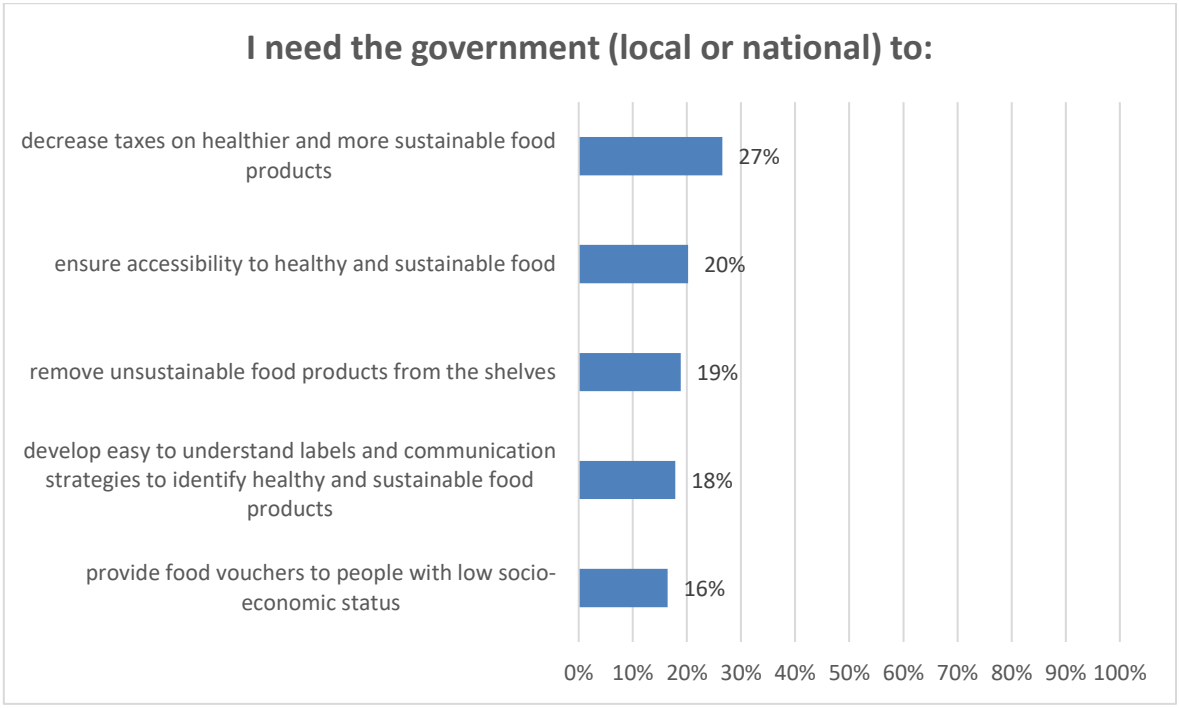

Figure 7. What citizens need from policy actors (max 3 responses).

PLAN'EAT PROJECT EXPECTATIONS

Providing communication and education tools to make more informed food choices and improve citizen eating habits is the most interesting outcome of the PLAN'EAT project declared by the respondents (24%), followed by providing easy-to understand national food based dietary guidelines (21%) (Figure 8).

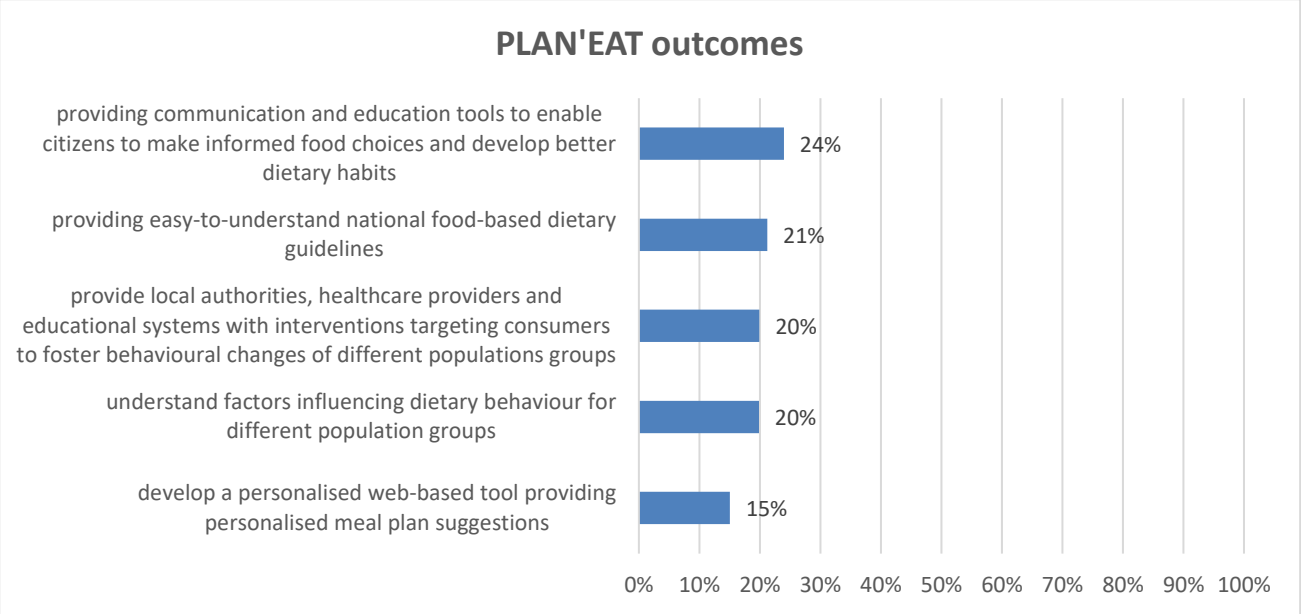

Figure 8. Citizens' expectations from PLAN'EAT project.

3.6 Discussion and future actions

The SPG2 can be considered an explorative survey that had the aim to collect data concerning opinions, best practices and ideas from all the food value chain actors together with all the stakeholders that are involved in the food system, including the citizens.
The results can be used as a tool to establish the PLAN'EAT future actions in terms of which strategy and direction should be applied for all actors involved in the project.
The SPG2 surveys applied together the administration process allowed to identify the main critical aspects on which base the next surveys during the PLAN'EAT project.

MAIN RESULTS

- **Primary producers** need more vertical collaboration within the food supply chain from farm to fork to ensure the awareness of consumers of the true price of healthy food products and they also stress the need for a fair renumeration (living wages) for farmers as a part of true pricing. They also need more support from the government, both financially and for the consumers' education.
- **Food industries** identified vertical and horizontal collaboration as extremely important to boost the transition, but also the government support is relevant to accelerate this process. In addition, innovation and research are again crucial to effectively identify and share best practices.
- **Food services** are quite agreed on what are their needs to implement a transition to a healthier and more sustainable food system. Consumer education is one of the main elements in all sections, along with the necessity for financial support and collaboration (horizontal and vertical) to achieve this transition. Instead, there is less agreement about ensuring adequate remuneration to the primary sector and about increasing taxes for actors in the food value chain that do not reduce their environmental and socio-economic impacts.
- **Restaurants** collectively recognise the importance of acquiring additional knowledge, especially on managing the extra costs of a transition towards a healthier and more sustainable diet and how on creating healthy and sustainable menus. They want to actively promote strong horizontal and vertical collaboration as well as encouraging government actions to achieve a food transition towards more healthy and sustainable diets. Especially on government action, they believe that direct intervention is necessary to educate consumers on the impact on health and the environment of food products and the real cost of healthy and sustainable food.
- **Retailers** need vertical and horizontal collaboration, as well as the government intervention. Regarding the knowledge, however, some of respondents seem to be more conscious, while others did not express clear idea (many 'neither agree nor disagree' answers).

- **Educational systems** recognise the importance of acquiring additional knowledge and best practices, fostering strong collaboration with food suppliers and between educational institutions from all levels and encouraging government actions to achieve a food transition towards more healthy and sustainable diets.
- **Healthcare professionals need** more knowledge and education for patients. They need to be supported financially by the governments to provide healthier, tastier and more sustainable offers and they want more vertical collaborations with policy makers.
- **Policy makers** need more horizontal and vertical collaborations to increase the availability of healthy, sustainable and accessible food products and to collaborate in a joint transition. From the PLAN'EAT project their expectations regard the identification of trade-offs and best practices to reduce health, environmental and socio-economic impacts of food systems through the True Cost Accounting.
- **Citizens** need more knowledge on how to make a healthier and more sustainable change in their eating habits. The economic factor has also emerged, recognised as the most important obstacle that prevents the purchase of healthier and more sustainable food products. For this reason, citizens require an active intervention of the government (local or national) to reduce the taxation of these products to make them more economical accessible to all. Increased accessibility and availability of these food products is also required to food value chain actors, along with the need that the food providers reduce the negative environmental impact of the global food system. The most important outcome of the project identified is the creation of communication and education tools that allow them to make more informed food choices.

LIMITATIONS

→ few answers for most of the actors surveyed (except for the citizen questionnaire), especially those that come from the LLs. For in-depth studies, a bigger sample is surely necessary.

→ the pro-bono answering could mean less effort in answering the questionnaire, that can bring to less information obtained or being less specific/precise;

→ the survey structure should be simplified, with less effort during answering, in order to make the respondent more focused.

These limitations could be achieved discussing limits and the advantages of the approach used in the first round (questionnaire) and evaluate other possible approach (i.e qualitative approach based on face-to-face interviews or workshops).

Regarding the next steps connected to the CWGs-LLs involvement some considerations needed are reported below:

→ Implementing the connection between CWGs and LLs, in order to have a more collaborative approach between food chain actors at different levels;

→ Assessing barriers and enablers for each individual stakeholder in shaping a better identification of the food environment to provide a healthy and sustainable food supply.

4. Conclusions and next steps

The present document represents the summary of some of the activities of the PLAN'EAT project. The findings collected in this deliverable can be considered both as the starting point to set up specific strategies and to present the current overview in PLAN'EAT countries. The huge data collection and the further analysis allowed to establish which directions should be taken for the future project activities, highlighting the fact that some countries have developed more strategies than others. However, a comprehensive approach is still missing even in these countries that have already put in place more actions. For this reason, the PLAN'EAT project will be the opportunity to take some scenarios/situations as the example and to fill gaps in those sectors where interventions are needed.

AUTHOR CONTRIBUTION

Vittoria Aureli, Federica Grant, Laura Rossi (CREA): conceptualisation, writing, reviewing, editing, design; writing the section the entire document except for 'Dietary behavior section', 'Policy framework section', 'European status quo and context'; **Tina Joanes (JLU):** writing 'Dietary behavior section', reviewing; **Anke Brons (WU):** writing the 'Policy framework section', reviewing; **Juliette Soudon (EQY):** writing the section ' European status quo and context', reviewing.

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Dietary behavior

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Annex

All the annexes are attached below.

Annex A
Behaviour change strategies to change dietary-related behaviours
An overview of evidence for nine European target groups

TABLE A1. YOUNG CHILDREN (<6 YEARS)

Strategy	Sub-type	Domain	Results	Strategy examples	Source[1]	Notes
Interventions targeting individual processes						
Providing information	Providing visual, emotional etc. information	V	4 reviews incl. RCTs & non-RCTs (4 positive, N=181 studies incl. n=66 unique)	cognitive knowledge transfer, e.g., veggie picture books	in Bell et al. (2021): Appleton et al. (2016), Barends et al. (2019), Paroche et al. (2017), Hodder et al. (2018)	small effects and only applied to veggies exposed to and for unfamiliar veggies
	Education – curriculum	F&V	3 reviews incl. 4 RCTs + 8 NRCTs (F: 2 positive & 2 n.s., V: 3 positive & 2 n.s., FV: 1 positive & 3 n.s.)	school lessons such as taste lessons	in Verdonschot et al. (2022): Govula et al. (2007), Panunzio et al. (2007), Perry et al. (1985), Domel et al. (1993), Auld et al. (1999), Bell & Lamb (1973), Smolak et al. (1998), Spiegel et al. (2006), Friel et al. (1999), Head (1974), Shannon & Chen (1988)	Verdonschot et al. included also reviews measuring nutrition knowledge, but main focus on FV intake
	Education – experiential learning	F&V	2 reviews incl. 3 RCTs (F: 1 positive, V: 2 positive)	practice-based education such as gardening or cooking	in Verdonschot et al. (2022): McAleese & Rankin (2007), Parmer et al. (2009)	
Skills training	Flavour learning	V	4 reviews RCTs & controlled design (1 positive, 2 no effect or unable to separate from other strategies, 1 negative; N=286 studies whereof n=63 unique)	pairing veggies with nutrients oil/fat, i.e., flavour-nutrient learning	in Bell et al. (2021): Nekitsing et al. (2015), Paroche et al. (2017), Hodder et al. (2018), Appleton et al. (2018)	4 reviews on liking only

[1] Umbrella review and supporting systematic reviews

Strategy	Sub-type	Domain	Results	Strategy examples	Source[1]	Notes
	Flavour learning	V	7 reviews RCTs or controlled design (2 positive, 2 no effect or unable to separate from other strategies, N=272 studies incl n=61 unique)	pairing veggies with nutrients salt and spice, i.e., flavour-flavour learning	in Bell et al. (2021): Appleton et al. (2016), Nekitsing et al. (2015), Paroche et al. (2017), Hodder et al. (2018)	3 reviews on liking only
Incentivisation (rewards)	Rewards & incentives	F&V	1 review incl. 1 RCT + 1 NRCT (FV: 1 positive, V: insufficient data)	stickers, praise encouragement for tasting/eating FV	in Verdonschot et al. (2022): Horne et al. (2004), Cooke et al. (2011)	
	Rewards & incentives	V	5 reviews incl. RCTs & non-RCTs (4 positive, 1 unable to separate from other strategies, N=135 studies incl. N=11 unique)	provision of non-food rewards	in Bell et al. (2021): Appleton et al. (2018), Holley et al. (2017), Nekitsing et al. (2018), Touyz et al. (2018), Hodder et al. (2018)	
Digital/e-health interventions	Gaming/ Computer delivered	F&V	4 reviews incl. 8 RCTs (V: 3 studies positive, F: 1 positive & 1 negative, FV: 2 positive & 1 n.s.	Squire's Quest – internet-administered activities providing healthy eating information in an entertaining way	in Verdonschot et al. (2022): Baranowski et al. (2003), Mangunkusumo et al. (2007), Amaro et al. (2006), Raby Powers et al. (2005)	
Interventions working with the social context/environment						
Social messages	Social encouragement or support	V	6 reviews incl. RCTs & non-RCTs (5 positive, N=199 studies incl. N=26 unique)	parental 2modelling + 1 study on peer m2odelling via video	in Bell et al. (2021): Appleton et al. (2018), Barends et al. (2019), Holley et al. (2017), Nekitsing et al. (2018), Paroche et al. (2017)	
Modelling	Caregiver involvement	F&V	1 review incl. 1 RCT (FV: 1 positive)	caregiver involvement: active, i.e., participating in intervention or inactive, i.e., receiving information	in Verdonschot et al. (2022): Crespo et al. (2012)	
Interventions working with the material environment						
Nudges	Choice architecture	F&V	1 review incl. 4 RCTs (FV: 1 positive, F: 1 positive & 2 n.s.)	attractive bowls, signage & images promoting FV, placement of FV in canteens, prompts	in Verdonschot et al. (2022): Adams et al. (2005), Cohen et al. (2015), Greene et al. (2017), Schwartz (2007)	
	Choice architecture	V	3 reviews incl. ? (1 positive but not robust, 2 not separable from other strategies, N=126 studies incl. n=42 unique)	serving veggies first (prior to other food stuff)	in Bell et al. (2021): Appleton et al. (2016), Holley et al. (2017), Nekitsing et al. (2018)	
Affordability	Providing healthy/sustainable alternative for free	F&V	4 reviews incl. 10 RCTs + 5 NRCTs (F: 5 studies positive, V: 2 studies positive & 1 negative, VF: 2 positive, 3 n.s.	school setting: free or subsidized FV distribution, food provision at lunchtime	in Verdonschot et al. (2022): Moore et al (2008), Bere et al. (2010), Fogarty et al. (2007), Eriksen et al. (2003), Ashfield-Watt et al. (2009),	

Strategy	Sub-type	Domain	Results	Strategy examples	Source[1]	Notes
					Tak et al. (2007), He et al. (2009), Bere et al. (2005)	
Availability	Product	V	15 reviews incl. RCTs & NRCTS consisting of 9 reviews = 1 vegetable (N=233 studies incl. n=29 unique) & 6 reviews = variety of veggies (N=229 studies incl. N=60 unique)	? Exposure to vegetables to children up to 6 yrs	in Bell et al. (2021): Appleton et al. (2018), Appleton et al. (2016), Barends et al. (2019), Holley et al. (2017), Nehring et al. (2015), Paroche et al. (2017), Spill et al. (2019), Touyz et al. (2018), Hodder et al., 2018)	
	Product	V	2 reviews incl. RCTs & observational (2 positive, N=117 with n=65 unique)	commencing complementary feeding with veggies	in Bell et al. (2021): Barends et al. (2019), Paroche et al. (2017)	
	Related objects	V	2 reviews incl. interventions & observational (1 positive, N=66 with n=21 unique)	maternal vegetable consumption while breastfeeding on child intake	in Bell et al. (2021): Spahn et al. (2019)	1 review on liking only
Presentation	Product	V	3 reviews incl. RCTs, pre-post (1 positive, 2 no effect, N=126 studies incl. N=49 unique)	improving presentation of vegetables (whatever that means?)	in Bell et al. (2021): Appleton et al. (2016), Holley et al. (2017), Nekitsing et al. (2018)	
	Product	V	2 reviews incl. RCTs & non-RCTs (1 positive, 1 no effect, N=33 incl. N=3 unique)	altering texture of veggies	in Bell et al. (2021): Paroche et al. (2017), Spill et al. (2019)	
Combined strategies						
Availability + education	Product	SSB	1 review/6 of 12 primary studies found a reduction in SSB	reduced availability of SSB at home; education	In Kirkpatrick et al. (2018): Mazarello et al. (2015)	Children 2.3-7 years old

TABLE A2. CHILDREN & ADOLESCENTS (6-18 YEARS)

Strategy	Subtype	Domain	Results[2]	Strategy examples	Source[3]	Notes
Interventions targeting individual processes						
Providing information	Content not further specified	SSB	3 out of 5 reviews are in favour of the intervention; 1 review with mixed results (# incl. studies not indicated)	medium intensity educational interventions (4-10 1h sessions delivered between 6 weeks - 12 months); content not specified	in Kirkpatrick: Avery et al. (2015), Gibson et al. (2008), Levy et al. (2011), Malik et al. (2006), Malik et al. (2013)	
	Education	FV, fat, SSB, fish	2 reviews incl. 9 RCTS, 15 CRCTs (Studies - F: 3/5 positive (+), FV: 2/5 +, fat: 5/5 +, SSB: 9/15 +, fish: 1/1 +	educational and behavioural intervention to reduce SSB consumption in school settings	in O'Brian et al. (2021): Rahman et al. (2017), Meiklejohn et al. (2016)	
	Nutrition education	FV	1 review/10 of 12 studies in favour of the intervention	school based, classroom activities and parental development	in Wolfenden (2021): Silveria et al. (2011)	school feeding policy is listed as educational strategy?
Education & skills training	School garden	F&V	1 review in favour of the intervention (20 primary studies)	not specified	in Wolfenden (2021): Rochira et al. (2020)	potential skill component? Authors sorted this technique under give education and skills
	Education and skill-based programs (community based)	F&V	1 review unclear whether in favour of the intervention (4 primary studies), one of two trials were effective in the long term	Community based after school education and skills programs; content not further specified	in Wolfenden (2021): Hendrie et al. (2017)	
Skills training	Cooking classes	F&V	1 review in favour of the intervention (6 primary studies), however little current evidence	not specified	in Wolfenden (2021): DeCosta et al. (2017)	age 1-12?
Digital/e-health interventions	Combined digital approaches	not specified/mixed	4 reviews/? out of ? studies are in favour of the intervention	media (radio/television shows), personalised computer-based feedback, messaging and/or online content	in Capper et al. (2022): specific review sources not further specified	such interventions are deemed as more age appropriate

[2] # of reviews provided, if possible including information on study designs included such as RCT, # of individual studies in parentheses, whenever possible with indication of positive/negative/no effect)
[3] Umbrella review and supporting systematic reviews

Strategy	Subtype	Domain	Results[2]	Strategy examples	Source[3]	Notes
Interventions working with the social context/environment						
Social messages	Peer or parent involvement	not specified/ mixed	2 reviews /? out of ? studies are in favour of peer involvement, 1 review/3 out of 7 studies were mixed; 1 review was in favour of parent involvement	peer-led education sessions with role models, group projects, peer support, nutrition classes/tasting sessions with parents	in Capper et al. (2022): Calvert et al. (2019), De Sa et al. (2008), Murimi et al. (2018), Sheperd et al. (2006)	it is not completely clear which review refers to peers and/or family, hence the summary of results here might not reflect the reviews correctly
Interventions working with the material environment						
Nudges	Choice architecture	F&V	1 review in favour of the intervention short term, long-term benefits sparse evidence (7 primary studies)	not further specified	in Wolfenden et al. (2021): DeCosta et al. (2017)	
Affordability	Increase price on unhealthy/unsustainable alternative	SSB/soda	1 review/? out of ? studies are in favour of the intervention	taxes on SSB, excluding SSB from sales tax	in Kirkpatrick et al. (2018): Levy et al. (2011)	
Availability	Product	not specfied/ mixed	6 reviews/? out of ? studies are in favour of the intervention	increased availability and exposure	in Capper et al. (2022): specific review sources not further specified	
	Product	SSB, high energy, sugary snacks	3 reviews/? out of ? studies are in favour of the intervention	restricting access to unhealthier foods	in Capper et al. (2022): McHugh et al. (2020), Murimi et al. (2018), Vézina-Im et al. (2017)	linked to this are findings from three SR…' - it is not clearly stated whether those SR were in fact in favour of the intervention
Combined strategies						
Environment	school food environments interventions	FV, Fat, SSB, unhealthy snacks, fish, calories, energy, diet in general	4 reviews incl. 15 RCTs, 13 CRCTs (F: 19/21 studies positive (+), V:10/10 +, FV: 6/6 +, fat: 4/4 +, unhealthy snacks: 2/2 +, SSB: 1/1 +, calories: 2/2 +, diet: 0/2 +	food environment policy interventions targeting food and beverage availability, provision of healthful foods, improving nutrition quality standards for school meals	in O'Brian et al. (2021): Bonell et al. (2013), Micha et al. (2018), Pineda et al. (2019), Pineda et al. (2021)	Micha et al. (2018): age 2-18
Multiple	School nutrition-based interventions	FV, fat	2 reviews incl. 20 CRCTs (studies: FV: 9/13 +, fat: 0/17 +)	HPS interventions framework	in O'Brian et al. (2021): Langford et al. (2014), Langford et al. (2015)	

Strategy	Subtype (HPS framework - WHO)	Domain	Results[2]	Strategy examples	Source[3]	Notes
eHealth	other school-based nutrition interventions	FV, fat, unhealthy snacks	10 reviews incl. 26 RCTs & 36 CRCTs (studies: FV: 16/32 +, fat: 1/4 +, SSB: 3/3 +, unhealthy snacks: 0/3 +, diet: 9/13 +, total energy: 1/5 +, breakfast: 1/1 +)	ehealth targeting multiple behaviours	in O'Brian et al. (2021): Champion et al. (2017), Champion et al. (2019), Delgado-Noguera et al. (2011), Evans et al. (2012), Evans et al. (2010), MacArthur et al. (2018), Nally et al. (2021), Rose et al. (2021), Rose et al. (2020), Singhal et al. (2020)	
Educational and environ-mental	School-based interventions	not specified/mixed	5 reviews/? out of ? studies are in favour of combining interventions compared to environmental or educational alone; 1 review in favour of education-only interventions, 2 reviews in favour of environmental or legislative only interventions	not specified	in Capper et al. (2022): specific review sources not further specified	
Educational and environ-mental	School-based interventions	SSB	3 reviews/? out of ? studies are in favour of different combinations of the intervention techniques	school environment policies (e.g., restriction of SSB availability or installing water fountains), partially plus home and/or school delivery of low-caloric beverages	in Kirkpatrick et al. (2018): Avery et al. (2015), Gibson (2008), Levy et al. (2011)	
Motivational and environ-mental	Home and school-based interventions	SSB	2 reviews/? out of ? studies are in favour of different combinations of the intervention techniques	home and/or school delivery of non-caloric beverages plus telephone contact or motivational calls	in Kirkpatrick et al. (2018): Malik et al. (2006), Malik et al. (2013)	
Educational and environ-mental	Health promoting schools	F&V	1 review/9 out of ? studies in favour of intervention	offer healthy food and set food standards in public institutions and give nutrition education/skills	in Wolfenden et al. (2021): Langford et al. (2014)	age group 4-18 yrs

TABLE A3. YOUNG ADULTS (18-30 YEARS)

Strategy	Subtype	Domain	Results[4]	Strategy examples	Source[5]	Notes
Interventions targeting individual processes						
Providing information	Information on health impact	Mixed	15 von 29 studies in favour of the intervention	?	Ashton et al. (2019)	median of 5 combined BCT per intervention, but evidence reporting is done at the level of single BCTs, it is not clear from the reporting which were combined with which
Goal-setting and self-monitoring	Self-weighing	Weight management	3 out of 3 studies in favour of the intervention	Self-weighing and email (and WIFI scale)	Willmott et al. (2019)	
	Action planning	Mixed	16 out of 27 studies in favour of the intervention	?	Ashton et al. (2019)	See above
	Goal setting	Mixed	18 out of 32 studies in favour of the intervention	?	Ashton et al. (2019)	See above
Feedback	Behavioural feedback	Mixed	14 out of 27 studies in favour of the intervention	?	Ashton et al. (2019)	See above
Digital/e-health interventions	Internet	Weight management	3 out of 12 studies in favour of the intervention, 3 mixed results	eLearning website and often email, effective studies combined it with synchronous chat or forums	Willmott et al. (2019)	
	Mobile	Weight management	1 out of 1 study mixed results	text message, apps	Willmott et al. (2019)	
	Combined digital approaches	F&V	4 out of 8 studies in favour of the intervention (statistically significant effect)	Online education, email, or phone calls	Nour et al. (2016)	variability in outcome measures/intervention design

[4] # of reviews provided, if possible including information on study designs included such as RCT, # of individual studies in parentheses, whenever possible with indication of positive/negative/no effect)

[5] Umbrella review and supporting systematic reviews

Strategy	Subtype	Domain	Results[4]	Strategy examples	Source[5]	Notes
	Combined digital approaches	V	2 out of 5 studies in favour of the intervention (statistically significant effect)	SMS, mobile apps, website, email	Nour et al. (2016)	variability in outcome measures/intervention design
	Combined digital approaches	Weight management	2 out of 6 studies in favour if the intervention	combinations of the following: text message, email and app; telephone counselling, website and app; newsletter and wearable tracking device	Willmott et al. (2019)	
Habits	Habit formation	Mixed	5 out of 5 studies in favour of the intervention	?	Ashton et al. (2019)	median of 5 combined BCT per intervention, but … (see above)
Interventions working with the social context/environment						
Social messages	Social encouragement or support	Mixed	13 out of 24 studies in favour of the intervention	unspecified	Ashton et al. (2019)	See above
Modelling	Social encouragement or support	Mixed	3 out of 6 studies in favour of the intervention	practical	Ashton et al. (2019)	See above
Interventions working with the material environment						
Presentation	Related objects	Mixed	7 out of 10 studies in favour of the intervention	adding objects to the environment	Ashton et al. (2019)	See above
	Wider environment	Mixed	7 out of 12 studies in favour of the intervention	prompts/cues	Ashton et al. (2019)	See above
Combined strategies						

TABLE A4. PREGNANT WOMEN & YOUNG PARENTS

Strategy	Subtype	Domain	Results[6]	Strategy examples	Source[7]	Notes
Interventions targeting individual processes						
Providing information	Information on antecedents	Weight gain	2 out of 2 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Redman et al. (2017)	
	Information on health impact (consequences)	Weight gain	3 out of 11 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017), Evans et al. (2012), Pollack et al. (2014), Evans et al. (2015), Olson et al. (2018), Dahl et al. (2018)	
	Information on other impacts	Weight gain	3 out of 6 studies in favour of the strategy	information of emotional consequences, via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017), Dahl et al. (2018)	
Feedback	Feedback on current behaviour	Weight gain	2 out of 4 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017), Pollack et al. (2014), Olson et al. (2018)	
	Feedback on outcomes	Weight gain	1 out of 2 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Redman et al. (2017), Olson et al. (2018)	
Skills training	Instructions on how to perform a behaviour	Weight gain	2 out of 7 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017), Olson et al. (2018), Dahl et al. (2018)	
	Substitution of behaviour	Weight gain	0 out of 3 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): ?	
Goals and planning	Goal setting (behaviour)	Weight gain	2 out of 5 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017), Pollack et al. (2014), Olson et al. (2018), Dahl et al. (2018)	

[6] # of reviews provided, if possible including information on study designs included such as RCT, # of individual studies in parentheses, whenever possible with indication of positive/negative/no effect)

[7] Umbrella review and supporting systematic reviews

Strategy	Subtype	Domain	Results[6]	Strategy examples	Source[7]	Notes
	Problem solving	Weight gain	2 out of 3 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017), Olson et al. (2018)	
	Goal setting (outcome)	Weight gain	2 out of 5 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017), Pollack et al. (2014), Olson et al. (2018), Dahl et al. (2018)	
	Action planning	Weight gain	1 out of 4 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Pollack et al. (2014), Olson et al. (2018), Dahl et al. (2018)	
	Review behaviour goals	Weight gain	2 out of 2 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017)	
	Discrepancy between current behaviour & goal	Weight gain	1 out of 1 study in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Redman et al. (2017)	
	Review outcome goals	Weight gain	1 out of 1 study in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Redman et al. (2017)	
Monitoring	Self-monitoring of behaviour	Weight gain	2 out of 5 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017), Pollack et al. (2014), Olson et al. (2018), Dahl et al. (2018)	
	Self-monitoring of outcome	Weight gain	2 out of 5 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017), Pollack et al. (2014), Olson et al. (2018), Dahl et al. (2018)	
Digital/e-health interventions	Internet (e.g., e-mail, website based)	Protein intake	1 out of 1 study was inconclusive about outcome (slight, n.s. increase, +1.40%,95%-CI 0.11-2.69;)	not mentioned (unspecified "Web-based program")	In Sherifali et al. (2017): Smith et al. (2016)	
Interventions working with the social context/environment						

Strategy	Subtype	Domain	Results[6]	Strategy examples	Source[7]	Notes
Social messages	Social encouragement or support	Weight gain	2 out of 3 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017), Redman et al. (2017), Dahl et al. (2018)	Social encouragement or support
	Social comparison	Weight gain	1 out of 2 studies in favour of the strategy	via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017)	Social comparison
Interventions working with the material environment						
Availability	Wider environment	Weight gain	2 out of 2 studies in favour of the strategy	Restructuring physical environment, instruction via text message, website, or app	In Rhodes et al (2020): Wilcox et al. (2017),	
Combined strategies						

TABLE A5. GENERAL POPULATION – MIDDLE-AGED ADULTS

Strategy	Subtype	Domain	Results[8]	Strategy examples	Source[9]	Notes
Interventions targeting individual processes						
Providing information	Content not further specified	F&V	1 review / 2 out of ? primary studies is not in favour of the intervention	Parent nutrition education to influence child's F&V consumption	In Wolfenden et al. (2021):	
	Information on environmental impact	Meat	3 reviews / 10 out of 11 studies are in favour of the intervention (10/11; 91%, 95% CI [62.3%, 98.4%]; p .012)	Provide information about the environmental consequences of eating meat	in Grundy et al. (2022): Harguess et al. (2020), Bianchi et al. (2018), Hartmann & Siegrist (2017)	Grundy also included intentions as outcome variable - so this might be referring to increasing intentions
	Information on health impact	Meat	5 reviews / 8 out of 10 studies are in favour of the intervention (8/10; 80%, 95% CI [49%, 94.3%]; p .11)	provide information about the health consequences of eating meat	in Grundy et al. (2022): Harguess et al. (2020), Bianchi et al. (2018), Veul (2018), Graca et al. (2019), Valli et al. (2019)	
	Information on other impacts	Meat	2 reviews/2 out of 2 studies are in favour of the intervention (2/2; 100%, 95% CI [34.2%, 100%]; p .5)	Social or animal welfare	in Grundy et al. (2022): Harguess et al. (2020), Bianchi et al. (2018)	
	Providing multiple arguments	Meat	5 reviews / 11 out of 16 studies are in favour of the intervention (11/16; 68.75%, 95% CI [44.4%, 85.8%]; p .21)	Providing multiple reasons (e.g., health and environment) to reduce meat consumption	in Grundy et al. (2022): Harguess et al. (2020), Bianchi et al. (2018), Veul (2018), Taufik et al. (2019), Wynes et al. (2018)	
Goal-setting and self-monitoring	Text message reminders	Meat	6 reviews / 2 out of 2 studies are in favour of the intervention (2/2; 00%;,95% CI [34.2%, 100%]; p .5)	digital notifications reminding individuals to monitor their red or processed meat consumption	in Grundy et al. (2022): Harguess et al. (2020), Bianchi et al. (2018), Veul (2018), Graca et al. (2019), Taufik et al. (2019), Wynes et al. (2018)	
	Implementation intentions	Meat	5 reviews / 2 out of 2 studies are in favour of the intervention (2/2; 00%;,95% CI [34.2%, 100%]; p .5)	creating implementation intentions, e.g., to consume meat free	in Grundy et al. (2022): Harguess et al. (2020), Bianchi et al. (2018), Veul (2018), Taufik et al. (2019), Wynes et al. (2018)	

[8] # of reviews provided, if possible including information on study designs included such as RCT, # of individual studies in parentheses, whenever possible with indication of positive/negative/no effect)

[9] Umbrella review and supporting systematic reviews

Strategy	Subtype	Domain	Results[8]	Strategy examples	Source[9]	Notes
Tailored approaches	Individual lifestyle counselling	Meat	1 review / 6 out of 8 studies (majority) is in favour of the intervention (6/8; 75%; 95% CI [40.9%, 92.9%]; p .29)	Providing individualised supporting material such as information on barriers to change, feedback and support to prompt behaviour change	in Grundy et al. (2022): Bianchi et al. (2018)	
	Counselling	F&V	1 review is in favour of the intervention (26 primary studies)	individual or in group, via in-person, telephone, web-based, text message and/or print mailing	in Wolfenden et al. (2021): Patnode et al. (2017)	overlap with digital interventions but not possible to split results
	Personalised messaging (e.g., based on stage of change)	Meat	2 reviews / 6 out of 10 studies are in favour of the intervention – mixed results (6/10; 60%; 95% CI [31.3%, 83.2%]; p .75)	tailored messages based on receivers' state of change, animal-product intake levels or personality	in Grundy et al. (2022): Harguess et al. (2020), Bianchi et al. (2018)	What was the content of the information though? Or it was only tested whether there is a benefit in personalizing (but otherwise same messages compared)
Digital/e-health interventions	Internet (e.g. e-mail, website based)	Dietary outcomes	2 out 6 reviews / ? out of ? studies (meta-analyses) found small effects in favour of the intervention, 4 narrative results found mixed results	not specified	in Gold et al. (2021): Afshin et al. (2016), Aneni et al. (2014), Hou et al. (2013), Maon et al. (2021), Lustria et al. (2013), Webb et al. (2010)	
	Mobile (e.g. text message, apps)	Dietary outcomes	6 out of 6 reviews / ? out of ? studies are in favour of the intervention, esp. F&V but not for weight loss	not specified	in Gold et al. (2021): Afshin et al. (2016), DiFillipo et al. (2015), McCarroll et al. (2017), Lyzwinksi et al. (2014), Palmer et al. (2018), Covolo et al. (2017)	there was ‚some evidence' - unclear what that means
	Interactive, computer-based	Dietary outcomes	2 out of 2 reviews not in favour of the intervention	not specified	in Gold et al. (2021): Wieland et al. (2012), Harris et al. (2011)	
	Social Media	Dietary outcomes	1 out of 3 reviews / ? out of ? studies is in favour of the intervention, 1 with mixed results (changes in fat consumption but not weight), 1 not in favour the intervention	not specified	in Gold et al (2021): Elaheebocus et al. (2018), Mita et al. (2016), Williams et al. (2012)	some tackled further behaviours including PA

Strategy	Subtype	Domain	Results[8]	Strategy examples	Source[9]	Notes
	Mass media	F&V	1 review in favour of the intervention (5 primary studies)	not further specified	in Wolfenden et al. (2021): Afshin et al. (2015)	
	Multiple strategies	Fat, F&V	1 review in favour of the intervention	not further specified	in Gold et al (2021): Carvalho de Menzes et al. (2016)	
	Multiple strategies	F&V	1 review found mixed evidence, in favour of computer-based, SMS based, internet-based strategies, not in favour of CD-ROM, mobile based (app) and video game strategies	computer-, SMS, internet-, CD-ROM, app, and video game based; content not further specified	in Wolfenden et al. (2021): Rodriguez et al. (2019)	
Interventions working with the social context/environment						
Social messages	Norms	Meat	5 reviews / 4 out of four studies in favour of the intervention (4/4; 100%, 95% CI [51%, 100%]; p .125)	emphasizing that amount of people following plant-based diets is growing, conveying positive representations of plant-based diet through popular TV shows	in Grundy et al. (2022): Harguess et al (2020), Graca et al. (2019), Taufik et al. (2019), Wynes et al. (2018), Nisa et al. (2019)	
	Specific group norms	Meat	2 reviews / 1 out of one study not in favour of the intervention (0/1; 0%, 95% CI [0%, 79.3%]; p 1)	telling people who reject social dominance that those who are more socially dominant eat more meat	in Grundy et al. (2022): Harguess et al. (2020), Bianchi et al. (2018)	
	Social images/consequences (e.g. popularity)	Meat	3 reviews / 1 out of one study in favour of the intervention (1/1; 100%, 95% CI [20.7%, 100%]; p 1)	telling people about negative social consequences of eating meat (e.g. regarding popularity or poorer social image)	in Grundy et al. (2022): Harguess et al. (2020), Bianchi et al. (2018), Sanchez-Sabate and Sabaté (2019)	
Interventions working with the material environment						
Nudges	Default option	Meat	5 reviews / 1 out of one study in favour of the intervention (1/1; 100%, 95% CI [20.7%, 100%]; p 1)	offer plant-based meals and menus as the default option at restaurants	in Grundy et al. (2022): Harguess et al. (2020), Hartmann & Siegrist (2017), Veul (2018), Wynes et al. (2018), Byerly et al. (2018)	

Strategy	Subtype	Domain	Results[8]	Strategy examples	Source[9]	Notes
Affordability	Making healthy/sustainable alternative more affordable	Meat	2 reviews / 2 out of two studies not in favour of the intervention (0/2; 0%, 95% CI [0%, 65.8%]; p .5)	providing financial incentive for healthy food/drink purchases or changing pricing structure so that there is a stable price for meat per unit instead of decreasing price with increasing portion sizes	in Grundy et al. (2022): Taufik et al. (2019), Bianchi et al. (2018b)	
	Making healthy/sustainable alternative more affordable	F&V	1 review in favour of the intervention (9 primary studies)	subsidy, price decrease in F&V	in Wolfenden et al. (2021): Afshin et al. (2017)	Why healthy food and drink purchases? Especially drink - in the meat review??
	Providing healthy/sustainable alternative for free	Meat	1 review / 3 out of three studies in favour of the intervention (3/3; 100%, 95% CI [43.9%, 100%]; p .25)	providing people with meat alternatives to try	in Grundy et al. (2022): Bianchi et al. (2018b)	
	Increase price on unhealthy/unsustainable alternative	Sugar/SSB	4 out of 5 reviews / ? out of ? studies are in favour of the intervention, 1 with mixed results	taxes or price increases on SSB	in Kirkpatrick et al. (2018): Backholer et al. (2016), Bes-Rastrollo et al. (2016), Cabrera Escobar et al. (2013), Nakhimovsky et al. (2016), Powell et al. (2013)	If this is more like sampling of new products in retail settings what is meant here then perhaps it is another strategy?
Presentation	Related objects	Meat	2 reviews / 2 out of two studies in favour of the intervention (2/2; 100%, 95% CI [34.2%, 100%]; p .5)	labelling meat options as "meat" instead of "standard" or "normal" in cafeterias, referring to "beef" and "pork" dishes as "cow" and "pig"	in Grundy et al. (2022): Harguess et al. (2020), Bianchi et al. (2018b)	
	Related objects	Meat	1 review / 1 out of 3 and hence majority were not in favour of the intervention	changing name of meat-free meals to more appealing alternatives; highlighting plant-based meal as "chef's recommendation"	in Grundy et al. (2022): Bianchi et al. (2018b)	
Size	Product (e.g. reducing plate or portion sizes)	Meat	3 reviews / 4 out of 4 lab and field studies in favour of the intervention (4/4; 100%; 95% CI [51%, 100%]; p .125)	smaller meat portion size offering in supermarket, restaurants reducing meat portion size and maintaining dish volume by vegetable servings	in Grundy et al. (2022): Veul (2018), Taufik et al. (2019), Bianchi et al. (2018b)	

Strategy	Subtype	Domain	Results[8]	Strategy examples	Source[9]	Notes
Information	Wider environment	F&V	1 review / 2 out of 3 studies in favour of the intervention	information-based cue at point of choice in out of home settings, content not further specified	in Wolfenden et al. (2021): Carter et al. (2018)	
Workplace intervention strategies	Not further specified	F&V	1 review / 13 of 18 studies in favour of the intervention, 3 with mixed results	intervention at workplace dining locations (e.g. cafeterias and canteens), content not further specified	in Wolfenden et al. (2021): Hendren et al. (2017)	
Combined strategies						
Motivational and environment	Home basedSSB interventions		1 review / ? out of ? studies is in favour of the home delivery, motivational part not further specified	inhome delivery of non-caloric beverages plus motivational calls/ visits/ advice	Kirkpatrick et al. (2018): Althuis et al. (2013)	
Multicomponent integrated interventions	Total WorkerF&V Health Strategy		1 review / 3 RCTs in favour of the intervention (vs. no intervention)	interventions may include a range of components including policy, organisational structure, environmental factors, education/ counselling	in Wolfenden et al. (2021): Feltner et al. (2016)	

Fiedler et al. (2020) conducted an umbrella review of eHealth and mHealth interventions for physical activity, sedentary behaviour, and nutrition for all age groups. The umbrella review includes 11 systematic reviews. It includes an assessment of theoretical foundations, BCT use, social context, and just-in-time adaptive interventions. The umbrella review only provides an overview of which systematic reviews found significant changes in F&V consumption or healthy eating, but it does not present intervention effectiveness by BCT in a systematic manner. Overall, 42% of interventions targeting healthy eating were successful. Notably, however, quantitative analysis showed small effects and more than 50% of the effects were only temporary. There is a limit to the comparability and generalizability of the results, due to a lack of precise reporting and comparison of confounding variables in reviews, and high heterogeneity concerning assessment methods and outcomes in original research.

Schlieman & Woodside (2019) conducted an umbrella review of dietary interventions in the workplace based on 22 systematic reviews. Included outcome variables are dietary outcomes (e.g., changes in F&V, overall diet, fat, and fibre intake), health outcomes (e.g., weight or cholesterol) and economic outcomes (e.g., productivity). The umbrella review does not consistently report intervention effectiveness by intervention type or content. Further, it reports a high heterogeneity in the designs and outcomes of the reviewed interventions, and hence concludes that there is no consistent answer to what interventions were most effective. Results regarding targeting dietary behaviours alone or in combination with other health behaviours were mixed. The umbrella review concludes that dietary interventions seem to have small, potentially clinically relevant effects (e.g., for F&V consumption, overall diet, diet knowledge, weight loss and reduced cholesterol). The authors further recommend applying standardized design criteria for developing context tailored interventions, instead of focusing on finding 'perfect' interventions.

FROM WORK TO RETIREMENT

The change from work to retirement is one of the major life events and therefore potentially represents an window of opportunity for behaviour change (Lara et al., 2014; Verplanken & Roy, 2016). The literature on this specific target group is more sparse, and less interventions exist for this population (Lara et al., 2014; Zaslavsky et al., 2022). We could not identify an umbrella review, and two reviews we identified did not present results for single strategies. One is a scoping review from Zaslavsky et al. (2022), which provides a good summary of existing literature but does not report on intervention effectiveness. The second one from Lara et al. (2014) reports effectiveness sorted for different outcome variables (e.g., F&V intake and F or V intake by themselves), but not by strategy. Both are briefly summarised in the following.

Zaslavsky et al. (2022) identified 43 studies for dietary interventions in adults aged 60 years and older. They analysed the use of behaviour change theory and identification of mechanisms of action. Half of the studies reported theory, and 30% associated mechanisms of change. The most used theory was the social cognitive theory and self-efficacy as proposed mechanism. Often used BCTs clusters were 'shaping knowledge' and 'goals and planning'. They also looked at the important aspect of intervention retention rates and found that interventions with higher retention rates more often showed a match between BCT and mechanism of action. Likewise, BCT clusters such as 'antecedents' and 'reward and threat' (especially positive reinforcement) were more common in higher retention rate interventions. For future research the authors recommend to develop theory-based interventions with clearly defined mechanisms of action, and to diversify the type of employed BCTs.

Lara et al. (2014) conducted a systematic review and meta-analysis of dietary interventions (i.e., interventions that promote a healthy dietary pattern and report the intake of specific food groups based on the Mediterranean diet (MD), for adults from 54 to 70 years old. They identified 68 publications reporting on 24 studies, whereby it is important to notice that most of these studies (n = 22) included mainly overweight and obese participants. In general, interventions were able to change dietary intake: they significantly increased F&V intake by 87.5 g/day ($p < 0.01$), both in short- and longer-term, significantly increased fish intake by 7g/day ($p = 0.03$) and significantly decreased meat intake by 9g/day ($p < 0.01$). Interventions thereby were slightly more effective in raising fruit than vegetable intake. Interestingly, interventions delivered face-to-face reported were only slightly more effective in increasing F&V intake (as compared to e.g., telephone calls) and a positive relationship exists between F&V intake and the number of contacts with participants during the intervention. Like many other systematic reviews, the authors note a high level of heterogeneity in the compared studies (e.g., regarding type of intervention, study design, mode of delivery) which limits the interpretation of findings.

