Assessment of Research and Innovation on Food Systems by European member States

Monique Axelos, Loreta Basinskiene, Beatrice Darcy Vrillon, Hendrik de Ruyck, Alba Muñoz, Alvija Salaseviciene, Anastasiya Terzieva, Minna Huttunen

European Commission

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Policy and Funding Analysis

by Standing Committee on Agricultural Research (SCAR) Strategic Working Group on Food Systems

Research and Innovation

Acknowledgments

Writing group

Monique Axelos (INRA, FR), Loreta Basinskiene (KTU, LT), Béatrice Darcy-Vrillon (INRA, FR), Hendrik De Ruyck (ILVO, BE), Alba Muñoz Pou (ILVO, BE), Alvija Salaseviciene (KTU, LT), Anastasiya Terzieva (INRA, FR) and Minna Huttunen (MMM, FI)

Representatives from SCAR FOOD SYSTEMS SWG members and other organisations:

Eva-Claudia Lang (AT); Kris Roels (BE); Hendrik De Ruyck (BE); Georges Sinnaeve (BE); Iva Blažková (CZ); Nikola Schulz (DE); Johannes Bender (DE); Stefan Rauschen (DE); Elke Saggau (DE); Katerina Kotzia (DE); Niels Halberg (DK); Niels Gotke (DK); Annette Toft (DK); Piret Priisalu (EE); Ángeles Alonso de Blas (ES); Begoña Perez Villarreal (ES); Minna Huttunen (FI); Anne Pihlanto (FI); Monique Axelos (FR); Beatrice Darcy Vrillon (FR); Cristophe Cotillon (FR); Andrea Gyorffy (HU); Viktória Szűcs (HU); Akos Jozwiak (HU); Ruairi Colbert (IE); Annamaria Stella Marzetti (IT); Aida Turrini (IT); Silvia Baralla (IT); Elena Capolino (IT); Loreta Basinskiene (LT); Alvija Salaseviciene (LT); Matthew Tabone (MT); Philip Aquilina (MT); Henk Westhoek (NL); Casper Zulim De Swarte (NL); Mona Gravningen Rygh (NO); Justyna Cieslikowska (PL); Paweł Chmieliński (PL); Nastasia Belc (RO); Catalin Dragomir (RO); Adrian Asanica (RO); Carmen Socaciu (RO); Viorel Vulturescu (RO); Susanne Johansson (SE); Ola Thomsson (SE); Ahmet Budaklier (TR); Lucy Foster (UK); Nahum Kidan (UK); Mike Collins (UK); Elain Groom (UK)

JPIs: Jolien Wenink (JPI HDHL, NL); Heather Mckhann (FACCE, FR)

SCAR FS SWG Chair: Monique Axelos (INRA, FR)

SCAR FS SWG Co-chair: Minna Huttunen (MMM, FI)

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European Commission Directorate-General for Research and Innovation

Directorate F - Bioeconomy

Unit F.3 - Agri-Food Chain

Contact Isabelle de Froidmont-Görtz

E-mail RTD-FOOD2030@ec.europa.eu
RTD-PUBLICATIONS@ec.europa.eu

European Commission
B-1049 Brussels

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Assessment of Research and Innovation on Food Systems by European Member States

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This publication presents an extensive quantitative and qualitative analysis of the research projects and policies in Europe in the last 5 years as related to food systems.
The analysis covers the major trends and ambitions, improvements needed, and gaps in R&I. The goals of the assessment, research methods, key points and participating actors are presented in the following sections.

Table of contents

EXECUTIVE SUMMARY

Food not only supports human life; food production side-streams are also used for bio-fuel or bio-based products. Food has important historical, social, cultural, environmental and economic dimensions. Currently the EU and global food systems are affected by major challenges such as climate change, migration, a growing world population, urbanisation and resource scarcity, in addition to the "triple burden" of malnutrition (undernutrition, obesity, and hidden hunger), ageing and food poverty. Research and innovation (R&I) is key to developing high-impact solutions to future-proof our food systems. There is a pressing need to avoid fragmentation, ensure policy coherence, and align programmes in order to adopt a food system approach that can effectively address multiple objectives.

For this reason, the Standing Committee on Agricultural Research (SCAR) FOOD SYSTEMS Strategic Working Group (SWG) has performed a qualitative and quantitative mapping of food related policies and food system related public R&I funds in Member States. This mapping provides information on:

- Existing policies and strategies linked to food and nutrition security
- Public R&I funding at national and regional level related to food systems and their alignment to the FOOD 2030.

