SYSTEMIC CHALLENGES

Changing and diversifying our dietary habits can be an effective way to tackle the issues of climate change and natural resource scarcity, and help providing sufficient, nutritious, safe, accessible and affordable food to a rapidly growing global population.

The livestock sector produces 14.5% of the global anthropogenic GHG emissions, and about one third of the land surface and three quarters of freshwater resources are used for crop or livestock production. Food production and consumption puts increasing pressure on animal welfare and is one of the main drivers of biodiversity loss and changes in ecosystem services (e.g. pollution due to excessive use of fertilisers and pesticides). Some animal-based products, which are imported from outside the EU, do not always follow the same sustainability standards in terms of production as those defined in the EU. This can lead to deforestation or land use change outside our EU borders. Excess red and processed meat consumption (of high availability and low price) has significant negative effects on human health and
can lead to diet-related diseases, in particular non-communicable diseases (NCDs), such as cancer, cardiovascular diseases, obesity and diabetes. Still, diet is a deeply engrained societal and cultural attitude that is difficult to change. Consumers may be unsure about whether alternative proteins are safe and healthy (trust issues) and how they are regulated. They expect these products to be tasty, visually appealing, have clear labels and be affordable to all. Shifting demand will unavoidably be a challenge for some businesses, which need to be supported in the transition to new business opportunities and jobs.

Dietary shifts towards alternative sources of proteins (e.g., plant-based, microbial-based, ocean-based, insect-based, meat and fish meat alternatives, etc.) can contribute to one fifth of the mitigation needed to ensure global warming does not exceed 2 °C. Both the Global Biodiversity Outlook report and the Scientific Advise Mechanism report on a Sustainable Food System are calling for a transition to healthier and more sustainable diets, including a moderate consumption of red and processed meat and greater emphasis on plant-based foods. Many alternative protein sources already exist, but far more can be done to invest in identifying and introducing other alternative protein sources into the human diet, such as edible insects or microalgae. However, this entails health, societal and regulatory considerations. Alternative protein sources may be novel foods in the EU thereby requiring a pre-market authorisation for their consumption based on the assessment of any health risks by the European Food Safety Authority (EFSA). Such a dietary shift depends on the European citizens’ willingness to change their diet and eating habits, which in turn relies on prices, food purchasing habits, product availability, perceived personal benefits, and policies. Consumer choices thus depend on the food environment that ensures the availability and access to food and marketing signals. It makes the link between food supply and diets and is one of the determinants of consumer choices and food production, and consumers and food services (e.g. restaurants and canteens) have a key role in shaping it.

**CO-BENEFITS**

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<tr>
<th>NUTRITION</th>
<th>CLIMATE</th>
<th>CIRCULARITY</th>
<th>INNOVATION</th>
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**Nutrition and health**
- More healthy and sustainable diets to prevent diet-related NCDs
- Diversification of the offer in proteins
- Place-based dietary shift to meet diverse and specific needs

**Climate and sustainability**
- Less GHG emissions and biodiversity loss
- Better air and water quality
- Less dependence on imports (less deforestation)

**Circularity and resource efficiency**
- Savings in energy, land and water use
- Better consumer footprint

**Innovation and communities**
- Trigger innovation, new jobs, business models, value-added products, goods, services and jobs
- Meeting the needs, values and expectations of society in a responsible and ethical way
- Better farmers’ resilience and image
RESEARCH AND INNOVATION ACTIONS NEEDED

Impact of alternative proteins and dietary shifts on the environment and health

• Impact on natural resources/climate and on allergenicity and food safety, impact of climate change/resource scarcity on alternative proteins’ production
• Nutritional quality (bioavailability) of protein sources
• Comparative systemic analysis of conventional vs. alternative protein sources
• ‘Future proof’ new technologies

Production and availability of different alternative protein sources

• Developing markets and analysis of the impact of alternative proteins production on small farms

The food environment

• Healthier and more sustainable food environments, easier access to healthy diets in rural/urban areas
• Analysis of different tools and instruments on improving alternative proteins provision

Consumption habits and dietary shift

• Understanding/monitoring dietary choices, their drivers/barriers, consumer demand, and how to engage in behavioural transition and realise dietary shift, improving the processing of alternative proteins
• Needs of societal/population groups and their resources to access/utilise alternative protein sources
• Comparative analysis of different tools/instruments to increase alternative protein consumption

Platform for the collection and collation of food consumption data → dietary data hub

Strengthen education and access to information (e.g., labelling) on food systems and diets.

BARRIERS AND LOCK-INS

• Disruption of major economic sector, difficult scaling up of the production of alternative protein production
• Non-negligible share of public finance directed towards unsustainable and unhealthy foods
• Regulatory issues (administrative burden, legal text difficult to understand and apply, cost)
• Confusion regarding the provision of data and communication, lack of labelling guidelines, and difficulty to make consumers change their preferences/demand
• Lack of political commitment as well as research and investments in fostering behavioural change.

ENABLERS OF CHANGE

• New job opportunities and business models for food producers and processors
• More direct and indirect subsidies and differentiating tax regimes
• More political commitment, research/communication for raising awareness of consumers and food services
• Increased willingness among citizens to change their diets
• Highlighting the importance of the food environment and private sector.
In Horizon 2020, the EU has invested about EUR 70 million in this area, by supporting about 15 projects (1). Some key projects include:

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<tr>
<th>PROJECT</th>
<th>DESCRIPTION</th>
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<tr>
<td>NEXTGENPROTEINS</td>
<td>2019-2023, EUR 7.9 M. Bioconversion of under-utilised resources into next generation proteins for food and feed</td>
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<td><a href="https://nextgenproteins.eu/">https://nextgenproteins.eu/</a></td>
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<tr>
<td>SUSINCHAIN</td>
<td>2019-2023, EUR 7.9 M. SUStainable INsect CHAIN</td>
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<td><a href="https://susinchain.eu/">https://susinchain.eu/</a></td>
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<tr>
<td>PROFUTURE</td>
<td>2019-2023, EUR 7.7 M. Microalgae protein ingredients for the food and feed of the future</td>
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<td><a href="https://www.pro-future.eu/">https://www.pro-future.eu/</a></td>
<td></td>
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<tr>
<td>SMART PROTEIN</td>
<td>2020-2023, EUR 8.1 M. Future-proof alternative terrestrial protein sources for human nutrition</td>
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<td><a href="https://smartproteinproject.eu/">https://smartproteinproject.eu/</a></td>
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This pathway seeks to provide a way forward for future R&I policy in Europe and beyond. It is 1 out of 10 FOOD 2030 Pathways for Action, which target key R&I leverage points for transitioning towards sustainable, resilient, healthy and inclusive food systems that leave no one behind. The FOOD 2030 Pathways for Action will help to underpin Horizon Europe, support evidence-based policymaking and implementation, foster education, skills and capacities, boost innovation and investment, encourage synergies and policy alignment. The achievement of these objectives will be assisted by a dedicated Horizon Europe Food Systems Partnership expected to be launched in 2023 that will provide a multi-actor R&I governance platform and process to deliver co-benefits in line with the European Green Deal. This Pathway Alternative Proteins and Dietary Shift is furthermore relevant to policies such as, the Common Agricultural Policy, the Common Fisheries Policy, the European Green Deal (the Farm to Fork and Biodiversity strategies), the EU Regulation on Novel Foods, the Updated Bioeconomy Strategy and 'A Clean Planet for All'.

(1) Some projects focused specifically on alternative sources of proteins, others focused, among other things, on dietary shift.