TABLE A6. ELDERLY (65+ YEARS)

Strategy	Sub-type	Domain	Results[10]	Strategy examples	Source[11]	Notes
Interventions targeting individual processes						
Education/ Counselling/ Workshops	Group counselling-, learning sessions, (personalized) educational sessions, peer support, professional education sessions	Protein Intake	1 out of 1 review was in favour of the strategy group	personalized dietary prescription by nutritionist	In Poscia et al. (2018): Bunn et al. (2016)	Protein intake not defined, in undernourished elderly, probably any protein
Education/ Counselling/ Workshops	Group counselling-, learning sessions, (personalized) educational sessions, peer support, professional education sessions	Dietary/ Caloric Intake	3 out of 6 reviews were in favour of the strategy group	personalized dietary prescription by nutritionist	In Poscia et al. (2018): Bandayrel & Wong (2011), Younget al. (2011), Abbott et al. (2010), Liu et al. (2014), Jackson et al. (2011), Bunn et al (2016)	
Mealtime assistance	Improving mealtime routines	Dietary/ Caloric Intake	1 out of 4 reviews were in favour of the strategy group	?	In Poscia et al. (2018): Abbott et al. (2013), Liu et al. (2014); Abdelhamid et al. (2016) Bunn et al. (2016)	no definition or example or explanation for actual strategy given
Interventions working with the social context/environment						
Interventions working with the material environment						
Availability	Product "Home-delivered meal programs"	Protein Intake	0 out of 1 review was in favour of the strategy, but only for caloric intake	"Meals on wheels"	In Poscia et al. (2018): Zhu et al. (2017)	

[10] # of reviews provided, if possible including information on study designs included such as RCT, # of individual studies in parentheses, whenever possible with indication of positive/negative/no effect)

[11] Umbrella review and supporting systematic reviews

Strategy	Sub-type	Domain	Results[10]	Strategy examples	Source[11]	Notes
	Product "Home-delivered meal programs"	Dietary/ Caloric Intake	1 out of 1 review was in favour of the strategy	"Meals on wheels"	In Poscia et al. (2018): Zhu et al. (2017)	but only for dietary intake
	Product "Home-delivered meal programs"	Diet quality	1 out of 1 review was in favour of the strategy	"Meals on wheels"	In Poscia et al. (2018): Zhu et al. (2017)	
Availability	Product "Food improvement intervention"	Protein Intake	1 out of 2 reviews was in favour of the strategy group	Adding a sauce or powdered modules to increase energy density (or "visual attractiveness")	In Poscia et al. (2018): Morilla-Herrera et al. (2016), Trabal et al. (2015)	
	Product "Food improvement intervention"	Dietary/ Caloric Intake	4 out of 4 reviews were in favour of the strategy group (although 1 review based on one study alone)	Adding a sauce or powdered modules to increase energy density (or "visual attractiveness")	In Poscia et al. (2018): Vanderkroft et al. (2007); Morilla-Herrera et al. (2016); Trabal & Farran-Codina (2015), Abbott et al. (2013)	
Presentation	Wider environment "Alterations to dining environment"	Dietary/ Caloric Intake	3 out of 4 reviews were in favour of the strategy group (although 1 review based on one study alone)	Improving lighting or table setting	In Poscia et al. (2018): Abbott et al. (2013), Bunn et al. (2016), Jackson et al. (2011), Liu et al. (2014)	
	Wider environment "Alterations to dining environment"	Diet quality	0 out of 1 review was in favour of the strategy group	Improving lighting or table setting	In Poscia et al. (2018): Bunn et al. (2016)	
Combined strategies						

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Annex B1
Policy framework

POLICY DOMAIN	POLICY INDICATOR	NL		BE		FR		GE		SP		HU		GR		IT		PO		SW		IR	
		H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S
Food composition	Population intake targets, with appropriate strategies, have been established for the unhealthy nutrients of concern (usually salt, saturated and trans-fat, and/or added sugar)																						
	Food composition targets (T) /standards (S) have been established by the government for the content of unhealthy nutrients of concern in certain foods (groups)																						
	There is a transparent implementation plan, led by the government, to achieve improvements in energy density of the diet, food composition and population nutrient intakes for the specified nutrients of concern and/or for the sustainability of the diet																						
	Monitoring systems are in place to regularly check progress on improving food composition towards food composition guidelines/standards and population intakes towards specified intake targets or recommended daily intake levels.																						
	Ingredient lists and nutrient declarations in line with Codex Alimentarius																						

Food labelling	recommendations are present on the labels of all processed foods																							
	Robust, evidence-based **regulatory systems** are in place for approving/reviewing claims on foods, so that consumers are protected against unsubstantiated and misleading nutrition, health and sustainability claims																							
	A **monitoring system** is in place to ensure compliance, including that labels match product content																							
	A single, consistent, simple, interpretive, evidence-informed front-of-pack **supplementary nutrition information system** and/or **sustainability label** is applied to all processed foods																							
	A consistent, single, simple, clearly visible system of **labelling the menu boards of all quick service restaurants** (i.e. fast food chains) is applied																							
Food promotion/ advertising	Effective regulations are in place to restrict exposure and power of **promotion of unhealthy foods to children through all forms of media.**																							
	Effective regulations are in place to ensure that **the settings where children gather are free from all forms of promotion of unhealthy foods.** (e.g. preschools, schools, sporting grounds, cultural activities)																							
	There are effective systems in place for the **monitoring, evaluation and enforcement of marketing regulations** to ensure their effectiveness in reducing the impact on **children**.																							
	Effective regulations are in place to restrict exposure and power of																							

	promotion of meat through all forms of media.																						
Food provision	There are clear, consistent policies **in schools** that require food service activities (e.g. canteens, food at events, fundraising, promotions, vending machines) to provide and promote healthy and/or sustainable food choices consistent with dietary guidelines.																						
	There are clear, consistent policies **in other public sector settings** (e.g. government departments, hospitals, pre-school settings) that require food service activities (e.g. cafeterias, food at events, fundraising, promotions, vending machines) to provide and promote healthy and/or sustainable food choices consistent with dietary guidelines.																						
	There are good **support and training systems in place to help schools and other public sector organizations** (and interested private sector organizations) and their caterers meet the healthy and/or sustainable food service policies and guidelines.																						
	Regular **monitoring/reporting systems** are in place to monitor the implementation of the policies																						
	The government actively **encourages and supports private companies** to provide and promote healthy and/or sustainable foods and meals in their workplaces.																						
Food retail	**Zoning laws** and policies are robust enough for (local) governments to ensure that there is a **ready availability of outlets selling fresh fruit and vegetables.**																						

	Zoning laws and policies are robust enough for local governments to place **limits on the density or placement of quick-serve restaurants** or other outlets selling mainly unhealthy and/or unsustainable foods in communities.																							
	There are **existing support systems to encourage food stores to promote the in-store availability of healthy and/or sustainable foods**, and to limit the in-store availability of unhealthy and/or unsustainable foods.																							
Food prices	**Taxes on healthy and/or sustainable foods are minimized**, where possible, to encourage healthy and/or sustainable choices (e.g. low or no sales tax, excise or import duties on fruit and vegetables).																							
	Taxes on unhealthy and/or unsustainable foods (e.g. sugar-sweetened beverages, meat) are introduced to discourage unhealthy and/or unsustainable choices.																							
	Any subsidies on foods, including infrastructure funding support (e.g. research and development, supporting markets or transport systems) **favour foods that are recommended in dietary guidelines** rather than unhealthy and/or unsustainable foods																							
	Mechanisms are in place to ensure that **food-related social support programmes** (e.g. food stamps or other food assistance programmes) are for healthy and/or sustainable foods																							
	TOTAL	18	6	18	5	17	6	17	3	8	0	12	3	16	0	10	2	16	2	14	4	13	6	

**In aqua green healthy score (max 25) and in green sustainable score (max 25).*

Annex B2

GUIDANCE DOCUMENT – T1.1.1

Template questions on policy interventions for healthy and sustainable food consumption

Guiding questions (in addition to original template questions):

1. Does your country have a national food strategy? If so, could you share a link to the document?
2. What are your country's government's main goals for sustainable and healthy food consumption (if any)? Do these goals come with specific targets and/or timeframes?
3. What interventions has the national government adopted to foster healthier and/or more sustainable food consumption? Please fill out the table below (Table 2) for your country's governmental food-related policy instruments (the instruments in question are listed in the second column). For each category, we would like to know:
    - Whether the policy instrument is present. This can be answered in four ways: yes, no, only targeted at sustainability, or only targeted at health.
    - If the instrument is present, how it has been calibrated. Calibration refers to the specific settings of a policy instrument, e.g. the height of a subsidy, the strictness of a rule (e.g. alcohol may be banned <16 or <18 years, which is the same type of instrument but with different calibrations), and the target groups that are focused on. Would be very helpful if you could add these sort of details.
    - Link to websites or policy document(s) on/in which the policy instruments are mentioned.

Please complete the table by listing as many instruments for each domain as you are aware of and consider relevant. Feel free to consult colleagues and/or other experts for completing the list. At the end of the table, a category has also been added with additional policy instruments you might encounter which do not fit one of the existing categories of policy instruments.

Food environment domain	Type of policy instrument	Present: yes / no / only for health / only for sustainability	Calibration: what are the specific settings of the policy instrument?	Link to report/document/homepage in which the instrument is described	Comments: are there country-specific aspects? Do you know anything that can be regarded as a 'good practice'? Why?
Food composition	**Population intake targets**, with appropriate strategies, have been established for the unhealthy nutrients of concern (usually salt, saturated and trans-fat, and/or added sugar)				
	Food composition targets/standards have been established by the government for the content of unhealthy nutrients of concern in certain foods or food groups				
	There is a transparent **implementation plan**, led by the government, to achieve improvements in energy density of the diet, food composition and population nutrient intakes for the specified nutrients of concern and/or for the sustainability of the diet				
	Monitoring systems are in place to regularly check progress on improving food composition towards food composition guidelines/standards and population intakes towards specified intake targets or recommended daily intake levels.				
Food labelling	**Ingredient lists and nutrient declarations** in line with Codex Alimentarius recommendations are				

	present on the labels of all processed foods				
	Robust, evidence-based **regulatory systems** are in place for approving/reviewing claims on foods, so that consumers are protected against unsubstantiated and misleading nutrition, health and sustainability claims				
	A **monitoring system** is in place to ensure compliance, including that labels match product content				
	A single, consistent, simple, interpretive, evidence-informed front-of-pack **supplementary nutrition information system** and/or **sustainability label** is applied to all processed foods				
	A consistent, single, simple, clearly visible system of **labelling the menu boards of all quick service restaurants** (i.e. fast food chains) is applied				
Food promotion/advertising	Effective regulations are in place to restrict exposure and power of **promotion of unhealthy foods to children through all forms of media.**				
	Effective regulations are in place to ensure that **the settings where children gather are free from all forms of promotion of unhealthy foods.** (e.g. preschools, schools, sporting grounds, cultural activities)				
	There are effective systems in place for the **monitoring, evaluation and enforcement of marketing regulations** to ensure their effectiveness in reducing the impact on **children**.				

	Effective regulations are in place to restrict exposure and power of **promotion of meat through all forms of media.**				
Food provision	There are clear, consistent policies **in schools** that require food service activities (e.g. canteens, food at events, fundraising, promotions, vending machines) to provide and promote healthy and/or sustainable food choices consistent with dietary guidelines.				
	There are clear, consistent policies **in other public sector settings** (e.g. government departments, hospitals, pre-school settings) that require food service activities (e.g. cafeterias, food at events, fundraising, promotions, vending machines) to provide and promote healthy and/or sustainable food choices consistent with dietary guidelines.				
	There are good **support and training systems in place to help schools and other public sector organizations** (and interested private sector organizations) and their caterers meet the healthy and/or sustainable food service policies and guidelines.				
	Regular **monitoring/reporting systems** are in place to monitor the implementation of the policies				
	The government actively **encourages and supports private companies** to provide and promote healthy and/or sustainable foods and meals in their workplaces.				

Food retail	**Zoning laws** and policies are robust enough for (local) governments to ensure that there is a **ready availability of outlets selling fresh fruit and vegetables.**				
	Zoning laws and policies are robust enough for local governments to place **limits on the density or placement of quick-serve restaurants** or other outlets selling mainly unhealthy and/or unsustainable foods in communities.				
	There are **existing support systems to encourage food stores to promote the in-store availability of healthy and/or sustainable foods**, and to limit the in-store availability of unhealthy and/or unsustainable foods.				
Food prices	**Taxes on healthy and/or sustainable foods are minimized**, where possible, to encourage healthy and/or sustainable choices (e.g. low or no sales tax, excise or import duties on fruit and vegetables).				
	Taxes on unhealthy and/or unsustainable foods (e.g. sugar-sweetened beverages, meat) are introduced to discourage unhealthy and/or unsustainable choices.				
	Any subsidies on foods, including infrastructure funding support (e.g. research and development, supporting markets or transport systems) **favour foods that are recommended in dietary guidelines** rather than unhealthy and/or unsustainable foods				
	Mechanisms are in place to ensure that **food-related social support programmes** (e.g. food stamps or				

	other food assistance programmes) are for healthy and/or sustainable foods				
Any other policy instruments: feel free to add additional policy instruments not included in this framework					
Future food policy:	Finally, for all of the above policy instruments: are there any policy instruments that have not yet been adopted but are in the pipeline in your country?				

Annex C1

SPG1 - TEMPLATE

Data and Information required for the WP1

Country page template: Please indicate your Country _____

Items to be collected in all Territories

The focus of this template is on gathering data and information regarding four main topics: food composition database, dietary guidelines, food consumption and food behaviors.

Please fill in the boxes below providing information that comes from scientific papers, reports and projects, grey literature, including websites and documents in your local language.

Please, take in mind that each information added in the template must have a valid reference.

Please add each citation in the text and the bibliography at the end of the document.

Other clarifications:

- Having in mind that the subject of the survey is "your Country". Data and information need to be collected from experts and representatives of each sectors investigated.
- Answer such as "do not know", "not studied yet", "not evaluated yet" ect. are possible; in this case provide an explanation of the absence of information.

1. Food composition database

1. Food composition database: main contents

1.1. Does your Country have a national food composition database?

☐ Yes ☐ No

If yes, could you describe it? When did the first version come out? When was the last version released? Do you have a specific website which collects your Country food composition database?

(Please, provide a description of the last version of the database specifying how many food items it contains and which components are reported, e.g. carbohydrates, proteins, fats, vitamins).

If no, what database does your Country usually use?

(Please provide a brief description of this database).

1.2. Are data, that your Country use, freely downloadable by everyone?

(Please answer to the following questions (from 2 to 7) also if your Country does not have its own database-both private and public).

2. Regulation for the creation of the food composition database

2.1. Did your Country follow specific recommendations to create the database?
☐ Yes ☐ No
If yes, provide a quick overview of the process
(Please provide an overview of the process and interventions made by any organizations - both public and private - that led the creation of the database).
If no, which scheme/procedure/guidelines did your Country follow?
(Please provide an overview of the process and interventions made by both political and private organizations that led the creation of the database).
3. Techniques to create the food composition database
3.1. Who was responsible for the creation of the database?
(Please provide a description of the type and the role of the experts that participated in this process)
3.2. What kinds of methodologies were used to build up the database?
(Please provide an overview of the methodologies/protocols/tools used and highlight their limits and strengths.)
4. Any weaknesses about the database
4.1. Are there any weaknesses about the database?
☐ Yes ☐ No
If yes, what kind of weaknesses? Are your Country working to solve them?
(Please provide a specific list of what kind of components of the database could be improved and the reason).
4.2. Are there any strengths of the database?
(Please provide a description of the main characteristics that make the database a useful tool for your Country research).
5. Food sustainability
5.1. Is there any information regarding the environmental sustainability of a product?
☐ Yes ☐ No
If yes, what kind of information?
(Please provide a description of indicators or simple information on this topic).
If no, would you like to add this kind of information to the database? Do you already have plans for this addition?
(Please provide a brief description of the plan or of the idea that you would apply). *We have not yet contacted the Max Rubner Institute in this regard.*

6. Future plans
6.1. Are there any plans to update the current database??
☐ Yes ☐ No
If yes, which kinds of changes are your Country going to make? Will the environmental sustainability aspects be improved?
(Please provide a description of which are the future changes and the reasons which brought you to make them, explaining in depth what changes will be made to environmental sustainability aspects (if there will be any)).
If no, are your Country planning to realize modifications in the future?
Please provide a brief description of ideas/plans/intentions for the future.
7. INFOODS
INFOODS is the International Network of Food Data Systems that, with FAO, provides guidelines, standards, compilation tools, databases, capacity development tools, policy advice, advocacy tools, technical assistance at country level.
7.1. Are you aware of the INFOODS network?
☐ Yes ☐ No
If yes, is your Country a partner?
(Please provide a brief description of your Country role in this network).
If no, why? Would you like to become a partner?

2. Dietary Guidelines

1. National dietary guidelines
1.1. Do you have any national dietary guidelines in your Country?
☐ Yes ☐ No
If yes, how long have they been published? Who was responsible for their creation? How often and by who are they updated? The nutrition recommendations have been published by the German Nutrition Society since 1950. Reference values have been updated approx. annually since then.
1.1.1. What kind of methodologies were used to realize them and how are they structured?
1.1.2. What are the major topics of your Country's guidelines?
(Please, provide a concise description of the major topics of your Country's guidelines, including recommendations for specific groups (e.g., children and adolescents, pregnant women, older people…), if there are any).
If no, why? Do you have any plans to publish them in the future?

(Please, provide a brief description of your Country's plans to publish dietary guidelines in the future).
2. Food sustainability issues
2.1. Do you have any reference to sustainability (environmental, social, economic) in your guidelines?
☐ Yes ☐ No
If yes, could you describe it?
(Please, provide a concise description of the major sustainability topics of your Country's guidelines).
If no, do you have any plans to add this topic in the future?
(*Please, provide a brief description if your Country has plans to add guidelines about sustainability in the future*).
3. Behavioral advice
3.1. In addition to dietary recommendations, is there also behavioral advice? (e.g. physical activities, smoking, breakfast...)
☐ Yes ☐ No
If yes, could you describe them?
(*Please, provide a concise description of the major behavioral advice of your Country's guidelines).*
If no, why? Do you have any plans to add this section in the future?
(Please, provide a brief description if your Country has any plans to add this section in the future).
4. Changes in eating habits
4.1. Has there been an improvement in the eating habits of the population after the guideline's publication and its updates? (e.g., increased consumption of fruits and vegetables, increased consumption of legumes, reduction of sugar, fruit juices, fats, red meat, etc..).
☐ Yes ☐ No
If yes, please provide the list of the possible improvements that happened after the guidelines' publication together with an overview of studies that analyzed changes and the methodology used for the evaluation).
5. Communication activities
5.1. Does your Country organize communication activities towards the population to spread the dietary guidelines? By whom are they carried out?
☐ Yes ☐ No

(If yes, please provide an overview of all activities performed, including school programs, conferences, online video summaries etc..).
6. Limitations and future prospective
6.1. Are there any limitations in the dietary guidelines of your Country? (e.g. behavioral changes difficult to achieve/poor compliance; lacking of some topics; difficulties with the communication/technicality in the wording; absence of a graphical form etc.)
☐ Yes ☐ No
If yes, could you describe it? Do you have any plans to overcome them?
(*Please, provide a written account of a concise description of the major limitations of your Country's guidelines).*

3. Food consumption

1. Food consumption
1.1. Does your Country assess the population food consumption?
☐ Yes ☐ No
If yes, can you provide a description?
(Please provide information regarding who is responsible for the research, what is the methodology applied and how food consumption and diet composition is calculated, and which population groups are included).
If no, is your Country planning to set up a study?
(Please provide a description of the study that you are going to carry out).
2. Trends
2.1. Which changes did you observe in food consumption in the last 10 years (e.g. an increase or a decrease in a particular food group)
(Please provide a list of the food group changes and the possible economic, social and environmental impacts).
3. Food consumption dataset
3.1. Does your Country have a dataset for food consumption?
☐ Yes ☐ No
If yes, could you describe it?

(Please provide information regarding who is responsible for its creation (specifying the type and the role of the experts), when it was realized, when is the last update, how is structured, if it has a private or public access).
3.2. Does the dataset have some shortcomings?
If yes, what are these shortcomings?
(Please provide a description of the shortcomings and if you are adopting strategies to solve them).
If no, could you underly the main strength of the dataset?
4. Food consumption and recommendations
4.1. Please provide an overview of the relation between food consumption and what your Country dietary guidelines recommend, highlighting what is in line.
4.2. Please provide an overview of the relation between food consumption and what your Country dietary guidelines recommend, highlighting what is not in line.
5. Sustainable consumption
5.1. Has your Country studied food consumption with regard to sustainability? (e.g. focusing on the economic, environmental and social sustainable aspects).
☐ Yes ☐ No
If yes, could you describe how your Country conducted the study?
(Please provide the description of the research methodology and the main findings).
If no, are you going to carry out this study in the future?
(Please provide the idea of the study project).
6. Policy actions to encourage the shift towards sustainable consumption
6.1. Has your Country established actions (e.g. educational program, awareness campaign, food labelling, taxes, educational policy such as school meals or food curriculum, restaurant and hotel food requirements, etc..) to lead the transition towards more sustainable consumption?
☐ Yes ☐ No
If yes, could you describe them?
(Please provide details regarding main laws and specify if there is a determined action plan, describing it, in particular listing existing articles / documents / reports which collects these information).
If no, are you aware of any policies or strategies to adopt as measures to move towards this objective that your government is preparing?
6.2. Is your Country adopting actions to achieve one or more specific targets of the 12 SDG regarding sustainable consumption and production?

If yes, what kind of actions? (e.g. project, research actions, educational programs, awareness campaigns, etc...)

(Please provide a description of the target on which your Country is working (e.g. food waste, sustainable food consumption, sustainability reports, sustainable public procurement policy, etc...) and then the actions (e.g. project and data collection, broad research, educational programs, awareness campaigns) towards the achievement of the 12 Goal; provide also a description of indicators of the progress of these actions, if there are any).

If no, could you explain the reason?

4. Eating behaviour

1. Eating habits and cultural diets

1.1. Could you describe the eating habits and cultural diets of your Country general population?

Please, provide a description of the major eating habits (omnivorous, flexitarian, vegetarian...) and cultural diets (Mediterranean, Western...) of your country. Take into consideration ethnic groups in your regions.

1.2. How have the population's eating habits changed in the last 10 years?

Please provide a brief description of the changes in eating habits that may have occurred in your Country (e.g. increasing in the number of vegetarians and/or vegans, eating more plant-based food or increasing the consumption of animal products, more attention towards food waste, attention to locally produced foods, etc.).

1.3. Have any shifts towards more environmentally sustainable eating habits and diets been evaluated?

☐ Yes ☐ No

If yes, please provide an overview of studies/reports that analyzed changes and the methodology used for the evaluation.

1.4. What is the percentage of the population in your Country that has food allergies or intolerances (e.g. celiac disease, lactose intolerance, nickel allergy...)?

1.4.1. How has the consumption of "*free*" products changed in the last 10 years? (e.g. gluten-free, lactose-free, etc...)

2. Drivers

2.1. Did your Country identify specific drivers that led food consumption in your country? (i.e. socio-economic factors, environmental issue, marketing strategies, policy actions, recommendations, guidelines, etc...)

☐ Yes ☐ No

If yes, please provide a list of these drivers and the how they were identified (e.g. surveys, literature studies)

3. Population's meal daily pattern

3.1. What is the meal daily pattern of your Country general population? (E.g. 3 meals/day, 5 meals/day..)

(Please, provide a description of the typical daily pattern of your country, specifying if there are meals (breakfast, lunch and dinner) and/or snacks).

4. Macronutrients daily proportion

4.1. What is the macronutrients proportion (carbohydrates, fat and proteins) recommended in your Country?

5. Plant-based food

5.1. How many servings of fruit and vegetables per day are recommended in your Country? What is the recommended standard portion (g/day)?

5.2. Do your Country recommend the consumption of seasonal fruit and vegetables?

5.3. Are there any government projects in your Country to encourage the consumption of fruit and vegetables?

☐ Yes ☐ No

If yes, please provide a description of the government's main interventions.

5.4. How many servings of legumes per week are recommended in your Country? What is the recommended standard portion (g/week)?

5.5. Did you notice a change in the subjective attitude/purchasing/consuming of the population towards legumes in the last 10 years in your Country?

☐ Yes ☐ No

If yes, please provide a description of these changes.

5.6. Are there any government projects in your Country to encourage the consumption of legumes?

☐ Yes ☐ No

If yes, please provide a description of the government's main interventions.

5.7. How many servings of nuts per day or week are recommended in your Country? What is the recommended standard portion (g/day or week)?

6. Grain-based foods

6.1. How many servings of refined and whole-grain cereals per day or week are recommended in your Country? What is the recommended standard portion (g/day or week)?
7. Meat
7.1. How many servings of meat per week are recommended in your Country? And processed meat? What is the recommended standard portion (g/week)?
(Please, take in mind that red meat refers to unprocessed mammalian muscle meat (e.g. beef, veal, pork, lamb) including that which may be minced or frozen; processed meat refers to meat that has been transformed through salting, curing, fermentation, smoking or other processes to enhance flavor or improve preservation and white meat refers to meat that comes from the breast or other thick parts of a chicken, turkey, etc).
7.2. Did you notice a change in the subjective attitude/purchasing/consuming of the population towards meat in the last 10 years in your Country?
☐ Yes ☐ No
If yes, which kind of meat? Was this change related to health, ethic and/or environmental reasons?
7.3. Are there any government projects in your Country aim to reduce the consumption of meat?
☐ Yes ☐ No
If yes, please provide a description of the government's main interventions.
8. Fish and seafoods
8.1. How many servings of fish and seafoods per week are recommended in your Country? What is the recommended standard portion (g)?
8.2. Did you notice a change in the subjective/purchasing/consuming attitude of the population towards fish and seafoods in the last 10 years?
8.3. If yes, this change was related to health, ethic and/or environmental reasons?
☐ Yes ☐ No
9. Fats
9.1. Which type of fats is the most common used in your Country? (e.g. extra olive oil, olive oil, sunflower oil, peanut oil, rapeseed oil, butter, margarine)
9.2. How are fats mainly used? To season? To cook? To fry?
10. Breakfast habits
10.1. What is the percentage of the population that usually have breakfast every morning in your Country?

10.2. What is the most common type of breakfast in your Country? (P*lease provide a description)*
10.3. Where is it consumed (e.g., home, bar...)?
11. Alcohol
11.1. What is the percentage of the population that drinks alcohol in your Country? Do you know the percentage of <18 years that drinks alcohol? What is the most common source of alcohol (e.g. beer, wine, spirits, drinks...)?
11.2. What is the current recommendation for alcohol consumption in your Country? Are there any government projects to reduce the consumption of alcohol?
☐ Yes ☐ No
If yes, please provide a description of the government's main interventions.
12. Processed and ultra-processed foods
12.1. What is the definition of processed foods that your Country use? And of ultra-processed foods?
12.2. What is the percentage of processed foods consumed by the population in your Country? And of home-made processed food? (e.g. bread, pizza, desserts, etc..).
12.3. What is the percentage of ultra-processed foods consumed by the population in your Country?
12.4. What are the most consumed ultra-processed foods in your Country?
12.5. Are there any restrictions in your Country for ultra-processed foods?
☐ Yes ☐ No
If yes, please provide a description of the limitations that are currently in place in your Country.
13. Household dietary diversity score (HDDS) *(The Household Dietary Diversity Score (HDDS) was released in 2006 as part of the FANTA II Project as a population-level indicator of household food access. Household dietary diversity can be described as the number of food groups consumed by a household over a given reference period and is an important indicator of food security).*
13.1. Has your Country calculated the population's HDDS?
☐ Yes ☐ No
If yes, please provide a description of the main results.

Annex D1

SPG2 – Primary producers

Introduction

PLAN'EAT is a Horizon Europe research project, funded by the European Commission, which aims at transforming food systems and food environments towards healthy and sustainable dietary behaviour. The questionnaire you are filling in aims to assess the needs and current local/national/EU initiatives implemented by food value chain actors (farmers, food industries, retailers, food services, restaurants) to foster dietary behaviour change and to improve food environments. This survey can be completed by different employees if necessary, as long as the answers are realistic and representative of the food value chain actor surveyed and as long as we receive only one answer per organisation (not per person). Thus, if you have a doubt on some answers, feel free to ask your colleagues.

Before continuing with the survey, we would like you to carefully read the information below:

My participation in this survey, as part of the PLAN'EAT project, carried out by the University of Leuven (BE) and the Council for Agricultural and Economics Research (IT), is voluntary. I have the right to terminate my participation at any time. I do not have to give a reason for doing so and I know that this cannot be to my detriment. The results of this research may be used for scientific purposes and may be published. My name will not be published. Anonymity and confidentiality of the data will be guaranteed at every stage of the research. Only general statistics will appear in the reports. I will receive a summary with the main findings of the survey. I am aware that I can always contact the CWG leaders for questions, complaints or more information.

General information

What is the name of your organisation/farm?

Open answer: _____

In which country(ies) do you operate?

☐ *Belgium* ☐ *Germany* ☐ *Greece* ☐ *Spain* ☐ *France* ☐ *Hungary* ☐ *Ireland* ☐ *Italy* ☐ *Netherlands* ☐ *Poland* ☐ *Sweden.*

What is the size of your organisation/farm?

☐ Number of ha:...../ ☐ Number of animals:..... ☐ Type of animals: .....

What is your role in the organisation/farm?

Open answer: _____

Which types of food products are you producing?

☐ Dairy ☐ Fruits ☐ Vegetables ☐ Meat ☐ Other: please specify_____

What do you need to achieve a food system transition towards more healthy and sustainable diets?

We need more knowledge and resources to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
identify what is a healthy, fair and sustainable food product, and which claims are accepted						
cover extra costs to improve our farming practices towards healthier and more sustainable production						
make the right choices to change our assortment of crops to provide a healthier and more sustainable offer						
understand how to manage and be rewarded for increased costs linked to a healthier, fairer and more sustainable offer						
understand how to guide consumers to purchase and pay more for this healthier, fairer and more sustainable food offer						
develop (or further develop) on-farm visits and educational experiences (e.g. with school children)						

promote and organise direct supply of our food products to consumers, canteens, restaurants						
organise public engagement activities (farm days, exhibitions, participatory events) to support existing production-consumption links and create new ones						
reach national communication media, like TV and advertising boards to reach the general audience						

We need more vertical collaboration (= between suppliers and buyers) to:

Vertical collaboration brings together two or more food supply chain actors from different levels (e.g. farmers, food industries, retailers, restaurants and food services), increasing productivity and performance.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
engage in a joint transition to healthy and sustainable food environments with minimum additional costs (e.g. producers improve their practices and offer, consumers change their behaviour)						
reduce the negative externalities of food systems (e.g. greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.)						
increase adherence to farmers services (e.g. direct supply to other food value chain actors)						
ensure a fair remuneration for farmers						
produce healthier, fairer and more sustainable food products						
increase the availability of healthy, sustainable and accessible food products						
provide sustainable, traceable, certified and fair short value chains at local/national level						
drive consumer demand towards healthier and more sustainable food products						
ensure that consumers are aware of the real cost/price of a healthy, sustainable and fair food product (and of the fact that a low-cost food product doesn't enable farmers to receive a fair remuneration)						
ensure that consumers are educated/aware of the environmental and health impacts of food products (the ones to avoid/reduce, the ones to choose)						

We need more horizontal collaboration (= between actors from the same level of the value chain) to:

Horizontal collaboration is between actors in the same level of the value chain that, while not competing directly, market and sell to similar customers and consumers.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
share good practices, lessons learnt, feedback on experience in applying best farming practices						
align in a joint transition to healthy and sustainable food environments (i.e. adopt the same best practices and communication messages to consumers) while keeping different offers						
join forces to ask policy makers to address regulatory barriers to that transition						
increase adherence to farmers services (e.g. direct supply to other food value chain actors)						
increase the availability of healthy, sustainable and accessible food products						

We need more government action to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)

ensure a fair remuneration to farmers						
receive recognition when applying healthy and sustainable best farming practices (e.g. through a label, a price or local communication)						
agree on a EU mandatory label for food products with regard to their health, environmental and socio-economic impacts						
provide financial support to launch our transition to healthier and more sustainable farming practices and foods produced						
overcome the barriers linked to public procurement						
educate consumers about the real cost/price of a healthy, sustainable and fair food product						
educate consumers about the environmental and health impacts of food products and meals (the ones to avoid/reduce, the ones to choose)						

What are your expectations, requirements and needs regarding PLAN'EAT?

To read first

The main objectives of **PLAN'EAT** are:

- to understand the underlying factors and drivers influencing dietary behaviour,
- to measure, compare and 'monetize' the environmental, social and health impacts of 3 dominant European dietary patterns through **True Cost Accounting (TCA)**, and
- to design effective recommendations, tools and interventions to allow food system actors to steer a transition towards healthier and more sustainable dietary behaviour.

PLAN'EAT will implement a systemic and co-creation approach at macro (food system), meso (food environment) and micro (individual) levels.

What are your expectations, requirements and needs regarding the project outcomes listed below?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
Identify trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food products through **True Cost Accounting (TCA)**						
Identify **macro-level** factors (food system drivers) influencing dietary behaviour across Europe (e.g., government policies, technologies, globalization, environmental issues)						
Identify **meso-level** factors influencing dietary behaviour across Europe (e.g., barriers and enablers to offer more healthy and sustainable food products and meals)						
Identify **micro-level** factors influencing dietary behaviour across Europe (e.g., physiological, lifestyle, social)						
Support **dietary advice** for consumers to adopt healthy and sustainable diets and design communication strategies to increase the acceptability of food and health policy interventions by all food system actors						
Setting up **innovative tools** to empower citizens to improve their dietary behaviour through dietary advice and education (e.g., personalised dietary & shopping advice app for citizens; specific educational programmes)						
Co-design **solutions**, as part of the CWG process, to improve food environments and foster behavioural change (such as public engagement activities to support existing production-consumption links and create new ones)						

Setting up context-specific food policy recommendations to share at **local, national and European level**						
Provide **local authorities** with interventions targeting consumers to foster behavioural changes of different target populations (different age ranges, different socio-economic status, etc.)						

Which initiatives have you already implemented?

What are the most relevant initiatives that you have been implementing, or that have been implemented in your country/region, since 2015 that have reached positive outcomes to shift to sustainable and healthy food environments/food systems?

Have you planned any other initiatives/actions for the (near) future?
(Open answer: maximum 200 characters for each initiative)

Annex D2

SPG2 – Food industries

Introduction

PLAN'EAT is a Horizon Europe research project, funded by the European Commission, which aims at transforming food systems and food environments towards healthy and sustainable dietary behaviour. The questionnaire you are filling in aims to assess the needs and current local/national/EU initiatives implemented by food value chain actors (farmers, food industries, retailers, food services, restaurants) to foster dietary behaviour change and to improve food environments.

This survey can be completed by different employees if necessary, as long as the answers are realistic and representative of the food value chain actor surveyed and as long as we receive only one answer per organisation (not per person). Thus, if you have a doubt on some answers, feel free to ask your colleagues.

Before continuing with the survey, please confirm that you have read the information below:

My participation in this survey, as part of the PLAN'EAT project, carried out by the University of Leuven (BE) and the Council for Agricultural and Economics Research (IT), is voluntary. I have the right to terminate my participation at any time. I do not have to give a reason for doing so and I know that this cannot be to my detriment. The results of this research may be used for scientific purposes and may be published. My name will not be published. Anonymity and confidentiality of the data will be guaranteed at every stage of the research. Only general statistics will appear in the reports. If desired, I can leave my e-mail address (at the end of the survey) and I will receive a summary with the main findings of the survey. I am aware that I can always contact the CWG leaders for questions, complaints or more information.

General information

What is the name of your organisation?

Open answer: _____

In which country(ies) do you operate?

☐ *Belgium* ☐ *Germany* ☐ *Greece* ☐ *Spain* ☐ *France* ☐ *Hungary* ☐ *Ireland* ☐ *Italy* ☐ *Netherlands* ☐ *Poland* ☐ *Sweden.*

What is the size of your organisation?

☐ Start-up ☐ SME ☐ Large company

What is your role in the organisation? *Please quote the departments who participate in this survey*

Open answer: _____

Which types of food products are you producing/processing/ distributing?

Open answer: _____

What do you need to achieve a food system transition towards more healthy and sustainable diets?

We need more knowledge or best practices to...

	Strongly disagre	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
identify what is a healthy, fair and sustainable food product						
change the sourcing and composition of our current food products to make them healthier, fairer and more sustainable						
reduce ultra-processing of our food products						
change our assortment of food products to provide a healthier, fairer and more sustainable offer						
design new food products with low health, environmental and socio-economic impacts						
understand how to manage increased costs linked to a healthier, fairer and more sustainable offer						
understand how to nudge consumers to purchase this healthier, fairer and more sustainable food offer						
develop a communication strategy on our healthy and sustainable food products to encourage consumers to switch to these products						

We need more vertical collaboration (= between suppliers and buyers) to:

Vertical collaboration brings together two or more food supply chain actors from different levels (e.g. farmers, food industries, retailers, restaurants and food services), increasing productivity and performance.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
engage in a joint transition to healthy and sustainable food environments with minimum additional costs (e.g. producers improve their practices and offer, consumers change their behaviour)						
reduce the negative externalities of food systems (e.g. greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.)						
change the sourcing and composition of our current food products to make them healthier, fairer and more sustainable (e.g. opt for local sourcing whenever possible)						
ensure a fair remuneration for farmers						
produce healthier, fairer and more sustainable food products						
increase the availability of healthy, sustainable and accessible food products						
provide sustainable, traceable, certified and fair short value chains at local/national level						
drive consumer demand towards healthier and more sustainable food products						
ensure that consumers are aware of the real cost/price of a healthy, sustainable and fair food product (and of the fact that a low-cost food product doesn't enable farmers to receive a fair remuneration)						
ensure that consumers are educated/aware of the environmental and health impacts of food products (the ones to avoid/reduce, the ones to choose)						

We need more horizontal collaboration (= between actors from the same level of the value chain) to:

Horizontal collaboration is between actors in the same level of the value chain that, while not competing directly, market and sell to similar customers and consumers.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
share good practices, lessons learnt, feedback on experience in shifting to healthier, fairer and more sustainable food offers						
align in a joint transition to healthy and sustainable food environments (i.e. adopt the same best practices and communication messages to consumers) while keeping different offers, brand identities and Unique Selling Points.						
join forces to ask policy makers to address regulatory barriers to that transition						
reduce the negative externalities of food systems (e.g. greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.)						
increase the availability of healthy, sustainable and accessible food products						
drive consumer demand towards healthier and more sustainable food products						
send a clear, common message to consumers on the environmental and health impacts of food products (which products to avoid/reduce, which products to choose and eat more often)						

We need more government action to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
receive recognition, as an organisation, when applying healthy and sustainable best food practices (e.g. through a label, a price or local communication)						
agree on a EU mandatory label for food products with regard to their health, environmental and socio-economic impacts						
receive financial support to launch our transition to a healthier, fairer and more sustainable food offer						
OR receive financial support to find a profitability balance and offset the costs of this transition to a healthier, fairer and more sustainable food offer						
increase taxes of food value chain actors not respecting best practices and not considerably reducing their health, environmental and socio-economic impacts						
overcome any potential barriers linked to public procurementespecially Green Public Procurement						
educate consumers about the real cost/price of a healthy, sustainable and fair food product						
educate consumers about the environmental and health impacts of food products and meals (the ones to avoid/reduce, the ones to choose)						

What are your expectations, requirements and needs regarding PLAN'EAT?

To read first

The main objectives of **PLAN'EAT** are:

- to understand the underlying factors and drivers influencing dietary behaviour,
- to measure, compare and 'monetize' the environmental, social and health impacts of 3 dominant European dietary patterns through **True Cost Accounting (TCA)**, and

- to design effective recommendations, tools and interventions to allow food system actors to steer a transition towards healthier and more sustainable dietary behaviour.

PLAN'EAT will implement a systemic and co-creation approach at macro (food system), meso (food environment) and micro (individual) levels.

What are your expectations, requirements and needs regarding the project outcomes listed below?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
Identify trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food products through **True Cost Accounting (TCA)**						
Identify **macro-level** factors (food system drivers) influencing dietary behaviour across Europe (e.g., government policies, technologies, globalization, environmental issues)						
Identify **meso-level** factors influencing dietary behaviour across Europe (e.g., barriers and enablers to offer more healthy and sustainable food products and meals)						
Identify **micro-level** factors influencing dietary behaviour across Europe (e.g., physiological, lifestyle, social)						
Support **dietary advice** for consumers to adopt healthy and sustainable diets and design communication strategies to increase the acceptability of food and health policy interventions by all food system actors						
Setting up **innovative tools** to empower citizens to improve their dietary behaviour through dietary advice and education (e.g., personalised dietary & shopping advice app for citizens; specific educational programmes)						
Be considered as a candidate to integrate the list of food providers recommended at local/national level in the personalised app						
Co-design **solutions**, as part of the CWG process, to improve food environments and foster behavioural change (such as best practices and communication tools based on True Cost Accounting)						
Setting up context-specific food policy recommendations to share at **local, national and European level**						
Provide **local authorities** with interventions targeting consumers to foster behavioural changes of different target populations (different age ranges, different socio-economic status, etc.)						

Which initiatives have you already implemented?

What are the most five important initiatives that you have been implementing, or that have been implemented in your country/region, since 2015 that have reached positive outcomes to shift to sustainable and healthy food environments/food systems?

Have you planned any other initiatives/actions for the (near) future?
(Open answer: maximum 200 characters for each initiative)

Annex D3

SPG2 – Food services

Introduction

PLAN'EAT is a Horizon Europe research project, funded by the European Commission, which aims at transforming food systems and food environments towards healthy and sustainable dietary behaviour. The questionnaire you are filling in aims to assess the needs and current local/national/EU initiatives implemented by food value chain actors (farmers, food industries, retailers, food services, restaurants) to foster dietary behaviour change and to improve food environments. This survey can be completed by different employees if necessary, as long as the answers are realistic and representative of the food value chain actor surveyed and as long as we receive only one answer per organisation (not per person). Thus, if you have a doubt on some answers, feel free to ask your colleagues.

Before continuing with the survey, we would like you to carefully read the information below:

My participation in this survey, as part of the PLAN'EAT project, carried out by the University of Leuven (BE) and the Council for Agricultural and Economics Research (IT), is voluntary. I have the right to terminate my participation at any time. I do not have to give a reason for doing so and I know that this cannot be to my detriment. The results of this research may be used for scientific purposes and may be published. My name will not be published. Anonymity and confidentiality of the data will be guaranteed at every stage of the research. Only general statistics will appear in the reports. If desired, I can leave my e-mail address (at the end of the survey) and I will receive a summary with the main findings of the survey. I am aware that I can always contact the CWG leaders for questions, complaints or more information.

General information

What is the name of your organisation?

Open answer: _____

In which country(ies) do you operate?

☐ *Belgium* ☐ *Germany* ☐ *Greece* ☐ *Spain* ☐ *France* ☐ *Hungary* ☐ *Ireland* ☐ *Italy* ☐ *Netherlands* ☐ *Poland* ☐ *Sweden.*

What is the size of your organisation?

☐ Below 50 employees ☐ 51-250 employees ☐ 251-1000 employees ☐ More than 1000 employees

How many meals per day do you serve?

☐ <100 meals ☐ 101-500 meals ☐ 501-2000 meals ☐ >2001 meals

Which type of catering are you?

☐ Education canteens ☐ Business and administrative catering ☐ Health-care catering ☐ Others: please specify: ___

What is your role in the organisation? *Please quote participating departments.*

Open answer: _____

What do you need to achieve a food system transition towards more healthy and sustainable diets?

We need more knowledge and best practicesto...

	Strongly disagre	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
identify what is a healthy, fair and sustainable food product						
change the sourcing and composition of our current meals to make them healthier, fairer and more sustainable						
change our assortment of meals to provide a healthier, fairer and more sustainable offer						
design new meals with low health, environmental and socio-economic impacts						

understand how to manage increased costs linked to a healthier, fairer and more sustainable offer						
understand how to nudge consumers to purchase this healthier, fairer and more sustainable food offer						
develop a communication strategy on our healthy and sustainable meals to encourage consumers to switch to these products						
Ensure that employees are properly trained and that their number reaches the technically requested minimum						

We need more vertical collaboration (= between suppliers and buyers) to:

Vertical collaboration brings together two or more food supply chain actors from different levels (e.g. farmers, food industries, retailers, restaurants and food services), increasing productivity and performance.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
engage in a joint transition to healthy and sustainable food environments with minimum additional costs (e.g. producers improve their practices and offer, consumers change their behaviour)						
reduce the negative externalities of food systems (e.g. greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.)						
change the sourcing and composition of our current food products to make them healthier, fairer and more sustainable (e.g. opt for local sourcing whenever possible)						
increase adherence to farmers services (e.g. direct supply from farmers to food services)						
ensure a fair remuneration for farmers						
cook and provide healthier, fairer and more sustainable meals						
increase the availability of healthy, sustainable and accessible meals						
provide sustainable, traceable, certified and fair short value chains at local/national level						
drive consumer demand towards healthier and more sustainable meals						
ensure that consumers are aware of the real cost/price of a healthy, sustainable and fair meal (and of the fact that a low-cost meal doesn't necessarily enable farmers to receive a fair remuneration)						
ensure that consumers are educated/aware of the environmental and health impacts of food products and meals (the ones to avoid/reduce, the ones to choose)						

We need more horizontal collaboration (= between actors from the same level of the value chain) to:

Horizontal collaboration is between actors in the same level of the value chain that, while not competing directly, market and sell to similar customers and consumers.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
share good practices, lessons learnt, feedback on experience in shifting to healthier, fairer and more sustainable food offers						
align in a joint transition to healthy and sustainable food environments (i.e. adopt the same best practices and communication messages to consumers) while keeping different offers, brand identities and Unique Selling Points.						

join forces to ask policy makers to address regulatory barriers (e.g. public procurement, rules, VAT regulation, etc.) to that transition						
reduce the negative externalities of food systems: greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.						
increase adherence to farmers services (e.g. direct supply to other food value chain actors)						
increase the availability of healthy, sustainable and accessible meals						
drive consumer demand towards healthier and more sustainable meals						
send a clear, common message to consumers on the environmental and health impacts of food products and meals (which ones to avoid/reduce, which ones to choose and eat more often)						

We need more government action to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
receive recognition, as an organisation, when applying healthy and sustainable best food practices (e.g. through a label, a price or local communication)						
agree on a EU mandatory label for meals with regard to their health, environmental and socio-economic impacts						
receive financial support to launch our transition to a healthier, fairer and more sustainable food offer						
OR receive financial support to find a profitability balance and offset the costs of this transition to a healthier, fairer and more sustainable food offer						
Increase taxes against food value chain actors not respecting best practices and not considerably reducing their health, environmental and socio-economic impacts						
overcome the barriers linked to public procurement (e.g. lowest price, non-consideration of social minimum of employment, lack of quality criteria considerations, VAT difference between outsourced and own management)						
eliminate irrealistic legal conditions (e.g. 27% VAT, payment terms-lengths)						
educate consumers about the real cost/price of a healthy, sustainable and fair meal						
educate consumers from kindergarden to university about food (e.g. food production, food waste) and its environmental and health impacts (which foods to avoid/reduce, which ones to choose)						

5. 2. What are your expectations, requirements and needs regarding PLAN'EAT?

5.1 To read first

The main objectives of **PLAN'EAT** are:

- to understand the underlying factors and drivers influencing dietary behaviour,
- to measure, compare and 'monetize' the environmental, social and health impacts of 3 dominant European dietary patterns through **True Cost Accounting (TCA)**, and
- to design effective recommendations, tools and interventions to allow food system actors to steer a transition towards healthier and more sustainable dietary behaviour.

PLAN'EAT will implement a systemic and co-creation approach at macro (food system), meso (food environment) and micro (individual) levels.

What are your expectations, requirements and needs regarding the project outcomes listed below?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
Identify and share trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food products through **True Cost Accounting (TCA).**						
Identify **macro-level** factors (food system drivers) influencing dietary behaviour across Europe (e.g., government policies, technologies, globalization, environmental issues)						
Identify **meso-level** factors influencing dietary behaviour across Europe (e.g., barriers and enablers to offer more healthy and sustainable food products and meals)						
Identify **micro-level** factors influencing dietary behaviour across Europe (e.g., physiological, lifestyle, social)						
Support **dietary advice** for consumers to adopt healthy and sustainable diets and design communication strategies to increase the acceptability of food and health policy interventions by all food system actors						
Setting up **innovative tools** to empower citizens to improve their dietary behaviour through dietary advice and education (e.g., personalised dietary & shopping advice app for citizens; specific educational programmes)						
Be considered as a candidate to integrate the list of food services recommended at local level in the personalised app						
Co-design **solutions**, as part of the CWG process, to improve food environments and foster behavioural change (e.g. optmised nudging strategies using behavioural selection mechanisms and factorial design)						
Setting up context-specific food policy recommendations to share at **local, national and European level**						
Provide **local authorities** with interventions targeting consumers to foster behavioural changes of different target populations (different age ranges, different socio-economic status, etc.)						

Which initiatives have you already implemented?

What are the most five important initiatives that you have been implementing, or that have been implemented in your country/region, since 2015 that have reached positive outcomes to shift to sustainable and healthy food environments/food systems?

Have you planned any other initiatives/actions for the (near) future? Please also mention eventual solutions for food waste/loss reduction and their measurement.
(Open answer: maximum 200 characters for each initiative)

Annex D4

SPG2 – Restaurants

Introduction

PLAN'EAT is a Horizon Europe research project, funded by the European Commission, which aims at transforming food systems and food environments towards healthy and sustainable dietary behaviour. The questionnaire you are filling in aims to assess the needs and current local/national/EU initiatives implemented by food value chain actors (farmers, food industries, retailers, food services, restaurants) to foster dietary behaviour change and to improve food environments. This survey can be completed by the manager/owner of the restaurant (only one person per restaurant).

Before continuing with the survey, we would like you to carefully read the information below:

My participation in this survey, as part of the PLAN'EAT project, carried out by the University of Leuven (BE) and the Council for Agricultural and Economics Research (IT), is voluntary. I have the right to terminate my participation at any time. The results of this research may be used for scientific purposes and may be published. The name of the respondent won't t be published. Anonymity and confidentiality of the data will be guaranteed at every stage of the research. Only general statistics will appear in the reports. If desired, you can leave your e-mail address (at the end of the survey) and you will receive a summary with the main findings of the survey. You can always contact my CWG leader for questions, complaints or more information.

General information

What is the name of your organisation?

Open answer: _____

In which country do you operate?

☐ *Belgium* ☐ *Germany* ☐ *Greece* ☐ *Spain* ☐ *France* ☐ *Hungary* ☐ *Ireland* ☐ *Italy* ☐ *Netherlands* ☐ *Poland* ☐ *Sweden.*

What is the size of your organisation?

☐ Micro company (less than 10 employees)

☐ Small company (less 50 employees)

☐ Medium size company (less than 250 employees)

What is your role in the organisation? (you can tick more than one)

☐ chef

☐ owner

☐ manager

☐ other please specify: _____

What type of restaurant are you? (you can tick more than one)

☐ Café (restaurants that offer a variety of food and drink options)

☐ Bistro (restaurants that serve simple, traditional dishes)

☐ Specialty restaurant (please specify): _____

☐ Gourmet (high-end dining experience)

☐ Buffet (offer self-service)

☐ Food truck

☐ Fast food

What do you need to achieve a food system transition towards more healthy and sustainable diets?

We need more knowledge about

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
identifying what is a healthy, fair and sustainable food product							
designing new meals with low health, environmental and socio-economic impacts							
change the sourcing and composition of our current meals to make them healthier, fairer and more sustainable							
ideas on how to build a healthier, fairer and more sustainable menu							
dealing with costs linked to healthier, fairer and more sustainable offer							
guiding consumers to purchase this healthier, fairer and more sustainable food offer							
developing a communication strategy on our healthy and sustainable meals to encourage consumers to switch to these options							

We need more vertical collaboration (= between suppliers and buyers) to:

Vertical collaboration brings together two or more food supply chain actors from different levels (e.g. farmers, food industries, retailers, restaurants and food services), increasing productivity and performance.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
commit to collaborate to move towards healthy and sustainable food environments							
take action to reduce the negative impact of food systems (e.g. greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.)							
ensure a fair price for farmers							
cook and provide healthier, fairer and more sustainable meals							
increase the availability of healthy, sustainable and accessible meals							
provide sustainable, traceable, certified and fair short value chains at local/national level							
drive consumer demand towards healthier and more sustainable meals							
ensure that consumers are aware of the real cost of healthy, sustainable and fair meal meal							
ensure that consumers are aware of the environmental and health impacts of food products and meals							

We need more horizontal collaboration (= between actors from the same level of the value chain) to:

Horizontal collaboration is between actors in the same level of the value chain that market and sell to similar customers and consumers.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
share good practices and feedback on experience in shifting to healthier, fairer and more sustainable meal offers.							
influence policy makers to address regulatory barriers so that transition to healthy and sustainable food offers is easier							

align our efforts to influence consumer demand towards healthier and more sustainable meals							
send a clear, common message to consumers on the environmental and health impacts of food products and meals (which ones to avoid/reduce, which ones to choose and eat more often)							

We need government to:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
formally recognize our sustainability efforts through formal labelling							
make actors in the supply chain comply with healthier, environmental and socio-economic standards							
provide subsidies to support restaurants actions towards transition to a healthier, fairer and more sustainable food offer							
increase taxes for food value chain actors not respecting best practices and not considerably reducing their health, environmental and socio-economic impacts							
educate consumers about the real cost of a healthy, sustainable and fair meal							
educate consumers about the environmental and health impacts of food products and meals (the ones to avoid/reduce, the ones to choose)							

What are your expectations, requirements and needs regarding PLAN'EAT?

To read first

The main objectives of **PLAN'EAT** are:

- to understand the underlying factors and drivers influencing dietary behaviour,
- to measure, compare and 'monetize' the environmental, social and health impacts of 3 dominant European dietary patterns through **True Cost Accounting (TCA)**, and
- to design effective recommendations, tools and interventions to allow food system actors to steer a transition towards healthier and more sustainable dietary behaviour.

PLAN'EAT will implement a systemic and co-creation approach at macro (food system), meso (food environment) and micro (individual) levels.

What are your expectations, requirements and needs regarding the project outcomes listed below?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
Identify trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food products through **True Cost Accounting (TCA)**							
Identify **macro-level** factors (food system drivers) influencing dietary behaviour across Europe (e.g., government policies, technologies, globalization, environmental issues)							
Identify **meso-level** factors influencing dietary behaviour across Europe (e.g., barriers and enablers to offer more healthy and sustainable food products and meals)							
Identify **micro-level** factors influencing dietary behaviour across Europe (e.g., physiological, lifestyle, social)							
Support **dietary advice** for consumers to adopt healthy and sustainable diets and design communication strategies to increase the acceptability of food and health policy interventions by all food system actors							

Setting up **innovative tools** to empower citizens to improve their dietary behaviour through dietary advice and education (e.g., personalised dietary & shopping advice app for citizens; specific educational programmes)							
Be considered as a candidate to integrate the list of restaurants recommended at local level in the personalised app							
Co-design **solutions**, as part of the CWG process, to improve food environments and foster behavioural change (e.g. optimised Green Key Label)							
Setting up context-specific food policy recommendations to share at **local, national and European level**							
Provide **local authorities** with interventions targeting consumers to foster behavioural changes of different target populations (different age ranges, different socio-economic status, etc.)							

Which initiatives have you already implemented?

What are the most five important initiatives that you have been implementing, or that have been implemented in your country/region, since 2015 that have reached positive outcomes to shift to sustainable and healthy food environments/food systems?

Have you planned any other initiatives/actions for the (near) future?
(Open answer: maximum 200 characters for each initiative)

Annex D5

SPG2 – Retailers

Introduction

PLAN'EAT is a Horizon Europe research project, funded by the European Commission, which aims at transforming food systems and food environments towards healthy and sustainable dietary behaviour. The questionnaire you are filling in aims to assess the needs and current local/national/EU initiatives implemented by food value chain actors (farmers, food industries, retailers, food services, restaurants) to foster dietary behaviour change and to improve food environments. This survey can be completed by different employees if necessary, as long as the answers are realistic and representative of the food value chain actor surveyed and as long as we receive only one answer per organisation (not per person). Thus, if you have a doubt on some answers, feel free to ask your colleagues.

Before continuing with the survey, we would like you to carefully read the information below:

My participation in this survey, as part of the PLAN'EAT project, carried out by the University of Leuven (BE) and the Council for Agricultural and Economics Research (IT), is voluntary. I have the right to terminate my participation at any time. I do not have to give a reason for doing so and I know that this cannot be to my detriment. The results of this research may be used for scientific purposes and may be published. My name will not be published. Anonymity and confidentiality of the data will be guaranteed at every stage of the research. Only general statistics will appear in the reports. I will receive a summary with the main findings of the survey. I am aware that I can always contact the CWG leaders for questions, complaints or more information.

General information

What is the name of your organisation?

Open answer: _____

In which country(ies) do you operate?

☐ *Belgium* ☐ *Germany* ☐ *Greece* ☐ *Spain* ☐ *France* ☐ *Hungary* ☐ *Ireland* ☐ *Italy* ☐ *Netherlands* ☐ *Poland* ☐ *Sweden.*

What is the size of your organisation?

☐ SME ☐ Large company

Which type of retailer are you?

☐ Small food store ☐ Market ☐ Centralised supermarket ☐ Decentralised supermarket

Which types of food products are you distributing?

☐ Organic food products ☐ Conventional food products ☐ All types of food products ☐ Only specific food products, please specify (and specify if organic or not)_____

What is your role in the organisation?

Open answer: _____

What do you need to achieve a food system transition towards more healthy and sustainable diets?

We need more knowledge and best practices to:

	Strongly disagre	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
identify what is a healthy, fair and sustainable food product						
change our assortment of food products to provide a healthier, fairer and more sustainable offer						
understand how to manage increased costs linked to a healthier, fairer and more sustainable offer						
understand how to guide consumers to purchase and pay more for this healthier, fairer and more sustainable food offer						
develop a communication strategy on our healthy and sustainable food products to encourage consumers to switch to these options						

We need more vertical collaboration (= between suppliers and buyers) to:

Vertical collaboration brings together two or more food supply chain actors from different levels (e.g. farmers, food industries, retailers, restaurants and food services), increasing productivity and performance.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
engage in a joint transition to healthy and sustainable food environments with minimum additional costs (e.g. producers improve their practices and offer, consumers change their dietary behaviour)							
take action to reduce the negative impact of food systems (e.g. greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.)							
ensure a fair remuneration for farmers							
provide healthier, fairer and more sustainable food products							
increase the availability of healthy, sustainable and accessible food products							
provide sustainable, traceable, certified and fair short value chains at local/national level							
drive consumer demand towards healthier and more sustainable food products							
ensure that consumers are aware of the real cost/price of a healthy, sustainable and fair food product (and of the fact that a low-cost food product doesn't enable farmers to receive a fair remuneration)							
ensure that consumers are educated/aware of the environmental and health impacts of food products and meals (the ones to avoid/reduce, the ones to choose/favour)							

We need more horizontal collaboration (= between actors from the same level of the value chain) to:

Horizontal collaboration is between actors in the same level of the value chain that, while not competing directly, market and sell to similar customers and consumers.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
share good practices, lessons learnt, feedback on experience in shifting to healthier, fairer and more sustainable food offers							
align in a joint transition to healthy and sustainable food environments (i.e. adopt the same best practices and communication messages to consumers) while keeping different offers, brand identities and Unique Selling Points (USP)							
join our forces to ask policy makers to address regulatory barriers to that transition (e.g. public procurement, VAT regulation, etc.)							
reduce the negative externalities of food systems: greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.							
increase the availability of healthy, sustainable and accessible food products							
drive consumer demand towards healthier and more sustainable food products							
send a clear, common message to consumers on the environmental and health impacts of food products (which products to avoid/reduce, which products to choose and eat more often)							

We need more government action to:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
receive recognition, as an organisation, when applying healthy and sustainable best food practices (e.g. through a label, a price or local communication)							
agree on a EU mandatory label for food products with regard to their health, environmental and socio-economic impacts							
receive financial support to launch our transition to a healthier, fairer and more sustainable food offer							
OR receive financial support to find a profitability balance and offset the costs of this transition to a healthier, fairer and more sustainable food offer							
increase taxes for food value chain actors who do not respect best practices and do not considerably reduce their health, environmental and socio-economic impacts							
overcome any potential barriers linked to public procurement (e.g. Green Public Procurement) (e.g. lowest price, non-consideration of social minimum of employment, lack of quality criteria considerations, VAT difference between outsourced and own management)							
educate consumers about the real cost/price of a healthy, sustainable and fair food products							
educate consumers about the environmental and health impacts of food products and meals (the ones to avoid/reduce, the ones to choose)							

6. 2. What are your expectations, requirements and needs regarding PLAN'EAT?

6.1 To read first

The main objectives of **PLAN'EAT** are:

- to understand the underlying factors and drivers influencing dietary behaviour,
- to measure, compare and 'monetize' the environmental, social and health impacts of 3 dominant European dietary patterns through **True Cost Accounting (TCA)**, and
- to design effective recommendations, tools and interventions to allow food system actors to steer a transition towards healthier and more sustainable dietary behaviour.

PLAN'EAT will implement a systemic and co-creation approach at macro (food system), meso (food environment) and micro (individual) levels.

What are your expectations, requirements and needs regarding the project outcomes listed below?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
Identify trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food products through **True Cost Accounting (TCA)**							
Identify **macro-level** factors (food system drivers) influencing dietary behaviour across Europe (e.g., government policies, technologies, globalization, environmental issues)							
Identify **meso-level** factors influencing dietary behaviour across Europe (e.g., barriers and enablers to offer more healthy and sustainable food products and meals)							
Identify **micro-level** factors influencing dietary behaviour across Europe (e.g., physiological, lifestyle, social)							
Support **dietary advice** for consumers to adopt healthy and sustainable diets and design communication strategies to increase the acceptability of food and health policy interventions by all food system actors							
Setting up **innovative tools** to empower citizens to improve their dietary behaviour through dietary advice and education (e.g., personalised dietary & shopping advice app for citizens; specific educational programmes)							
Be considered as a candidate to integrate the list of food providers recommended at local/national level in the personalised app							
Co-design solutions, as part of the CWG process, to improve food environments and foster behavioural change (such as spefic design and strategic placement to promote healthy and sustainable dietary choices in supermarket and food outlets)							
Setting up food policy recommendations specific to different contexts to share at **local, national and European level**							
Provide **local authorities** with interventions targeting consumers to foster behavioural changes of different target populations (different age ranges, different socio-economic status, etc.)							

7. 3. Which initiatives have you already implemented?

What are the most five important initiatives that you have been implementing, or that have been implemented in your country/region, since 2015 that have reached positive outcomes to shift to sustainable and healthy food environments/food systems?

Have you planned any other initiatives/actions for the (near) future? Please also mention eventual solutions for food waste/loss reduction and their measurement.
(Open answer: maximum 200 characters for each initiative)

Annex D6

SPG2 – Healthcare professionals

Introduction

PLAN'EAT is a Horizon Europe research project, funded by the European Commission, which aims at transforming food systems and food environments towards healthy and sustainable dietary behaviour. The questionnaire you are filling in aims to assess the needs and current local/national/EU initiatives implemented by healthcare professionalsto foster dietary behaviour change and to improve food environments. The aim of this survey is to collect needs, requirements and existing initiatives to achieve the transition that PLAN'EAT project is pursuing. In particular, this is an explorative survey of which results will be used for the project implementation. The survey can be completed by different professionals if necessary, as long as the answers are realistic and representative of the actor surveyed and as long as we receive only one answer per organisation (not per person). Thus, if you have a doubt on some answers, feel free to ask your colleagues.

Before continuing with the survey, we would like you to carefully read the information below:
My participation in this survey, as part of the PLAN'EAT project, carried out by the University of Leuven (BE) and the Council for Agricultural and Economics Research (IT), is voluntary. I have the right to terminate my participation at any time. I do not have to give a reason for doing so and I know that this cannot be to my detriment. The results of this research may be used for scientific purposes and may be published. My name will not be published. Anonymity and confidentiality of the data will be guaranteed at every stage of the research. Only general statistics will appear in the reports. I will receive a summary with the main findings of the survey. I am aware that I can always contact the CWG leaders for questions, complaints or more information.

General information

What is the name of your organization and in which country is it based?

Open answer: _____

In which country do you operate?

☐ *Belgium* ☐ *Germany* ☐ *Greece* ☐ *Spain* ☐ *France* ☐ *Hungary* ☐ *Ireland* ☐ *Italy* ☐ *Netherlands* ☐ *Poland* ☐ *Sweden.*

In which type of organization do you work?

☐ Public hospital ☐ Private hospital ☐ Clinic ☐ Private practice ☐ Liberal/self-employed ☐ Health center ☐ Assisted living facility ☐ Other: please specify_____

Which type of health care professionals/health scientist are you?

☐ Nutritionist/dietician ☐ Nurse ☐ Physician ☐ Caregiver

If you are a medical specialist, what is your area of expertise/specialisation"

☐ Paediatricians ☐ General practitioners ☐ Endocrinologists ☐Gastroenterologists ☐Cardiovascular specialists ☐Psychologists ☐Other: please specify

What do you need to achieve a transition towards more healthy and sustainable diets among your patients?

Definitions:

- ***Sustainable diets*** are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. These diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources. (FAO, 2010, Sustainable Diets and Biodiversity.)
- ***Food environment*** is the physical, economic, political and socio-cultural context in which consumers interact with the food system to make their decisions concerning purchasing, preparing and consuming food. The food environment key

elements that influence consumer food choices, food acceptability and diets are: physical and economic access to food (proximity and affordability); food promotion; advertising and information; and food quality and safety.

1. We need more knowledge and best practices to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
identify the healthy and sustainable food products to recommend to patients, according to their age, socio-economic and health status						
refine or create new disease (notably non-communicable diseases – NDCs) prevention and awareness raising programs, adjusted to different population groups						
refine or create healthier and more sustainable dietary recommendations to share to patients, adjusted to different population groups						
educate patients about the health and environmental impacts of food products and meals (the ones to avoid/reduce, the ones to choose)						
educate patients about the link between dietary patterns and health (notably according to their health status)						
implement dietary behavioural change interventions and techniques with our patients, as prevention or cure of NCDs, malnutrition and eating disorders						
For hospitals / healthcare centers offering catering: offer healthier, tastier and more sustainable menus in hospital / health centers catering						
For hospitals / healthcare centers offering catering: understand how to manage increased costs linked to a healthier, tastier and more sustainable food catering						
understand how to guide patients to select and eat these healthier and more sustainable food products and meals						
develop a communication strategy on healthy and sustainable food products to encourage patients to select and eat these options						
Provide patients with practical and easy tools to change their dietary patterns (emphasizing the importance of the context/food environment)						

*the yellow items are those addressed to healthcare professionals who offer catering

We need more vertical collaboration (= between suppliers and buyers) to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
For hospitals / healthcare centers offering catering: provide healthier, tastier and more sustainable food products and meals in hospitals / health centers						
For hospitals / healthcare centers offering catering: ensure the acceptance and attractiveness of these healthier and more sustainable food products and meals among patients						

*the yellow items are those addressed to healthcare professionals who offer catering

We need more collaboration between actors in the health sector to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
share good practices, feedback on experience in shifting to healthier and more sustainable dietary behaviour						
join our forces to ask policy makers to address regulatory barriers to that transition (e.g. economic and accessibility barriers)						

send a clear, common message to citizens on the health and environmental impacts of food products (which products to avoid/reduce, which products to choose and eat more often)						

We need more government action to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
For hospitals / healthcare centers offering catering: receive financial support to implement behavioural change interventions / awareness raising campaigns						
For hospitals / healthcare centers offering catering: receive recognition, as an organisation, when applying healthy and sustainable best food practices (e.g. through an incentive, a prize, local communication)						
For hospitals / healthcare centers offering catering: overcome any potential barriers linked to public procurement (e.g. set minimum criteria on health and sustainability)						

*the yellow items are those addressed to healthcare professionals who offer catering

What are your expectations, requirements and needs regarding PLAN'EAT?

To read first

The main objectives of **PLAN'EAT** are:

- to understand the underlying factors and drivers influencing dietary behaviour,
- to measure, compare and 'monetize' the environmental, social and health impacts of 3 dominant European dietary patterns through **True Cost Accounting (TCA)**, and
- to design effective recommendations, tools and interventions to allow food system actors to steer a transition towards healthier and more sustainable dietary behaviour.

PLAN'EAT will implement a systemic and co-creation approach at macro (food system), meso (food environment) and micro (individual) levels.

What are your expectations, requirements and needs regarding the project outcomes listed below?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
Identify best practices to reduce the health, environmental and socio-economic impacts of food consumption						
Identify **macro-level** factors (food system drivers) influencing dietary behaviour across Europe (e.g., regulatory and economic drivers, health system drivers)						
Identify **meso-level** factors influencing dietary behaviour across Europe (e.g., barriers and enablers to offer more healthy and sustainable food products and meals)						
Identify **micro-level** factors influencing dietary behaviour across Europe (e.g., physiological, lifestyle, social)						
Support tailored **dietary advice** for citizens to adopt healthy and sustainable diets and to support their behavioural transition, health promotion, disease prevention and care.						
Design communication strategies to increase the acceptability of food and health policy interventions by all food system actors						

Set up **innovative tools** to empower citizens to improve their dietary behaviour through dietary advice and education (e.g., personalised dietary & shopping advice app for citizens; specific educational programmes)						
Set up food policy recommendations specific to different contexts to share at **local, national and European level**						
Provide **healthcare professionals** with a behavioural change intervention toolbox tailored for specific behaviours, contexts and population groups (different age ranges, socio-economic status, health status, etc.)						
Test those interventions in 2 clinical studies targeting children and adolescents with obesity and adults and elderly with diabetes.						

Which initiatives have you already implemented?

What are the most five important initiatives that you/your organization have been implementing, or that have been implemented in your country/region since 2015, that have reached positive outcomes to shift to sustainable and healthy diets/food environments/food systems?
Have you planned any other initiatives/actions for the (near) future?

Are you aware of other EU initiatives which could be relevant on this matter?
(Open answer: maximum 200 characters for each initiative)

Annex D7

SPG2 – Educational System

Introduction

PLAN'EAT is a Horizon Europe research project, funded by the European Commission, which aims at transforming food systems and food environments towards healthy and sustainable dietary behaviour. The questionnaire you are filling in aims to assess the needs and current local/national/EU initiatives implemented by educational systems to foster dietary behaviour change and to improve food environments. This survey should be completed by the school manager or principal, by involving teachers, as long as the answers are realistic and representative of the actor surveyed and as long as we receive only one answer per organisation (not per person). Thus, if you have a doubt on some answers, feel free to ask your colleagues.

Before continuing with the survey, we would like you to carefully read the information below:

My participation in this survey, as part of the PLAN'EAT project, carried out by the University of Leuven (BE) and the Council for Agricultural and Economics Research (IT), is voluntary. I have the right to terminate my participation at any time. I do not have to give a reason for doing so and I know that this cannot be to my detriment. The results of this research may be used for scientific purposes and may be published. My name will not be published. Anonymity and confidentiality of the data will be guaranteed at every stage of the research. Only general statistics will appear in the reports. I will receive a summary with the main findings of the survey. I am aware that I can always contact the CWG leaders for questions, complaints or more information.

General information

What is the name of your institution?

Open answer: _____

In which country do you operate?

☐ *Belgium* ☐ *Germany* ☐ *Greece* ☐ *Spain* ☐ *France* ☐ *Hungary* ☐ *Ireland* ☐ *Italy* ☐ *Netherlands* ☐ *Poland* ☐ *Sweden.*

Which type of educational system are you? (you can tick multiple boxes)

☐ Pre-school/Kindergartens ☐ Primary schools ☐ Secondary schools ☐Universities

☐Vocational education ☐ Other: (please specify)_____

What is the size of your institution?

☐ <100 students ☐100-200 students ☐ 200-500 students ☐ 500 – 1000 students ☐>1000 students

What is the role of the respondents (you can tick multiple)?

Teacher

Principal

Manager/administrator of the school

Others: (please specify) _____

What do you needto participate to the food system transition towards more healthy and sustainable diets?

Some key definition:

- **Sustainable diet:** diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources.
- **Food environments**: refers to the context in which consumers make their decisions about acquiring, preparing and consuming food (e.g. physical and economic access to food (proximity and affordability), food promotion, advertising)

We need more knowledge and best practices to:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
understand and provide training to teachers about healthy, fair and sustainable diets: what do they mean? Why are they important?						
include (or better include) in educational programs lessons and tools fostering healthy and sustainable dietary behaviour (from the youngest age)						
create (or improve) practical lessons to make students aware of what a healthy and sustainable diet is and why it is important to adopt one (e.g. workshops with pictures, cooking classes, gardening classes)						
organise field visits by collaborating with local food value chain actors (e.g. farmers)						
educate about the health, socio-economic and environmental impacts of food						
teach students about the real price of food, with minimum health, socio-economic and environmental impacts (e.g. ensuring a fair remuneration for farmers)						
teach students how to select foods to buy, notably how to read/identify labels						
provide training to teachers about these new food-related lessons						
improve the food offer of the school/university canteen, by providing more healthy and sustainable options						
develop a communication and nudging strategy to encourage students to choose these healthier and more sustainable food options (e.g. divulgative leaflets, etc.)						
provide healthier and more sustainable food products and drinks in the vending machines, by encouraging students to choose them						

We need more vertical collaboration (= between suppliers and buyers) to:

provide healthier, tastier and more sustainable meals in canteens (e.g. include more vegetarian / organic / local options)						
guide students to choose these healthier and more sustainable food products, and reduce food waste to its minimum						
directly supply from local farmers (while ensuring a fair remuneration for farmers and a fair price for students)						
provide inevitable food waste to recycling structures (e.g. for compost, methanisation)						

We need more collaboration between educational systems (from all levels) to:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
share good practices, lessons learnt, student feedback on school projects focused on promoting healthy and sustainable dietary behaviour among students							
align in a joint transition to healthy and sustainable school/university food environments (e.g. between primary and secondary school of the same area, by adopting the same strategy and communication messages to students within school canteens)							
increase the availability of healthy, sustainable and accessible food products in school/university canteens and vending machines							
nudge students towards healthier and more sustainable food choices							
send a clear, common message to students on the environmental and health impacts of food products (which products to avoid/reduce, which products to choose and eat more often)							

We need more government action to:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
set an education framework with curriculums including lessons on healthy and sustainable diets and behavioural change techniques (e.g. healthy and sustainable eating plans in school canteens, mandatory lessons/workshop in food & sustainability)							
receive financial support to launch school projects based on improving students' awareness on what is a healthy, fair and sustainable food system and why it's important (e.g training teachers, creation of school gardens, access to facilities, etc.)							
set up food vouchers for students with low socio-economic status (SES) or subventions for canteens to make sure each student (no matter their SES) can access healthy, fair and sustainable food							
receive recognition, as a school or university, when there are projects/initiatives/ lessons on fostering healthy and sustainable dietary behaviour among students (e.g. through incentives, local communication, etc.)							

set up regulations to limit the consumption of animal-based products in school/university catering and increase the consumption of plant-based products							
overcome any potential barriers linked to public procurement for canteens							
design national communication strategies aligned with the healthy and sustainable food education programs to educate students about the real cost/price of a healthy, sustainable and fair food products							
design national communication strategies aligned with the healthy and sustainable food education programs to educate students about the environmental and health impacts of food products and meals (the ones to avoid/reduce, the ones to choose)							

What are your expectations, requirements and needs regarding PLAN'EAT?

To read first

The main objectives of **PLAN'EAT** are:

- to understand the underlying factors and drivers influencing dietary behaviour,
- to measure, compare and 'monetize' the environmental, social and health impacts of 3 dominant European dietary patterns through **True Cost Accounting (TCA)**, and
- to design effective recommendations, tools and interventions to allow food system actors to steer a transition towards healthier and more sustainable dietary behaviour.

PLAN'EAT will implement a systemic and co-creation approach at macro (food system), meso (food environment) and micro (individual) levels.

What are your expectations, requirements and needs regarding the project outcomes listed below?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Agree	Strongly agree	NA (not applicable for my case)
Identify **macro-level** factors (food system drivers) influencing dietary behaviour across Europe (e.g., drivers linked to education)							
Identify **meso-level** factors influencing dietary behaviour across Europe (e.g., barriers and enablers to offer more healthy and sustainable food products and meals, notably in canteens)							
Identify **micro-level** factors influencing dietary behaviour across Europe (e.g., physiological, lifestyle, social, peer effects across students)							
Support **dietary advice** for students to adopt healthy and sustainable diets and design communication strategies to increase the acceptability of food and health policy interventions by all food system actors							
Setting up **innovative tools** to empower students to improve their dietary behaviour through dietary advice and education (e.g., personalised dietary & shopping advice app for citizens; specific educational programmes)							
Sett up food policy recommendations specific to different contexts to share at **local, national and European level** (including educational aspects)							

Provide **local authorities** and educational systems with interventions targeting students to foster behavioural changes of different target populations (different age ranges, different socio-economic status, etc.)							

Which initiatives have you already implemented?

What are the most five important initiatives that you have been implementing, or that have been implemented in your country/region, since 2015 that have reached positive outcomes to shift to sustainable and healthy food environments/food systems?
Open answer: _____

Have you planned any other initiatives/actions for the (near) future?
Open answer: (maximum 200 characters for each initiative)

What content is already existing in your curriculum about healthy, fair and sustainable food?
Open answer: (maximum 200 characters for each initiative)

Annex D8

SPG2 – Policy makers, public authorities, NGOs

Introduction

PLAN'EAT is a Horizon Europe research project, funded by the European Commission, which aims at transforming food systems and food environments towards healthy and sustainable dietary behaviour. The questionnaire you are filling in aims to assess the needs and current local/national/EU initiatives implemented by policymakers, public authorities and NGOs (at local, national or EU level) to foster dietary behaviour change and to improve food environments. This survey can be completed by different employees if necessary, as long as the answers are realistic and representative of the actor surveyed and as long as we receive only one answer per organisation (not per person). Thus, if you have a doubt on some answers, feel free to ask your colleagues.

Before continuing with the survey, we would like you to carefully read the information below:

My participation in this survey, as part of the PLAN'EAT project, carried out by the Council for Agricultural and Economics Research (CREA - IT), is voluntary. I have the right to terminate my participation at any time. I do not have to give a reason for doing so and I know that this cannot be to my detriment. The results of this research may be used for scientific purposes and may be published. My name will not be published. Anonymity and confidentiality of the data will be guaranteed at every stage of the research. Only general statistics will appear in the reports. I will receive a summary with the main findings of the survey. I am aware that I can always contact CREA for questions, complaints or more information.

General information

What is the name of your organisation?

Open answer: _____

In which country(ies) are you based?

☐ *Belgium* ☐ *Germany* ☐ *Greece* ☐ *Spain* ☐ *France* ☐ *Hungary* ☐ *Ireland* ☐ *Italy* ☐ *Netherlands* ☐ *Poland* ☐ *Sweden.*

Which type of policymaker are you?

☐ Municipal ☐ Regional ☐ National ☐ EU ☐ Supranational ☐Other: please specify_____

What is your role in your organisation?

Open answer: _____

What do you need to achieve a food system transition towards more healthy and sustainable diets?

We need more knowledge and best practices to:

	Order from 1 to 4

identify what a healthy, fair and sustainable food product looks like	
understand how to manage increased costs linked to a healthier, fairer and more sustainable food offer	
understand how to guide consumers to purchase and pay more for this healthier, fairer and more sustainable food offer, e.g. through nudging	
develop a communication strategy on healthy, fair and sustainable food products to encourage consumers to switch to these options	

We need food value chain actors (farmers, food industries, retailers, restaurants, food services) to:

	Order from 1 to 9
engage in a joint transition to healthy and sustainable food environments (e.g. producers improve their practices and offer, consumers change their dietary behaviour)	
take action to reduce the negative impact of food systems (e.g. greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.)	
ensure a fair remuneration for farmers	
increase the availability of healthy, sustainable and accessible food products	
provide sustainable, traceable, certified and fair short value chains at local/national level	
drive consumer demand towards healthier and more sustainable food products	
ensure that consumers are aware of the real cost/price of a healthy, sustainable and fair food product (and of the fact that a low-cost food product doesn't enable farmers to receive a fair remuneration)	
ensure that consumers are educated/aware of the environmental and health impacts of food products and meals (the ones to avoid/reduce, the ones to choose/favour)	
share their barriers and enablers with policymakers	

We need more horizontal collaboration (= between policymakers) to:

	Order from 1 to 7
share good practices, lessons learnt, feedback on experience in shifting to healthier, fairer and more sustainable food systems	
align in a joint transition to healthy and sustainable food systems (i.e. adopt the same best practices and communication messages to consumers)	
address regulatory barriers to that transition (e.g. public procurement, VAT regulation, etc.)	
reduce the negative externalities of food systems: greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.	
increase the availability of healthy, sustainable and accessible food products	
drive consumer demand towards healthier and more sustainable food products	
send a clear, common message to consumers on the environmental and health impacts of food products (which products to avoid/reduce, which products to choose and eat more often)	

As governmental actors, we need to:

	Order from 1 to 9
provide recognition to organisations applying healthy and sustainable best food practices (e.g. through a label, a price or local communication)	
agree on EU mandatory labels for food products with regard to their health, environmental and socio-economic impacts	
provide financial support for food chain actors to launch their transition to a healthier, fairer and more sustainable food offer	
provide financial support to actors who already launched their transition but struggle to find a profitability balance and offset the costs	
increase taxes or introduce fines for food value chain actors who do not respect best practices and do not considerably reduce their health, environmental and socio-economic impacts	
overcome any potential barriers linked to public procurement (e.g. Green Public Procurement)	
educate consumers about the real cost/price of a healthy, sustainable and fair food products	
educate consumers about the environmental and health impacts of food products and meals (the ones to avoid/reduce, the ones to choose)	
Not applicable (e.g. for NGOs)	

What are your expectations, requirements and needs regarding PLAN'EAT?To read first

The main objectives of **PLAN'EAT** are:

- to understand the underlying factors and drivers influencing dietary behaviour,
- to measure, compare and 'monetize' the environmental, social and health impacts of 3 dominant European dietary patterns through **True Cost Accounting (TCA)**, and
- to design effective recommendations, tools and interventions to allow food system actors to steer a transition towards healthier and more sustainable dietary behaviour.

PLAN'EAT will implement a systemic and co-creation approach at macro (food system), meso (food environment) and micro (individual) levels.

Which of the project outcomes listed below match the most your requirements and needs?

	Order from 1 to 9
Identify trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food systems through **True Cost Accounting (TCA)**	
Apprehend **macro-level** factors (food system drivers) influencing dietary behaviour across Europe (e.g., government policies, technologies, globalization, environmental issues)	
Apprehend **meso-level** factors influencing dietary behaviour across Europe (e.g., barriers and enablers to offer more healthy and sustainable food products and meals)	
Apprehend **micro-level** factors influencing dietary behaviour across Europe (e.g., physiological, lifestyle, social)	
Support **dietary advice** for consumers to adopt healthy and sustainable diets and design communication strategies to increase the acceptability of food and health policy interventions by all food system actors	
Set up **innovative tools** to empower citizens to improve their dietary behaviour through dietary advice and education (e.g., personalised dietary & shopping advice app for citizens; specific educational programmes)	
Co-design **solutions** to improve food environments and foster behavioural change (such as best practices and communication tools based on True Cost Accounting)	
Set up integrated food policy recommendations specific to different contexts to share at **local, national and European level**	
Provide **local authorities** with interventions targeting consumers to foster behavioural changes of different target populations (different age ranges, different socio-economic status, etc.)	

Which initiatives have you already implemented?

What are the five most important initiatives that you have been implementing, or that have been implemented in your country/region/city, since 2015 that have reached positive outcomes to shift to sustainable and healthy food environments/food systems? Feel free to include links to relevant projects.

Have you planned any other initiatives/actions for the (near) future?
(Open answer: maximum 200 characters for each initiative)

Annex D9

SPG2 – Citizens

Introduction

PLAN'EAT is a Horizon Europe research project, funded by the European Commission, which aims at transforming food systems and food environments towards healthy and sustainable dietary behaviour. The questionnaire you are filling in aims to assess your needs and current initiatives as EU citizen to improve your dietary behaviour.
Before continuing with the survey, we would like you to carefully read the information below:
My participation in this survey, as part of the PLAN'EAT project, carried out by the University of Leuven (BE) and the Council for Agricultural and Economics Research (IT), is voluntary. I have the right to terminate my participation at any time. I do not have to give a reason for doing so and I know that this cannot be to my detriment. The results of this research may be used for scientific purposes and may be published. My name will not be published. Anonymity and confidentiality of the data will be guaranteed at every stage of the research. Only general statistics will appear in the reports. I will receive a summary with the main findings of the survey. I am aware that I can always contact the CWG leaders for questions, complaints or more information.

General information

General Information

What gender do you identify with?

- ○ Male
- ○ Female
- ○ Non-binary / third gender

Please indicate your age (in years):

☐ 18-35
☐ 36-45
☐ 46-55
☐ 56-65
☐ >65

In which country do you live?

☐ *Belgium* ☐ *Germany* ☐ *Greece* ☐ *Spain* ☐ *France* ☐ *Hungary* ☐ *Ireland* ☐ *Italy* ☐ *Netherlands* ☐ *Poland* ☐ *Sweden*

What do you need to shift to healthier and more sustainable diets?

I need more knowledge and best practices to:

Some key definitions:

- **Dietary behaviour**: result of the interplay between eating habits (automatic responses) and intentions (conscious choices)
- **Food systems**: refers to policies, macroeconomic mechanisms, infrastructure and other constitutive elements of food systems.

		Yes
	identify what is a healthy diet	
	identify what is sustainable diet	
	understand labels and select the most official/appropriate	
	understand the impact of food on health, on the environment and on the society	
	identify the best diets for my health and for the environment	
	adopt one of these healthier and more sustainable diets in the long run	
	understand which factors influence my dietary behaviour, e.g. intrapersonal (physiological, psychological, sociodemographic and lifestyle) and interpersonal (family, peers, social norms, culture) and how they interact	
	change my dietary behaviour to maintain these healthy and sustainable diets in the long run	
	cook healthier and more sustainable meals, with good taste	

I need more time, budget or motivation/willingness to:

		Time	Motivation/Willingness	Budget
	purchase healthier and more sustainable food products (e.g. organic, local, without packaging).			
	cook healthy, sustainable and tasty meals			
	better manage my groceries (e.g. avoid food waste, store food without packaging)			
	reduce my consumption of unhealthy (e.g. high in sugar, fat and salt) and/or unsustainable (e.g. beef-based) food products			
	change my eating habits			

I need food providers (farmers, food industries, retailers (e.g. supermarkets), food services (e.g. canteens), restaurants) to:

		Yes
	increase the accessibility and availability of healthy, tasty and sustainable food	
	improve their food offer to make it healthier, fairer and more sustainable	
	supply as fairly and locally as possible (e.g. ensure a fair remuneration for farmers)	

	make an effort for atransition to healthy and sustainable food environments	
	reduce the negative impact of food systems (e.g. greenhouse gas emissions, energy consumption, polluting production methods, loss of seasonality, etc.)	
	reduce the amount of food advertising (especially for unhealthy/unsustainable products)	

I need the government (local or national) to:

		Yes
	provide food vouchers to people with low socio-economic status (vouchers that could be used only to purchase healthy and sustainable food)	
	ensure accessibility to healthy and sustainable food (e.g. especially in rural areas or priority neighbourhoods)	
	develop easy to understand labels and communication strategies to identify healthy and sustainable food products	
	decrease taxes on healthier and more sustainable food products	
	remove unsustainable food products from the shelves (e.g. no strawberries in winter, supermarkets should only sell sustainably sourced fish, etc.)	

Which of the project outcomes listed below match your needs the most?

	Yes
Understand factors influencing dietary behaviour (e.g., physiological, lifestyle, social) for different population groups (different age, health status, socio-economic status, geographic area) as well as the interaction between these factors	
Providing communication and education tools to enable citizens to make informed food choices and develop better dietary habits.	
Providing easy-to-understand national food-based dietary guidelines (taking ethical, health and environmental factors as well as your context and local culture into account)	
Develop a personalised web-based tool providing personalised meal plan suggestions, based on individual nutrient requirements, sustainability criteria, food preferences and socioeconomic circumstances.	
Provide local authorities, healthcare providers and educational systems with interventions targeting consumers to foster behavioural changes of different populations groups.	

Your diet:

Do you consider your current diet to be… (Identify your level from 1 (not very) to 5 (very))

	1	2	3	4	5
Healthy					
Sustainable					

Annex D10

Tables and figures

Food value chain actors

PRIMARY PRODUCERS

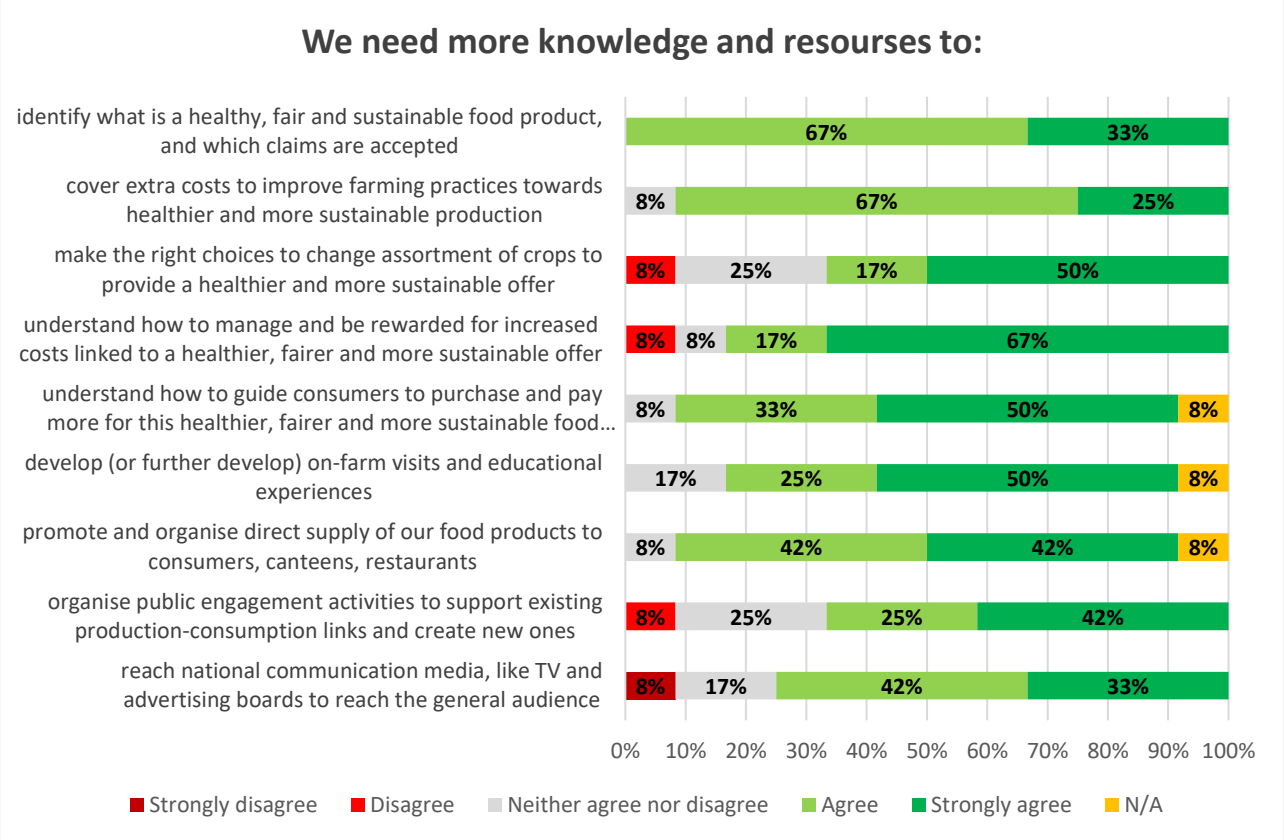


Figure 1. What primary producers need in terms of knowledge and resources (CWG).

Table 1. What primary producers need in terms of knowledge and resources (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
identify what is a healthy, fair and sustainable food product, and which claims are accepted	0%	12%	12%	26%	50%	0%
cover extra costs to improve our farming practices towards healthier and more sustainable production	0%	0%	25%	12%	63%	0%
make the right choices to change our assortment of crops to provide a healthier and more sustainable offer	0%	0%	13%	25%	62%	0%
understand how to manage and be rewarded for increased costs linked to an improved offer	0%	0%	13%	37%	50%	0%
understand how to guide consumers to purchase and pay more for this improved food offer	0%	0%	12%	13%	75%	0%

develop (or further develop) on-farm visits and educational experiences (e.g. with school children)	0%	0%	25%	13%	62%	0%
promote and organise direct supply of our food products to consumers, canteens, restaurants	0%	14%	14%	14%	57%	0%
organise public engagement activities (farm days, exhibitions, participatory events) to support existing production-consumption links and create new ones	0%	0%	13%	37%	50%	0%
reach national communication media, like TV and advertising boards to reach the general audience	0%	13%	25%	37%	25%	0%

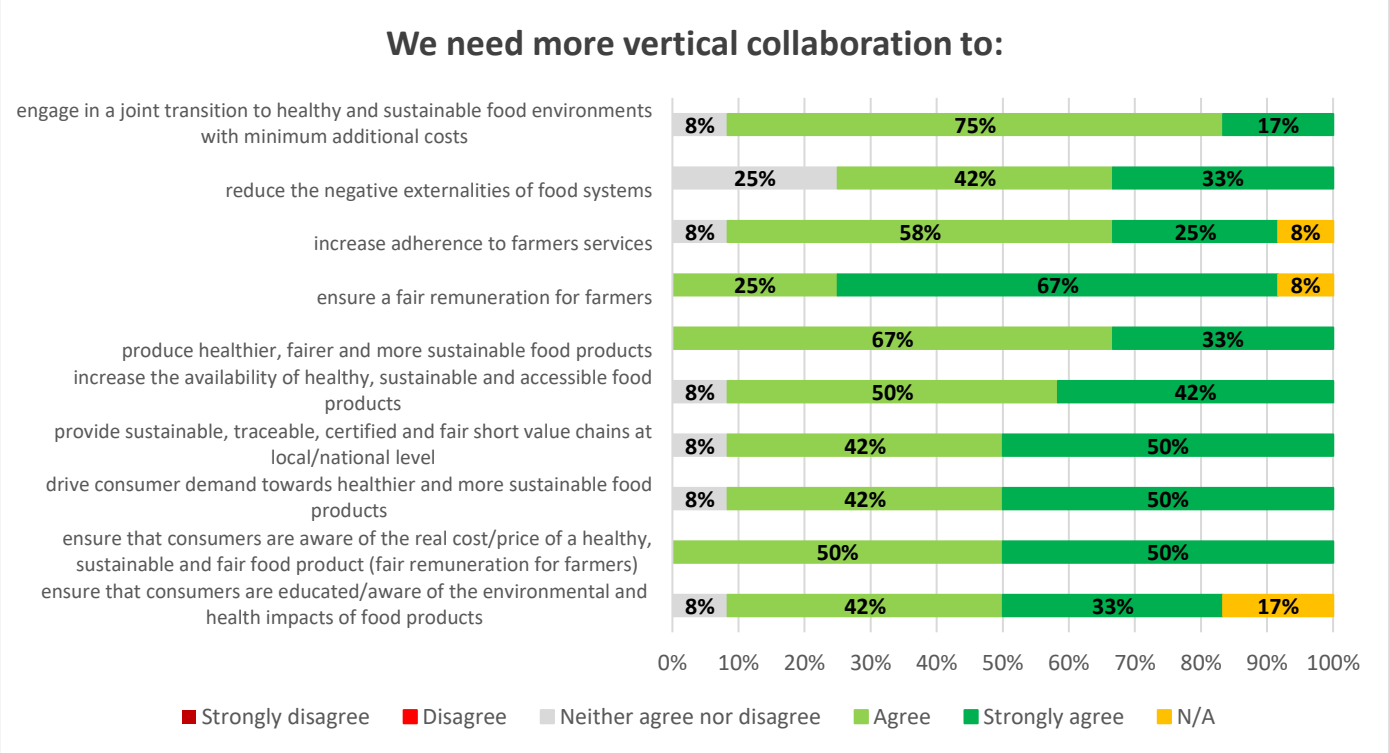


Figure 2. What primary producers need in terms of vertical collaboration (CWG).

Table 2. What primary producers need in terms of vertical collaboration (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
engage in a joint transition to healthy and sustainable food environments with minimum additional costs	0%	0%	12%	0%	75%	13%
reduce the negative externalities of food systems	0%	0%	0,0%	25%	63%	12%
increase adherence to farmers services	0%	0%	0%	25%	75%	0%
ensure a fair remuneration for farmers	0%	0%	0%	0%	100%	0%
produce healthier, fairer and more sustainable food products	0%	0%	0%	25%	75%	0%
provide sustainable, traceable, certified and fair short value chains at local/ national level	0%	0%	25%	50%	50%	0%
drive consumer demand towards healthier and more sustainable food products	0%	0%	13%	12%	75%	0%

ensure that consumers are aware of the real cost/ price of a healthy, sustainable and fair food product	0%	0%	0%	0%	100%	0%
ensure that consumers are educated/ aware of the environmental and health impacts of food products	0%	0%	0%	13%	87%	0%

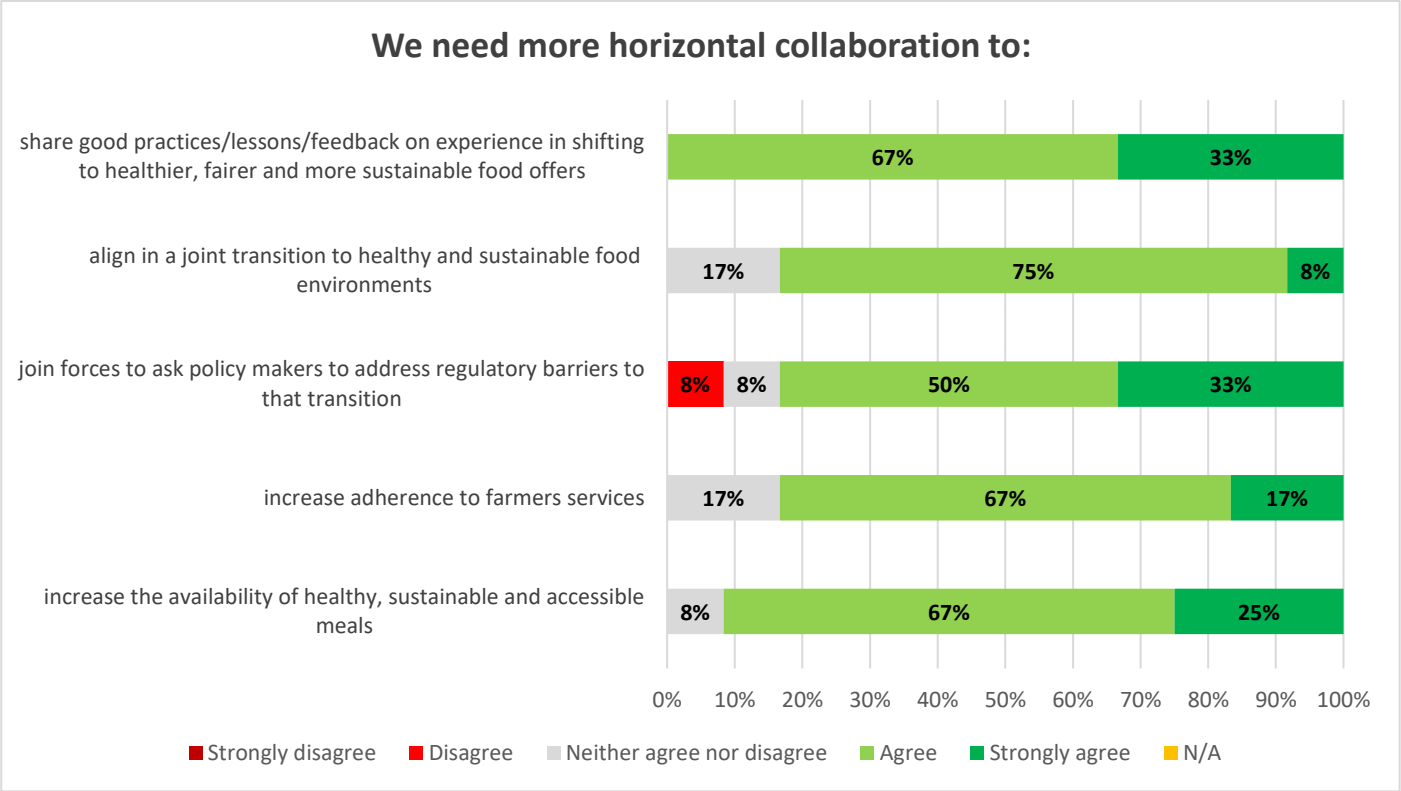


Figure 3. What primary producers need in terms of horizontal collaboration (CWG).

Table 3. What primary producers need in terms of horizontal collaboration (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
share good practices, lessons learnt, feedback on experience in applying best farming practices	0%	0%	13%	62%	25%	0%
align in a joint transition to healthy and sustainable food environments while keeping different offers	0%	0%	13%	62%	25%	0%
join forces to ask policy makers to address regulatory barriers to that transition	0%	0%	0%	13%	87%	0%
increase adherence to farmers services	0%	0%	13%	25%	62%	0%
increase the availability of healthy, sustainable and accessible food products	0%	0%	13%	37%	50%	0%

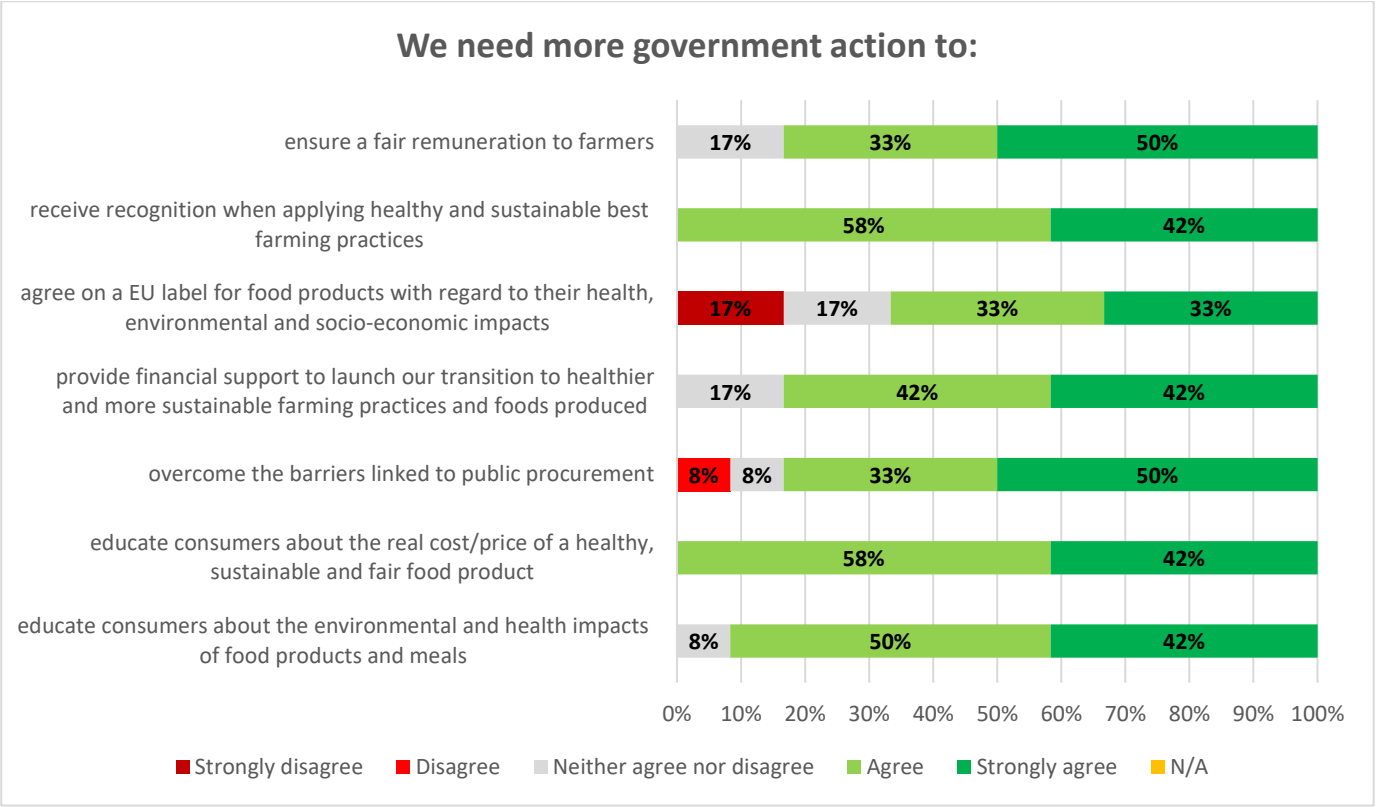


Figure 4. What primary producers need in terms of government action (CWG).

Table 4. What primary producers need in terms of government action (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
ensure a fair remuneration to farmers	0%	0%	0%	25%	75%	0%
receive recognition when applying healthy and sustainable best farming practices	0%	12%	13%	12%	63%	0,0%
agree on a EU mandatory label for food products with regard to their health, environmental and socio-economic impacts	0%	37%	13%	12%	38%	0%
provide financial support to launch our transition to healthier and more sustainable farming practices and foods produced	0%	12%	0%	25%	50%	13%
increase the availability of healthy, sustainable and accessible food products	0%	0%	12%	38%	37%	13%
overcome the barriers linked to public procurement	0%	0%	13%	25%	50%	12%
educate consumers about the real cost/price of a healthy, sustainable and fair food product	0%	0%	0%	38%	62%	0%
educate consumers about the environmental and health impacts of food products and meals	0%	0%	13%	25%	62%	0%

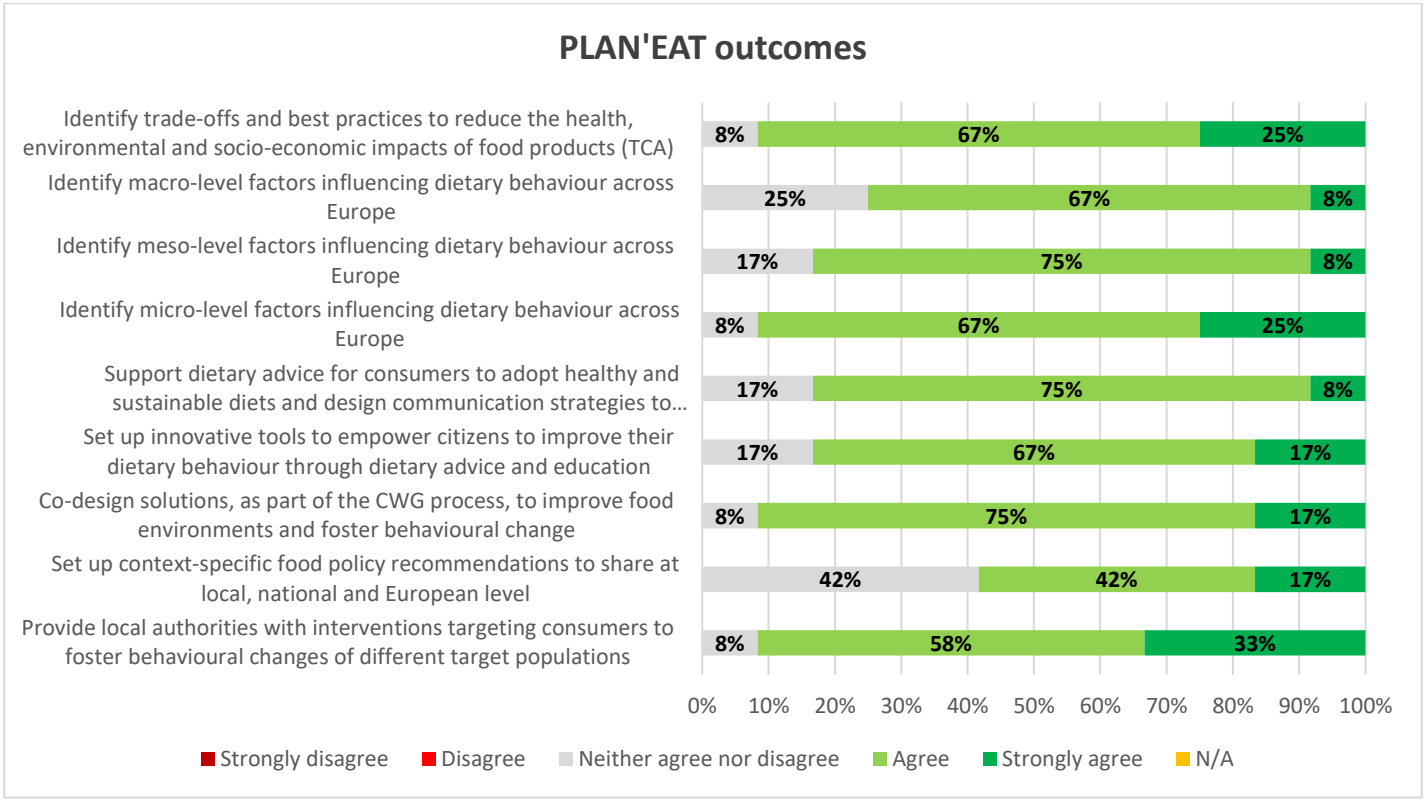


Figure 5 . Primary producers' expectations from PLAN'EAT project (CWG).

Table 5. Primary producers' expectations from PLAN'EAT project (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
Identify trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food products through True Cost Accounting (TCA)	0%	0%	38%	25%	25%	13%
Identify macro-level factors influencing dietary behaviour across Europe	0%	12%	12%	0%	63%	13%
Identify meso-level factors influencing dietary behaviour across Europe	0%	12%	13%	12%	63%	0%
Identify micro-level factors influencing dietary behaviour across Europe	0%	12%	13%	12%	63%	0%
Support dietary advice for consumers to adopt healthy and sustainable diets and design communication strategies to increase the acceptability of food and health policy interventions by all food system actors	0%	12%	38%	12%	38%	0%
Setting up innovative tools to empower citizens to improve their dietary behaviour through innovative dietary advice and education tools	0%	0%	12%	50%	25%	13%
Be considered as a candidate to integrate the list of food outlets recommended at local level in the PLAN'EAT personalised app	0%	0%	12%	50%	25%	13%
Co-design solutions to improve food environments and foster behavioural change	0%	0%	62%	25%	0%	13%
Setting up context-specific food policy recommendations to share at local, national and European level	0%	0%	37%	25%	38%	0%

Provide local authorities with interventions targeting consumers to foster behavioural changes of different target populations	0%	0%	37%	38%	25%	0%

Table 6. The list of the initiatives to achieve the transition towards sustainable and healthy food environments/food systems for primary producers (CWGs and LLs).

	Initiatives already implemented
Azienda Agrigola Agrianto di Maria Consilia Antonelli	Coldiretti Project " Sustainable development and food education – I know what I eat and I eat to Know".
Azienda Agricola Rossi Bourg sa	Re-formulation of food products.
Agnes méz (Agnes Honey))	Organise eco/biomarkets at local level and municipalities.
Hoeve op den Mierhoop	Organization of guided experience for people who want to get in touch with nature and the farm.
Rommens & Koien	Education in schoolchildren.
Food Cabinet	Campaign called "Akkertising", cooperation with other farmers to communicate directly to consumers.
Anastasoiu Family Farm	Participation in cooperatives for coordination of cultivation practices; Adoption of pro-environmental measures promoted by subsidies.
Fountas Farm	Website providing the benefits of sustainable practices in olive oil production;
Gospodarstwo Rolne Bochnia	Partecipation in "The E-Bazaat Platform" conncting consumers direct to farmers.
Gospodarstwo Rolnw Tomasz Pawel Cieslik	Educational campaing on the health promoting propeties of A2 milk.
Frutos de Valdivielso (Irene Cerezo)	Campaign "ALIMENTA MERINDADES".
Haladás Mezőgazdasági Zrt. (HU)	Establishment of an irrigation community with farmers in the area; Cooperation with members of the "National Potato Association".
Dimosthenis X(GR)	Sustainable use of water.
Fruits Farmer (PL)	Joining local cooperation networks to initiate the SFC (short food chain); Implementation of on-farm agroforestry; Investment in retention and mid-field afforestation; Cooperation in creating a local brand for food products.
La Dame Blanche (FR)	Implementation of direct sales with explanations of the necessary process from breeding to the finished product (cheese); Moderate use of agricultural machinery; Search for food self-sufficiency for animals.
Bouillet Dominica (FR)	Recover packaging; Spread less phytos products according to the economic needs of the consumer; Be less "productivist"
Ferme de la récompense (FR)	Application of a circular economy (i.e. vegetable peelings are transformed, the grains of the exploitation transformed, glass for jam consigned and reused, paper, bag cleaned some ironed. Cardboard, crate made available to customers, in order to transport their purchases).
Cal Torra (SP)	The conversion to organic agriculture of most of the hectares of cultivation, endorsed by the CCPAE, and direct marketing of the product in short circuits.

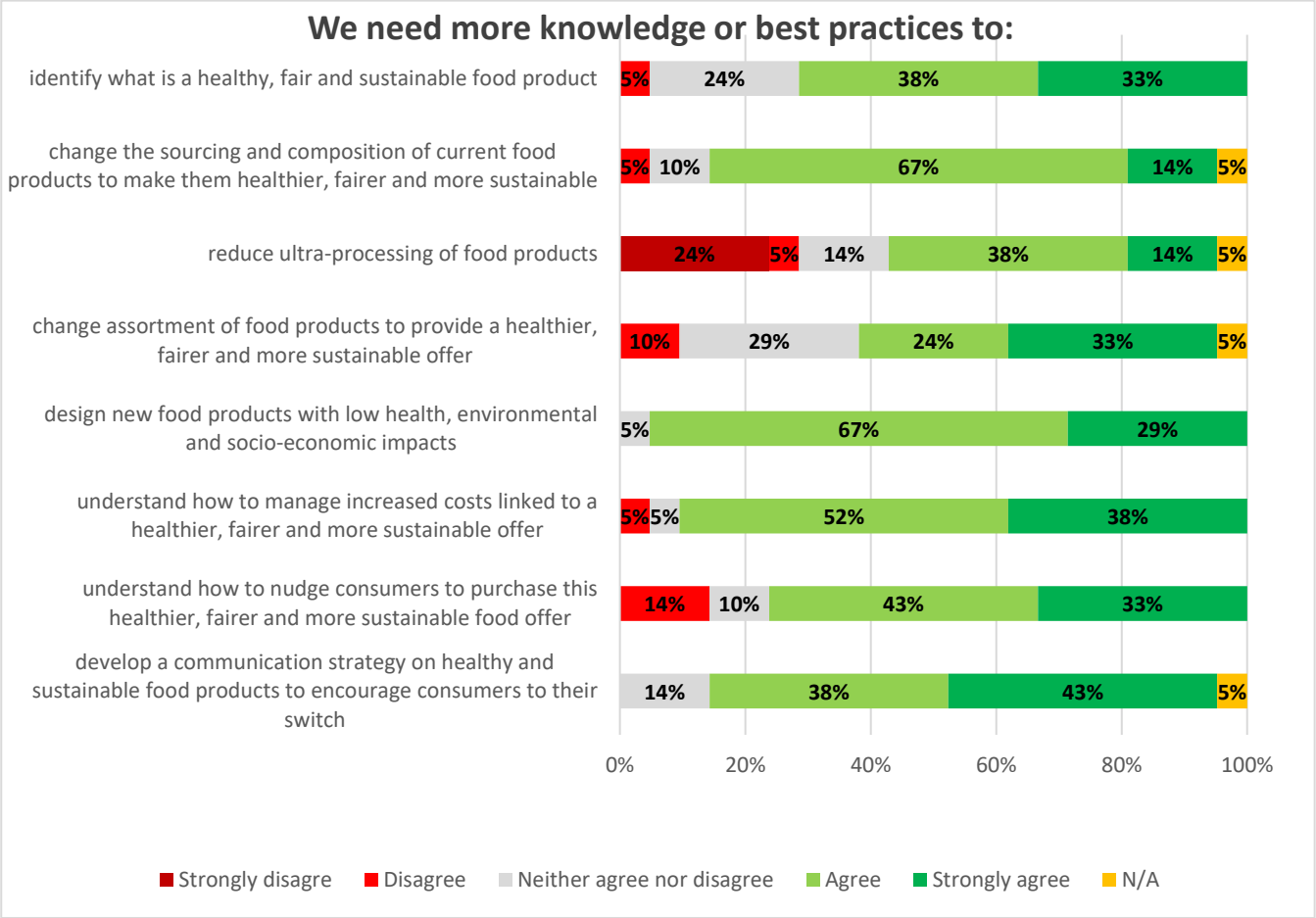


Figure 6. What food industries need in terms of knowledge and best practices (CWG).

Table 7. What food industries need in terms of knowledge and best practices (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
identify what is a healthy, fair and sustainable food product	17%	0%	0%	33%	50%	0%
change the sourcing and composition of our current food products to make them healthier, fairer and more sustainable	17%	33%	0%	33%	17%	0%
reduce ultra-processing of our food products	33%	17%	17%	0%	0%	33%
change our assortment of food products to provide a healthier, fairer and more sustainable offer	33%	0%	17%	50%	0%	0%
design new food products with low health, environmental and socio-economic impacts	17%	0%	0%	33%	33%	17%
understand how to manage increased costs linked to an improved offer	33%	0%	0%	17%	33%	17%
understand how to nudge consumers to purchase this improved food offer	33%	0%	0%	17%	33%	17%
develop a communication strategy on our healthy and sustainable food products to encourage consumers to switch to these products	33%	17%	0%	17%	17%	17%

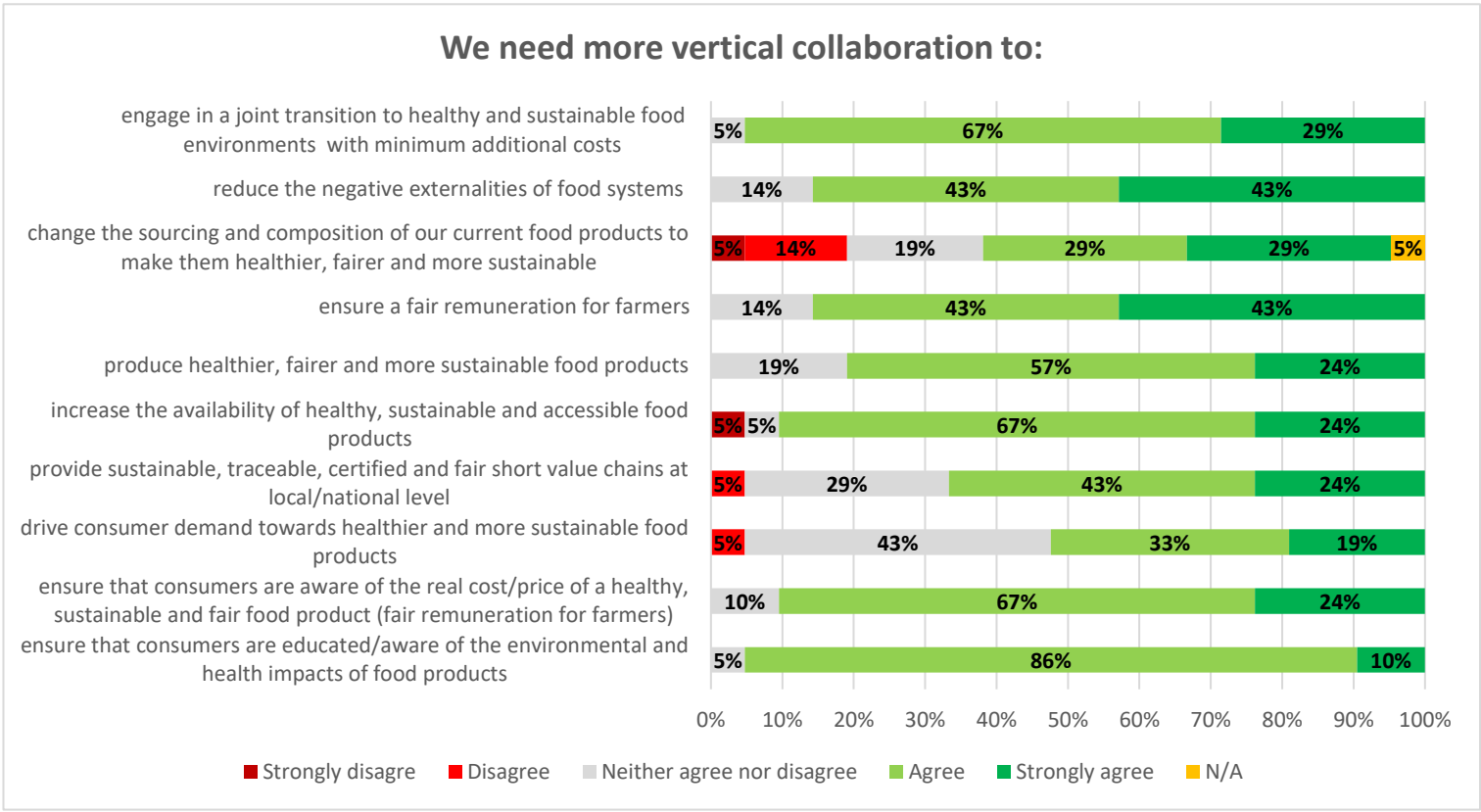


Figure 7. What food industries need in terms of vertical collaboration (CWG).

Table 8. What food industries need in terms of vertical collaboration (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
engage in a joint transition to healthy and sustainable food environments with minimum additional costs	33%	0%	17%	33%	17%	0%
reduce the negative externalities of food systems	17%	0%	0%	50%	33%	0%
change the sourcing and composition of our current food products to make them healthier, fairer and more sustainable	33%	0%	0%	67%	0%	0%
ensure a fair remuneration for farmers	17%	0%	17%	33%	33%	0%
produce healthier, fairer and more sustainable food products	17%	0%	0%	33%	50%	0%
provide sustainable, traceable, certified and fair short value chains at local/ national level	17%	0%	0%	50%	17%	17%
drive consumer demand towards healthier and more sustainable food products	17%	0%	17%	17%	33%	17%
ensure that consumers are aware of the real cost/ price of a healthy, sustainable and fair food product	17%	17%	0%	33%	17%	17%
ensure that consumers are educated/ aware of the environmental and health impacts of food products	17%	0%	17%	33%	33%	0%

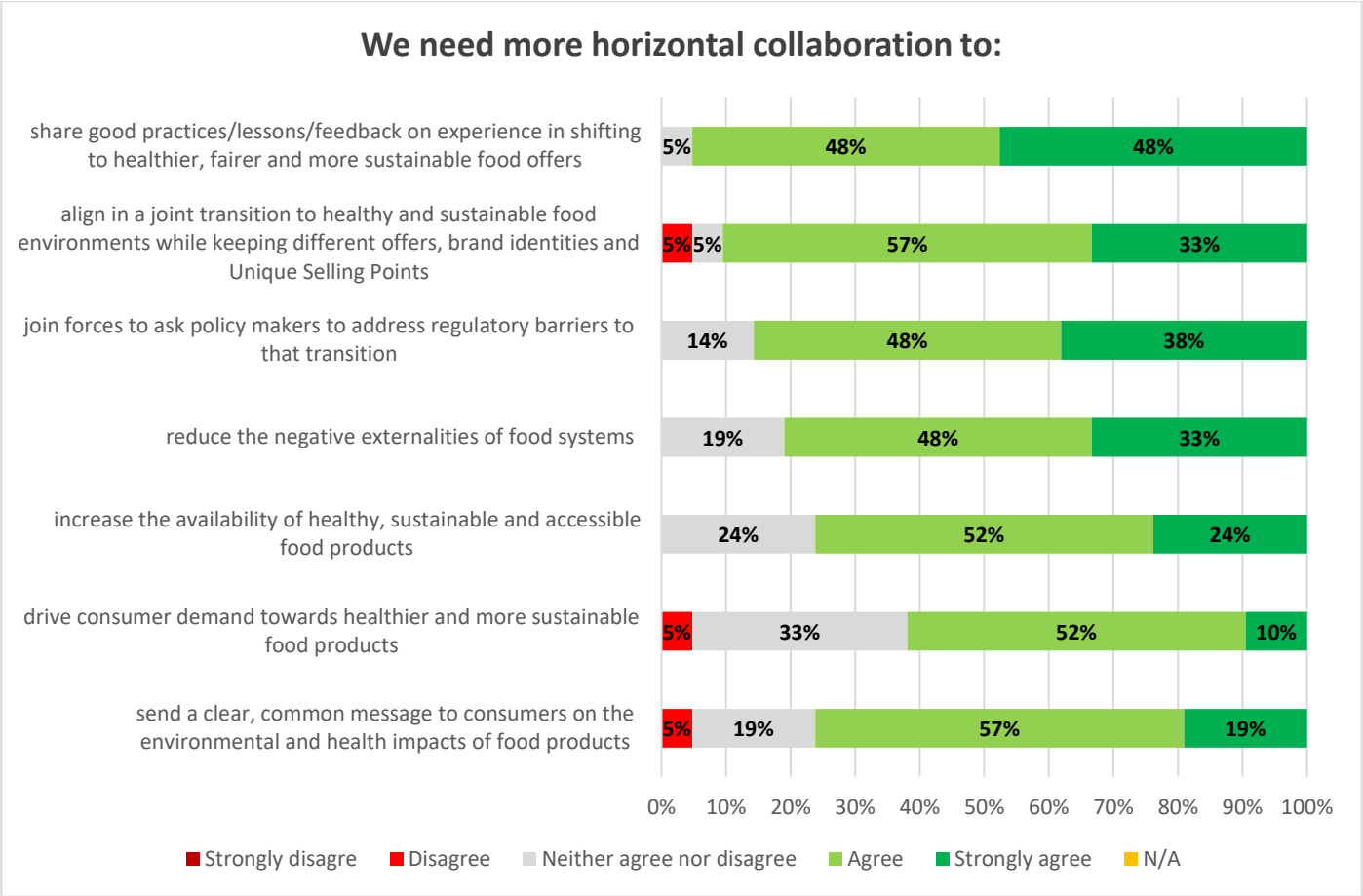


Figure 8. What food industries need in terms of horizontal collaboration (CWG).

Table 9. What food industries need in terms of horizontal collaboration (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
share good practices, lessons learnt, feedback on experience in shifting to healthier, fairer and more sustainable food offers	17%	0%	33%	17%	33%	0%
align in a joint transition to healthy and sustainable food environments while keeping different offers, brand identities and Unique Selling Points.	17%	0%	33%	0%	50%	0%
join forces to ask policy makers to address regulatory barriers to that transition	17%	0%	0%	33%	33%	17%
reduce the negative externalities of food systems	17%	0%	17%	33%	33%	0%
increase the availability of healthy, sustainable and accessible food products	17%	0%	17%	17%	50%	0%
drive consumer demand towards healthier and more sustainable food products	17%	0%	17%	17%	33%	17%
send a clear, common message to consumers on the environmental and health impacts of food products	17%	17%	0%	17%	50%	0%

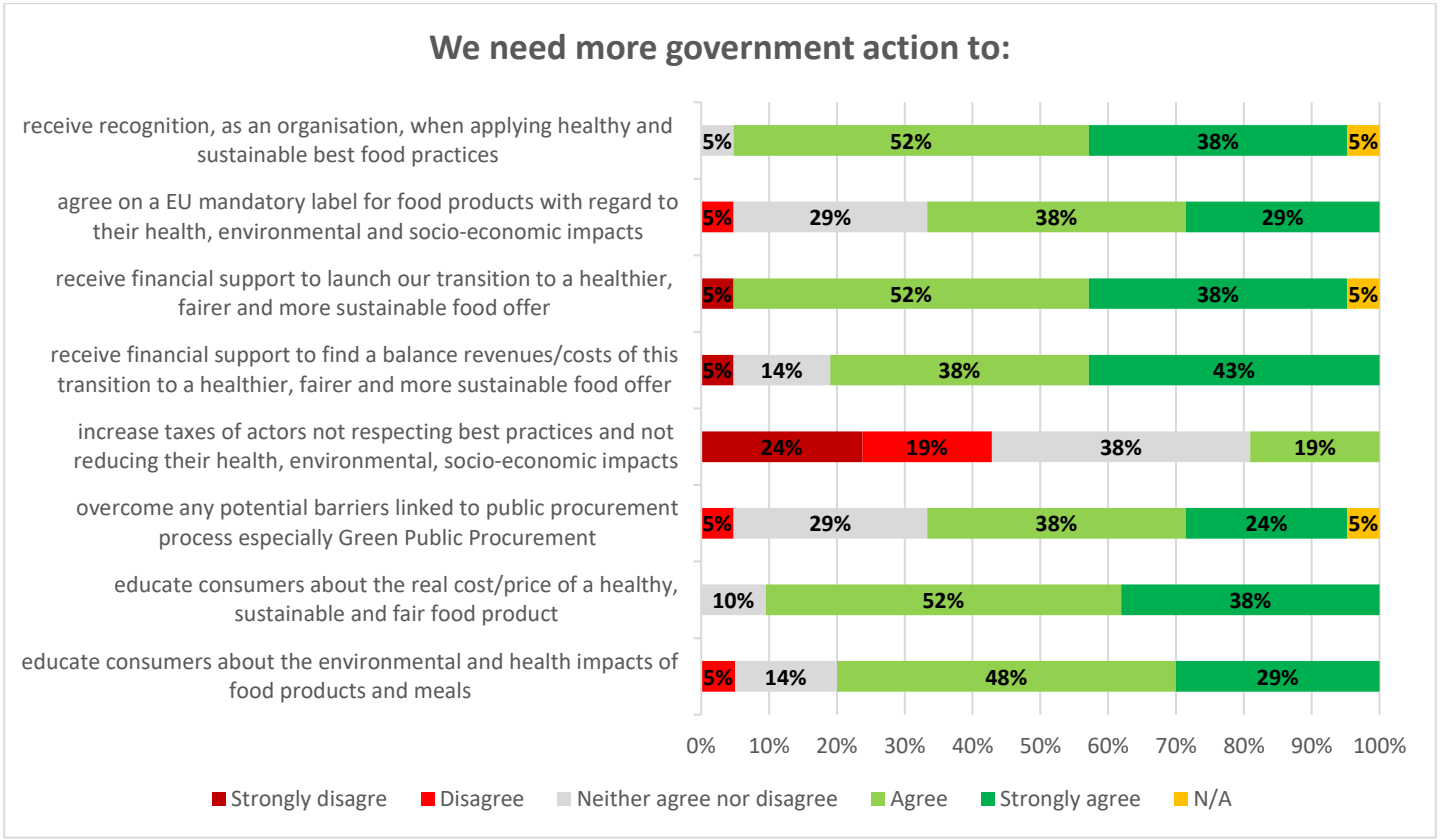


Figure 9. What food industries need in terms of government actions (CWG).

Table 10. What food industries need in terms of government actions (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
receive recognition, as an organisation, when applying healthy and sustainable best food practices	17%	0%	0%	33%	50%	0%
agree on a EU mandatory label for food products with regard to their health, environmental and socio-economic impacts	17%	0%	33%	17%	33%	0%
receive financial support to launch our transition to a healthier, fairer and more sustainable food offer	17%	0%	17%	17%	33%	17%
OR receive financial support to find a profitability balance and offset the costs of this transition to a healthier, fairer and more sustainable food offer	17%	0%	50%	33%	0%	0%
increase taxes of food value chain actors not respecting best practices and not considerably reducing their health, environmental and socio-economic impacts	17%	17%	50%	17%	0%	0%
educate consumers about the real cost/price of a healthy, sustainable and fair food product	17%	17%	17%	33%	0%	17%
educate consumers about the environmental and health impacts of food products and meals	17%	0%	17%	17%	50%	0%
overcome any potential barriers linked to public procurement especially Green Public Procurement	17%	0%	0%	33%	33%	17%

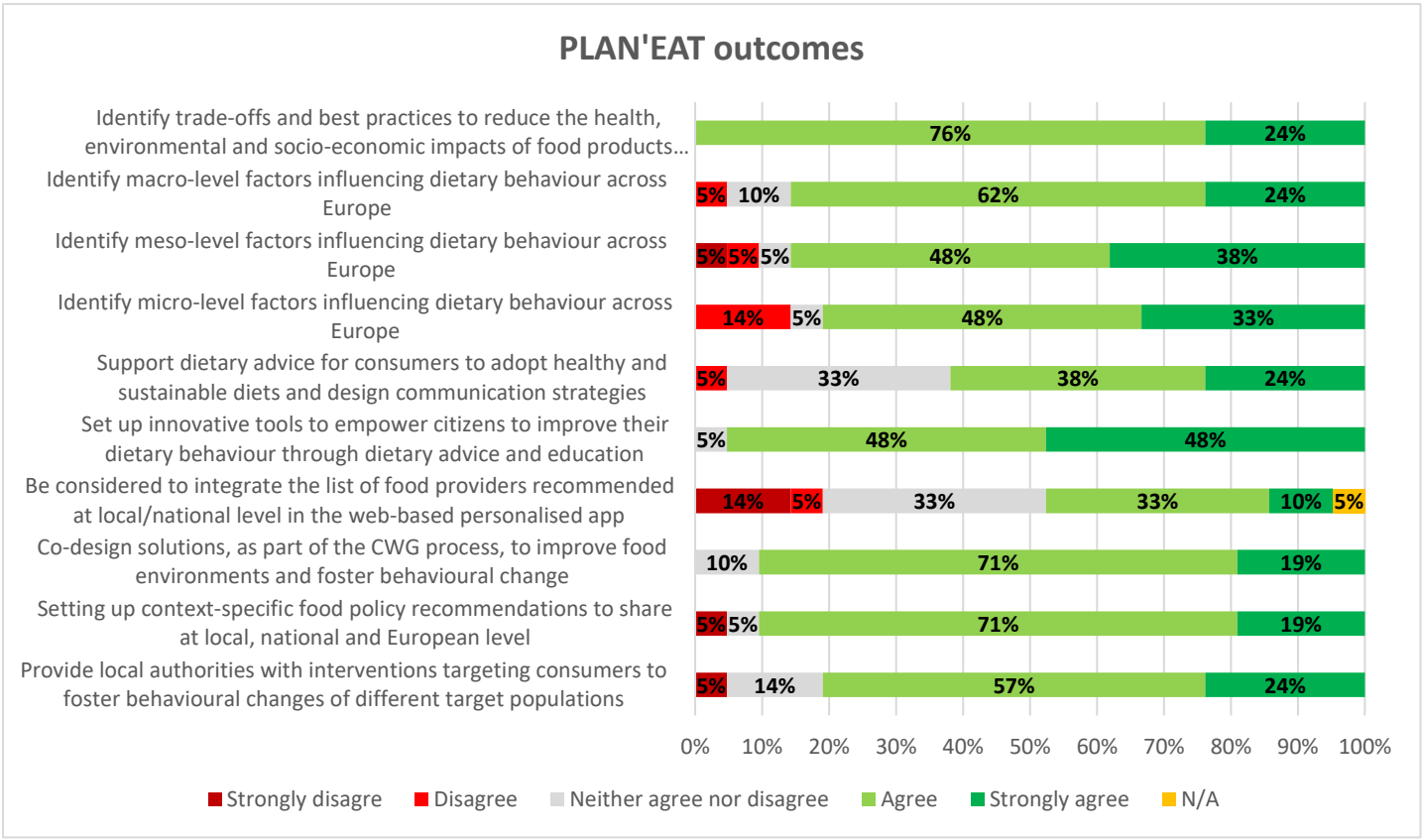


Figure 10. Food industries' expectations from PLAN'EAT project (LLs).

Table 11. Food industries' expectations from PLAN'EAT project (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
Identify trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food products through True Cost Accounting (TCA)	0%	17%	0%	67%	17%	0%
Identify macro-level factors influencing dietary behaviour across Europe	0%	17%	0%	50%	33%	0%
Identify meso-level factors influencing dietary behaviour across Europe	0%	17%	0%	33%	33%	17%
Identify micro-level factors influencing dietary behaviour across Europe	0%	17%	33%	17%	33%	0%
Support dietary advice for consumers to adopt healthy and sustainable diets and design communication strategies to increase the acceptability of food and health policy interventions by all food system actors	0%	17%	33%	33%	17%	0%
Setting up innovative tools to empower citizens to improve their dietary behaviour through innovative dietary advice and education tools	17%	17%	17%	33%	17%	0%
Be considered as a candidate to integrate the list of food outlets recommended at local level in the PLAN'EAT personalised app	0%	33%	33%	0%	0%	33%
Co-design solutions to improve food environments and foster behavioural change	0%	17%	17%	33%	17%	17%
Setting up context-specific food policy recommendations to share at local, national and European level	0%	17%	0%	0%	50%	33%

Provide local authorities with interventions targeting consumers to foster behavioural changes of different target populations	0%	33%	17%	17%	33%	0%

Table 12. The list of the initiatives to achieve the transition towards sustainable and healthy food environments/food systems for food industries (CWGs and LLs).

	Initiatives already implemented	Initiatives planned for the future
EVELINA FLACHI	Report to promote food education, elaborated with the Italian Ministry of Health and Instruction.	
SME – Winery (ES)	Natural viticulture: low yields, respect for the land; Valorization of by-products and waste: recycling barrels into works of art.	
SME – INGREDALIA (ES)	Implementation of circular economy.	
SME – BREWING/BEER (ES)	Reduction of additives and increase of natural fruits and ingredients.	
FOODINNOV (FR)	Mapping of regional co-products and networking for their valorization; Environmentally friendly ingredients by local sourcing.	
SME – Sweden	Increasing of local production; Decreasing import of goods; Reducing carbon impacts.	
PLANT INNOVATION (FR)		Analyze the environmental cost of food production; Lobbying for proving that a labelling system that can frame the genuineness of a product.
NUTRI MARKETING (FR)	Lobby towards NutriScore; Egalim and AGEC laws; Collaboration with France National programme for food.	
ACTALIA (FR)	Adjusting portion size and promoting sustainable recipes; Collaboration in the elaboration of Apps to evaluate the impact of consumption behavior.	
FEDERALIMENTARE SERVIZI SRL (IT)	Campaign for consumers to promote Mediterranean Diet, as the most sustainable and balance dietary pattern; Collaboration with national and EU institutions to elaborate an efficient front-of-pack-labelling (NutrInform Battery).	Lobby actions to drive government measures not to impose misleading tools for consumers.
SME – DAIRY (IT)	Reformulation of ingredients (lowering salt and fat content); CO_2 compensation.	Training on carbon sequestration and renewable energy use to our farmers.
FENGAFOOD INNOVATION (IT)	New food products, rich in protein and fibers, low in sugar, available in specialized shops.	
LLs Iniziatives		
Food company (PL)	Expanding the range to include vegan products; Reduction of the use of raw materials such as palm oil in production; Supporting local suppliers and farmers	
Large company (SW)	Company strategy 2020, focusing on: 1) people + planet health on product level (target based on share of sales); 2) recyclability, climate and biodiversity, own operations and value chain; 3) 100% raw materials from high risk countries sustainably verified by external parties. Targets for 2030.	
VEGEPOLYS VALLEY (FR)	Support innovation projects around the Clean Label; Improve the local sourcing of plant materials through innovation and support projects on the greening of food; (Reduction of food waste and losses) Support the GASPILAG project led by Geneviève PIERRE from the University of Orléans: https://www.univ-orleans.fr/fr/cedete/news/apr-ir-gaspilag -	

Danone (HU)	FOP: Launched voluntary FOP first the GDA (INBÉ in Hu-an) which became a preferred FOP on EU level too, than Nutri-Score - which is a science- based, easy to comprehend and fair FOP system. Food waste: In all 5 countries strong cooperation with Food Banks aiming to reduce food waste while also supports that healthy foods are available to people in need. Sustainability: Cooperation with various NGOs on sustainability (e.g. pack waste decrease, Platics Smart guide, Smart Guide and microsites on flexitarian diet etc.) programs. Platforms: Create and keep maintaining multi- stakeholders Platforms (like e.g in HU TÉT Platform) aims the multistakeholder cooperation and best practice sharing on balanced, healthy diet and healthy way of life (incl. sustainability) for the local population.	

FOOD SERVICES

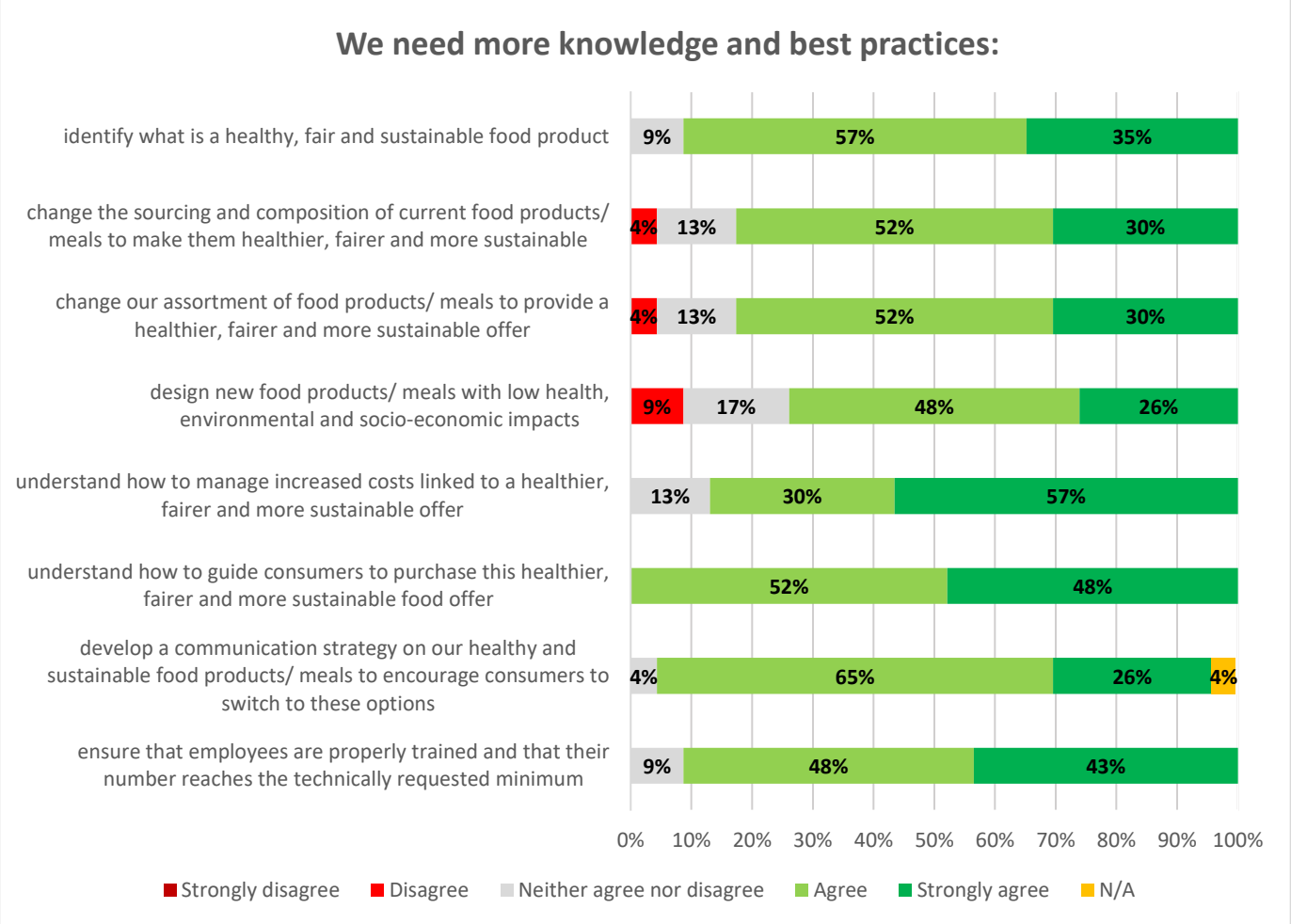


Figure 11. What food services need in terms of knowledge and best practices (CWG).

Table 13. What food services need in terms of knowledge and best practices (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
identifying what is a healthy, fair and sustainable food products	0%	0%	0%	22%	78%	0%

change the origin and composition of our current food products to make them healthier, fairer and more sustainable	0%	11%	0%	44%	44%	0%
changing our food assortment to offer a healthier, fairer and more sustainable offer	0%	0%	0%	67%	33%	0%
design new meals with low health, environmental and socio-economic impact	0%	0%	11%	44%	44%	0%
understand how to manage the increased costs associated with an enhanced offering	0%	0%	0%	22%	78%	0%
understand how to entice consumers to purchase this enhanced food offering	0%	11%	0%	33%	56%	0%
develop a communication strategy about our healthy and sustainable foods to encourage consumers to switch to these products	0%	0%	0%	44%	56%	0%
ensuring that employees are adequately trained and that their number reaches the technically required minimum	0%	0%	0%	33%	56%	11%

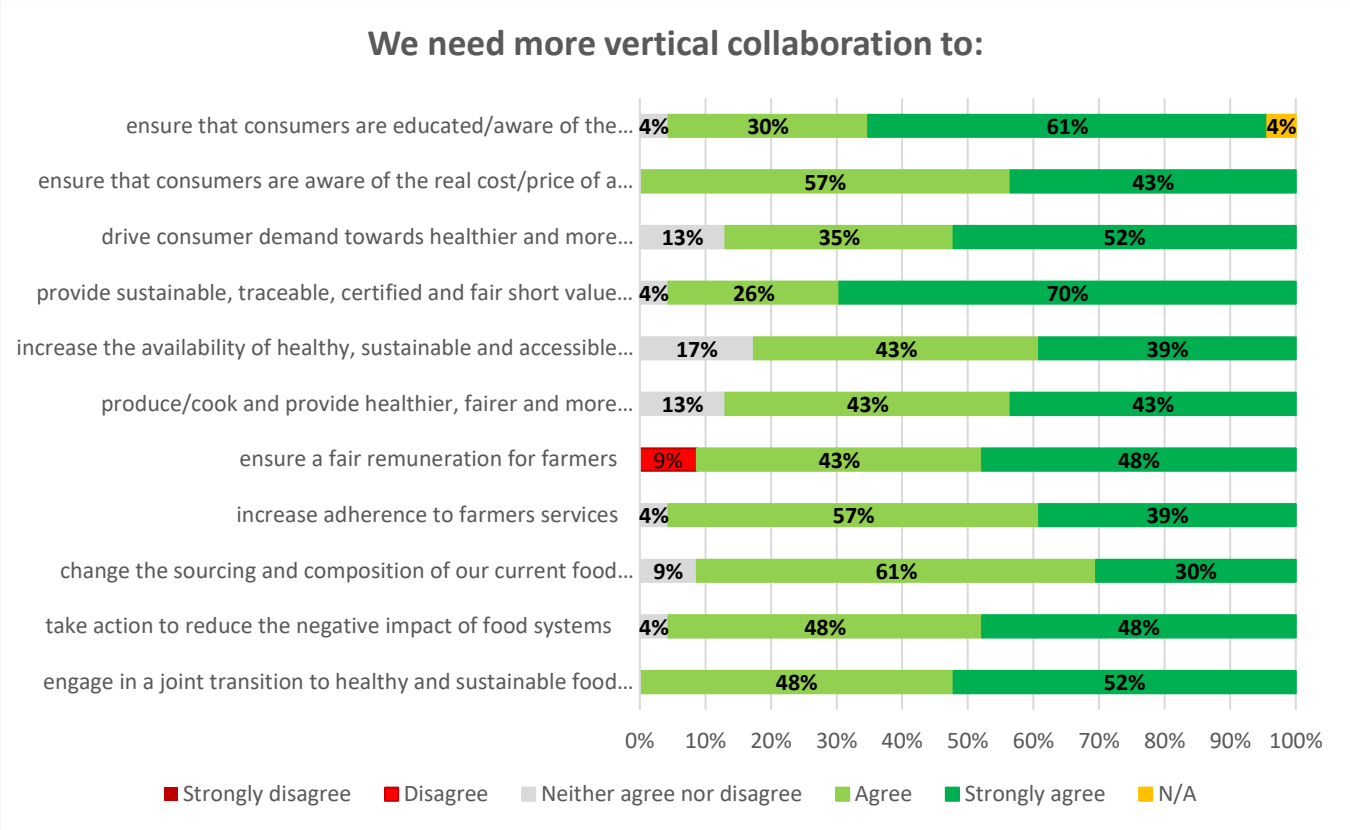


Figure 12. What food services need in terms of vertical collaboration (CWG).

Table 14. What food services need in terms of vertical collaboration (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
undertake a joint transition to healthy and sustainable food environments with minimal additional costs	0%	0%	11%	44%	44%	0%
reduce the negative externalities of food systems	0%	0%	0%	56%	33%	11%

change the origin and composition of our current food products to make them healthier, fairer and more sustainable	0%	0%	0%	67%	33%	0%
increasing adherence to farmer services	0%	11%	0%	22%	56%	11%
ensuring fair remuneration for farmers	11%	0%	0%	33%	44%	11%
cooking and offering healthier, fairer and more sustainable meals	0%	0%	11%	11%	78%	0%
increasing the availability of healthy, sustainable and affordable foods	0%	0%	11%	22%	67%	0%
providing sustainable, traceable, certified and fair short value chains at local/national level	0%	0%	11%	22%	67%	0%
drive consumer demand towards healthier and more sustainable food products	0%	11%	11%	11%	56%	11%
ensure that consumers are aware of the real cost/price of a healthy, sustainable and fair food product	0%	11%	0%	22%	67%	0%
ensure that consumers are informed and aware of the environmental and health impacts of food products and foods	0%	11%	0%	22%	67%	0%

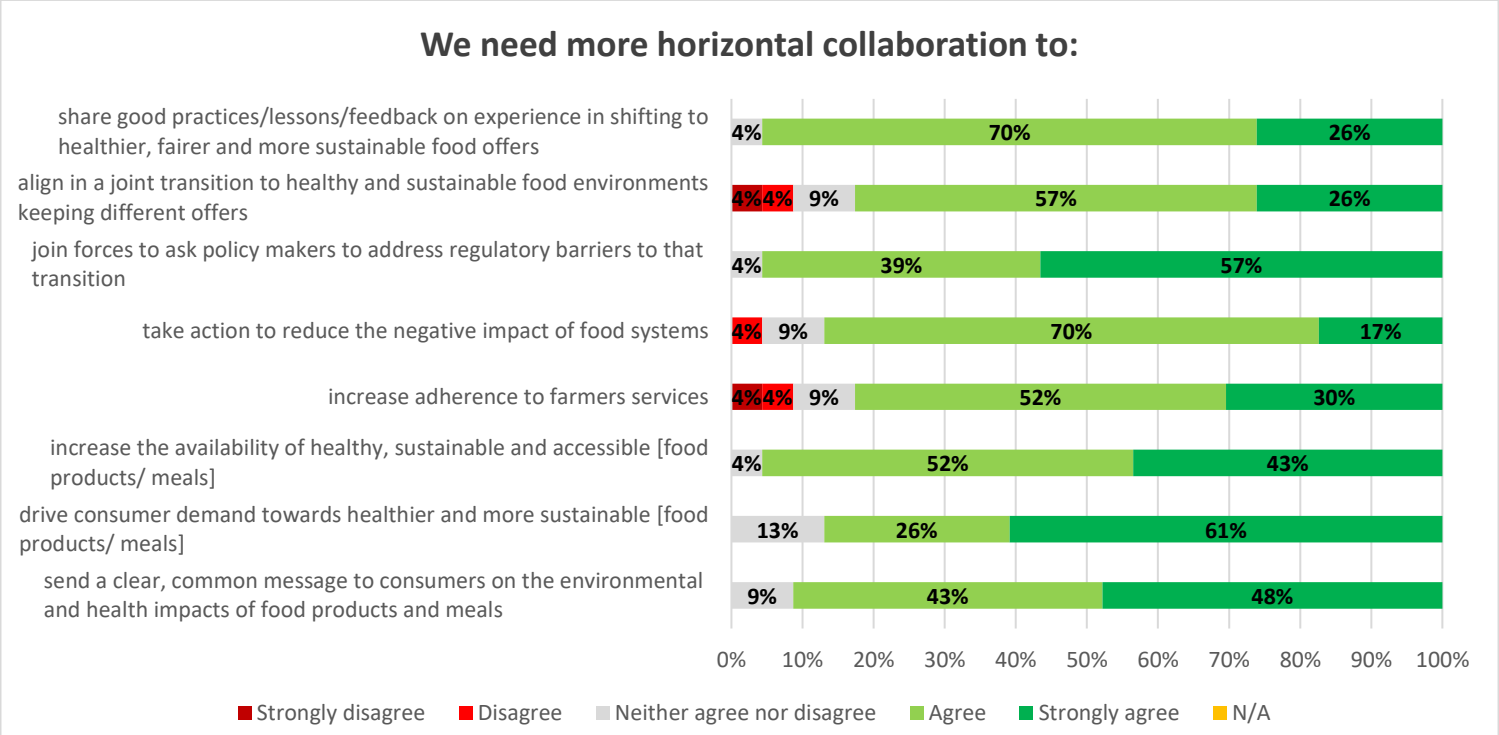


Figure 13. What food services need in terms of horizontal collaboration (CWG).

Table 15. What food services need in terms of horizontal collaboration (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
sharing best practices, lessons learned and experiences in the transition to healthier, fairer and more sustainable food offerings	0%	0%	0%	56%	44%	0%
align in a joint transition towards healthy and sustainable food environments	0%	0%	0%	44%	44%	11%

join forces to call on policy makers to address the regulatory barriers to such a transition	0%	0%	0%	33%	67%	0%
reduce the negative externalities of food systems	0%	0%	0%	56%	33%	11%
increasing the availability of healthy, sustainable and affordable foods	0%	0%	0%	22%	67%	11%
driving demand for healthier and more sustainable foods	0%	0%	0%	33%	56%	11%
send a clear and common message to consumers about the environmental and health impacts of food products	0%	0%	0%	33%	67%	0%

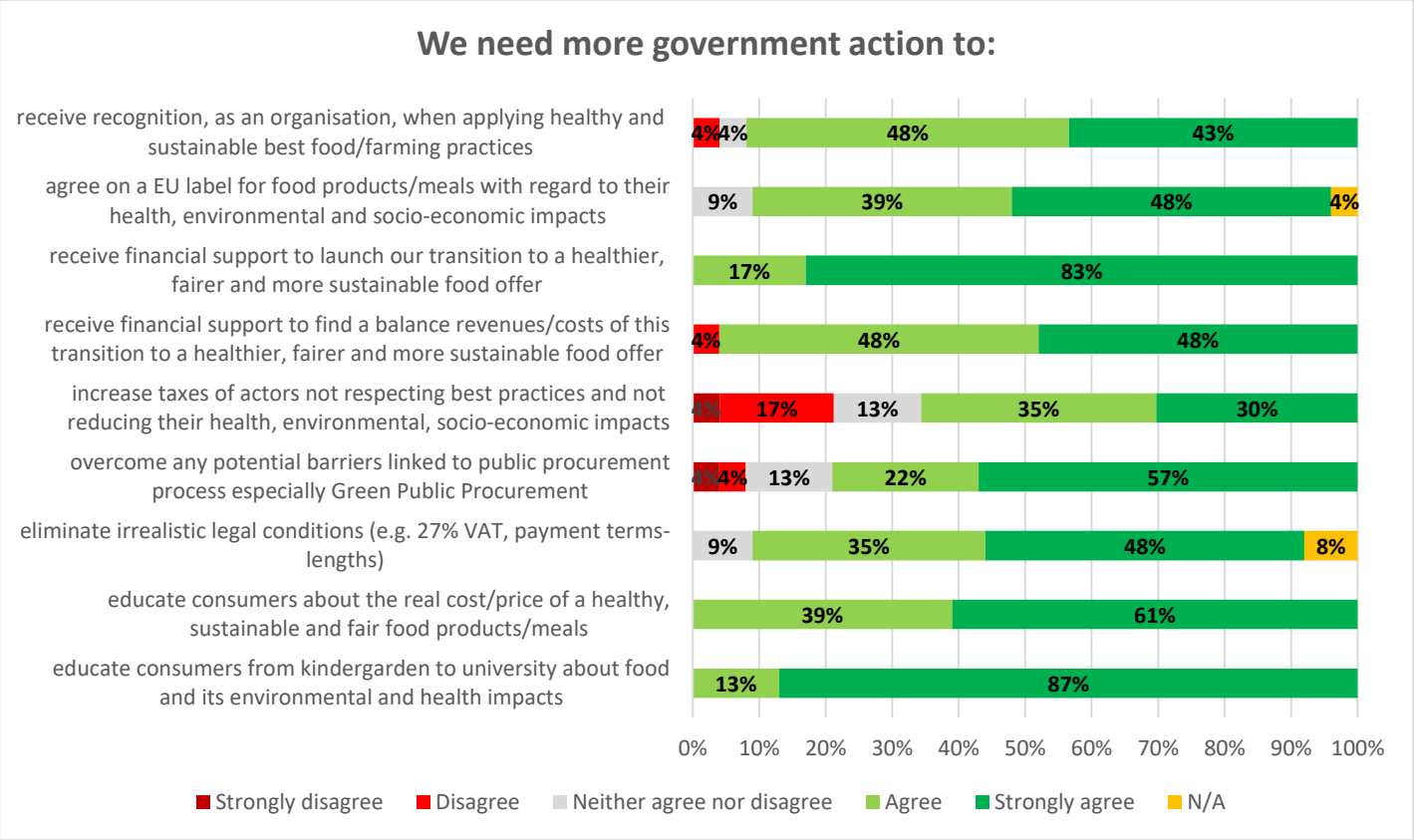


Figure 14. What food services need in terms of government action (CWG).

Table 16. What food services need in terms of government action (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
receive recognition, as an organization, for implementing healthy and sustainable food best practices	0%	0%	11%	33%	56%	0%
agreeing on a mandatory EU label for meals in relation to their health, environmental and socio-economic impact	0%	0%	11%	33%	56%	0%
receive financial support to implement our transition to a healthier, fairer and more sustainable food supply	0%	0%	25%	25%	50%	0%
receive financial support to find a balance of profitability and offset the costs of this	0%	0%	13%	38%	50%	0%

transition to a healthier, fairer and more sustainable food supply						
increase taxes against food value chain actors who do not respect best practices and do not significantly reduce their health, environmental and health impacts	0%	11%	33%	11%	33%	11%
overcoming the obstacles linked to public procurement	0%	0%	0%	22%	78%	0%
elimination of unrealistic legal conditions	0%	0%	22%	22%	44%	11%
educating consumers about the real cost/price of healthy, sustainable and fair food	0%	0%	11%	44%	44%	0%
to educate consumers, from kindergarten to university, about food and its impact on the environment and health	0%	0%	0%	33%	67%	0%

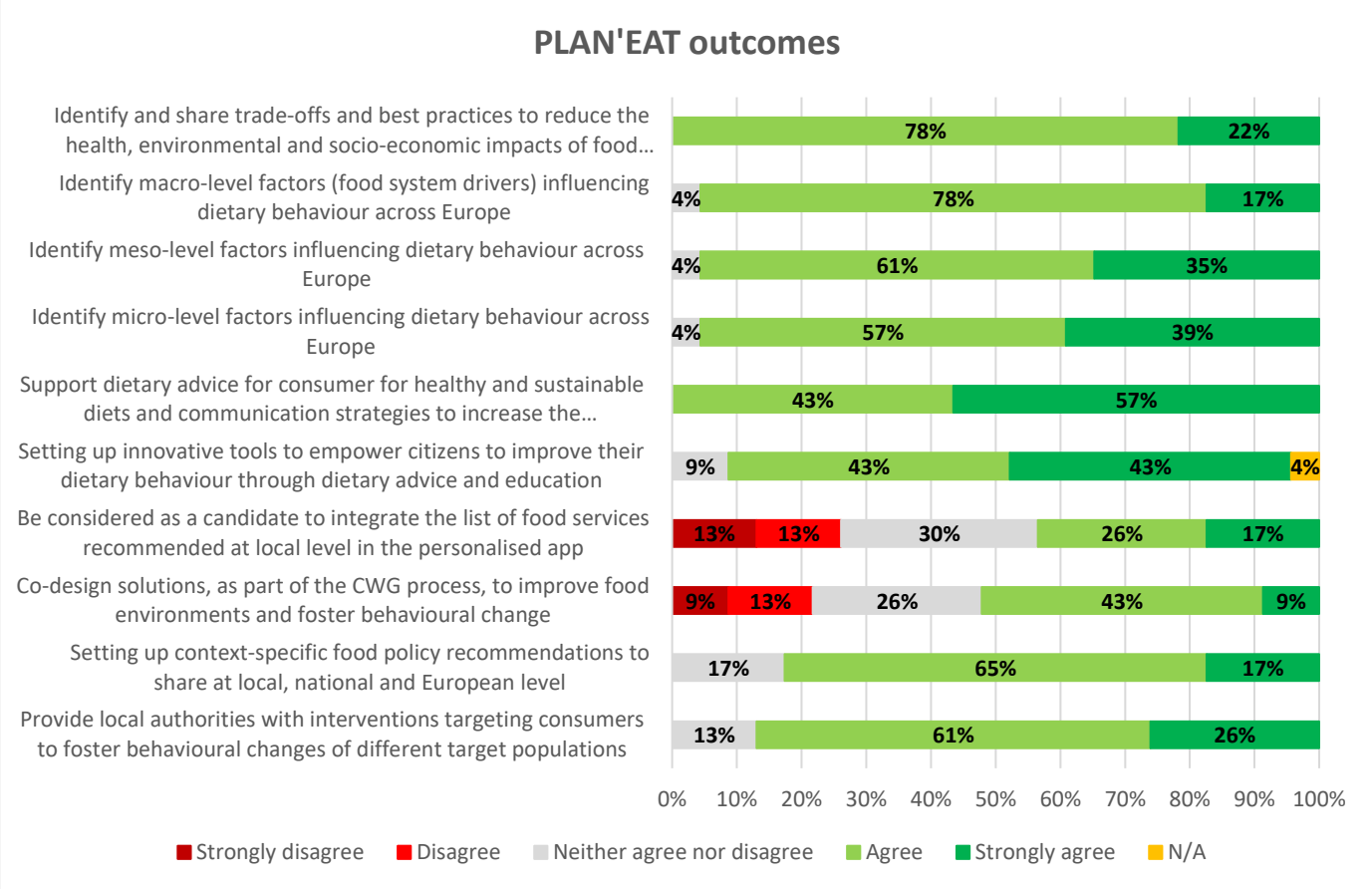


Figure 15. Food services' expectations from PLAN'EAT project (CWG).

Table 17. Food services' expectations from PLAN'EAT project (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
Identify trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food products through True Cost Accounting (TCA)	0%	0%	33%	33%	22%	11%
Identify the macro-level factors (food system drivers) that influence food behavior across Europe	0%	0%	11%	33%	44%	11%

Determine the meso-level factors influencing eating behavior across Europe	0%	0%	0%	33%	56%	11%
Identify micro-level factors that influence eating behavior across Europe	0%	0%	0%	33%	56%	11%
To support dietary counseling for consumers to adopt healthy and sustainable diets and to design communication strategies to increase the acceptability of public health policy interventions	0%	0%	0%	44%	44%	11%
Creation of innovative tools to empower citizens to improve their eating behavior through innovative dietary counseling and education tools	0%	0%	11%	44%	33%	11%
Be considered as a candidate to integrate the list of locally recommended food establishments in the PLAN'EAT personalized app	0%	0%	11%	22%	44%	22%
Co-design solutions to improve food environments and encourage behavioral change	0%	0%	11%	44%	22%	22%
Development of context-specific food policy recommendations to be shared at local, national and European levels	0%	0%	0%	56%	33%	11%
To provide local authorities with targeted consumer interventions to encourage behavioral changes in different target populations	0%	0%	0%	22%	67%	11%

Table 18. The list of the initiatives to achieve the transition towards sustainable and healthy food environments/food systems for food services (CWGs and LLs).

	Initiatives already implemented	Initiatives planned for the future
Sodexo (BE)	Menu management system that allows better control of production in the kitchen; Training and raising awareness of plant-based cooking among our chefs - Responsible energy management - The head office uses 100% renewable energy and is ISO 50001 certified (energy management)	Ambition is to reduce our carbon footprint by 50% by 2025; Since the start of the food waste reduction programme (April 2019), we have managed to reduce pre-consumer waste, i.e. waste that can be avoided directly in the kitchen, by 44%; Ambition to increase the number of Belgian products in the catalogue and strengthen cooperation with local producer cooperatives.
Michael J Wright Group (IR)	Use of season products.	Implement a purchasing policy that seeks locally produced products that are at their optimum best and best value.
Fundació Institut Català de la Cuina i la Gastronomia (FICCG) (SP)	Highlighting and promoting the local/regional food heritage (products, cuisine) and acting on this regarding producers, restaurants and political actors.	
ICAF (SP)	Social and cultural perspectives and research on local food, consumption, production and public policies.	
Albron (NH)	True pricing pilot with plant based milk in a coffee bar; Joined research into personalised nutrition with TNO and Wageningen University; Joined research with Wageningen University, Ijsselland hospital and Louis Bolk institute into offering more fruits and vegetables to patients; Replacing 40% of the cheese on our pizzas in leisure concepts to plant-based cheese. Join forces with food suppliers to make the transition.	
Delirest Hungary Ltd. (HU)	Increase share of local sourcing, constant plant-based food offer; Stop food waste programme, Central recipes for health-conscious cooking, oven frying vs. deep frying.	

Hungast Hungary (HU)	Reduction of meat production.	
Elamen PLC. (HU)	Educating consumers, stakeholders through roadshows; Continuous education of employees, education in schools, developing a new way of thinking; Extensive use of domestic raw materials; Introduction of meat-free Fridays; Promotion of health days; Introduction of an energy management system.	
Bakony Gaszt PLC. (HU)	Meat-free days; Finding and selecting nearby suppliers.	Analysing consumer habits by measuring food waste to plan the amount of food prepared. We have already introduced a buffet, which has significantly reduced the amount of food waste returned.
Central kitchen – KÖZSZÖV (HU)	Taking into account feedback from consumers, we have made qualitative and quantitative changes that have worked. We put idea boxes in the dining room to see what the needs are, it works.	Normalise portions and use quality ingredients; Communication, participation in events, awareness raising for parents and children, involving communities.
Hungast Mecsek Ltd. (HU)	Taking consumer habits into account.	
Hungast Esztergom PLC. (HU)		Introduction of a buffet serving system.
Cívis Hungast Ltd. (HU)		Introduce a one-day-a-week meat-free diet, a major step towards reducing environmental damage.
Hungast 14. Ltd. (HU)	Introduction of meat-free days; Use of foods/ingredients from the food chain; Distribution of educational materials to inform consumers.	Introduction of buffet instead of tray service.
LLs initiatives		
Santa Creu & Sant Pau hospital (SP)		We want to assess the real intake of patients and develop our own guidelines that allow us to adapt to individual needs, as well as collective and individual education.
KARJO CATERING (PL)	"Fruits and vegetables at school" Programme; "Milk at school" Programme; Supply fruits and vegetables to elementary schools in Krakow under the "fruits at school" program since 2009.	
Unilever Food Solutions (HU)	Launch of meat replacement brand supported by communication campaign. Communication campaigns (e.g. future 50 foods campaign (joint campaign between Knorr and WWF))	
Harokopio University (GR)	Reduction of food waste; More healthy and sustainable products in the food offer Vegetables from regional producers.	
DADEU CHARBONMELL (FR)	Presentation of menus with information on quality, "home-made", sourcing of products, etc.; Reducing the use of industrial meat powders, cooking meat to just right temperature; Introduction of 2 vegetarian meals, Training for kitchen staff; Membership of the regional and then local supply platform, increasing the number of very local supplies; Orders adjusted to needs: 6-month monitoring of quantities and deliveries from canteens; Actions on food waste : sorting and recycling waste with children; Work on "wooden crate" waste: encourage its reuse or recycling.	
City of Châtel-Guyon (childhood youth education department) TAILLANDIER (FR)	Anti-waste action: waste weighing, "small hunger" and "big hunger" menus; Events based on local products Participation in the "Parcours du coeur" (heart-healthy eating) and physical activities; Composting waste in a local school.	Collaborative work in the gardens of the "Partage et Jardin" association.
Måltidsavdelningen Skövde kommun (SW)	In 2016, Skövde municipality's politicians developed a meal policy that has contributed to the municipality	

	serving the highest proportion of Swedish food in public meals in the whole of Sweden. 2020 saw the start of daily measurement of food waste in public meals, which has since fallen by 37%. In 2020, training began for all chefs in the municipality in sustainable meals with a focus on Klimat2030 Västra Götaland ställer om with a focus on food waste, Swedish food and more green on the plate. In 2022, the transition to more "blue proteins" began together with winwin award and then with Innovatum science center. The focus is on sustainable foods that can be found below the surface, such as RAS-farmed fish, mussels, seaweed and herring.	
Camst group (IT)	Dry cleaning system (water saving and less detergent consumption); Monitoring of food waste in schools and related reduction actions; Supply of food-saving kits in schools (bags provided to children to recover uneaten bread and fruit); Replacement of disposable cutlery/dishes kits with washable and reusable alternatives; Calculation of the environmental impact of our menus (e.g. carbon dioxide emissions, water consumption, etc...) and compensation actions.	

RESTAURANTS

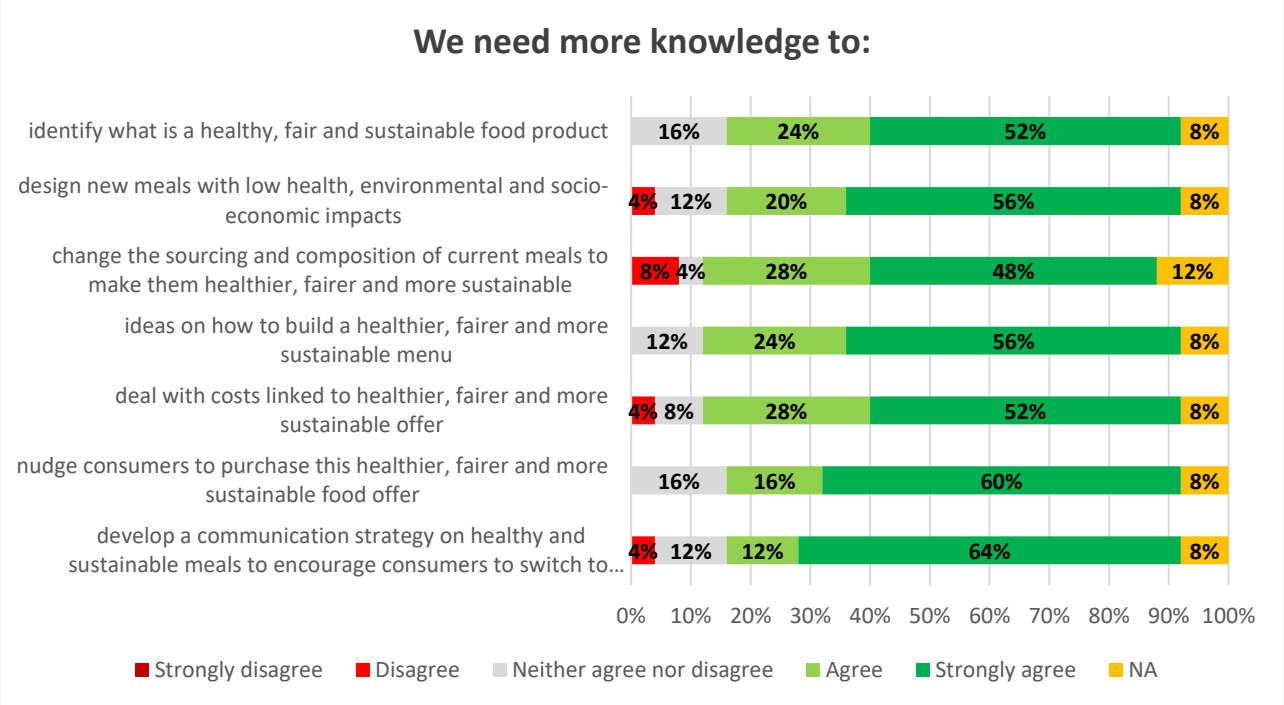


Figure 16. What restaurants need in terms of knowledge (CWG).

Table 19. What restaurants need in terms of knowledge (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
identify what is a healthy, fair and sustainable food product	14%	0%	0%	57%	29%	0%
change the sourcing and composition of our current meals to make them healthier, fairer and more sustainable	14%	0%	14%	43%	29%	0%

build a healthier, fairer and more sustainable menu	14%	14%	0%	29%	43%	0%
design new meals with low health, environmental and socio-economic impacts	0%	0%	0%	71%	29%	0%
deal with costs linked to a healthier, fairer and more sustainable offer	14%	0%	0%	43%	43%	0%
guide consumers to purchase this improved food offer	0%	0%	0%	57%	43%	0%
develop a communication strategy on our healthy and sustainable meals to encourage consumers to switch to these options	14%	0%	0%	57%	29%	0%

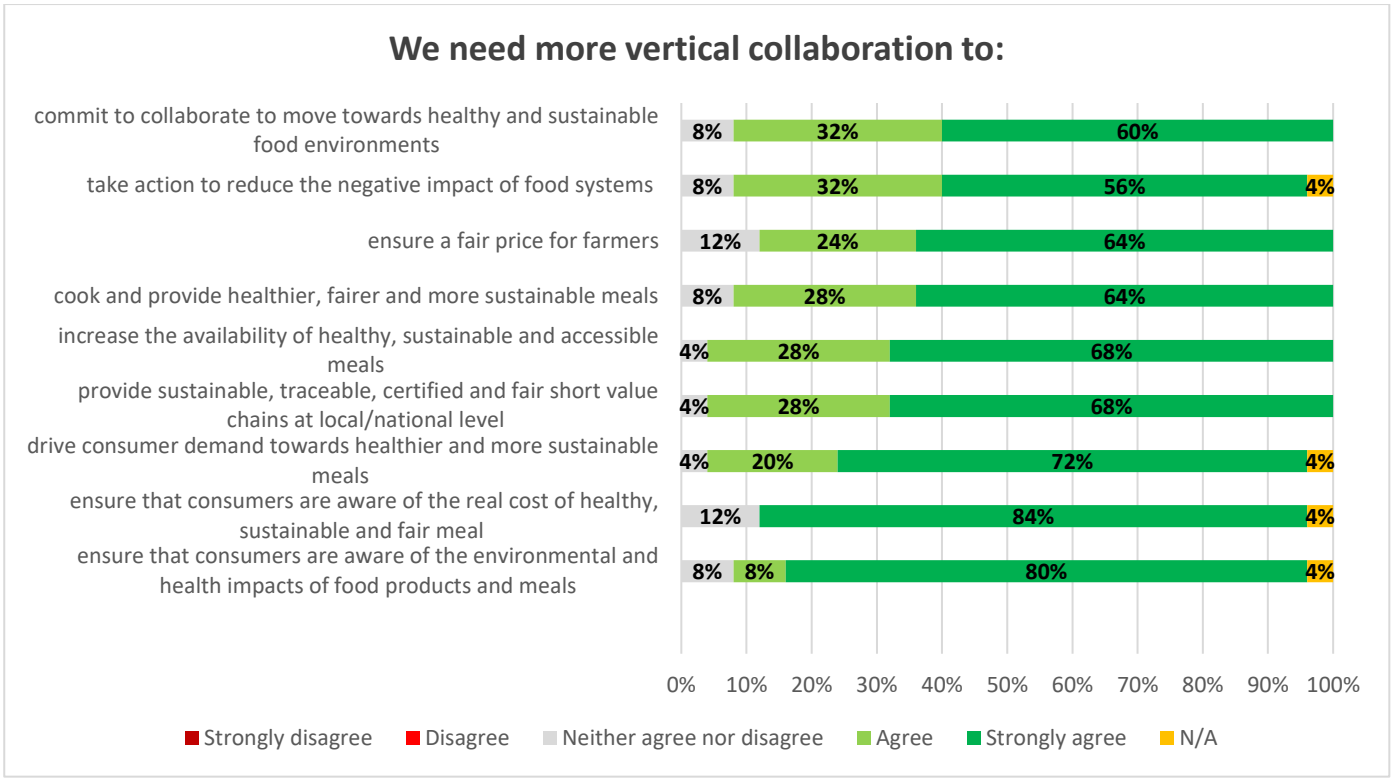


Figure 17. What restaurants need in terms of vertical collaboration (CWG).

Table 20. What restaurants need in terms of vertical collaboration (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
commit to collaborate to move towards healthy and sustainable food environments	14%	0%	29%	43%	14%	0%
take action to reduce the negative impact of food systems	0%	14%	0%	57%	29%	0%
ensure a fair price for farmers	0%	0%	14%	71%	14%	0%
cook and provide healthier, fairer and more sustainable meals	0%	14%	14%	57%	14%	0%
provide sustainable, traceable, certified and fair short value chains at local/ national level	14%	14%	0%	57%	14%	0%
drive consumer demand towards healthier and more sustainable meals	0%	0%	0%	57%	43%	0%

ensure that consumers are aware of the real cost of healthy, sustainable and fair meals	0%	0%	0%	29%	57%	14%
ensure that consumers are aware of the environmental and health impacts of food products and meals	0%	0%	0%	43%	57%	0%

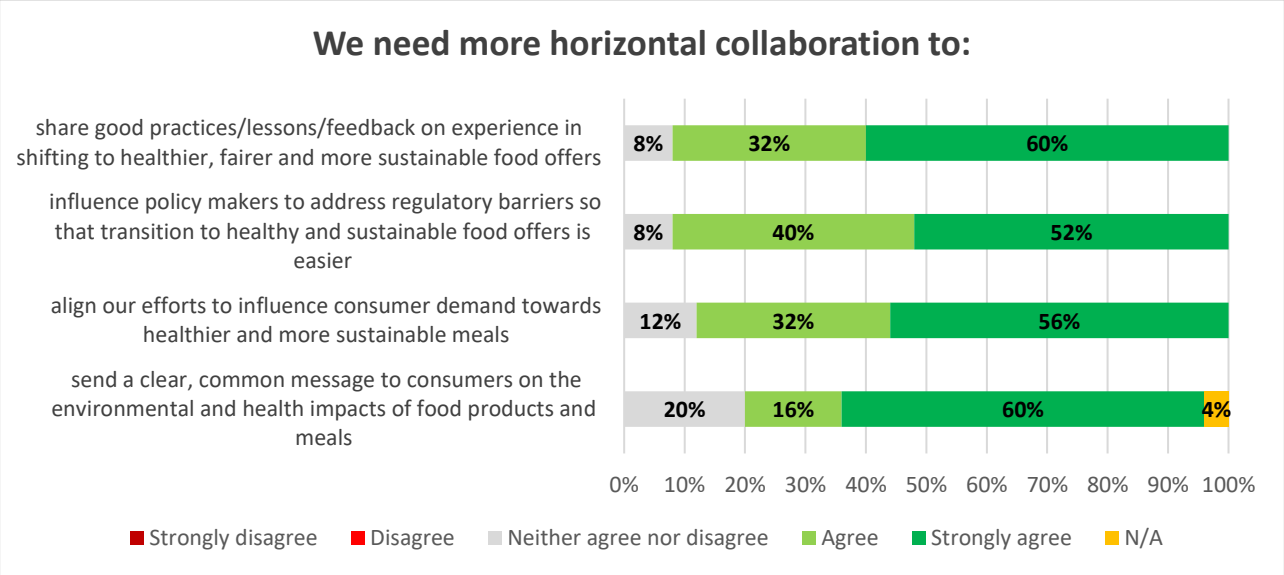


Figure 18. What restaurants need in terms of horizontal collaboration (CWG).

Table 21. What restaurants need in terms of horizontal collaboration (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
share good practices and feedback on experience in shifting to healthier, fairer and more sustainable meal offers.	0%	0%	14%	71%	14%	0%
influence policy makers to address regulatory barriers so that transition to healthy and sustainable food offers is easier	0%	0%	14%	43%	43%	0%
align our efforts to influence consumer demand towards healthier and more sustainable meals	0%	0%	14%	29%	57%	0%
send a clear, common message to consumers on the environmental and health impacts of food products/meals	0%	0%	0%	71%	29%	0%

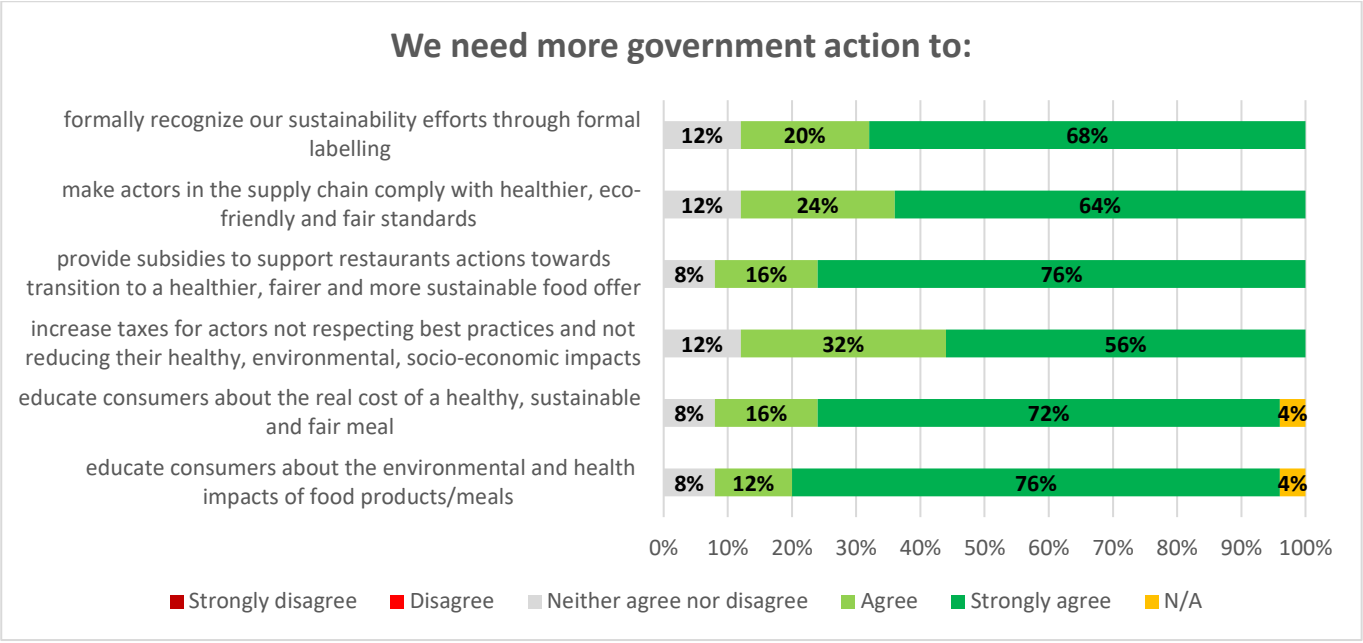


Figure 19. What restaurants need in terms of government actions (CWG).

Table 22. What restaurants need in terms of government actions (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
formally recognize our sustainability efforts through formal labelling	0%	0%	0%	71%	29%	0%
make actors in the supply chain comply with healthier, environmental and socio-economic standards	0%	0%	14%	57%	14%	14%
provide subsidies to support restaurants actions towards transition to a healthier, fairer and more sustainable food offer	0%	0%	14%	29%	57%	0%
increase taxes for food value chain actors not respecting best practices and not considerably reducing their health, environmental and socio-economic impacts	0%	0%	0%	29%	71%	0%
educate consumers about the real cost of a healthy, sustainable and fair meal	0%	0%	0%	43%	57%	0%
educate consumers about the environmental and health impacts of food products/meals	0%	0%	29%	14%	43%	14%

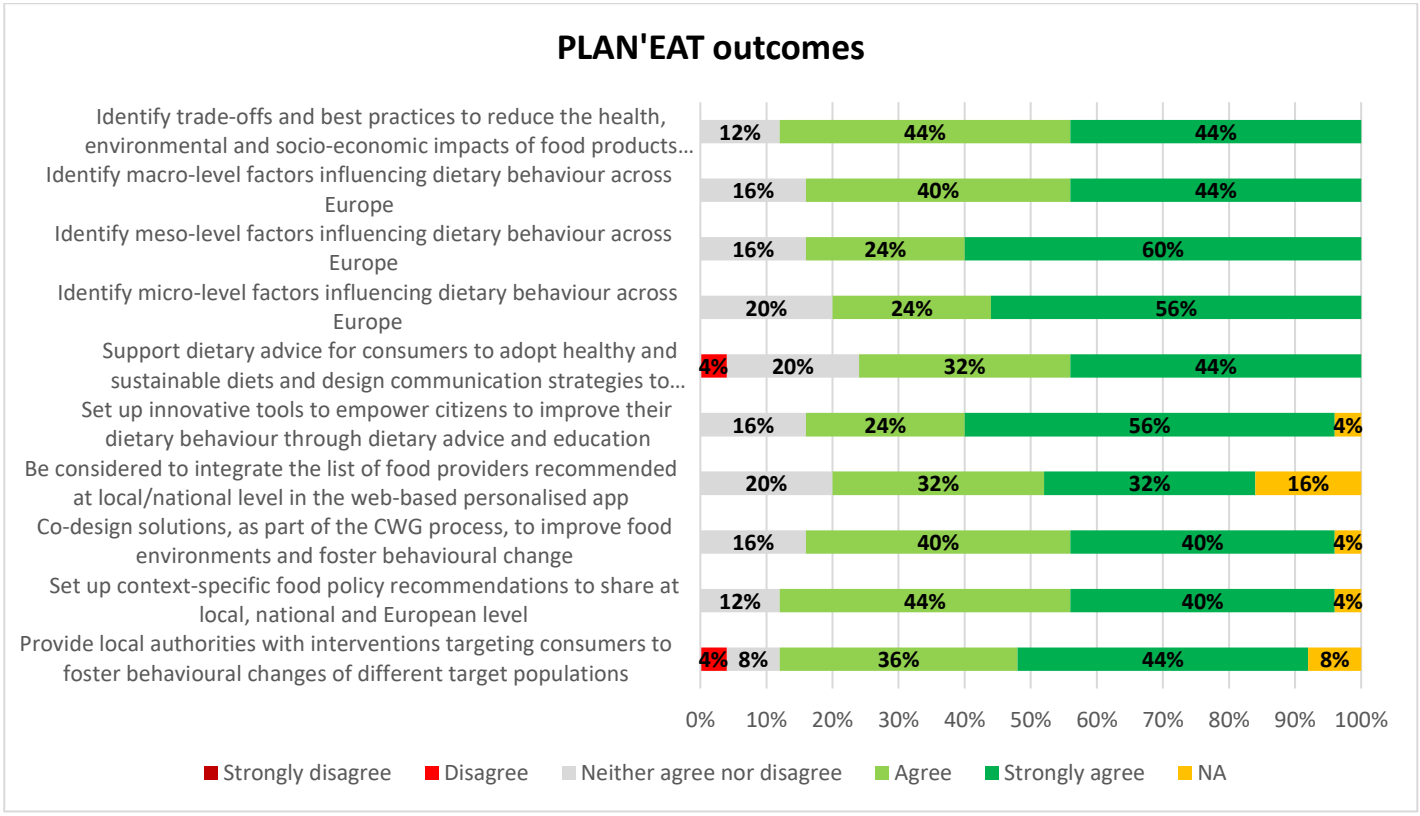


Figure 20. Restaurant's expectations from PLAN'EAT project (CWG).

Table 23. Restaurant's expectations from PLAN'EAT project (LLs).

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
Identify trade-offs and best practices to reduce the health, environmental and socio-economic impacts of food products through True Cost Accounting (TCA)	0%	0%	14%	71%	14%	0%
Identify macro-level factors (food system drivers) influencing dietary behaviour across Europe	0%	0%	0%	71%	29%	0%
Identify meso-level factors influencing dietary behaviour across Europe	0%	0%	14%	57%	14%	14%
Identify micro-level factors influencing dietary behaviour across Europe	0%	0%	14%	57%	29%	0%
Support dietary advice for consumers to adopt healthy and sustainable diets and design communication strategies to increase the acceptability of food and health policy interventions by all food system actors	0%	0%	29%	57%	14%	0%
Setting up innovative tools to empower citizens to improve their dietary behaviour through innovative dietary advice and education tools	0%	0%	14%	57%	29%	0%
Be considered as a candidate to integrate the list of food outlets recommended at local level in the PLAN'EAT personalised app	0%	0%	29%	57%	14%	0%
Co-design solutions to improve food environments and foster behavioural change	0%	0%	0%	57%	29%	14%

Table 24. The list of the initiatives to achieve the transition towards sustainable and healthy food environments/food systems for restaurants (CWGs and LLs).

	Initiatives already implemented	Initiatives planned for the future
Persian Properties Unlimited T/A O'Callaghan Collection (IR)	Buying more local Pushing suppliers to have sustainable ethical food supply chain	
The Mont by O'Callaghan Collection (IR)		Internal policy called "Food Vision 2030": Coherence of policies for food, health, and nutrition; Enhancement of consumer trust through providing evidence of safe and ethical food production; Creation of value-add, through insight and innovation, supporting the food sector and continuing to develop market opportunities at home and abroad
Pen & Player (IR)	Having healthy, organic options available; Using sustainable food suppliers; Reducing the use of single use packaging; Using reusable glass bottles to cut down on water; Using tetra pack cartons of water.	
De Frietboetiek bv (BE)	Providing local ingredients in the menus where possible; Focusing on the provision of different vegetarian offerings.	
Residence Inn Brussels Airport (BE)	Trying to work with seasonal products and local suppliers; Trying to reduce waste as much as possible.	
Chabrol restaurant (BE)	The supplier Terroirist changed the food system. Terroirist is a cooperative that connects producers (from Belgium and Europe) with shops and restaurants located in Brussels.	
Landal GreenParks GmbH (GE)	Green Key certification	
Lou Regalido (FR)	Local and 80% organic suppliers 100% artisanal drinks no processed products	
Wasven (NL)	Conversion to ingredients: organic, local, seasonal and plant based. Organizing events to promote sustainable healthy food.	
Hilton Milan (IT)	Using local products possibly at KM 0	A greenhouse for the aromatic herbs of our restaurant with biodynamic agriculture will be build
Rome Cavalieri, A Waldorf Astoria Hotel (IT)	Constant collaboration with the Slow Food Rome Presidium. (The Presidia sustain quality production at risk of extinction, protect unique regions and ecosystems, recover traditional processing methods, safeguard native breeds and local plant varieties.)	The future goal is to create menus that enhance the full use of raw materials with the minimization of waste
The St.Regis Florence & The Westin Excelsior Florence (IT)	creation of a menu entirely dedicated to sustainability and the Green choice Looking for suppliers from the territory and who can guarantee the territoriality of the products supplied	
Budapest Party Service Kft.(HN)	Striving to make dishes from local ingredients whenever possible. Reducing environmental impact by about 100,000 km by increasing the proportion of dishes prepared from local ingredients in menus. Labelling menu, indicating how environmentally conscious the given menu offer is.	

Restaurant Biarritz KFT (HN)	Working with local suppliers; Seasonality	
MAR CRISTAL MARILUM SL (SP)	Using suppliers km 0 and Using or certified organic; Policy of total use of products including those that are usually discarded; Promoting products of traditional origin; Encouraging the consumption of products with little commercial value;	
Royal Bristol Warsaw (PL)	Trying to choose local sources of supply; Buying organic products	
Leonardo Kraków OPCO SP. z o.o. (PL)	Sourcing goods from local suppliers; Reducing meat consumption in favour of plant products; Increasing the supply of ECO products; Increasing the supply of regional products	
Leonardo Hotels Warsaw Sp.zo.o. (PL)	Water Filtering Machines and Carafes instead of individual bottles; Removal of Plastic Single-Use Materials	Education of Hotel Guests in the field of food waste and limit food waste
Metropolis Roof Garden (GR)	Food waste management; Donations of leftovers; Local suppliers; Information to guests	
Peskesi (GR)	Creation of a farm to table concept where 70% of food comes from owned organic farming; Minimization of waste by using the restaurant's food wastewater to fertilize crops; Creation of an educational catalogue explaining the seasonality and origin of raw materials ; The training of the staff about the value of the traditional sustainable diet to promote it to consumers	
Living Labs		
Raggazzi (GR)	Banning the use of plastic	
RESTAURACJA (PL)	Restricting plastic to a minimum, using natural products	
Sergi de Meià (SP)	Working with local and organic producers; The creation of the Fundació Coma de Meià, which is dedicated to gastronomic culture, organic farming and social and environmental project in rural areas.	
The man and the sea (IT)	Fresh and available fish to cook reducing the waste of the products	
Sunday Meals (FR)	More local and direct purchases with producers	

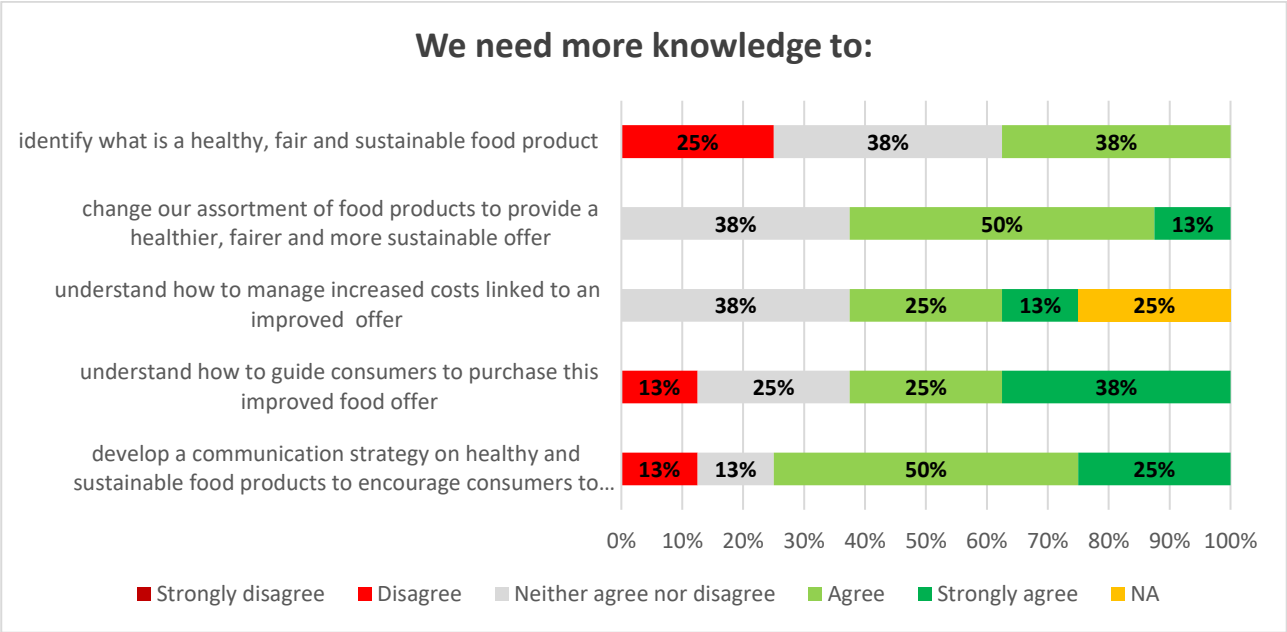


Figure 21. What retailers need in terms of knowledge and resources.

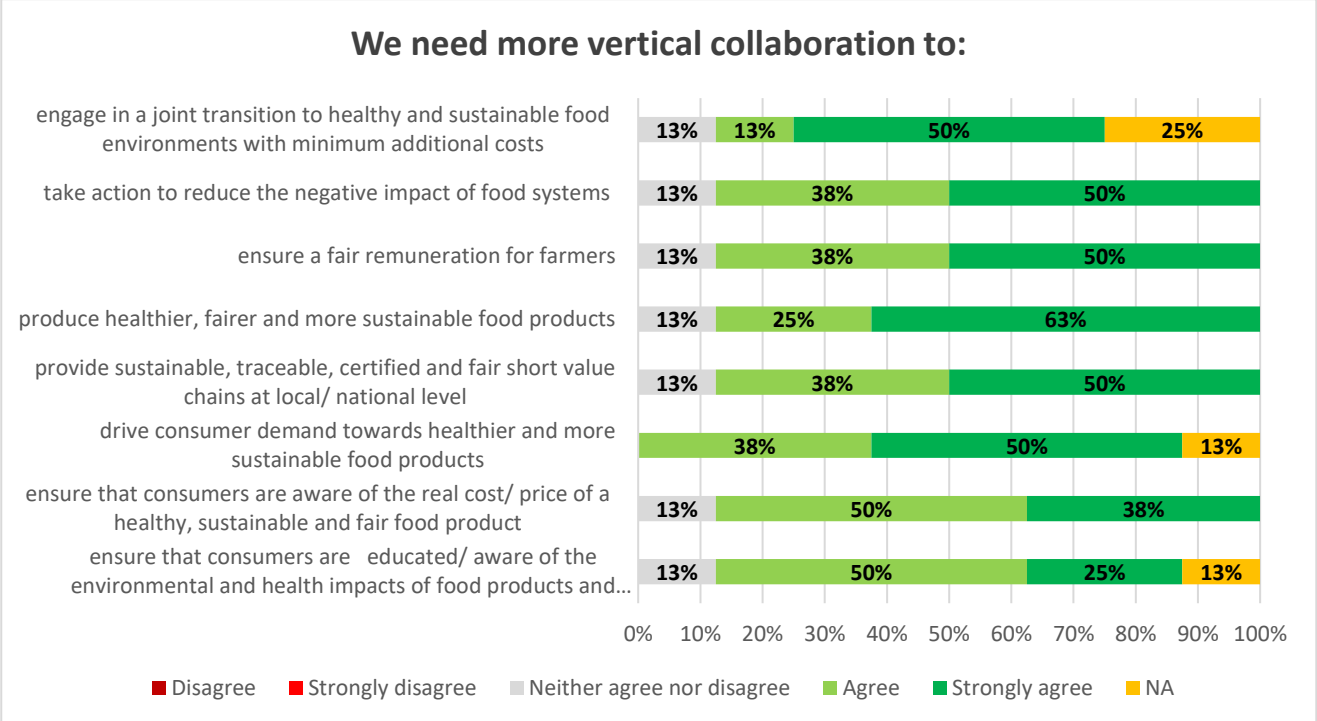


Figure 22. What retailers need in terms of vertical collaboration.

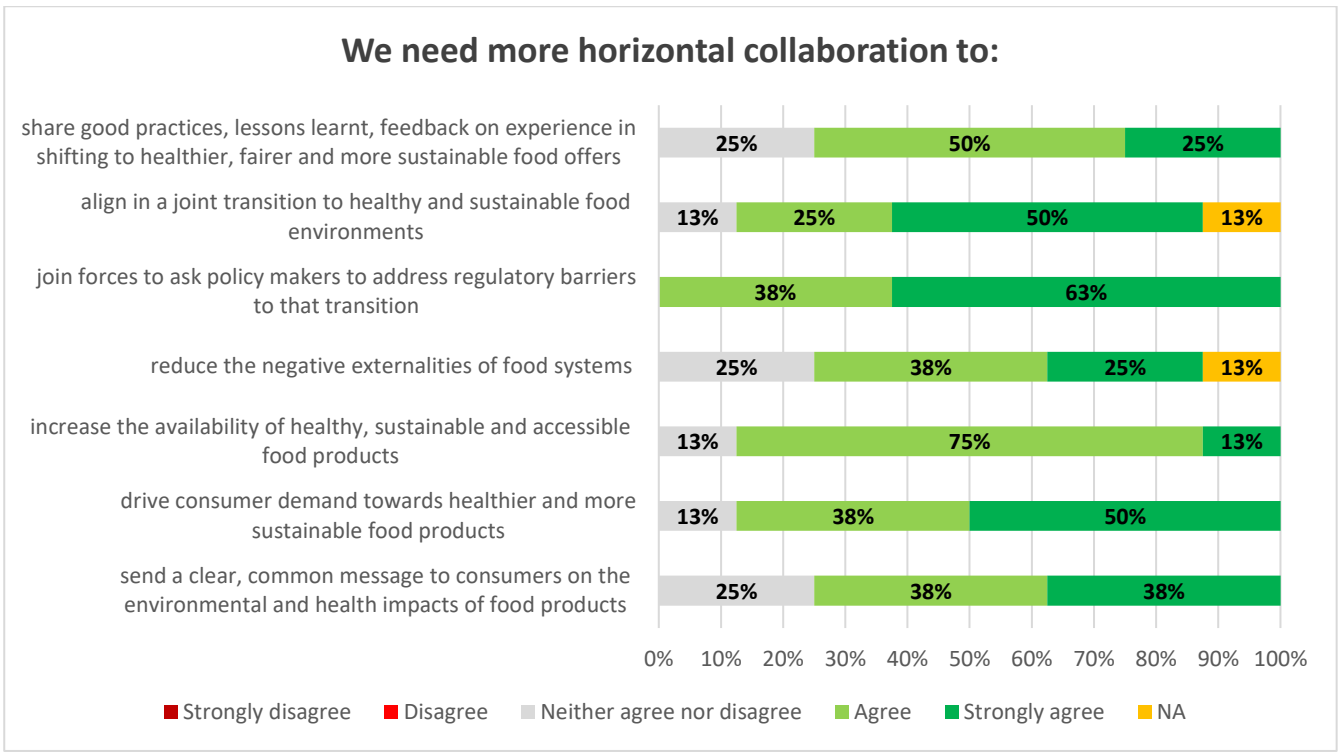


Figure 23. What retailers need in terms of horizontal collaboration.

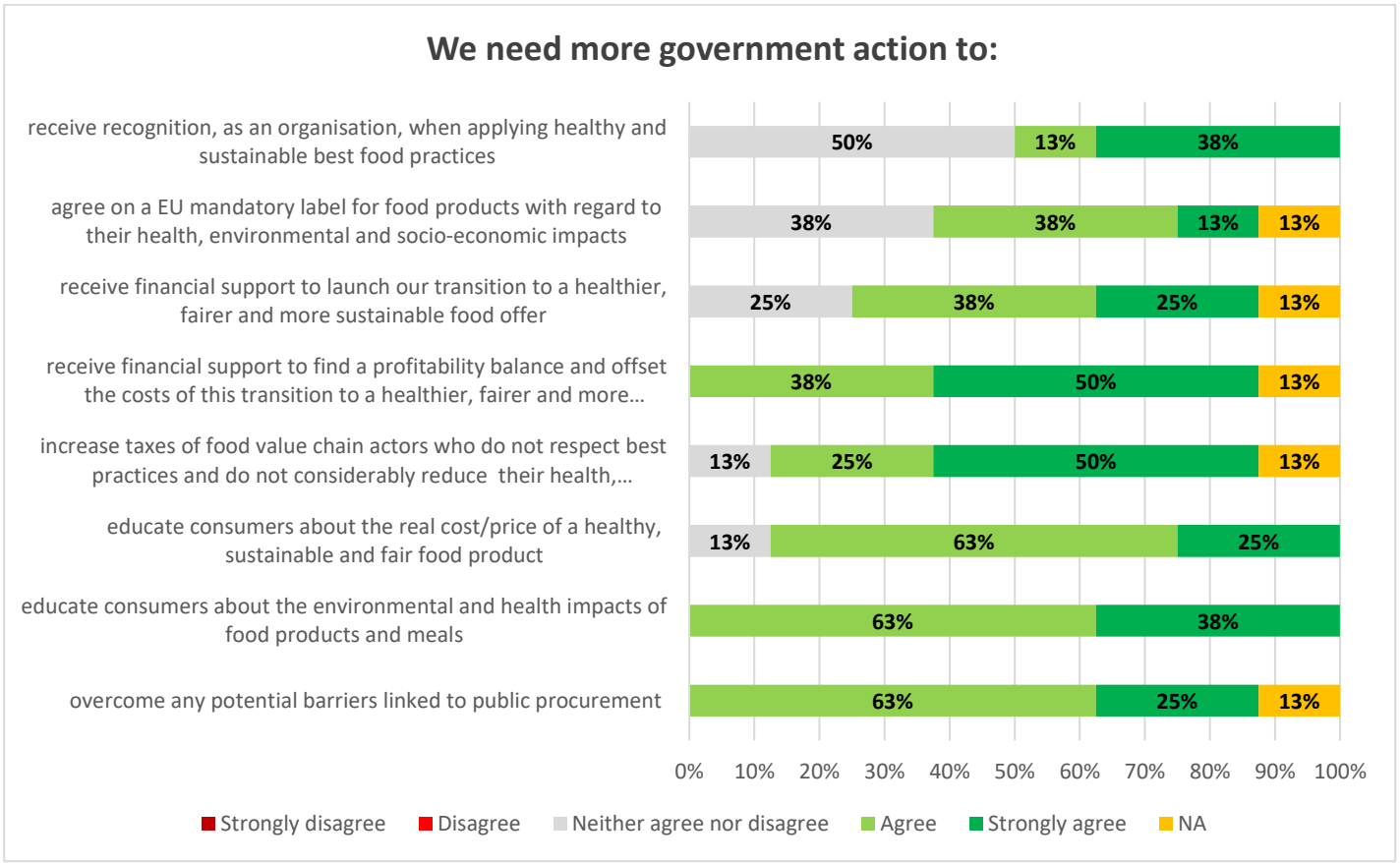


Figure 24. What retailers need in terms of government action.

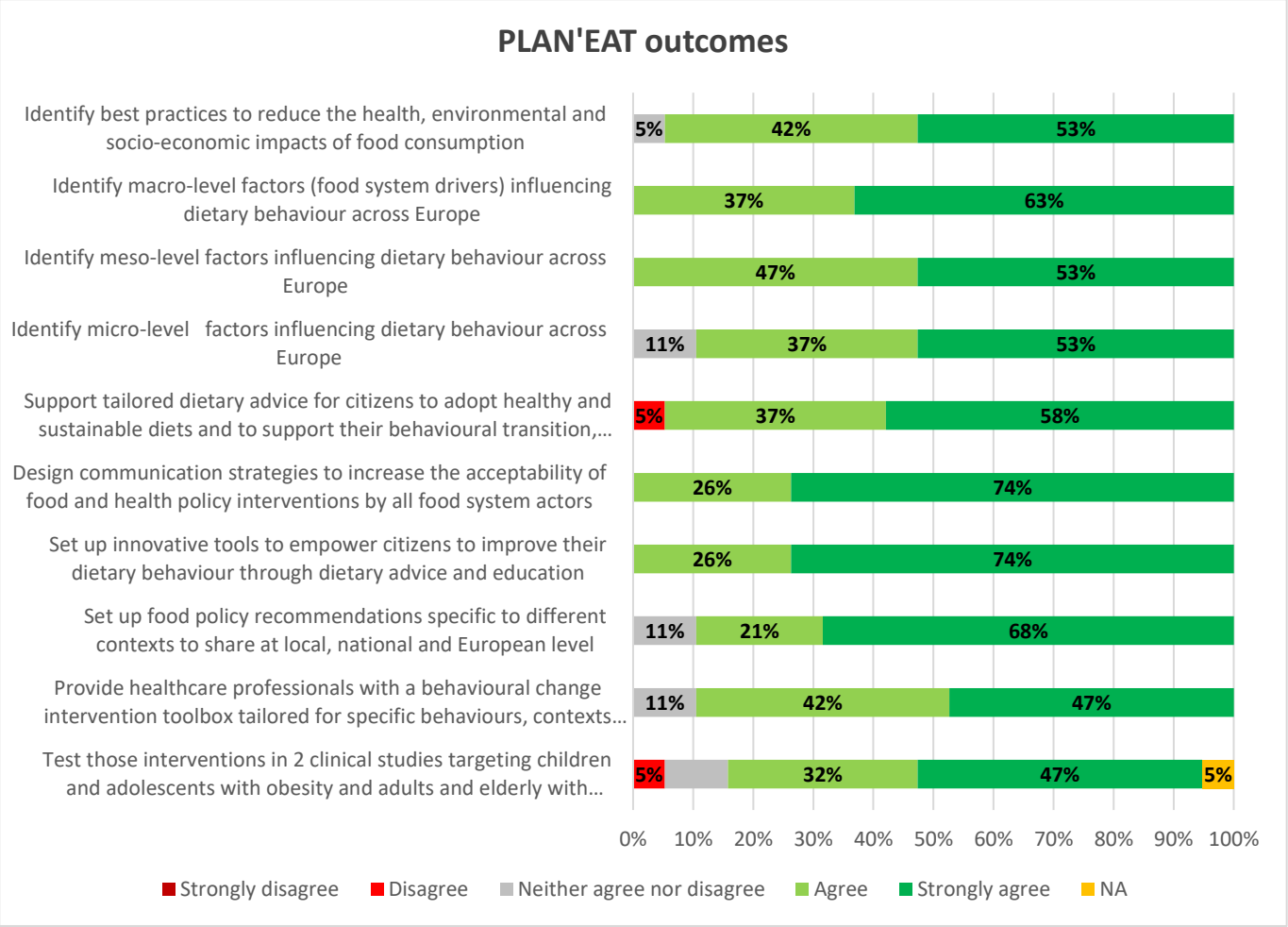


Figure 25. Retailers' expectations from PLAN'EAT project.

Table 25. The list of the initiatives to achieve the transition towards sustainable and healthy food environments/food systems for retailers.

	Initiatives already implemented
Coop Sverige (SW)	Coop Sustainability declaration https://www.coop.se/hallbarhet/hallbarhetsdeklaration/coops-sustainability-declaration/; The Swedish platform on risk commodities https://riskgrodor.se/english/ The Sustainable Supply Chain for Food in Sweden initiative https://hallbarlivsmedelskedja.se/; Antibiotics for food producing animals https://www.axfoundation.se/en/projects/antibiotics-in-food-production
Lidl Sverige KB (SW)	Work towards reducing sugar and salt content of 20% in assortment by 2025; Policy strategies to increase fiber content and increase plant-based protein share by 2025; Strategy for marketing only healthy foods toward children
Farm of the louvieres (FR)	Fresh, unprocessed products without preservatives;
The Hive that says Yes! (FR)	Promoting the model to have more products in short circuits; Promoting the fact that products in short circuits are not always more expensive than supermarkets
Fruits del Secà (SP)	Change some packaging to paper or biodegradable plastic.
Coop Italia (IT)	"ViviSmart": encourage healthy diets and lifestyle based on the Mediterranean Diet (Barilla, Coop Italia, Danone, Fondazione Barilla Center for Food & Nutrition, ANCC-Coop e 101ondazione Istituto Danone); PROGETTO EDUCAZIONE AL CONSUMO CONSAPEVOLE Dal (from 1980): school programs to educate young consumers towards responsible dietary choices ; ALLEVIAMO LA SALUTE: encouraging healthy and balanced diets; MONDO BENESì: products aimed to particular/specific population requirements.

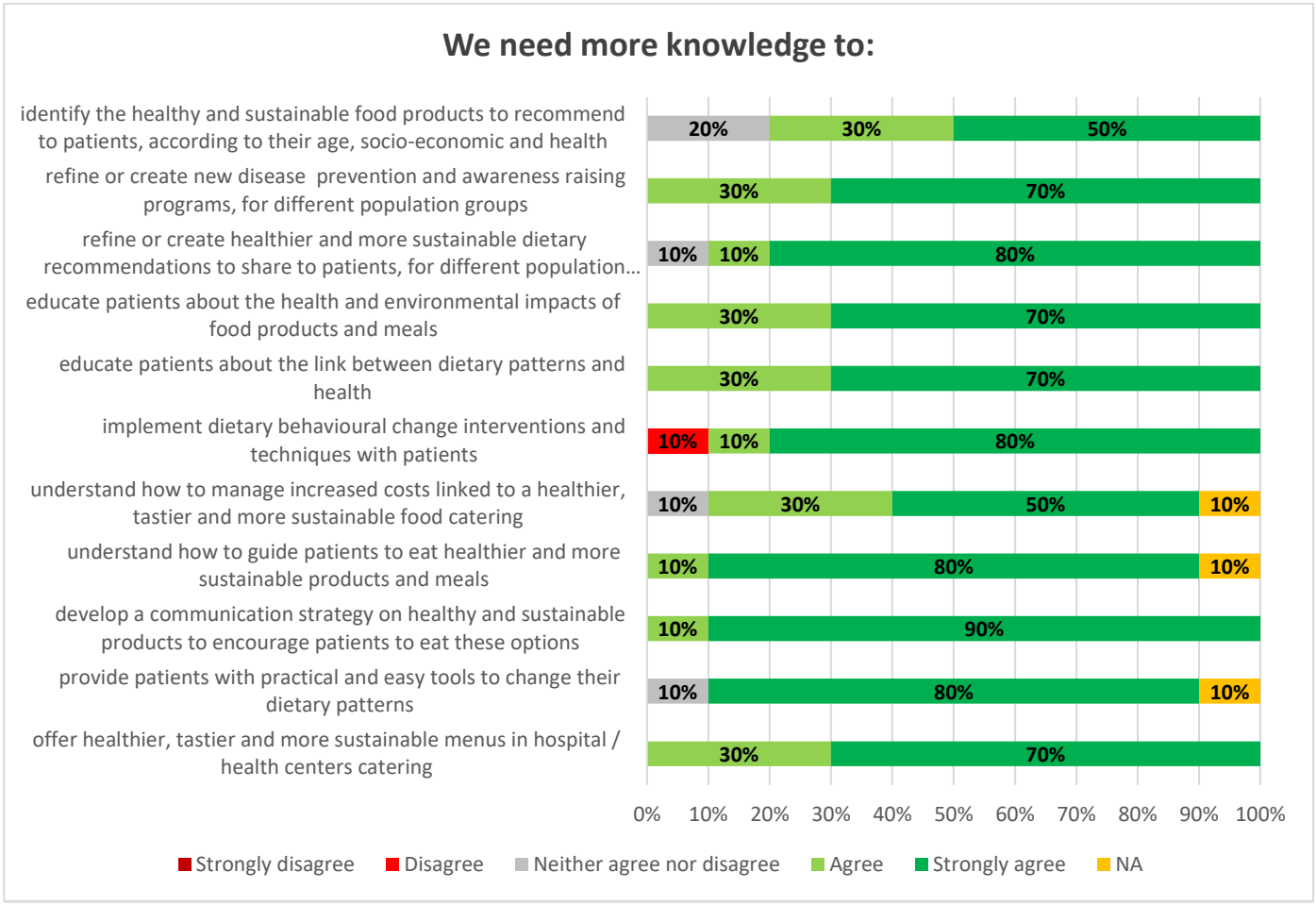


Figure 26. What healthcare offering catering need in terms of knowledge.

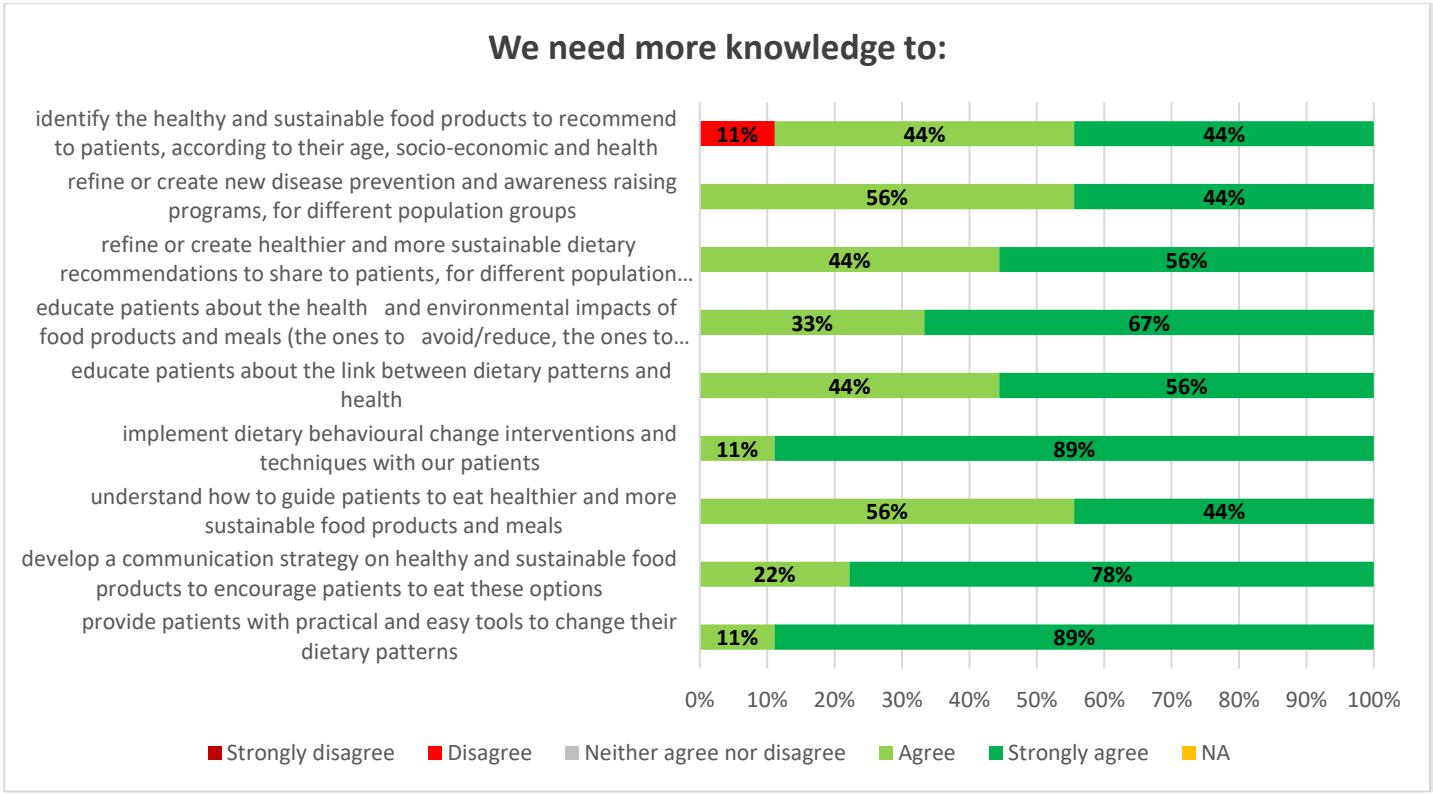


Figure 27. What healthcare not offering catering need in terms of knowledge.

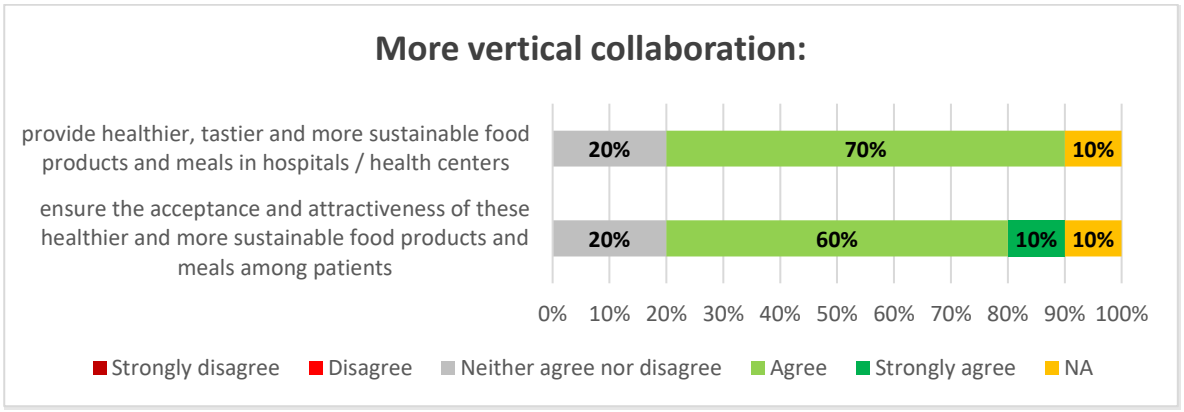


Figure 28. What healthcare offering catering need in terms of vertical collaboration.

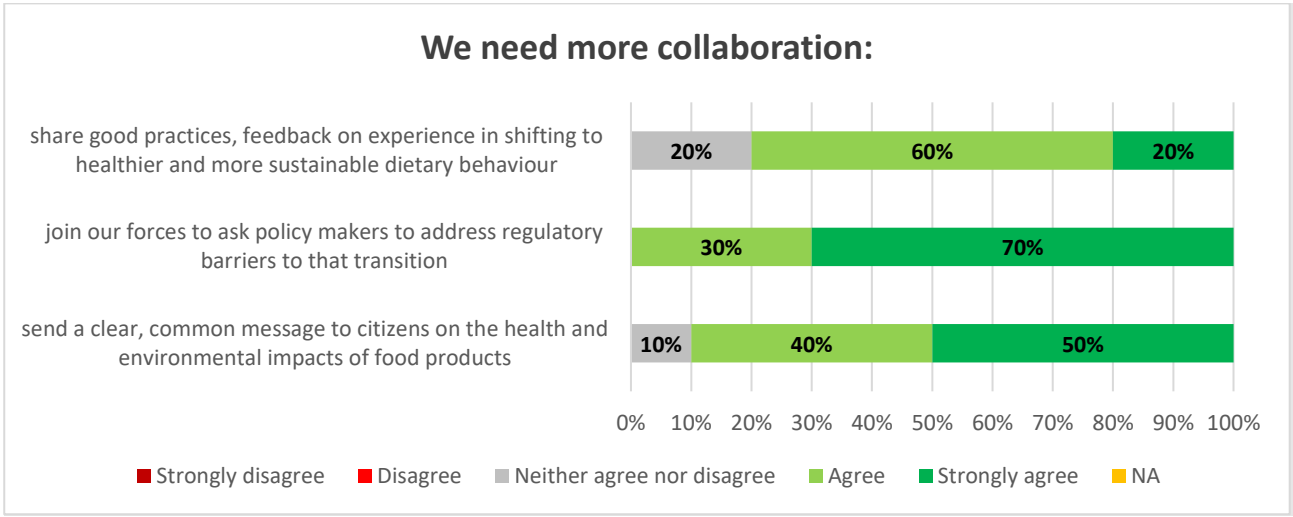


Figure 29. What healthcare offering catering need in terms of collaboration between healthcare actors.

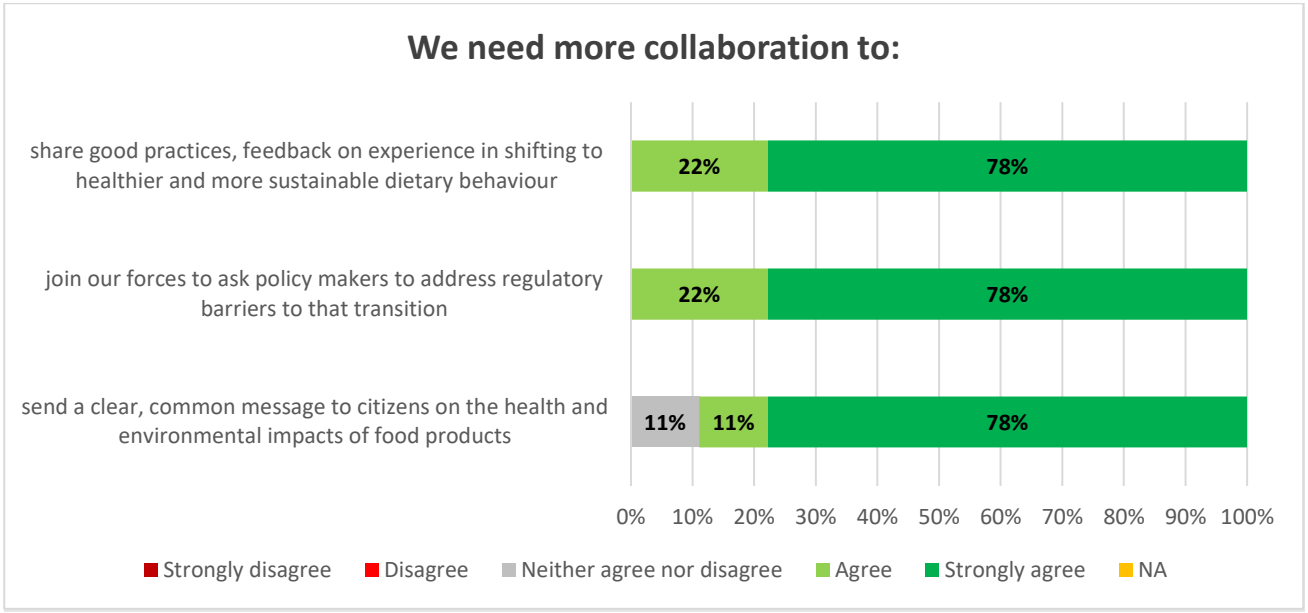


Figure 30. What healthcare not offering catering need in terms of collaboration between healthcare actors.

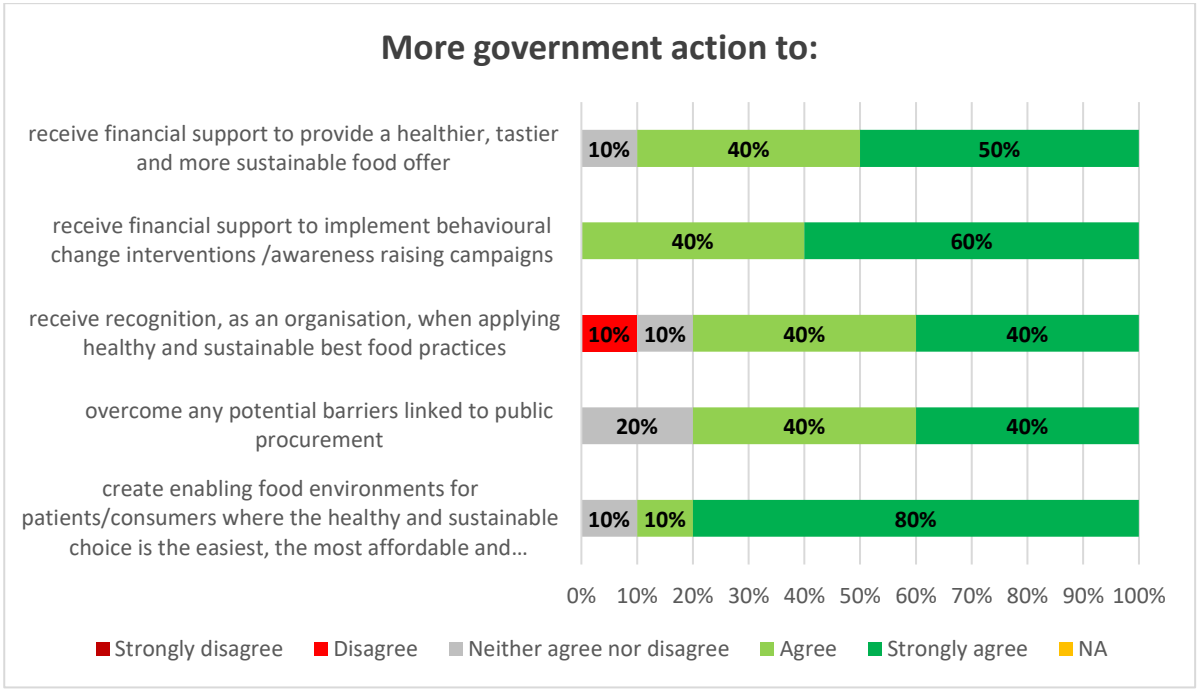


Figure 31. What healthcare offering catering need in terms of government action.

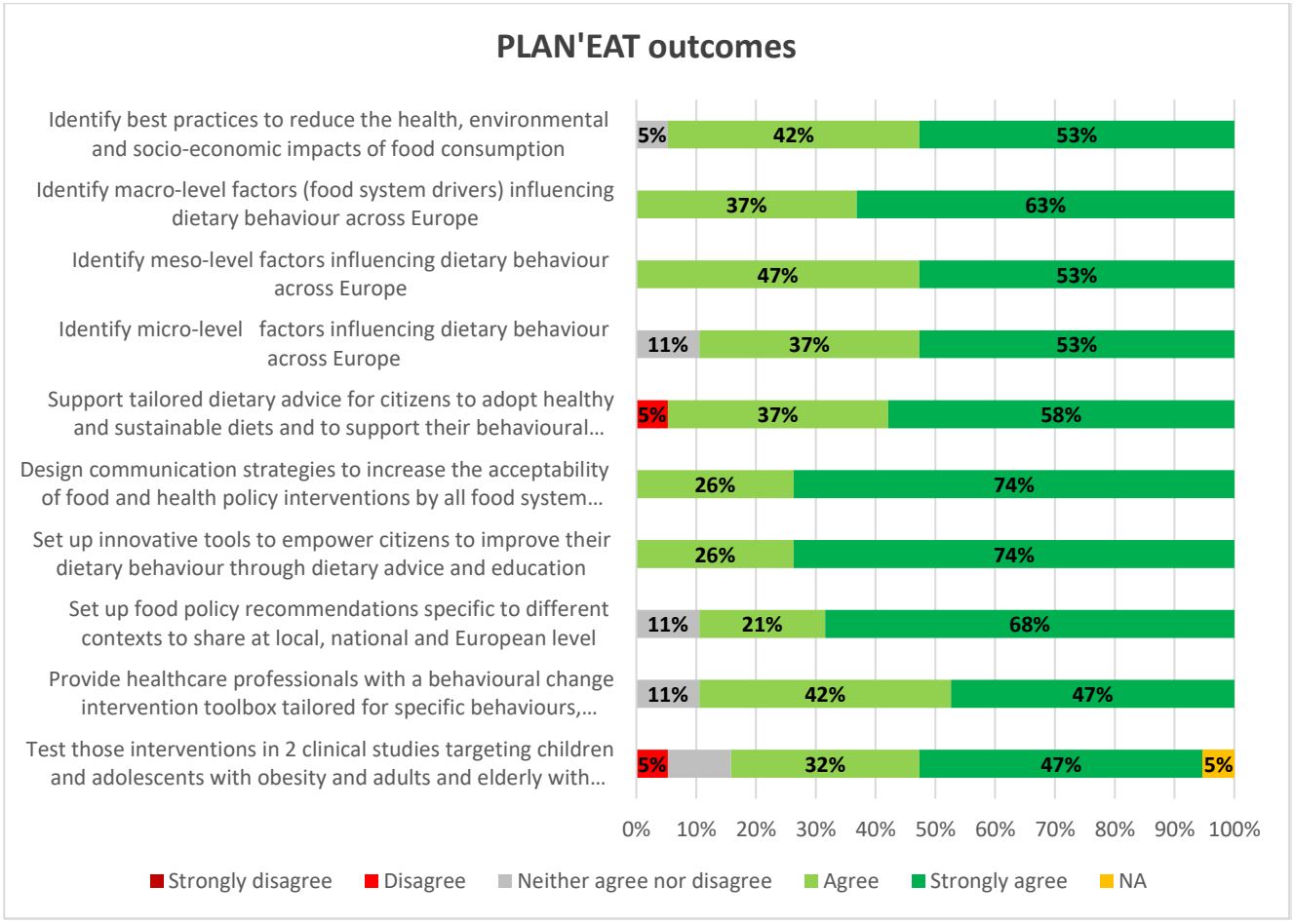


Figure 32. Healthcare's expectations from PLAN'EAT projects.

Table 26. The list of the initiatives to achieve the transition towards sustainable and healthy food environments/food systems for healthcare professionals.

	Initiatives already implemented
Offering catering	
Hospital Germany (GE)	Recommended mostly plant-based diets to patients
Sant'Orsola Malpighi (IT)	Nutritional educational programmes for specific target groups (e.g. kids at school to prevent overweight and obesity). Specific porgrammes at hospital to sensitise the professionals to take care of patient nutrition and to educate patients.
CHU Clermont-Ferrand (FR)	Promoting vegetarian and organic meals for students
HM Children's Hospital (SP)	Educating patients regarding the importance of a sustainable and healthy diet, sharing this message with other pediatricians and health professionals in congresses, conferences, scientific sessions, etc.
ARCASA Catering (SP)	Communication actions on the diets served to patients, so that they are aware of the nutritional recommendations derived from their pathologies; Nutrition workshops are being held to show different tasty and healthy culinary techniques.
Not offering catering	
Università di Bologna (IT)	Plan to develop and test new educational protocols for preventing NCDs in children and adolescents (DUSE project)
Kostkunskap.se (SW)	To recommend more plant-based food and to implement more plant-based foods in schools, pre-schools and elderly's rest-homes.

IREPS 63 (FR)	Implementation of the PACAP project (prevention of obesity and overweight in 0-6 years old) in Thiers.
LB Nutrition Consulting (FR)	Healthy cooking sessions with local and seasonal products and nutrition workshops within schools for kids.

EDUCATIONAL SYSTEMS

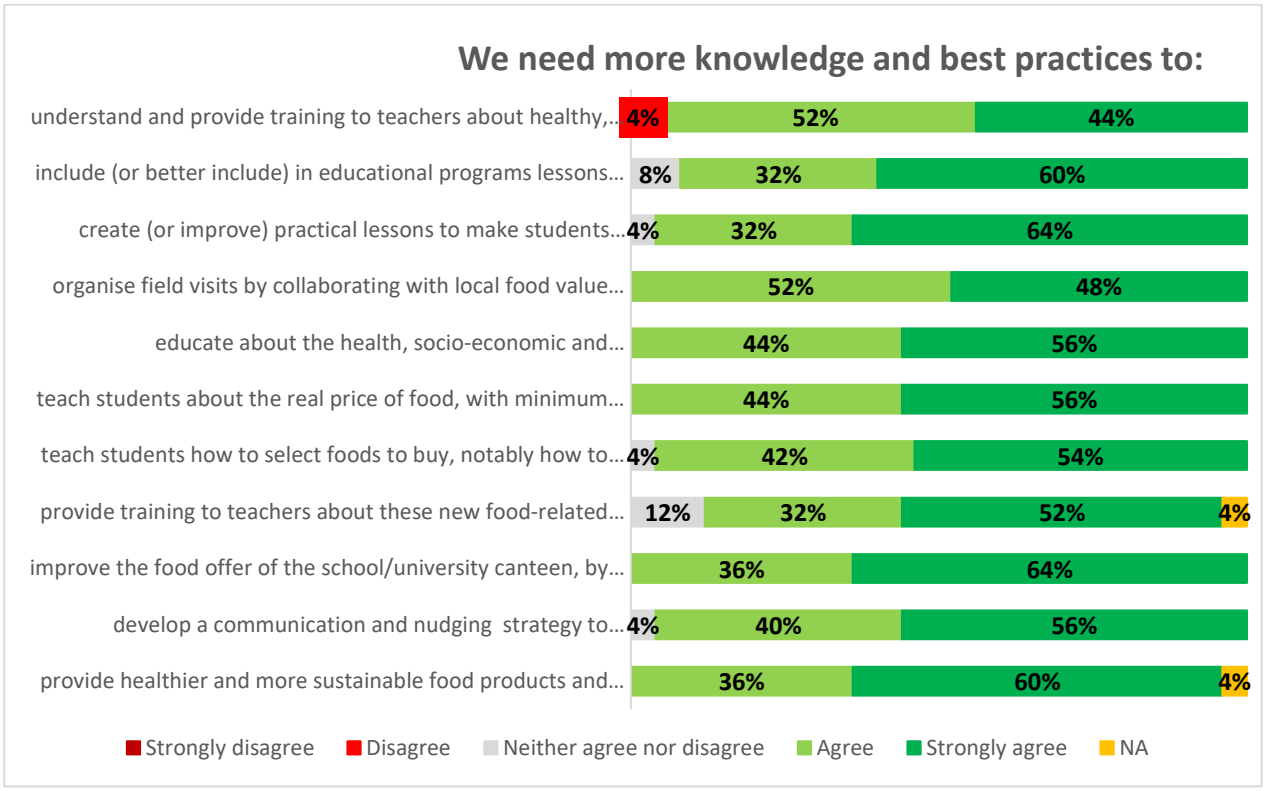


Figure 33. What educational systems need in terms of knowledge and best practices.

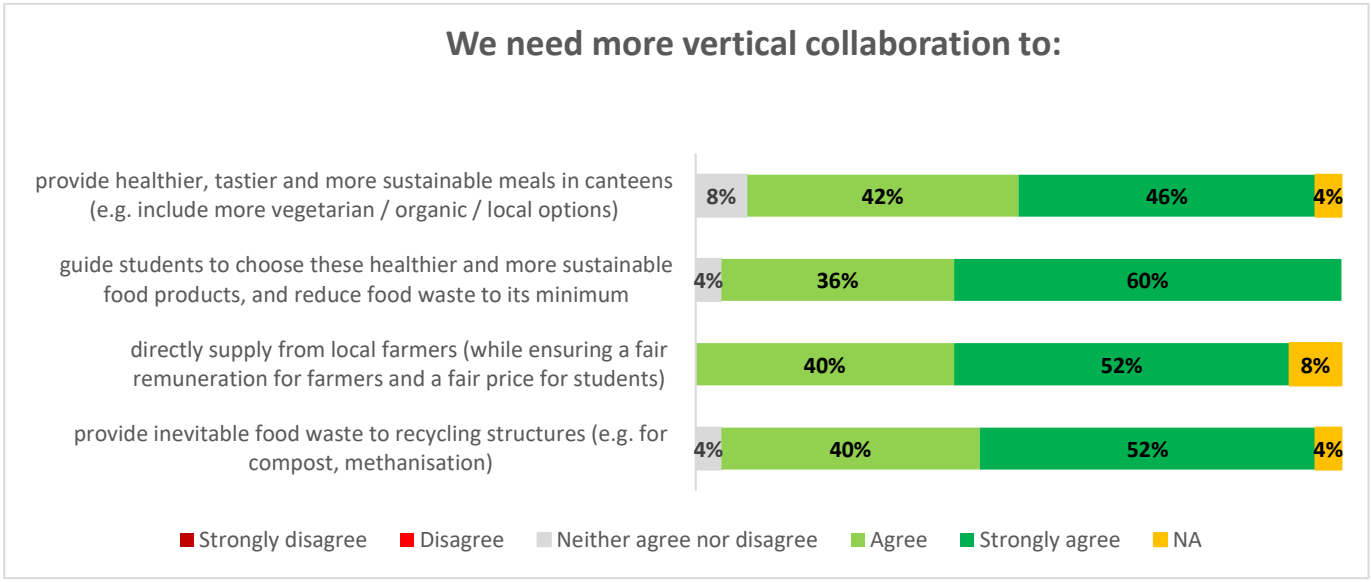


Figure 34. What educational systems need in terms of vertical collaboration.

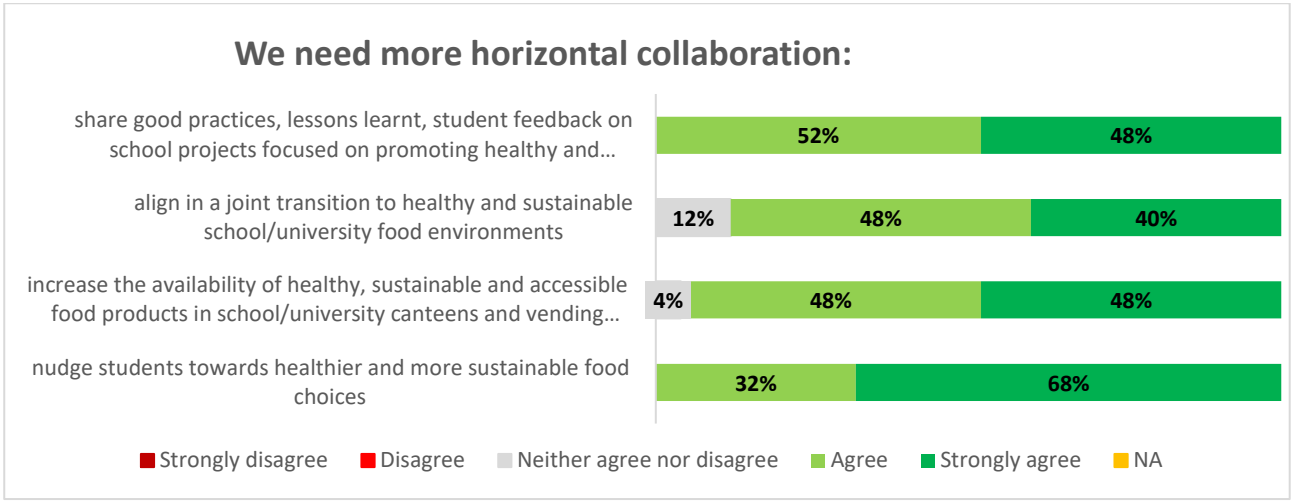


Figure 35. What educational systems need in terms of horizontal collaboration

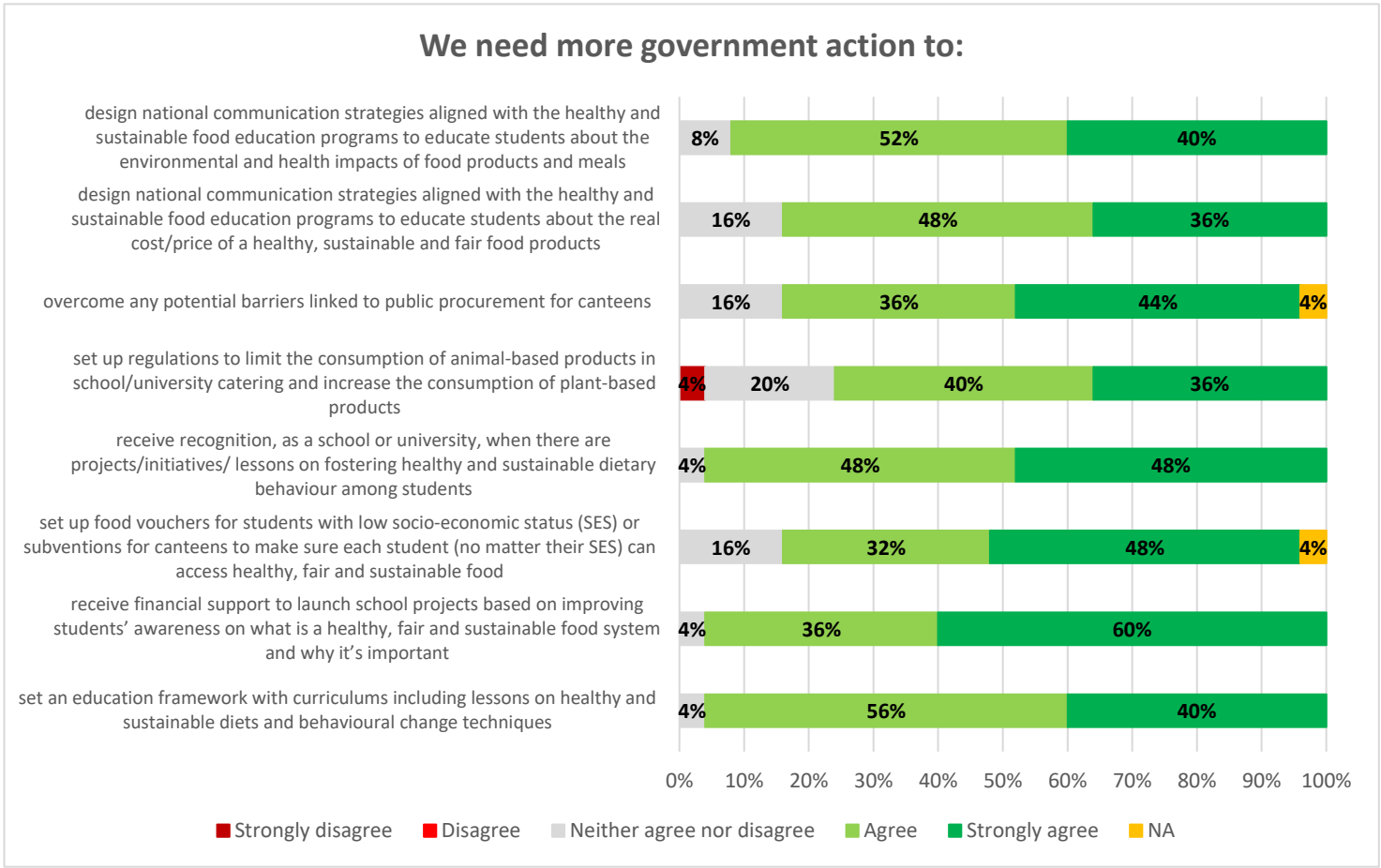


Figure 36. What educational systems need in terms of government action.

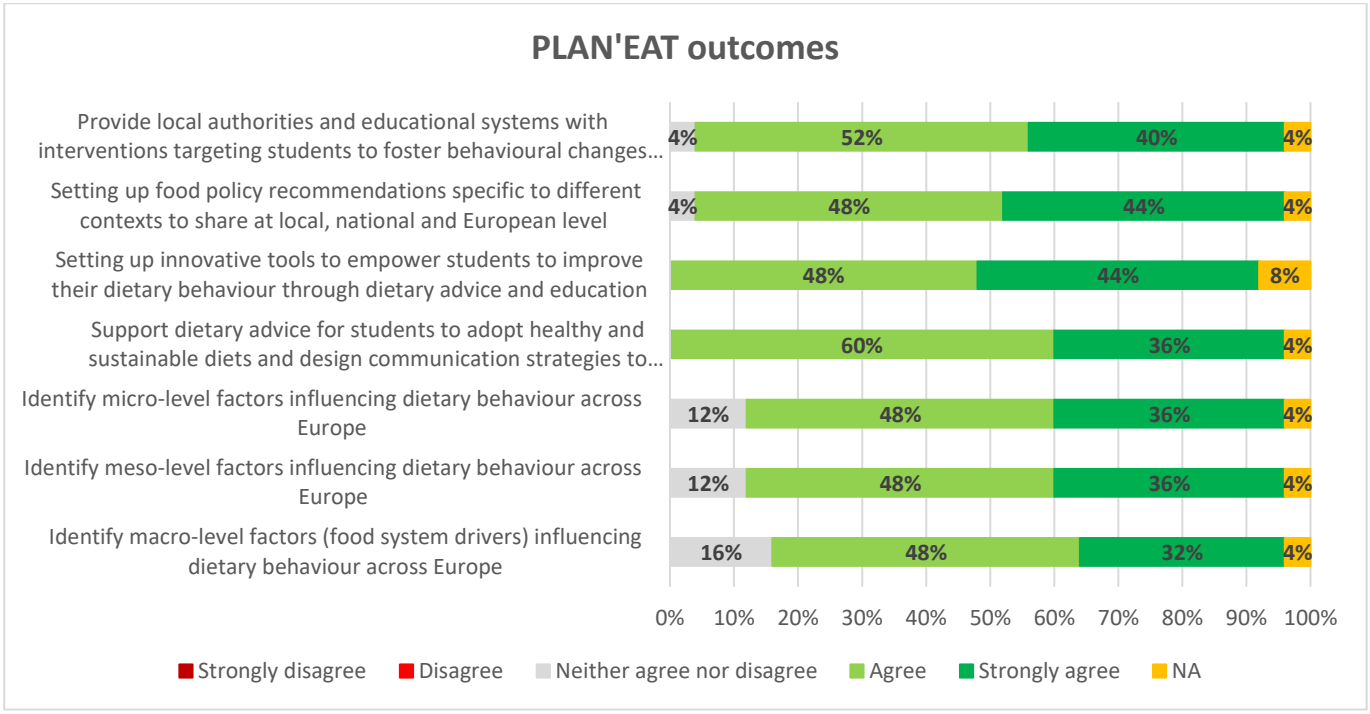


Figure 37. Educational system's expectations from PLAN'EAT projects.

Table 27. Educational systems initiatives.

	Initiatives already implemented	Initiatives planned for the future	Existing content in the curriculum about healthy, fair and sustainable food
Global research on wellbeing research group - Blanquerna Faculty of Health Sciences (URL) (SP)	FIT4FOOD - Alison Project (although it is a pilot project, and its impact is yet to be evaluated). Projecte Alimenta (Ajuntament de Barcelona) Projecte mimosa (Ajuntament de Granollers, La Magrana Vallesana) Espigoladors	Scientific publications linked to my doctoral thesis. On the one hand, I will soon publish an article defining the reference intake for a healthy and sustainable diet (SSA) in Spain considering several sustainability indicators. On the other hand, I will publish a scoping review on the factors that determine people to follow an SSA. This last work has led to the development of a questionnaire to assess the barriers and facilitators to follow a SSA, which I plan to publish during the second half of 2023.	Dr. Carrillo's sociology course presented the fundamentals of the current food system, identifying the key points that characterize each of its actors (producers, processors, distributors, consumers); Seminar on food waste.
University of Alicante (SP)	"Tax on sugar-sweetened beverages Spain: In 2021, VAT on sugar-sweetened beverages was increased (from 10% to 21%) Law 11/2020, of December 30, on the General State Budget for 2021 (article 69)".	Proposal for the regulation of advertising of food and beverages to children.	Contents related to the implementation of the Sustainable Development Goals, healthy and sustainable food in different areas, Km0, proximity food, fair trade, responsible consumption, among others.
University of Valencia (SP)	Project Development and implementation of new tools for advanced sustainable management of the Palacio de Congresos de València. Develop R+D+i projects for the creation of healthy and sustainable school environments.		Contents related to: Healthy and sustainable dietary recommendations complemented with physical activity recommendations for the Spanish population 2022; EAT-Lancet Commission: Healthy diets from sustainable food systems; Dietary guidelines and sustainability FAO.

Faculty of Health Sciences Blanquerna (SP)	Reduction of food waste; Publication of contents from public bodies.		
CdL Dietistica UNIBO (IT)	Creation of Last-minute market.	Participation in plan for consumption orientation, food education and a sustainable diet.	Courses concerning applied dietetic technical sciences, teaching of the agri-food system and food and society.
IIS Bartolomeo Scappi (IT)	Classes aimed at reducing water and carbon footprint while cooking; Workshops and projects focused on how to reduce food waste, including a visit to FAO headquarters in Rome; Activities to celebrate World Food Day (Oct. 16th); Food Issues, annual conference organized by our school to share good practices and ideas on nutrition, health and sustainability with experts and other Italian/European schools. Prof. Jeffrey Sachs was one of the speakers in 2022; Participation in the contest "ER - School of Food", promoted by Emilia Romagna.	Our school belongs to the network Health Promoting Schools in Emilia Romagna. We are currently planning the next edition of our annual conference, Food Issues, focusing on topics such as nutrition, health and sustainability. We are looking forward to actively participating in Plan'Eat project.	Topics on healthy eating, Slow Food and its mission and vision, 2030 Agenda, FAO, sustainability, knowledge and promotion of local products, Mediterranean diet.
Greek Ministry of Education, Faculty of Preschool Education (GR)	I am not in the relevant position to point out any important initiatives implemented in the Greek preschool educational system, since 2015, due to missing guidelines, aims and action plans.	I would definitely love to be involved to planning for reaching positive outcomes to shift to sustainable and healthy food environments/food systems.	Unfortunately Greek preschool curriculum has not an organized, public health-orientated context, aims, initiatives and actions to be implemented by preschoolers. As a result, the aim to foster positive outcomes to shift to sustainable and healthy food environments/food systems, especially in the preschool education arena, remains a personal bet to be won, according to each preschool educator willingness to offer in depth towards a better nutrition education.
Budapest Business University Faculty of Commerce, Hospitality and Tourism (HU)		NA	Topics on nutrition, with general, basic knowledge and with information on healthy nutrition, in particular. Relationship between sustainability and healthy nutrition, especially in the field of hospitality/ gastronomy.
Claesborgs förskola (SW)	Healthier food, in form of remove rice and change it into beans and other seeds. Education about healthy food.		
Igelkottens förskola (SW)	I have difficult to say that. My supermarket has more food from the local farmers which I think is very good.		It´s in our curriculum about health and sustainable food and development.
Elementary School Jean ZAY Beaumont (FR)	Building a vegetable garden at school; Work on the classification of foods and the recognition of balanced menus/ partnership with INRAE; Work on sorting waste (with a recycling center); Work across the board in different areas around environmental protection (arts and music, questioning the world, French).	No, it's already huge over a year and for a single class. The only thing is to pass the baton next year so that a new class has access to the Landestini program and extend knowledge in the school through this.	Classification of food and composition of balanced menus but based on my knowledge which needs to be updated.
Mortaix College (FR)	Weekly vegetarian meal; Reduced food waste by transforming leftover food into a new dish; Each student asks the attendant serving the main course how much they would like to eat; Bread is sliced more finely and is available at the end of the line; The pupils do not throw their yoghurt/fruit directly into the bin when they do not want to eat it, they have the possibility of leaving it on a table in the restaurant, where their classmates can come and help yourself.	We would like to organize a space for dialogue between the students and the chef.	Official program for cycle 4 (5e-3e): Related to geography, physical and sports education, chemistry, mathematics,

			technology, modern languages, media and information education. Food, feeding, global management of food resources (production, transport, conservation); food chains including humans; concentration of contaminants; phytosanitary products, OMGs, role of microorganisms in food production; crops and food; obesity epidemic in rich countries; Food Safety. Related to physical and sports education, mathematics, chemistry, technology. Sport and science, diet and training; breathing; exercise physiology and doping; effort and reward system; medicine, sport and biotechnologies; medical imaging.
LPO Léon Blum (FR)	School catering supply of local and organic products; Waste sorting; Valuation of donations for a local enterprise; Planting an orchard; Various edd and eco delegate projects.	Desire for partnership with middle school and primary school	Content of the course: science of life and earth.
LYCÉE PROFESSIONNEL RENÉE BONNET (FR)	Collection of waste for recycling (food - cardboard - paper-glass-plastic); Collaborative vegetable gardens within the school grounds; Purchase for the Self and the educational workshops of food products in short and labelled circuit; EDD clean up action (cleaning of the Canal du Midi); At the Regional level, implementation by the Occitanie Region of the OCCIT'Alim purchasing program (grouping of orders) of local, organic and sustainable agriculture products.	As part of the partnership with the Toulouse CREPS and as part of our 'Paris 2024' project, we plan to bring a food truck to the Olympic village (in partnership with the Occitanie Region, the Rectorate of Toulouse, the Georges Frêche high school in Montpellier, etc.). This food truck will serve vegetarian menus and/or low in animal protein prepared with Michelin-starred chefs from Toulouse, sports dieticians and high school students accompanied by their teachers.	PSE Course (Prevention Health and Environment) Biotechnology Course Cooking class in partnership with the CREPS of Toulouse on a healthy food project for top athletes
Szkoła Podstawowa z Oddziałami Integracyjnymi nr 105 [Primary School number 105 with Integrative Branches] (PL)	Supplying school stores with healthy food, eliminating the most harmful products from the offer; Definitely, in stores there is more choice of goods described as healthy food and good labelling; Vegetables and fruits at school supplied by local suppliers; Healthy eating as a module of the school's education and prevention program; Week for the Heart - a cyclical campaign to promote healthy lifestyles; Keep in shape program.	Participation in the PLAN'EAT project	Organic foods. Nutritional values of food products. Preparation of meals to maintain health. Consequences of eating sweetened products in excess. Finding the labels of substances harmful to health on packaging. Principles of a healthy lifestyle, including nutrition. Harmfulness of stimulants and energy drinks. Causes and evaluation of the waste of huge amounts of food. Human attitude towards nature and the environment - responsible use of nature's goods. Organic cultivation. Effects of vitamin deficiency and improper supplementation of vitamins and minerals. The role of fiber in the functioning of the digestive system and the need for regular

			consumption of fruits and vegetables. Health consequences of improper nutrition. Diseases of the digestive system. Renewable and non-renewable resources of nature, proposals for rational management of these resources in accordance with the principle of sustainable development. Pyramid of nutrition.

POLICYMAKERS

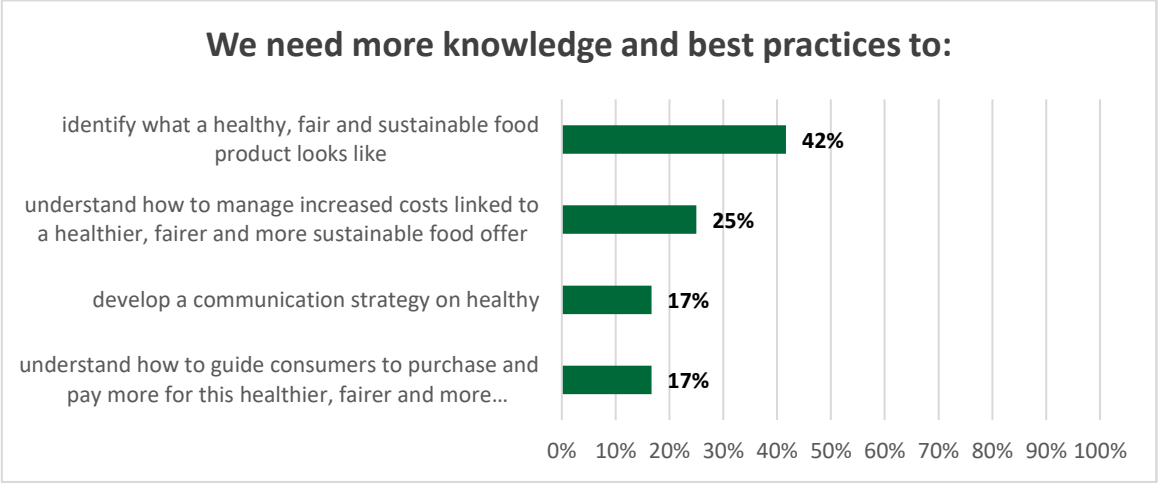


Figure 38. What policymakers need in terms of knowledge and best practices.

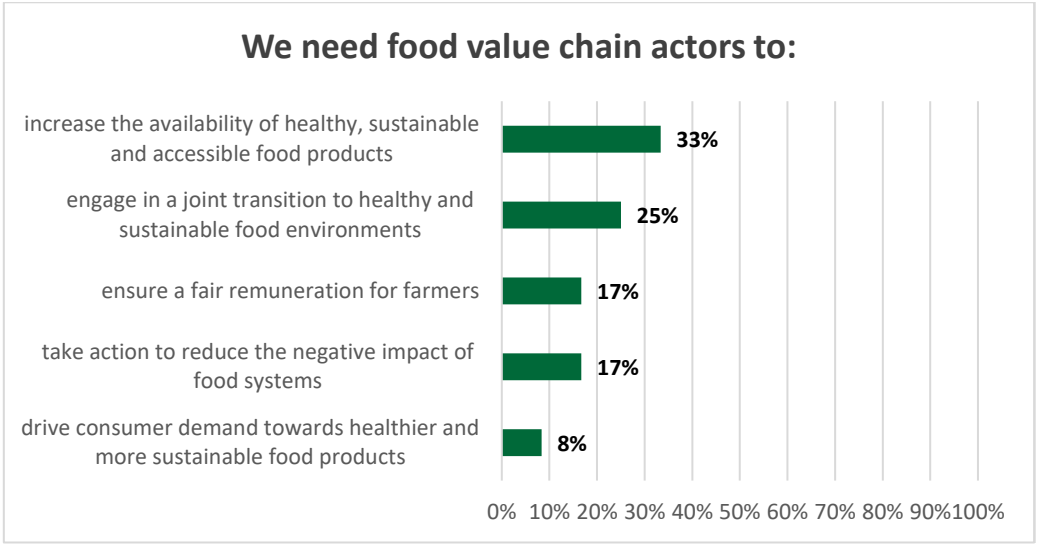


Figure 39. What policymakers need in terms of food value chain actors' collaboration.

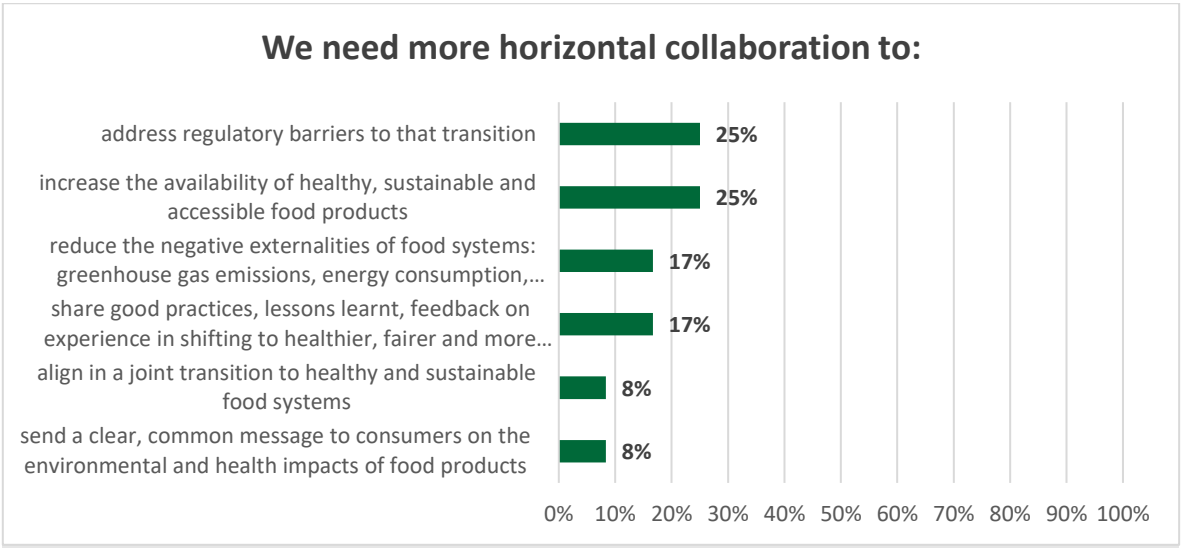


Figure 40. What policymakers need in terms of horizontal collaboration.

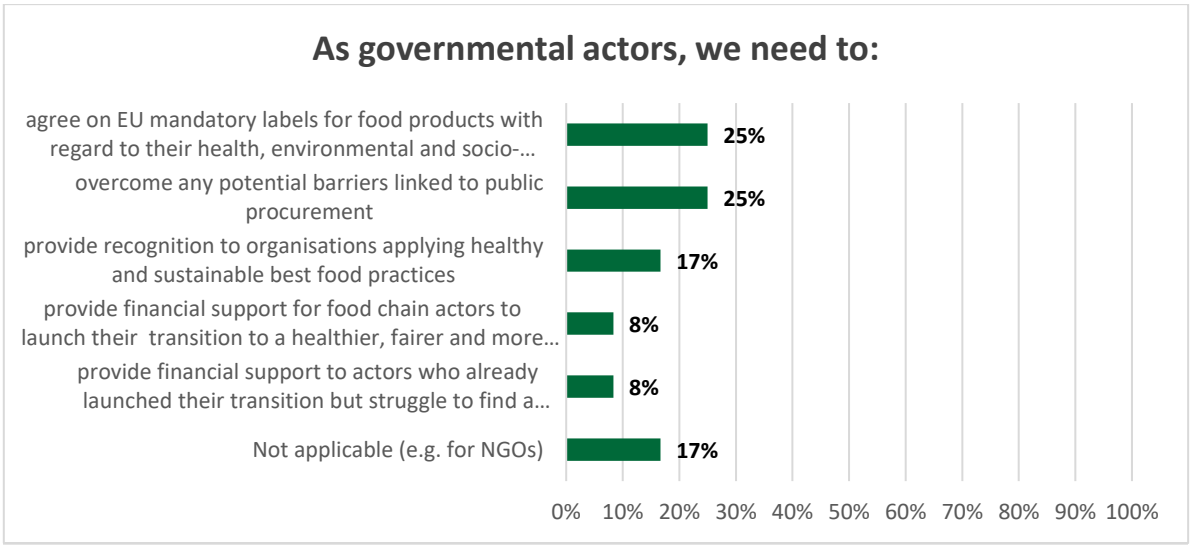


Figure 41. Policymakers' intentions as governmental actors.

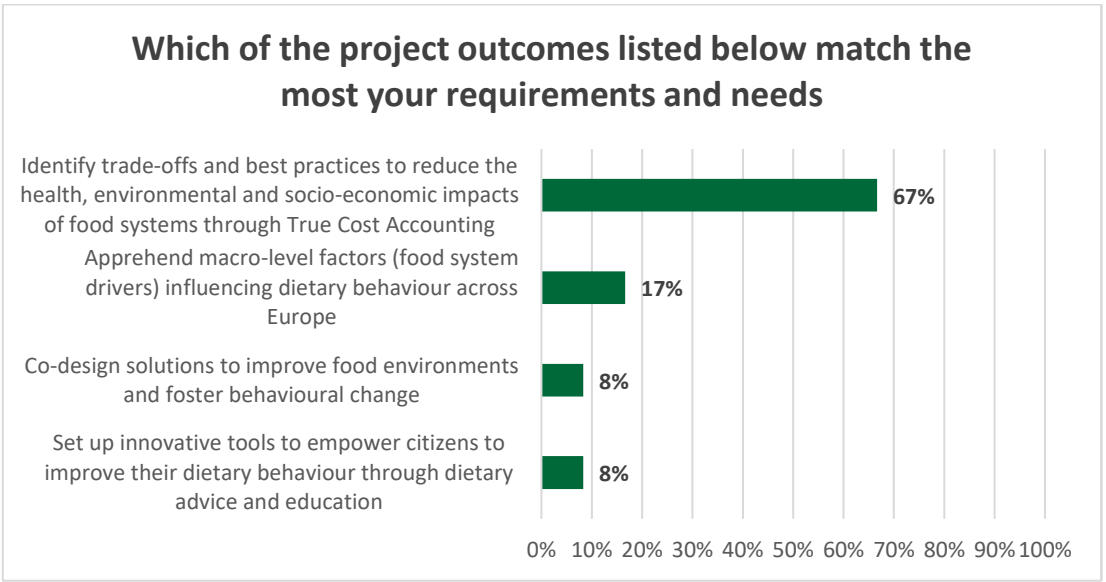


Figure 42. Policymakers' expectations from PLAN'EAT project.

Table 28. The list of the initiatives to achieve the transition towards sustainable and healthy food environments/food systems for policy makers.

	Initiatives already implemented
Good Food Good Farming	Raising awareness on sustainable food systems locally, and demanding change EU wide: https://www.goodfoodgoodfarming.eu/home/food-for-talk/
European Heart Network	Elimination of trans fatty acids in Europe since 2021 is one of the major achievements; Taxation of unhealthy foods and drinks (including alcohol).
Permanent Representation	"School fruit" project
Ministry of Agriculture and Forestry of Finland	Public Procurement guidelines for Sustainable and Healthy Food (2017 updated 2023); Local food Program (2021); Organic Food Program (2022).

Annex E

Countries snapshots

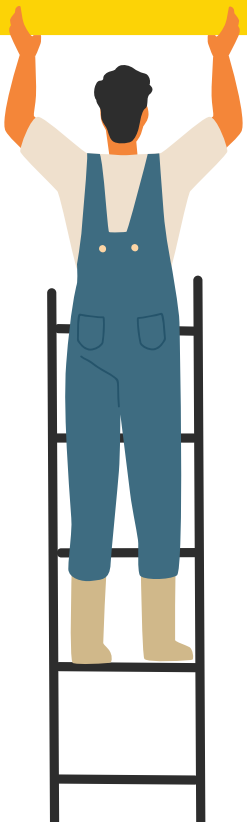
PLAN'EAT




This document represents the snapshot of Belgium regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines and Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. The Belgian NUBEL database (last update in 2022), created by includes 10.000 foods classified into different categories (1,2). **The responsible**. The Nubel foundation (established by the Belgian Public Health and the Food Chain Safety and Environment) is responsible for the creation of the database. **Techniques.** To build the database, three methodologies were used: the laboratory analysis; the literature review and the food composition tables from other countries. **Weaknesses.** Data comes from industry and the database is not very easy to use. **Sustainability.** Not available.



FOOD CONSUMPTION

Food consumption assessment. The Belgian Food Consumption Survey was carried out by Sciensano (Scientific Institute of Public Health) once in a decade. The last data collection was realized using two non-consecutive 24-hour dietary recalls, a questionnaire administered in a face-to-face interview setting, a paper/online questionnaire handed in for self-completion. The population group: ≥3 years old (3). **Trends (2004-2014).** Increase of fruits and vegetables, meat and processed meat, potatoes and sweets. Decrease of bread and cereals, legumes, milk and dairy products, alcoholic beverages (4). **Food consumption and recommendations.** Not in line, lower: water, cereal products, potatoes and substitutes, vegetables, fruits and dairy products. Not in line, higher: meat, fish, eggs (and substitutes) and cheese. (4). **Sustainable consumption.** There is not a specific study that relates food consumption to sustainability. However, there is a study that investigated the carbon footprint of all consumption in Flanders, finding out that food purchased by Flemish households, excluding eating out and alcoholic beverages, had a carbon footprint of 2.2 tons of CO_2-eq per inhabitant (5). **SDG 12 Policy actions.** In Flanders: the Circular Action Plan (2021-2025)(6); the Green Deal "Anders verpakt"(7); the Green Deal "Protein shift on our plate"(8).

DIETARY GUIDELINES

The responsible and the last update. The Belgian dietary guidelines are developed by the Superior Health Council (last version released in 2019) (9). **The structure.** The Superior Health Council formulates specific and detailed recommendations regarding energy, macro-nutrients and micro-nutrients following the EFSA model (10). The regional authorities then translate these recommendations into a region-approach: the Flemish government updated its food guide in 2021 (11) and the French region in 2020 (12). **The major topics.** The Gezond Leven Institute is responsible for the Flanders region, identifying three pillars: consume more vegetables than animal products; consume as few empty calories as you can; limit your consumption and prevent food waste (13). For the Wallonia region the classical food pyramid that contains quantitative recommendations for food groups is used as guideline. **Sustainability issue.** There is not a section on sustainable aspects, however the new Food Triangle (Flanders) considers the environmental impact (under the health and environmental point of view based on a literature review that takes into account the Planetary Boundaries). Based on the three principles of the food triangle, several tips to give information to choose foods that are healthy and environmentally sustainable and on how to change consumer's behavior are provided. **Behavioral advice.** For Flanders, the Gezond Leven provides tips in its website in addition to the nutritional recommendations: 1) physical activity: change position every 30 minutes, do as much as possible low-intensity physical activity, do more exercise daily and do high intensity exercise weekly; 2) have a healthy breakfast including a grain product, preferably of whole grains, topping sandwiches with vegetables, replacing butter with margarine or minarine, avoiding sweetening, consuming dairy products and fresh seasonal fruit; 3) smoking: do not start smoking (prevention), smoke-free public spaces, help with quitting smoking. **Communication activities.** Nubel activities: 1) provides recommendation weekly on social networks; videos of interviews with dieticians on a food theme are posted on YouTube; 2) nutritional support and information tools (e.g. composition tables, food planners, educational game for schools, recommendation in pocket format). Regional governmental institutes: online and offline brochures. **Limitations.** For the general guidelines, there is a lack of the recommended intake in grams of servings for all food groups. For the Flanders, the Food Pyramid cannot be considered a reference for a sustainable food model since economic, social and animal welfare aspects are not included.

EATING HABITS

Eating habits and cultural diet. The Belgian population are mainly omnivores (83.3%), followed by semi-vegetarians (almost vegetarians, part-time vegetarians and pesco-vegetarians) (11.8%) and vegetarians (including vegans and vegetarians) (1.6%) (14). **Shift towards sustainable eating habits and diets.** Not available. **Drivers.** Not available. **Macronutrient recommendations (total energy intake).** Carbohydrates 50-55% (added sugars at a maximum of 10%), fats from 20 to 30-35%, proteins 15% (0.83 g/kg bw).

Food category	Recommended serving (s)
Fruit and vegetables	300 g/day vegetables and 250 g/day fruit
Legumes	Eat legumes every week
Nuts	Every day (standard portion: 15 to 25 g of plain seeds or nuts -unsalted or without a sweet coating)
Grain-based foods	
Whole grain	Minimum 125 g/day
Meat	
Red	Maximum 300 g/week
Processed	Maximum 30 g/week
White meat	1-3 times/week (including eggs/meat subsitutes)
Fish	1-2 times/week

Alcohol consumption. Adult population: 70.6% drinks wine and 60.2% beer. 10-13 years olds population: 2.1% drinks wine and 2.9% beer. 14-17 years old population: 21.7% drinks wine and 40.4% beer (15). **Alcohol recommendations.** Alcoholic beverages recommendations are not addressed in the Belgian dietary guidelines. However, different activities have been implemented to sensitize the consumers to decrease/avoid the alcohol consumption, as school-based programs, multiple-associations (police, municipal) interventions, hospital activities. **Changes in food consumption. Meat:** the overall meat consumption decreased of 20% between 2010 and 2019 (16). **Legumes:** Not available.

PLAN'EAT




This document represents the snapshot of France regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines and Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. The French food composition database (FCD) (last update in 2020) includes 3.185 foods, and 67 components. It collects data on generic and branded foods. 2020 (1,2). **The responsible.** The database is regularly updated by Ciqual (Food Quality Information Center) under the supervision of the authority of the National Agency for Food, Environmental and Occupational Health and Safety (ANSES). **Techniques.** To build the database, three steps were followed: selecting the source data for each food-constituent pair (the most representative on the French market and the most recent are selected); calculating the average content; carrying out consistency test for the profile. **Weaknesses.** No composition of branded industrial product (e.g., ready-to-eat meals), difficulties with identifying the origin of the products. For some foods, the database lacks nutrient data; no data for polyphenols and lipotropes, both important for human health. **Sustainability.** The database does not have information on the environmental impact of the products. However, the Agribalyse database provides reference data on the environmental impacts of agricultural and food products (3).

FOOD CONSUMPTION

Food consumption assessment. The individual and national study on food consumption (INCA 3, 2014-2015) was carried out by ANSES. The data collection was realized through questionnaires administered by interviewers, face-to-face (FAF; using a computer-assisted personal interview system) and by telephone (using a dietary software), as well as with a self-administered (SA) questionnaire available either on paper or via the Internet. The population group: 0-79 years old (4,5). **Trends (2014-2018).** Increase of fruits and vegetables, legumes, eggs, potatoes and sweets. Decrease of meat and processed meat, dairy products (6). **Food consumption and recommendations.** In line: dairy products. Not in line, lower: fiber intake, fruit and vegetables, whole grains, legumes, nuts and seeds, organic products; not in line, higher: salt, processed foods, animal products, supplements; (INCA3 results and recommendations). **Sustainable consumption.** Different studies were carried out among French population regarding the sustainability of food consumption. Main findings: a decrease in the consumption of animal products and an increase in the consumption of healthful plant-based foods and organic foods is a potential trend towards more sustainable diets (7); a dietary pattern among a French cohort was identified as one of the most sustainable producing less greenhouses gas, including organic food and being quite affordable. The pattern is characterized by lower red and white meat, and dairy products but higher fruit and vegetables products (8); the adherence to French population to the EAT-Lancet recommendations led to lower environmental impacts (9); the development of the Sustainable Dietary Index (SDI) including nutritional, environmental, economic, sociocultural aspects was applied (10, 11); a holistic indicator that assesses the healthiness and sustainability of food consumption was developed. It is called the 3V Rule, based on three generic dimensions governing the diet-global health relationship, and that includes the animal/plant ratio (15% daily of animal calories, Végétale= plant-based), the degree of food processing (maximum 15% daily of ultra-processed food calories, Vrai=real, with low level of UPF) and food diversity (Varié= varied, preferably organic, local and seasonal).The 3V rule was applied to the comparison between INCA1, INCA2 and INCA3 studies pointing out that among a representative French population the animal products consumption is still above that recommended, the UPF consumption is too high and there is still an insufficient food diversity (12,13). **SDG 12 Policy actions.** The “Plant protein plan” (2020) (14); “Ma cantine” (15); EGalim law (2018) (16); the Climate and Resilience law (2021) (17); the 4th Programme d’investissements d’avenir (PIA4, Future Investments Program,2021) (18).

DIETARY GUIDELINES

The responsible and the last update. The French dietary guidelines, PNNS 4 (the National Nutrition Santé n°4 Pro) are developed by ANSES (last version released in 2019)(19). **The structure.** The PNNS 4 is structured around 5 strategic axes: improve the food and physical environment for your health; encourage healthy behaviors; better care for people who are overweight, undernourished or who suffers from chronic diseases; support a territorial dynamic; develop research, expertise and monitoring in support of nutrition policy. **The major topics.** 1) promote new nutritional recommendations; 2) increase fibers, reduce the quantities of salt, sugars and fats and promote the Nutri-Score, aiming to make it compulsory at European level; 3) reduce salt consumption by 30% by 2025; 4) protect children and adolescents from exposure to unrecommended food and drink advertising; 5) allow everyone to benefit from quality collective catering in complete transparency; 6) extend food education from kindergarten to high school; 7) develop the practice of Adapted Physical Activity for people with chronic diseases; 8) reinforce the prescription of Adapted Physical Activity by doctors; 9) taking care of the food of our elderly; 10) promote and share at the national level innovative local actions, sources of creativity. **Sustainability issue.** There is not a specific focus on the sustainability but there are four indicators linked to the environmental issue: 1) reduce meat consumption; 2) move forward to organic products; 3) reduce ultra-processed food consumption by 20%; 4) recommend the consumption of lentils, beans or chickpeas as an accompaniment to meat or as a replacement. **Behavioural advice.** This advice is included in the axis 2: fight against sedentary behaviors; improve information regarding the food quality; accompany women before, during and after their pregnancy, and during breastfeeding; promote healthy eating and physical activity for parents with young children; protect children and adolescents from exposure to unrecommended food and drink advertising; develop the practice of Adapted Physical Activity for people with chronic diseases; reinforce the prescription of Adapted Physical Activity by doctors. **Communication activities.** 1) communication activities to promote physical activity, through developing equipment and facilitating initiatives; 2) using internet, media, workshops, symposium to promote the use of the Nutri-score; develop campaign for the entire population on diet, physical activity and sedentary lifestyle; propose a national malnutrition week every year to raise awareness among the general public, health professionals and the social sector about this topic; promote territorial dynamics with communication and educational tools that are developed by public authorities in particular Public Health France or others; set up a website that provide to find different recipes, ideas of activities and tricks to eat better and move more (20). **Limitations.** The guidelines are not sufficiently linked to global health (i.e., One Health Approach); the focus on industrial ultra-processed products is not emphasized enough; there are contradictions between main recommendations, Nutri-score and the reduction in ultra-processed foods consumption. How to solve them: hierarchize the recommendations from the most to the less impactful for global health, and to achieve more holistic and generic recommendations.

EATING HABITS

Eating habits and cultural diet. In 2020, approximately 30% of the French population declared to follow a flexitarian diet, 4% a vegetarian diet, and 3% a vegan diet (21). **Shift towards sustainable eating habits and diets.** Between 1999 and 2015 the average French dietary pattern (INCA surveys) slightly moved towards plant-based food for both children and adults (around +6% and +4% calories, respectively) but the level of ultra processed-foods and animal-based products intakes in 2015 remained very high and far from being considered sustainable (35% and 36% of total daily calorie, respectively) (22). **Drivers.** The 3 main factors influencing consumer's choices are: price (48%), consumption habits (43%), taste (38%) and origin of the product (36%) (6). **Macronutrient recommendations (total energy intake).** Carbohydrates 40-55%, fats 35-40%s, proteins 10-20% (23).

Food category	Recommended serving (s)
Fruit and vegetables	5 fruit and vegetables/day
Legumes	At least twice a week
Nuts	A handful/day
Grain-based foods	At least one portion of whole-grain starchy food/day. No recommendations for whole-grain cereals
Meat **Processed meat**	Prioritize poultry and limit other meats to 500 g/week Charcuterie: limit to 150g/week
Fish	2 times/week

Alcohol consumption. 0.7% of people aged 0-10 years (0.1 g/day), 2.6% of people aged 11-18 years (4.0 g/day), 56.4% of people aged 18-79 years, (128.4 g/day) drink alcohol (6). **Alcohol recommendations.** Maximum 2 glasses/day and not every day (24). **Changes in food consumption. Meat:** the French have reduced the share of meat products on their plates. Beef shows the strongest decline in 2020 (-2.2%). In 2020, total meat consumption (at home and away from home) fell by 1.5%. Pork, driven by charcuterie, remains the most consumed meat in France, despite a 13% decline in twenty years (31.5 kg per capita in 2020). It is now followed by poultry, which has exceeded beef since 2013. The French ate an average of 27.7 kg of poultry in 2020, an increase of 73% in 40 years. Paradox of 2020, if the French ate less meat, they bought more. Consequence of the increase in meals eaten at home. Sales of ground beef, chicken cuts and processed poultry products increased sharply (up 9% for fresh poultry) (25). **Legumes:** In children, plant calories/day moved from 56.2% in 2007 to 61.2% in 2015. In adults, plant calories/day moved from 59.7% in 2007 to 64.1% in 2015 (13).

PLAN'EAT




This document represents the snapshot of Germany regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines and Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. The "Bundeslebensmittelschlüssel" (BLS), (last update in 2014) includes data on the nutritional composition of about 15,000 food products (1). **The responsible.** The database is managed by the Max Rubner Institute (MRI), a federal institute attached to the Federal Ministry of Food and Agriculture. **Techniques.** To build the database, 3 methodologies were followed: literature research, MRI internal laboratory analysis and external analysis through cooperations with national and international partners. For processed foods, a nutrient calculation is made based on the analysed nutritional data of the individual ingredients (2). **Weaknesses.** Not available. **Sustainability.** Not available.

FOOD CONSUMPTION

Food consumption assessment. 1) The German National Nutrition Survey (NVSII) (2005-2008) carried out by the Max Rubner-Institut (MRI). Three methods of dietary assessment: diet history interview (personal interview about the eating habits of the last four weeks), weighing records (participants weigh their meals twice every four days and record everything in a diary) and 24-h recalls (Computer Assisted Telephone Interview - enquiry about food intake in the last 24 hours). The population groups: 14 to 80 years (3); 2) Germany as it eats – the BMEL Nutrition Report (2016–2022) by the German Federal Ministry of Food and Agriculture (BMEL). The population groups: over 14 years (4); 3) German Eating Study as a KiGGS Module (EsKiMo II) (2014-2017). The population groups: 6 to 17 years (5). **Trends (2016-2022).** Increase of pasta, rice and wheat flour, legumes and vegetables, mineral water. Decrease of bread, rye flour and potato, fruits and fruit juices, milk and alcoholic beverages (beer, wine and spirits) (6). **Food consumption and recommendations.** In line: high-carbohydrate foods (bread, cereals, cereal products, potatoes and potato products); fruits, nuts and seeds; milk, dairy products and cheeses; soft drinks. Not in line, lower: vegetable, fish and eggs; not in line, higher: meat (7). **Sustainable consumption.** Food consumption was analyzed in relation to sustainability in two studies. The main results were that: the factor that most influences food choices is price, while the impact on health and the environment only slightly influence food choice decisions (8) and that German food consumption is responsible for 2.7 tons of greenhouse gases per person per year (9). **SDG 12 Policy actions.** Germany's Sustainable Development Strategy (10); Germany's National Programme for Sustainable Consumption (NPNK) (11); National Strategy for Food Waste Reduction (12); Project "eco-Platform" di Tafel Deutschland (13); The dialogue forum on avoiding food waste in away-from-home catering (14); The "Sustainability Action Programme" (15).

DIETARY GUIDELINES

The responsible and the last update. The German Dietary Guidelines (DGE) are developed by German Nutrition Society (last version released in 2017) (7). **The structure:** 10 rules. **The major topics:** The dietary guidelines are focused on 10 rules: 1) enjoy food diversity; 2) vegetables and fruit – take '5 a day; 3) favour whole-grain foods; 4) complete the choice with animal based foods; 5) choose health promoting fats; 6) reduce sugar and salt intake; 7) water is the best choice; 8) prepare carefully cooked dishes; 9) mindful eating and enjoying; 10) watch your weight and stay active. **Sustainability issues.** Environmental aspects are broadly addressed in the 10 rules in terms of mindful eating, sustainable food preparation and physical activity. For each rule there is an annex on sustainability, with the aim of directing the German citizen towards more sustainable choices. **Behavioural advice.** 1) combination of a wholesome diet and physical activity. Not only regular exercise, but also an active daily routine (e.g., walking or cycling more often); 2) take a break for your meals and take your time eating; 3) recommendations on weight loss programs. **Communication activities.** There are different activities to spread the DGE: 1) the press service (16) provides information on seasonal products and consumer-related topics; 2) the scientific journal of the DGE (17) provides scientific content primarily aimed at ; 3) "DGE intern" mainly contains references to events of the DGE and its sections and introduces new DGE media (18). **Limitations.** Dissemination of dietary guidelines is particularly difficult in the lower socioeconomic strata based on cost, educational level and cultural differences.

EATING HABITS

IEating habits and cultural diet. The 44% of the population is flexitarian, the 7% vegetarian and the 1% vegan (4). Population means energy intake (1968 kcal/die) (19). **Shift towards sustainable eating habits and diets.** An increase of number of vegans (0.8% in 2015 vs. 1.6% in 2022) (20) and vegetarians (5.3% in 2014 vs. 7.9% in 2022) (21) and a slightly decrease in number of people who eat meat every day (34% in 2015 vs. 25% in 2022) (4) were observed. Steady increase in organic and fair-trade revenue (22). Increase the number of people in Germany who prefer regional products from home when going grocery shopping (35.9% in 2018 vs. 38.9% in 2022). **Drivers.** The main factors influencing consumers food choices are: 1) 93% flavour/taste; 2) 80% husbandry conditions; 3) 76% fair trade. The young consumers are more careful about the price of products, older ones to calories and content descriptions (4). **Macronutrient recommendations (total energy intake).** Carbohydrates > 50%, fats 30%, protein 0.8g/kg bw (23).

Food category	Recommended serving (s)
Fruit and vegetables	400g vegetables and about 250g fruit/day (standard portion vegetables: 200g and fruit: 100-150g)
Legumes	Legumes are listed under fruit and vegetables (standard portion: uncooked 70g or cooked 125g)
Nuts	Nuts are listed under fruit and vegetables (standard portion: 25g)
Grain-based foods	200 – 300g bread or 150 – 250g bread and 50 – 60g cereal flakes and 200 – 250g potatoes (cooked) or 200 – 250 g pasta (cooked) or 150 – 180 g rice (cooked)/day You should choose whole grain.
Meat	Not more than 300-600g/week
Fish	1-2 times a week (standard portion: sea fish 80–150g or fatty fish 70g)

Alcohol consumption. In 2021, 19% of the adult population in Germany consumed alcohol several times a week and 6% daily (24). The 8.7% of adolescents consume alcohol regularly (10.6% from male) while 47.2% have a 12-month prevalence consumption (25). **Alcohol recommendations.** Alcoholic beverages are not recommended (7). **Changes in food consumption.** Meat: in the last years a reduction in per capita meat pork consumption (kg) (53.6kg in 2012 vs. 43.7kg in 2021) (26). **Legumes:** a reduction in per head legumes consumption (2.5kg in 2016/17 vs. 3kg in 2012/13) (27).

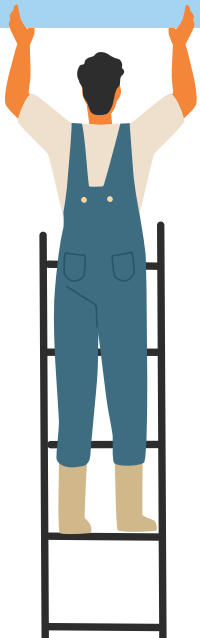
PLAN'EAT




This document represents the snapshot of Greece regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines and Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. 1) the Greek national food composition database (FCD) (last update in 2004) (1) contains information concerning the amount of energy and the amount of nutrients for 598 foods and 214 Greek plates; 2) The Hellenic Food Thesaurus (HelTH) (2) was released in 2020 but it is not yet completed. It contains data on the nutritional composition of foods for up to 45 nutrients, on-pack claims (health, nutrition, social, environmental), quality indicators, and prices were recorded for more than 4,000 foods. **The responsible.** The Greek FCD was created under the supervision of Dr. Antonia Trichopoulou, Director of the World Health Organization, Collaborating Centre of Nutrition, University of Athens; HeITH under the supervision of Dr. Maria Kapsokefalou, Professor in Human Nutrition at the Agricultural University of Athens. **Technique.** The Greek FCD included translation of McCance & Widdowson (3) expanded to have data on Greek recipes and traditional foods. HeITH uses the EuroFIR methodology and extensive literature review on the international databases structure and variables of other databases worldwide. It combines data on the nutritional composition of foods based on qualitative indicators and includes other indicators relevant to Greece. **Weaknesses.** HeITH is not completes, for now is available only a demo. **Sustainability.** HeITH is composed of 4 files: description, nutrients, claims and photobook. The claims file contains information on the environmental impact of food products.



FOOD CONSUMPTION

Food consumption assessment. The Greek National Survey on Health and Nutrition (the HYDRIA Project) (2013-2014) by the Hellenic Health Foundation (HHF) in collaboration with the Hellenic Ministry of Health and the Center for Disease Control & Prevention in Greece assessed the food consumption. Three methods of dietary assessment: food propensity questionnaire (CAPI-computer assisted personal interview), eating out questionnaire (CAPI) and 24h dietary recall (web-based automated, interviewer). The population group: >18 years old (4). **Trends.** Not available. **Food consumption and recommendations.** N/A. **Sustainable consumption.** Ecological Footprint (EFs) was evaluated starting from the FAO Food Balance Sheet and it was assessed that the Greek footprint of the category "food and non-alcoholic beverages" is 1.2 global hectares (gha), among the highest in the Mediterranean area (5). **SDG 12 Policy actions.** National Circular Economy Action Plan (2021-2025) (6).

DIETARY GUIDELINES

The responsible and the last update. The "National Nutrition Guide for Greek" (NDGGR) was created by a non-profit organization, under the Ministry of Health, by representatives of academia, Ministry of Health and Ministry of Education and Culture and was updated in 2017 (6). **The structure.** The eight volumes are grouped in four parts: 1) Adults (7); 2) Women (including pregnancy, breastfeeding and menopause) (8); 3) Infants, Children and Adolescents (9); 4) Adults aged 65 years and older (10). **The major topics.** 1) consume a variety of fruit and vegetables/cereals (prefer whole-grains) every day; 2) prefer low-fat dairy products; 3) limit red meat consumption; choose lean cuts; avoid processed meat; 4) consume fish and seafood frequently; 5) choose small fatty fish; 6) consume legumes frequently; 7) use olive oil as the main added fat; 8) limit salt and added sugar intake; 9) be physically active every day; maintain a healthy body weight; 10) drink water (11). **Sustainability issue.** Not available. **Behavioural advice.** The NDGGR includes guidelines on physical activity and information on the number and frequency of meals (eat 3 main meals and at least one snack a day), the importance of eating a healthy breakfast, cooking healthy and safe food at home, and choosing seasonal products. **Communication activities.** The NDGGR has been distributed in Greek public schools as a tool for policy to encourage healthy eating. **Limitations.** The guidelines should be updated more frequently.

EATING HABITS

Eating habits and cultural diet. Older Greeks are more adherent to the traditional Greek Mediterranean diet, compared to younger Greeks who report a more Western eating pattern (12). **Shift towards sustainable eating habits and diets.** Not available. **Drivers.** Not available. **Macronutrient recommendations (total energy intake).** Carbohydrates 45-60%, fats 20-35%, protein 0,8 g/kg bw (13).

Food category	Recommended serving (s)
Fruit and vegetables	4 servings of vegetables and 3 servings of fruits/day (standard portion vegetables: 150-200g of raw or cooked and fruit: 120-200g).
Legumes	3 servings/week (standard portion: 150-200g of cooked legumes)
Nuts	1-2 servings of nuts/ day (standard portion: 18 almonds, 6 whole walnuts, 3 tablespoons of sunflower seeds)
Grain-based foods	5-8 serving of refined and whole-grain cereals/day (standard portion: 1 slice or 30 gr of bread, ½ cup of cooked pasta or rice, ½ of breakfast cereals, 1 medium potato: 120-150g cooked)
Meat	
Red	1 serving of lean red meat/week (standard portion: 120-150g of cooked meat).
White	1-2 servings of white meat/week (standard portion: 120-150g of cooked meat).
Processed	As few as possible.
Fish	2-3 servings of fish and seafood/week (standard portion: 150g of cooked fish or seafood).

Alcohol consumption. 5.9% of the adult population in Greece consumed alcohol every day (10.0% men vs. 2.2% women); 25.2% every week. Not available for <18 years old (14). **Alcohol recommendations.** 2 drinks/per day for men and up to 1 drink/per day for women (1 drink is equal to 1 small beer (330 ml) with 4-5% of alcohol, 1 glass (125 ml) of wine with 11-13% of alcohol or 1 glass (40-45 ml) ouzo, tsipouro or other drink like vodka etc. with 40% of alcohol) (7). **Changes in food consumption.** Not available.

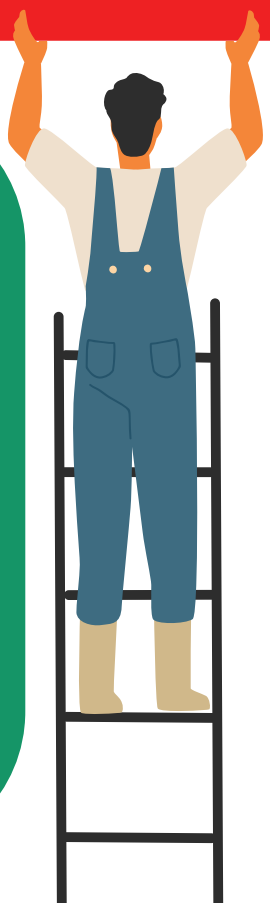
PLAN'EAT




This document represents the snapshot of Hungary regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines and Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. The Hungarian food composition database (last update in 2005) includes information on about 1000 foods divided into 20 main categories. Currently, data is collected intoan offline database (paper tables) (1). **The responsible.** The database was created by the National Institute of Pharmacy and Nutrition (OGYÉI). **Technique.** Not available. **Weaknesses.** The current version is not available online. Furthermore, there is no information about the methodology used for the creation of the database. **Sustainability.** Not available.



FOOD CONSUMPTION

Food consumption assessment. The Hungarian national food consumption survey (2018-2020) conducted according to the EFSA EU MENU methodology by the National Food Chain Safety Office. Two methods of dietary assessment: 24h- recall for two non-consecutive days and Food Propensity Questionnaire (FPQ). To collect the information, computer assisted telephone and personal recall interviews were carried out. The population groups: 1-74 years old (2). **Trends (2003-2018).** Increase of meat, milk and dairy products, sweets and alcoholic beverages. Decrease of fruits and vegetables, bread, processed meat, legumes, eggs and potatoes (3). **Food consumption and recommendations.** Not in line, lower: fruit and vegetables, whole grain bread, dietary fibre, milk and dairy products, fish, sugar; not in line, higher: meat, fats, salt (4). **Sustainable consumption.** Ecological Footprint (EFs) was evaluated according to different socio-demographics factors and lifestyle approaches. Students, women with small children and people with sedentary forms of employment have a higher-than-average food-related EF, while elderly have a lower EF (5). Consumer clusters who consume more fruit, vegetables and dairy products seemed to not have a lower EF than the other groups, since these products are not used as an alternative to meat and do not lead to a reduction of this (6). One study found that following dietary recommendations and minimizing dietary change (~32%) resulted in a higher total reduction in food water footprint (~18% for women and ~28% for men) among a representative Hungarian sample (7). **SDG 12 Policy actions.** The National Sustainable Development Framework Strategy (8); Government Decree 676\2020 on the specific rules applicable to public procurement procedures in the field of public catering (9); "Maradék nélkül" programme (10); EMMI Regulation 37/2014 (11).

DIETARY GUIDELINES

The responsible and the last update. The SmartPlate represents the Hungarian dietary guidelines created by the NGO Hungarian Dietetic Association and the Hungarian Academy of Sciences (last version released in 2021) (4). **The structure.** Two versions of the SmartPlate have been developed: one for adults (4) and one for 6-17 year olds (12). **The major topics.** 1) reduction of salt, sugars and fats as much as possible; 2) consume not more than 350-500g a week of cooked / steamed / fried (500-700 g raw) red meat (e.g. beef, pork); 3) eat processed meat products only occasionally, in small amounts; 4) eat fish at least once a week; choose from local fishes more often (e.g. trout, catfish, bighead carp). **Sustainability issue.** In the latest version of the Smart Plate, major changes have been added that have incorporated sustainability aspects: seasonality and preference for local food; fight food waste, more plant-based diets, less meat. **Behavioural advice.** Pay attention to the quantity and quality of food and drink you consume! Choose more seasonal, fresh ingredients and less processed foods. If you can, favour the domestic, locally produced ingredients! Drink plenty of fluids, eat regularly, have 3-5 meals a day and eat a varied, balanced diet. A healthy diet is more than the consumed food. Eating in calm conditions with pleasure has countless benefits. Be active! Pick those activities that you like and do them for at least 10 minutes. Increase the time of the exercise step by-step: the more physical activity you do, the more your health benefits. For adults at least 150 minutes of moderate intensity or 75 minutes of intense exercise is recommended a week. For children and adolescents at least 60 minutes of physical activity daily. **Communication activities.** ONG Hungarian Dietetic Association, Hungarian Nutrition Society and National Institute of Pharmacy and Food Safety (OGYÉI) share the guideline content through conferences, website and social media (13-15). **Limitations.** There are not recommendations for certain age groups (e.g. children aged 3-6) or subpopulations (e.g. pregnant women); recommendation on smoking has been removed from the recommendations on behaviour; not recommendation on mental health; no public plans on how to overcome these limitations; organic food consumption is almost impossible (because of the price and of domestically produced organic raw materials are exported).

EATING HABITS

Eating habits and cultural diet. Hungarian population is typically omnivorous (16). 2% of population is vegetarian and 1% is vegan (17). **Shift towards sustainable eating habits and diets.** Shift towards the consumption of plant-based foods, especially among the younger generation (16). Local food system with direct selling is still highly developed in Hungary, with 36% of Hungarians engaged in some kind of self-sufficiency food practices and 47% of individual farms practices subsistence farming (18). Food waste in households reduced of 24% (2016 vs. 2021) (19). **Drivers.** The individual drivers of food choices are presented in order of importance for consumers: 1) economic; 2) mindfulness; 3) environmental awareness; 4) psychological; 5) social; 6) media (20). **Macronutrient recommendations (total energy intake).** Carbohydrates 55-60% (free sugars <10%), fats <30%, protein 10-15% (21).

Food category	Recommended serving (s)
Fruit and vegetables	At least 5 portions of fruit or vegetables/day; 3-4 servings of vegetables/1-2 servings of fruit, and at least 1 serving should be fresh/freshly cut (standard portion: 1 large pepper, tomato, 1 large apple or peach or 1 medium bowl of lettuce or 80 g dry or 120 g fresh/frozen pulses or 1 cup of berries or 2 dl smoothie)
Legumes	At least once a week (included in vegetables consumption)
Nuts	2-3 times/week (standard portion: small handfuls of nuts, unsalted almonds, hazelnuts, oilseeds such as pumpkin seeds)
Grain-based foods **Whole grain**	3 servings of grains/day at least one portion out of three should be wholegrain (standard portion: 1 piece of sweet bread dough or 1 medium slice bread/brioche bread or 12 tablespoons (200g) cooked pasta/rice or 3 tablespoons of breakfast)
Meat **Processed**	Choose lean variants more often. Consume not more than 350-500g/ week of cooked/ steamed/fried (500-700 g raw) red meat (e.g. beef, pork). Only occasionally, in small amounts
Fish	Eat fish at least once/week Choose local fishes more often (e.g. trout, catfish, bighead carp)

Alcohol consumption. 86% of population aged 15 years and older drinks alcohol (22). **Alcohol recommendations.** No current recommendations for alcohol consumption are in place at national level. **Changes in food consumption. Meat.** Annual per capita meat consumption increased in all age groups between 2015-2018, with the over-65 age group consistently consuming more meat than the under-25 in each year. The only significant decrease was in pork consumption among young people, with all age groups and all categories showing an increase (23). **Legumes.** Not available.

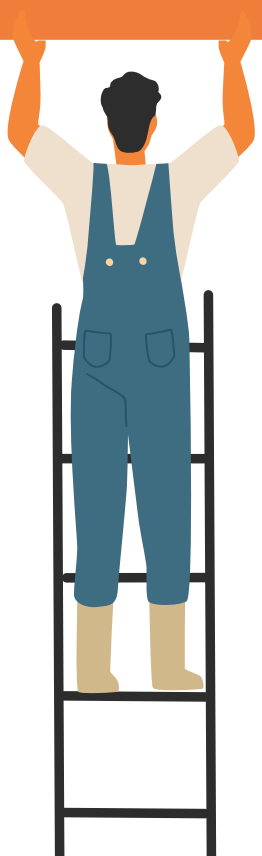
PLAN'EAT




This document represents the snapshot of Ireland regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines and Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. Ireland uses the UK Composition of foods integrated dataset (CoFID) (last update in 2021) (1). **The responsible.** The database is maintained up-to-date by the Public Health England (PHE). **Techniques.** To build up the database, three methodologies were adopted: direct analysis of the foods; search for literature sources (preference for the food similar to that in the UK); add processed foods (leading brands with an established composition) (2). **Weaknesses.** Not available. **Sustainability.** The database does not have information on the environmental impact of the products. However, there are other datasets available, but these are not part of the composition database.



FOOD CONSUMPTION

Food consumption assessment. The National Food Consumption Surveys in Ireland were carried out by the Irish Universities Nutrition Alliance (IUNA) that brings together different University experts. The data collection was realized through a semi-weighted food diary and 24-hour recalls in some cases. The population groups: National Adult Nutrition Survey (2008-2011), adults; National Pre-School Nutrition Survey (2011-2012), 1-4 years old; National Children's Food Survey II (2017-2018), 5-12 years old; National Teens' Food Survey II (2019-2020), 13-18 years old (3). **Trends.** Not available. **Food consumption and recommendations.** Not in line, lower: fruit and vegetables, fiber intake; higher: total fat and saturated fat, sugar – discretionary foods. **Sustainable consumption.** The environmental impact of food consumption in Ireland was assessed for children, adolescents and the adult population based on the three national surveys. The studied shows that average GHGE were 2.77, 2.93 and 4.31 kg CO2eq and freshwater use per day was 88, 144 and 307 L for children, adolescents and adults respectively For GHGE, meat and meat alternatives, eggs, dairy, and dairy alternatives, and savouries, snacks, nuts, and seeds were the highest contributors for all population groups. For water use, savouries, snacks, nuts, and seeds, eggs, dairy, and dairy alternatives, meat and meat alternatives, and starchy staples were the highest contributors for all population groups (4). **SDG 12 Policy actions.** The Waste Action Plan for a Circular Economy (actions for the 12 goal) (5).

DIETARY GUIDELINES

The responsible and the last update. The Healthy Eating Guidelines are developed by the Department of Health (Health Service Executive), with supporting advice from the Food Safety Authority of Ireland (last version released in 2016) (6). **The structure.** The guidelines are included into the Food Pyramid, that includes 6 food groups: 1) vegetables, salad and fruit; 2) whole meal cereals and breads, potatoes, pasta and rice; 3) milk, yogurt and cheese; 4) meat, poultry, fish, eggs, beans and nuts; 5) fats, spreads and oils; 6) foods and drinks high in fat, sugar and salt. There are three versions of it: simple, consumer, professional. For each food group, there is a detailed guide for food consumption (a fact sheet). **The major topics.** Primary messages to the general population are: 1) eat more vegetables, salad and fruit - up to seven servings each day, and limit your consumption of high-fat, high-sugar, and high-salt (HFSS) foods and beverages; 2)size does matter; 3) increase your level of physical exercise and use the food pyramid as a guide for serving sizes; 4) even small adjustments can have a significant impact; 5) start TODAY! In addition, even though not included in particular healthy eating recommendations, the Food Safety Authority of Ireland (FSAI) provided the information for children (7) and older adults (8). **Sustainability issue.** Not available. **Behavioral advice.** Not included in the Healthy Eating Guidelines but provided by Healthy Ireland (commissioned by the governmental Department of Health): 1) Staying active (Starting, Walking, Running, Cycling, Active Parenting, Activity for Seniors, Protect Your Skin, Summer Ready); 2) Healthy eating (Tips for healthy eating; Tips for older people; Quick meals; Snacks and treat foods; Takeaways; Cooking with children); 3) Minding your mood (Getting enough sleep; Switching off; Keep learning and being creative; Spending time in nature; Giving to others; Returning to the workplace; Anxiety around COVID-19; Keeping in contact) (9). **Communication activities.** The organizations involved in this type of activities include Healthy Ireland, SafeFood and the Department of Health. Activities: 1) dissemination through social marketing, radio adverts, tv adverts, print media; 2) school programmes for fruit and vegetables consumption (e.g. FoodDudes(10)); 3) healthy eating policies for schools; 4) school meal provision for low SEG schools. **Limitations.** The compliance to the dietary guidelines is low. For this reason, the government run public health strategies under the umbrella of Healthy Ireland to address these and other public health issues (Obesity, PA etc).

EATING HABITS

Eating habits and cultural diet. Traditional meat and veg diet (8% vegetarians-2% vegans)(3,11). **Shift towards sustainable eating habits and diets.** It was quantified the environmental impact of daily diets across population groups (using nationally representative food consumption survey). The results showed that the environmental impact exceeded the planetary boundary for GHG emissions for all the population groups, but not the boundary of blue water use. While in adults, cropland, nitrogen and phosphorous use exceeded planetary boundaries. This study represents the baseline analysis, against which it will be possible to monitor progress towards sustainable diets (4). **Drivers.** Taste (41%) and health and nutrition (36%) are the most crucial factors for the Irish adult population (12). **Macronutrient recommendations (total energy intake).** Carbohydrates 45-60%, fats 20–35%; proteins 0.83 g/kg bw (13).

Food category	Recommended serving (s)
Fruit and vegetables	5-7 servings/day
Legumes	¾ cups *
Nuts	40 g*
Grain-based foods**	1 cup cooked rice, pasta, noodles or cous cous 2 thin slices wholemeal bread
Meat	standard portion: 50-75 g*
Fish	standard portion: 100 g*

** the recommendations are: choose two servings of one of foods includes in the Meat, poultry, fish, eggs, beans and nuts food groups.*

*** 3-5 portions of cereals products that include also whole-meal cereals and breads, potatoes, pasta and rice.*

Alcohol consumption. Around 60% of Irish adult population drinks alcohol (14). 15.5% of young people in Ireland are drinking at 13 years. This increases to 90% by the time they reach 17/18 years (15). **Alcohol recommendations.** There are not recommendations in the Healthy Eating Guidelines. Instead, specific policies are provided by the Healthy Ireland (16). **Changes in food consumption. Meat and legumes:** Not available.

PLAN'EAT

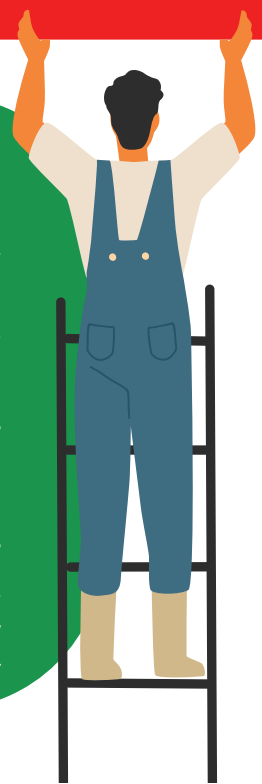



This document represents the snapshot of Italy regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines and Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. There are two Italian food composition database. The food composition tables (1) (last update in 2019) contains nutritional information on around 900 food products grouped into 20 categories. The food composition database for epidemiological studies in Italy (2) (last update in 2022) includes 978 food products grouped into 22 product categories. **The responsible.** The responsible for the database 1 is CREA-Food and Nutrition Research Center, supported by the funding of the Ministry of Agriculture. The responsible for the database 2 is different research groups, that were coordinated by the Epidemiological Division of The European Oncology Institute of Milan (IEO). **Techniques.** For the database 1: experimental studies (80%); literature review, focused on Italian works; estimates or calculations using similar foods (2%) (3). For the database 2: literature review; other sources/databases in case of missing data(4). Both database have followed the EuroFIR standards. **Weaknesses.** For the database 1 there are few recipes and not updated with new foods/specific products (for example celiacs); few updates due to a lack of fundings. For the database 2 there are no recipes, and it is not updated with new foods/specific products (except for products for celiacs). **Sustainability.** There is not sustainability issue connected with the two databases but there has been recently developed a database with the environmental impact of 102 foods using 50% of Italian studies that assess the GHGE for food products(5).

FOOD CONSUMPTION



Food consumption assessment. The Italian food consumption was assessed by the national dietary survey on adult population – IV SCAI ADULT (2018-2020) by the CREA-Research Centre for Food and Nutrition. Methodology: two 24-hour diet booster interviews with a time interval of at least 15 days, using FoodSoft 1.0 software. The population groups: 10-74 years old (6). Italian National Dietary Survey on children population –IV SCAI CHILD (2018-2020). The population groups: 3 months - 9 years old (7). **Trends (2005-2018).** Increase of legumes, nuts, oilseeds and spices; meat and meat products; alcoholic beverages; coffee, cocoa, tea and infusions; water and water-based beverages. Decrease of grains and grain-based products; fruit and vegetables; milk and dairy products; eggs and egg products (6-8). **Food consumption and recommendations.** In line: carbs and fibre-rich products (pasta, bread, rice, etc.), fish, eggs, extra olive oil, water and salt. Not in line, lower: fruits and vegetables, legumes, milk and yoghurt; not in line, higher: red meat, cheese, alcohol. **Sustainable consumption.** A database was developed in which the nutritional composition of food products and greenhouse gas (GHG) emissions were linked, based on 921 food products consumed in Italy in the national survey - INRAN-SCAI 2005-2006. Examples of diets were developed for males and females aged 18 to 60 years to minimize GHGE (5). **SDG 12 Policy actions.** National Strategic Plan for Circular Economy(9); National Food Waste Policy(10); PINPAS (National Food Waste Prevention Plan)(11); Gadda Law (n°166/2016) (12); National Waste Management Program 2022-2028(13); National Dialogue on Sustainable Finance(14).

DIETARY GUIDELINES

The responsible and the last update. The Italian dietary guidelines development is an institutional task of the CREA Research Center for Food and Nutrition, which collected a team of experts (both inside and outside the CREA institute) to set up a scientific commission for their updates (2018) (15-16). **The structure.** The guidelines are structured in 13 directives, addressed to all age groups, from infants to the elderly. Specific recommendation for different population groups as childbearing age, conception, pregnancy and breastfeeding period, menopause, and for those sportive/athletes are included. **The major topics.** The 13 Directives are divided in four conceptual blocks: 1) balance the weight, the food intake, and the physical activity (Directive 1); 2) food categories that need to be promoted to increase their consumption, such as fruits and vegetables, legumes, whole grain cereals and water (Directives 2–4); 3) critical food components in the current diet that need to be reduced, such as fat, salt, sugar, and alcohol (Directives 5–8); 4) "how to" ensure a varied, safe, healthy, and sustainable diet (Directives 9–13). **Sustainability issue.** The sustainable aspects are included in the directive n.13. Food choices: eat more plant-based foods and limit meat consumption. Behavioral choices: prefer to eat local, seasonal and organic food products; make an effort to reduce the impact of food packaging; reduce food waste. **Behavioural advice.** There is also advice for what concerns physical activity (for different age groups), for kid's breakfast, and for preserving food safety. Physical activity for the adult population: moderate activity (least 2.5 hours) or powerful exercise (or 1 hour and 15 minutes) per week + exercises that build muscle (at least twice per week); for kids/adolescents (5-17 years old): at least one hour per day of moderate-powerful + 3 times a week powerful activity to reinforce muscles and bones (games moving or sportive activities). **Communication activities.** The dietary guidelines are shared through training programmes as lecturers at University, online training courses for nutritionists, doctors, and other health professionals, in-school educational programs as discussion material and information tools for teachers. For the general population, the guidelines were translated into short videos published on CREA's YouTube channel (17). In addition, there were realized two decalogues, "Decalogue to promote the consumption of fruit and vegetables (18) and "Decalogue against food waste" (19). **Limitations.** More detailed recommendations to avoid the smoking and specific recommendations on how to have a balanced diet should be included; the guidelines do not include specific breakfast recommendations even they were published by The Italian Society for Human Nutrition (20); there is a lack of a solid dissemination activity for the general population for the moment (future dissemination plans have been established as next steps to follow).

EATING HABITS

Eating habits and cultural diet. 83.6% of the Italian population follow a traditional diet (omnivorous) or other types of diet (flexitarian, low-carbs diet...), 5.4% is vegetarian and 1.3% vegan (21). Only the 13% of the Italian population has high levels of adherence to MD, more than 60% has medium-low and low levels, like a Western Diet (22). **Shift towards sustainable eating habits and diets.** Changes in the percentage of vegetarians were observed through the years, (5.9% 2012 vs. 7% 2016 vs. 5.4% 2022) together with an increase of the percentage of vegans (0.6% 2014 vs. 1.3% 2022) (23). An increased consumption of plant-based foods, but also of meat and meat products with a reduction in the consumption of fruits and vegetables were observed (see "Food consumptions"). In 2022, there were a decrease of 38% (vs. 2019) in the organic eating habits. As reported in the Coop 2022 Report, based on a survey by NOMISMA, Italians will increase the purchase of km0 products (37%), made in Italy (35%) and foods with sustainable packaging (33%) (24). In the study carried out by Grant and Rossi it was evaluated how consumers who have higher adherence values to the Italian Dietary Guidelines are more proactive to implement anti-waste measures (e.g. spending planning, food storage, etc.) (25). **Drivers.** Origin and food safety are the factors driving food consumption choices in Italy, following by taste (46%) and cost (40%) as for nutritional values (40%) (1). Based on the socio-demographic characteristics, family income and in particular the professional condition of the reference person of the family determine the purchases of Italian families (27). **Macronutrient recommendations (total energy intake).** Carbohydrates 45-60% (free sugars at <10%), fats 20-35% (cholesterol<300mg), protein 0.9g/kg bw (28).

Food category	Recommended serving (s)
Fruit and vegetables	5 times/day (standard portions: fruits: 150g and vegetables: 200g)
Legumes	3 times/week (standard portion: dry legumes: 50g or fresh legumes: 150g)
Nuts	1-2 1/2 servings/week (standard portion: 30g)
Grain-based foods	Bread 2 ½ - 4 ½ times/day (standard portion: 50g); Pasta, rice, etc 1 – 1 ½ serving/day (standard portion: 80g)
Meat	
Red	1 time/week (serving: 100g)
White	1-3 times/week (standard portion: 100g)
Processed	Limit the consumption.
Fish	2-3 times/week (standard portion: 150g)

Alcohol consumption. 55.8% of the adult population consume alcohol (29); for the younger (11-17 years) the consumption of alcohol is: wine 5.3%; beer 8.9%; alcoholic aperitif 8.2% (30). **Alcohol recommendations.** The amount of alcohol consumption compatible with a "low risk" can be summed up in a 2-1-0: 1) up to 2 units of alcohol per day if you are an adult man; 2) up to 1 alcohol unit per day if you are a woman or a person over 65 years old; 3) 0 alcohol <18 years (15). **Changes in food consumption. Legumes.** Italians consumed 15% more legumes in 2020 (vs. 2019), + 12% of chickpeas and + 28% of beans (31). **Meat.** Meat consumption has increased of 10% from the 2005-2006 survey to the 2018 survey (+12.96 g/day) (32).

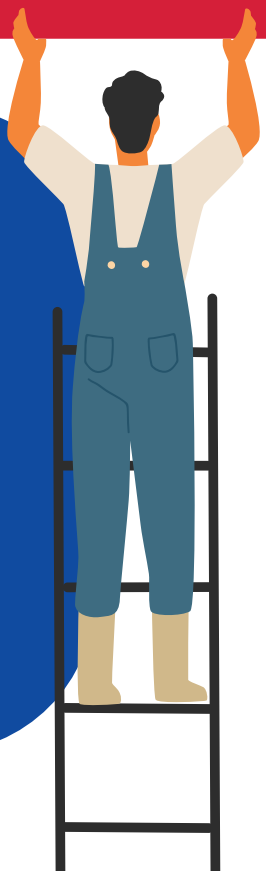
PLAN'EAT




This document represents the snapshot of Netherlands regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines and Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. The Dutch Nutrient Database "NEVO" (last update in 2022) includes data on the composition of food products consumed (2.207 food products) (1). **The responsible.** The database is owned by the Ministry of Health, Welfare and Sport and is managed and maintained by the National Institute for Public Health and the Environment (RIVM). **Technique.** The data regarding nutritional composition of foods comes from chemical analyses. Data sources come from foreign tables, scientific literature and food labels; information about missing nutrients is supplemented with those from comparable foods, calculations from recipes and estimates. RIVM works according to internationally accepted EuroFIR guidelines (2). **Weaknesses.** Part of data is based on expert judgement rather than laboratory analysis. Some data are old, and some values/components are not available (e.g. Vitamin K) (3). **Sustainability**. Not available.



FOOD CONSUMPTION

Food consumption assessment. The Dutch Food Consumption Survey (2019-2021) was carried out by the National Institute for Public Health and the Environment (RIVM). One method of dietary assessment: 24-hour dietary recall on non-consecutive and independent days, conducted with a developed computer-controlled interview program. Only for younger and older age groups, this method of recall is combined with diaries. The population groups: 1 to 79 years (4). **Trends (2007/2010-2019/2021).** Increase of fruit and vegetables, cereals and bread, legumes. Decrease of meat and processed meat, milk and dairy products, sweet (5) . **Food consumption and recommendations.** In line: carbohydrates and fiber-rich products, dairy products, plant proteins and alcohol. Not in line, lower: fruit and vegetables, legumes, fish, nuts; not in line, higher: meat and salt (6). **Sustainable consumption:** Research programme "Sustainable Food Monitor", commissioned by the Ministry of Agriculture, Nature and Food Quality to Wageningen University and Research (WUR) (since 2011) (7). The latest results show that consumers spent €9.5 billion on sustainable food (environment, animal welfare and/or social aspects) in 2021 (+12% compared to 2020), especially products with labels such as Beter Leven, Biologisch and Rainforest Alliance. Food services (hospitality, restaurant and healthcare institutions) recorded a 6% increase of sustainable products compared to 2020 (8). **SDG 12 Policy actions:** There are no specific policy actions for SDG 12.

DIETARY GUIDELINES

The responsible and the last update. Food-based dietary guidelines for the Netherlands (FBDG) are presented in the food guide "Wheel of Five", which is the practical information tool used by the Netherlands Nutrition Centre (NNC) (last version released in 2016) (6). **The structure.** In the "Wheel of Five", there are 5 sections representing the combinations of food groups. Another graphical representation is reported for foods outside the Wheel of Five, which it divides into "Daily choice" and "Weekly choice" (9). **The major topics.** The dietary guidelines are focused on: 1) eat lots of fruits and vegetables; 2) go especially for whole wheat; 3) choose less meat and more vegetable. Vary with fish, legumes, nuts, eggs and vegetarian products; 4) take enough low-fat and semi-skimmed dairy products. Do not take more than necessary; 5) eat a handful of unsalted nuts every day; 6) choose soft or liquid fats, such as oil, low-fat margarine and liquid frying fat; 7) drink enough (e.g. water, tea and coffee). **Sustainability issue.** Environmental impact was considered by establishing within their optimization model maximum recommendations for foods of animal origin with high GHGE. The major topics are: limiting the consumption of animal-based foods, especially meat and eating more plant-based foods like nuts and legumes; preventing food waste; eating only what you need; eating local fruits and vegetables of the season; and also, information is provided on animal welfare and sustainability labels (10). **Behavioural advice.** Extra recommendation of NNC: Exercise moderately intensity for at least 60 minutes every day. This does not have to be for 1h at a time. You can also exercise for 20 minutes three times a day (11). **Communication activities.** The NNC actively promotes the "Wheel of Five" with different actions, for example the "Eetwissel" project (12) aims to encourage people to change their eating patterns by exchanging a food product for a healthier variant. **Limitations.** They are criticised by a part of dieticians as they are still too based on animal products and the consumer compliance is still too low.

EATING HABITS

Eating habits and cultural diet. The Dutch diet is typically an omnivorous diet; 4-6% of consumers are vegetarians, which includes vegans (3%) and pescetarians (1-2%) (13). It is possible to find different dietary patterns such as Surinamese, Turkish and Moroccan. **Shift towards sustainable eating habits and diets.** An increase was observed for the percentage of "vegetarians, vegans, macrobiotes and anthroposophists" (1.1% in 2010 vs. 4.4% in 2014), of flexitarian (3.9% in 2010 vs. 4.5% in 2012) (13), and for the consumption of fruits and vegetables (4). There was also an increase in consumers spending of 12% on sustainable food in 2021 (vs. 2020) (8). Finally, there was evaluated that considering the latest national food consumption data, a reduction of GHGE to 12-16% with respect to the current level could be a strategy to improve the sustainability and health of the diet (14). **Drivers.** There are 4 broad levels that influence food choices: the individual, the social environment, the physical environment, and the macro-level environment. The individual drivers are: 1) biological (dental deficiency and food preferences were rated as the most modifiable factors), 2) demographic (income and levels of educational attainment (i.e., socio-economic status) are the most impacting factors), 3) psychological (most important appear to be habits, behavioural intention, and self-regulation skills) and 4) situational factors (screen time and sedentary behaviour are strongly related with dietary behaviour) (15)**. Macronutrient recommendations (total energy intake).** Not available.

Food category	Recommended serving (s)
Fruit and vegetables	250g of vegetables and 200g of fruits/day (standard portion vegetables: 50g and fruit: 100g)
Legumes	2-3 serving spoons/week (standard portion spoon: 60g)
Nuts	25g/day
Grain-based foods	Bread (standard portion: 4-5 sandwiches for women and 6-8 for men/day) 4-5 servings/day of cereal products and potatoes
Whole grain	At least half of whole-grain grain products every week.
Meat	Max 500g/week*
Red	(standard portion: 100g/day excluding processed meat and eggs)
Processed	Limit the consumption of red and processed meat.
Fish	Eat fish once a week, preferably fatty fish (standard portion: 100g)

** For meat, the advice is not to eat meat more than five times a week, of which a maximum of three times red meat.*

Alcohol consumption. On average, 73% of adults drink alcohol and 25% of them consume less than one glass/day (17). **Alcohol recommendations.** Current recommendation is to not drink alcohol, or at least not more than one glass/day (18). **Changes in food consumption. Meat.** The amount of meat consumed is slowly decreasing and is currently at 75.9 in 2020 kilo (carcass weight)/person/year vs. 77.6 in 2012 (19). **Legumes.** Not available.

PLAN'EAT




This document represents the snapshot of Poland regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines, Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. The Polish food composition database was created by the Polish State Medical Publishers. The last update was released in 2017 (The National Institute of Public Health) and it contains the nutritional composition of 1045 food products and information related to 96 nutrients (1). The database is accessible through a payment. **The responsible.** The National Institute of Public Health PZH – National Research Institute is the responsible for creating the database. **Technique.** The methods used for creating the database were different: compilation of data, desk research, calculations based on the composition of the recipes (for the most complex products and dishes); analytical evidence made available by food manufacturers; analytical tests carried out in the laboratories of the Institute for Food and Nutrition in Warsaw (2). **Weaknesses.** Not available **Sustainability.** Not available.

FOOD CONSUMPTION

Food consumption assessment. The Central Statistical Office (GUS, Główny Urząd Statystyczny) is responsible for carrying out research on the food consumption of the Polish population. The study is conducted annually through the use of a questionnaire (the "Diary of household budgets" survey) through which the quantitative consumption for one month is collected from the participants (last version in 2022 but not yet released) (3). Population group included: dependent, farming households, self-employed, retired households and households living from unearned sources. Methodology: Household Budget Diary that collects receipts and outgoings (monetary and non-monetary) of participants (in particular for food consumption: food diaries recording the date when they got the product, the name of the item, the quantity, and the monetary or non-monetary value). **Trends (2010-2020).** Increase of fruit, yogurt and water. Decrease of vegetables, bread and cereal products, meat, fish, milk, eggs, oils and other fats, sweets. (4). According to a preliminary report from the household budget survey 2022, in both urban and rural areas the value of monthly consumption of fruit and vegetables decreased by 0.1-0.3 kg/person (5). **Food consumption and recommendations.** Not in line, higher: fats (especially of animal origin); lower: minerals (calcium and magnesium) and some B vitamins (6). Low fruit, high meat (7). **Sustainable consumption.** Since the pandemic there has been more attention to the impact of food on health, to buy more unprocessed foods and to buy more Polish products (8). **SDG 12 Policy actions.** National Waste Management Plan 2022; Roadmap for the transition to circular economy; Transition from linear to circular: policy and innovation project, Organic farming (Rural Development Programme 2014-2020) (9)

DIETARY GUIDELINES

The responsible and the last update. The guidelines were developed and endorsed by the National Institute of Public Health – National Institute of Hygiene (NIZP-PZH), in collaboration with the Ministry of Health (last version released in 2020) (10). **The structure.** The Plate of Healthy Eating plus a specific section "In 3 steps to health" (changing eating habits in small steps: 1) STEP 1 - take the first step; 2) STEP 2- implement the recommended level; 3) STEP 3 – achieve further health. **The major topics.** Too much salt, meat, sugar; fruit and vegetables should be the basis; [where to look for] carbohydrates and protein sources; vegetables fats [as a dietary supplement]. **Sustainability issue.** In the Healthy Eating there is an environmental focus on the promotion of a diet based mainly on plant-based products (11). **Behavioural advice.** Be active (walk, take the stairs, do some active housework) and be physically active at least 30 minutes a day (Walk at least 5 000 steps a day. Walk at least 10 000 for your health) (12). **Communication activities.** The Polish guidelines are promoted through the website and awareness campaigns aimed at children and families. There are also training for public administrations, food manufacturers and the catering industries. In addition, media experts, scientific publications, conferences are aimed to promote the guidelines. **Limitations.** There is a lack of efficient communication towards the adult population (only through social media, congresses and workshops and does not seem to be so committed, as eating healthy could be an option). In addition, the communication takes place online, so there is a need to establish channels dedicated to older generations. The focus is on children, and it is not adequate for the adult population.

EATING HABITS

Eating habits and cultural diet. In total, 8.4% of adult Poles are vegetarians or vegans (13). **Shift towards sustainable eating habits and diets.** A study carried out in 2021 found out that Poles prefer local and seasonal fruit and vegetables and are reducing the purchase of packaged food (14). **Drivers.** The cooking tradition, the inspiration from family tradition/own ideas/ cooking magazines and the Taste for Traditional Polish dishes seem to lead the food consumption in Poland (15). **Macronutrient recommendations (total energy intake).** Carbohydrates 45-65%, fats 15-30%, proteins 10-20% (7).

Food category	Recommended serving (s)
Fruit and vegetables	400 g/day ¼ of plate is fruit; ¾ of plate is vegetables
Legumes	2-3 times/week (standard portion: 50 g; dry portion)
Nuts	30/40 g/day
Grain-based foods	90 g/3 times day of whole grain cereals
Meat **Red/ Processed** **White**	Not more than 350-500 g of red meat and processed meat products/week For the white meat: choose lean poultry meat (e.g. chicken, turkey) without the skin
Fish	100-150g/2 times week

Alcohol consumption. Less than 8% of consumers drinks alcohol on a daily or almost daily basis. Beer is consumed most frequently while wine and spirits are consumed relatively rarely (16). The young population, in 2021: 66% of students drank beer at least once, 62% of students drank vodka and other strong spirits, and 37% of students drank wine (17). **Alcohol recommendations.** For those who drink alcohol: 10 g/day for women and 20 g/day for men; a patient with elevated triglycerides should abstain from alcohol; those who abstain from alcohol should not drink to prevent cardiovascular disease (18). **Changes in food consumption. Meat.** According to the Household Budget Survey (3), in 2021 there was a decrease in meat consumption in Poland: processed meat and other meat preparations decreased by 2.6% and meat by 2.4%, (of which raw poultry by 6.5%). Between 2000 and 2021, average monthly meat consumption at household declined from 5.47 kg to 4.97 kg. Residents in urban areas, in comparison with residents in rural areas, consumed less meat (average monthly per capita). Meat consumption was lower along with the increase in the level of education. **Legumes.** Not available.

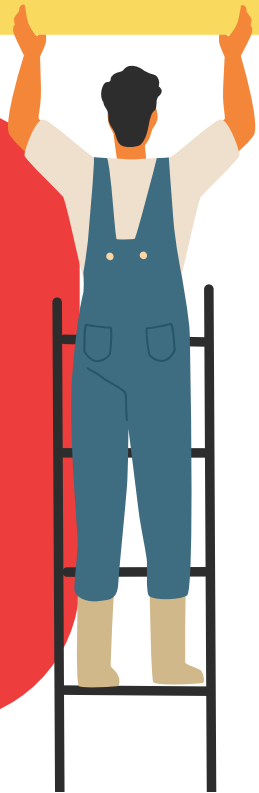
PLAN'EAT




This document represents the snapshot of Spain regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines and Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. The Spanish Food Composition Database BDECA (last update in 2010) includes nutritional information of the 500 most consumed foods in Spain (1). **The responsible.** The database is published by the Ministry of Science and Innovation and managed by the Spanish Agency for Food Safety and Nutrition of the Ministry of Health, Social Services and Equality. **Technique.** The data was collected according to EuroFIR methodologies which include chemical analysis of food samples, calculation of values using yield and nutrient retention factors, comparison with other FCDs to fill missing data, collect values from other sources, such as scientific literature for analysed values or food labels for branded foods (2). **Weaknesses.** The database is old and does not include some products (e.g. plant-based foods). It is not downloadable so it cannot be compared with other countries**. Sustainability.** Not available.



FOOD CONSUMPTION

Food consumption assessment. 1) Spanish National dietary survey in adults, elderly and pregnant women (2013) was carried out by the Spanish Agency for Food Safety and Nutrition. The dietary assessment was based on 24-hours recall, including two non-consecutive days (at least 14 days in between) and complemented with a Food Propensity Questionnaire. A computer-assisted telephone interview and a second computer-assisted personal interview (face-to-face) were arranged at the participants' homes. The population groups: 18-74 years and pregnant women (3). 2) The Spanish National dietary survey on children and adolescents (2015). The population groups: 0-18 years old (4). **Trends (2014-2021).** Increase of pasta and whole grains. Decrease of fruit and vegetables, meat, fish, legumes and dairy products (5-6). **Food consumption and recommendations.** In line: legumes, whole grains, meat and fish consumption. Not in line, lower: fruits and vegetables, cereals especially fresh bread; not in line, higher: products derived from cereals (such as cookies or pastries), prepared dishes (7). **Sustainable consumption.** Life Cycle Assessment (LCA) was used to analyse the average habitual diet of the Spanish population. The global net warning (GWP) related to feeding an average Spanish citizen during a year is 2.1 tons CO_2-eq (8). **SDG 12 Policy actions.** Spanish circular economy strategy (9); Plastics Action Plan (work in progress) (10); National Water Treatment Plan (11).

DIETARY GUIDELINES

The responsible and the last update. The Spanish dietary guidelines are developed by the Agencia Española Seguridad Alimentaria y Nutrición (AESAN) (last version released in 2022) (7). **The structure.** The dietary guidelines are structured in 5 sections: 1) what are the recommendations and what are they for? 2) what should be in a healthy and sustainable diet? 3) and physical activity, why is it good for health? 4) some practical ideas; 5) at a glance. **The major topics.** 1) 5 servings per day of fruits and vegetables; 2) potatoes and other tubers in moderation; 3) cereals, preferably whole grains (3-6 servings per day); 4) more legumes (4 servings per week); 5) more nuts (3 or more servings per week); 6) more fish, preferably blue fish (3 servings per week); 7) eggs in moderation (4 servings per week); 8) milk and dairy products in moderation (maximum 3 per day, according to need); 9) less meat, better if it is white (0-3 servings per week); 10) olive oil every day; 11) water always; 12) reduce or avoid consumption of processed foods high in fat, sugar, salt, etc. **Sustainability issue.** The guidelines encourage the consumption of food with less environmental impact (fruits, vegetables, legumes), locally produced foods, seasonal foods and, if possible, organic foods and promote decrease the intake of animal products with high environmental impact. External experts on the sustainability of food systems were part of the scientific panel that developed the report on which guidelines are built (11). **Behavioural advice.** Physical activity: for adults at least 150-300 minutes of moderate aerobic activity, or at least 75-150 of vigorous intensity; for children under 1 years: the more activity the better; 1-2 years: minimum 180 minutes; 3-4 years: minimum 180 minutes, of which at least 60 minutes of moderate to vigorous activity; 5-17 years: minimum 60 minutes of moderate aerobic activity; over 65: activities to enhance strength and balance (12). **Communication activities.** The new guidelines were released with press actions and as part of the "COME SANO, MUÉVETE Y CUIDA TU PLANETA" (13); Youtube channel of AESAN in which there are videos about different topics present within the guidelines (14-15); campaigns from private or other organizations that have the backing of the local government and that are effective at raising public awareness (for example, the Eat Act Impact Campaign for kids and teenagers (16). **Limitations.** Lack of a user-friendly visual representation that could easily lead to higher compliance.

EATING HABITS

Eating habits and cultural diet. 56.2 % of the individuals living in Spain are omnivores and eat meat on average 6.7 times a week. 41 % are flexitarians, 0.8% vegans and 1.4% vegetarians (10). **Shift towards sustainable eating habits and diets.** The percentage of flexitarians is increasing and therefore gaining in importance over the years (during the pandemic period, the percentage of flexitarians decreased due to confinement and the change of consumption from outside to inside the home) (10). In addition, it was investigated the potential intervention in Spanish eating habits to shift the consumption towards EAT-Lancet recommendations: to achieve this goal a significant decrease in animal source foods, pastry and ready-meals, and an increase in plant-based foods is necessary (17). **Drivers.** Groups with a low socio-economic level showed a greater correlation with the consumption of unhealthy foods and a reduced consumption of fruits and vegetables (18-19). In addition to this, children under 18 at home and the academic level of a consumer has been seen to contribute to the choice of sustainable foods (20). **Macronutrient recommendations (total energy intake).** Carbohydrates > 50% (free sugar <10%), fats <30% (keeping an eye on the presence of saturated fats). No available recommendations for proteins (21).

Food category	Recommended serving (s)
Fruit and vegetables	3 servings of fruit at least and 2 servings of vegetables/day (standard portion vegetables: 150-200g and fruit: 120-200g)
Legumes	4 servings/week (standard portion: 50-60g raw)
Nuts	3 or more servings/week (standard portion: 20-30g)
Grain-based foods	3-6 servings/day (standard portion: 40-60 g bread, 60-80 g pasta, rice)
Meat	0-3 servings/week for meat (standard portion: 100-125g)
Processed	For processed meat: reduce or even avoid consumption
Fish	3 servings/week (standard portion: 125-150g)

Alcohol consumption. Population aged from 14 to 64, lifetime alcohol use: 93.2%; alcohol use in the last 12 months: 76.4%, alcohol use in last 30 days: 64.5% (22). Population aged from 14 to 18: lifetime alcohol use: 73.9%, alcohol use in last 12 months: 70.5%, alcohol use in last 30 days: 53.6% (23). **Alcohol recommendations.** 1 standard drink (10g/day) in women and 2 standard drinks (20g/day) in men (24). **Changes in food consumption. Legumes.** The consumption of legumes in Spain has fallen by more than 60% in recent decades, falling below the recommended amounts (25). **Meat.** 10.2% decrease of meat sector in Spanish household (2020 vs. 2021), with a contraction of 11.5% in the purchase of fresh meat (5).

PLAN'EAT




This document represents the snapshot of Sweden regarding four topics: Food Composition Database, Food Consumption, Dietary Guidelines and Eating Habits. The snapshot has the aim to give an overview of the situation in this country.

FOOD COMPOSITION DATABASE

National food composition database. The Swedish Food Composition Database (last update in 2022) includes information on about 2300 different foods classified into 29 different categories, according to the European LanguaL code (1). **The responsible.** The Swedish Food Agency (SFA) is the responsible for the creation of the database. **Technique.** The database follows the INFOODS and EuroFIR standards. To build up the database, different methodologies were used: analytical methods of guaranteed quality; compositional values taken from other country databases or from the food industry; estimated values (nutritional values transferred from similar foods); calculated values (2). **Weaknesses.** Not all food products in the Swedish market are included; processed foods are presented as generic foodstuff; there is no record whether or not foods are fortified; there is a discrepancy between the reported protein content in the food database compared to the nutrition label due to a different conversion factor (the work to standardize the procedure is on going). **Sustainability.** The database does not include information on the sustainability of a product and at the moment there are no set plans to include it. However, the discussion is still on going.

FOOD CONSUMPTION

Food consumption assessment. The Swedish Food Agency (SFA) is the responsible for assessing the food consumption. The Swedish National Dietary Survey - Riksmaten (Adults, 2010-2011) was carried out by the SFA. The data collection was realized through an online based 4-day food diary and a questionnaire. The population group: 18-80 years old (3). Other surveys: Riksmaten Small children - ongoing. Methodology: questionnaire, diary answered by the parents, and two interviews. Population group: 9 and 18 months and 4-year-olds (4). Riksmaten Children (2003). Methodology: questionnaire and food diary. Population group: 4-, 8- and 11-year-old (5). Riksmaten Adolescents (2016). Methodology: web-based questionnaire. Population group: 10-17 years old. **Trends (1998-2014).** Increase of vegetables, pasta and cereals, meat, legumes, eggs, fish, potatoes. Decrease of fruit, bread, milk and dairy products, sweet and alcoholic beverages (7,8). **Food consumption and recommendations.** Not in line, lower: fruit and vegetables, wholegrains, fish and shellfish, legumes, nuts. Not in line, higher: fat, sugar, meat and processed meat (8,9,10). **Sustainable consumption.** Life Cycle Assessment (LCA) was used to identify and assess the environmental impacts of Swedish food consumption from a cradle-to-gate perspective based on FAO Food Balance data. The results showed that Swedish food consumption produces about 21 million tons of CO2-eq emissions, equivalent to about 1.9 tons of per capita CO2-eq emissions (11) . **SDG 12 Policy actions.** Not available.

DIETARY GUIDELINES

The responsible and the last update. The Swedish eating habits and dietary guidelines were developed by the Swedish National Food Agency (NFA) (last update in 2015) (12). **The structure:** The guidelines included recommendations for different population groups, in addition to the general adult population, meaning: pregnant women, breastfeeding women, small children (1-2 years), children and adolescents (2-17 years old). **The major topics.** The guidelines for the adults contains different topics: 1) more vegetables and fruit; 2) more seafood; 3) switch to wholegrain; 4) switch to healthy fats; 5) switch to low fat dairy products,; 6) eat less red meat and processed meat; 7) less salt; 8) less sugar; 10) maintain energy balance; 11) more exercise; 12) choose foods with the keyhole label(12). **Sustainability issue.** Sustainability issues are highlighted in the following guideline topics: vegetables and fruits, fish and seafood, meat and cured meats, fats, dairy products and sugar. The issues include organic versus conventional farming, sustainable labeling (e.g., KRAV, MSC, ASC), frozen foods are nutritious as fresh foods, and intake restrictions based on health and environment. In this regard, food models: less (red) meat and more legumes; consume fish and diary (valid health and environmental alternative); vegetables and fruit, coarse, tough greens are preferred over salad (longer shelf life, grown outdoors and consumed seasonally). **Behavioral advice.** Physical activity: 30 minutes a day of physical activity (stay active); for children: 60 minutes; for elderly: find your balance. Eat regular meals without snacking (including breakfast, lunch and dinner). Purchase products labelled with the Keyhole symbol and sustainability labels (13). **Communication activities.** The NFA actively updates its website and has made communication materials for the “Find YOUR way”-campaign (14). The website has a lot of written materials (both in normal and in easy-to-understand form) regarding healthy and sustainable eating together with video material. The schools work with healthy dietary patterns in different ways (15). **Limitations.** The main limitation is the consumer compliance to the guidelines. The NFA therefore aims to work more with financial instruments and other actions that could be more effective than dietary guidelines (16).

EATING HABITS

Eating habits and cultural diet. The Swedish diet is omnivorous and has Western-style eating habits, though it tends to include more fish. In the "Food report 2022" 78% of respondents said they were omnivorous, 10% were flexitarians, 4% were vegetarians, 2% were pescatarians, 1% were vegans, and 4% were other (17). **Shift towards sustainable eating habits and diets.** A study that evaluated food consumption through a 14-years baseline (from 2000-2004 to 2014-2018) observed that there was a decreased trends in GHGE from animal-based foods in all age groups with a smaller increase from plant-based sources in younger groups only. For all age groups, GHGE from discretionary foods decreased (18). **Drivers.** Not available. **Macronutrient recommendations (total energy intake).** Carbohydrates 45-60%, fats 25-40%, proteins 10-20% (19).

Food category	Recommended serving (s)
Fruit and vegetables	500 g/day three fruits and two large hands-full of vegetables
Legumes	Not available
Nuts	A couple of teaspoons of various nuts and seeds/day
Grain-based foods	70 g/day for women and 90 g/day for men
Meat	≤500 g red meat and charcuterie/week
Fish	2-3 times/week

Alcohol consumption. In 2010-2011 61% of all respondents had consumed alcohol (beer and wine mostly) (3). In 2020, according to CAN, 42% of all young consumers aged 15-16 reported having had alcohol during the last 12-months (20). **Alcohol recommendations.** NFA (based on the Nordic Nutrition recommendations) states that the intake of alcohol should not exceed 10 g alcohol/day for women and 20 g alcohol/day for men (21). **Changes in food consumption. Meat:** Meat consumption (slaughter weight) decreased from 86.1 kg per capita year in 2012 to 80.1 kg per capita year in 2021 (22). **Legumes:** Not available.