This information will help to:

- Provide strategic support to the further development of existing national, European and global policies and strategies that are linked to food and nutrition security as well as R&I policy,
- Identify R&I investment gaps to be filled,
- Catalyse future reflections and discussions at national and regional levels regarding the need to work better across institutional silos in order to tackle food system transformation through a systemic approach and to provide advice for possible next steps of the FOOD 2030 initiative.

Assessment of existing policies/strategies of more than 20 countries revealed that in the last 5 years, agriculture, food production and food safety were the most prominent fields to have benefitted from R&I support, whereas food innovation and nutritional aspects linked to health were less represented. More recently, national bioeconomy strategies are present or in preparation in the majority of the countries. The exercise also revealed that food and nutrition security, although identified as a great societal

challenge, has not been well covered by current integrated policies.

Mapping of the R&I investments of 11 countries reveals that much of the funding has focused on primary production and food processing. R&I funding drops off as one approaches the consumer (e.g. retail, consumption, food waste). This reflects the fragmented and unbalanced nature of past R&I investments, as well as a lack of interest in other stakeholders (including society) beyond those involved in primary production. Consumer or distribution related R&I investments were minor in most countries that completed the quantitative mapping. Climate change, urbanisation and other issues are likely to result in even longer travel from the production site to consumption, which calls for better performing logistics systems and innovative packaging to keep the products safe and fresh. Product durability reduces food waste and contributes to food system sustainability.

Food safety is of great importance to the European food system. Food safety R&I inputs have focused strongly on production. This is not surprising as food safety starts with good practices in primary production. Furthermore, primary production has received a great deal of food system R&I funds. Food safety R&I investments are also an important dietary health factor. Currently, only minimal investments are being made in food consumption related R&I. This requires careful evaluation of the tools available vs. the tools needed to change the trend from treating non-communicable diseases (NCD) to preventing NCDs through healthy eating. Public health R&I inputs need to include food system dimensions through healthy and sustainable diets. We need novel approaches to create non-obesogenic food environments that contribute positively to health and consumer physical and cultural needs. Citizens play a vital role as an active part of a sustainable food system.

For example food waste related targets can be reached only if the whole food system – including citizens – is involved.

The food system provides food and nutrition security, hence it is a major player in health promotion. It also provides a significant number of jobs and opportunities for growth through innovation. The quantitative mapping results can stimulate national reflection regarding the allocation of R&I funds. The question is: are the inputs to the food system R&I sufficient to exploit the potential of the food system? The findings of the quantitative mapping exercise clearly show gaps in R&I. Food system elements and interconnections need to be included into various national research programmes to fill those gaps. By involving all relevant societal stakeholders and creating open innovation, novel approaches could lead to the crafting of future solutions.

The food system is large and highly complex and has many actors. It is unlikely that one R&I project could cover it all. Therefore, we recommend whenever possible to look beyond sectoral approaches by creating links between food system categories that also simultaneously address multiple objectives (ex: climate adaptation, sustainability, health, etc.). Possible solutions to fill the current R&I gaps could be found by stimulating existing working platforms to enable collaboration between the different sectors and stakeholders, including society. This type of 'systems thinking' provides stronger and more prolonged influence and co-ownership of outcomes. To see the future progress in strengthening food and nutrition security, we also need to create adequate targets and indicators for monitoring - indicators that cover the whole food system and reflect the outcome. Measuring the progress made will demonstrate movement towards future-proofing European food systems so they can become more sustainable, resilient, responsible, diverse, competitive, and inclusive.

1

BASELINE ASSESSMENT OF MEMBER STATES **FOOD SYSTEM POLICIES AND R&I FUNDING**

The main rationale for the SCAR FOOD SYSTEMS SWG is that the SCAR Member States (MS) provide strategic advice and support to the EU Research and Innovation (R&I) policy framework **FOOD 2030**[1] as well as to the review of the bioeconomy strategy, in which food plays a central role based on the 'food comes first' principle.

Food is defined as 'edible products derived from land or sea (including inland waters) destined for human consumption or animal feed'. Food is more than just biomass used as input for life support, bio-fuel and bio-based products: it has historical, social, cultural, environmental and economic dimensions. Currently the EU and global food systems are affected by major societal and interrelated challenges such as climate change, migration, a growing world population, urbanisation, resource scarcity, the triple burden of malnutrition (undernutrition, obesity, and hidden hunger), ageing and food poverty.

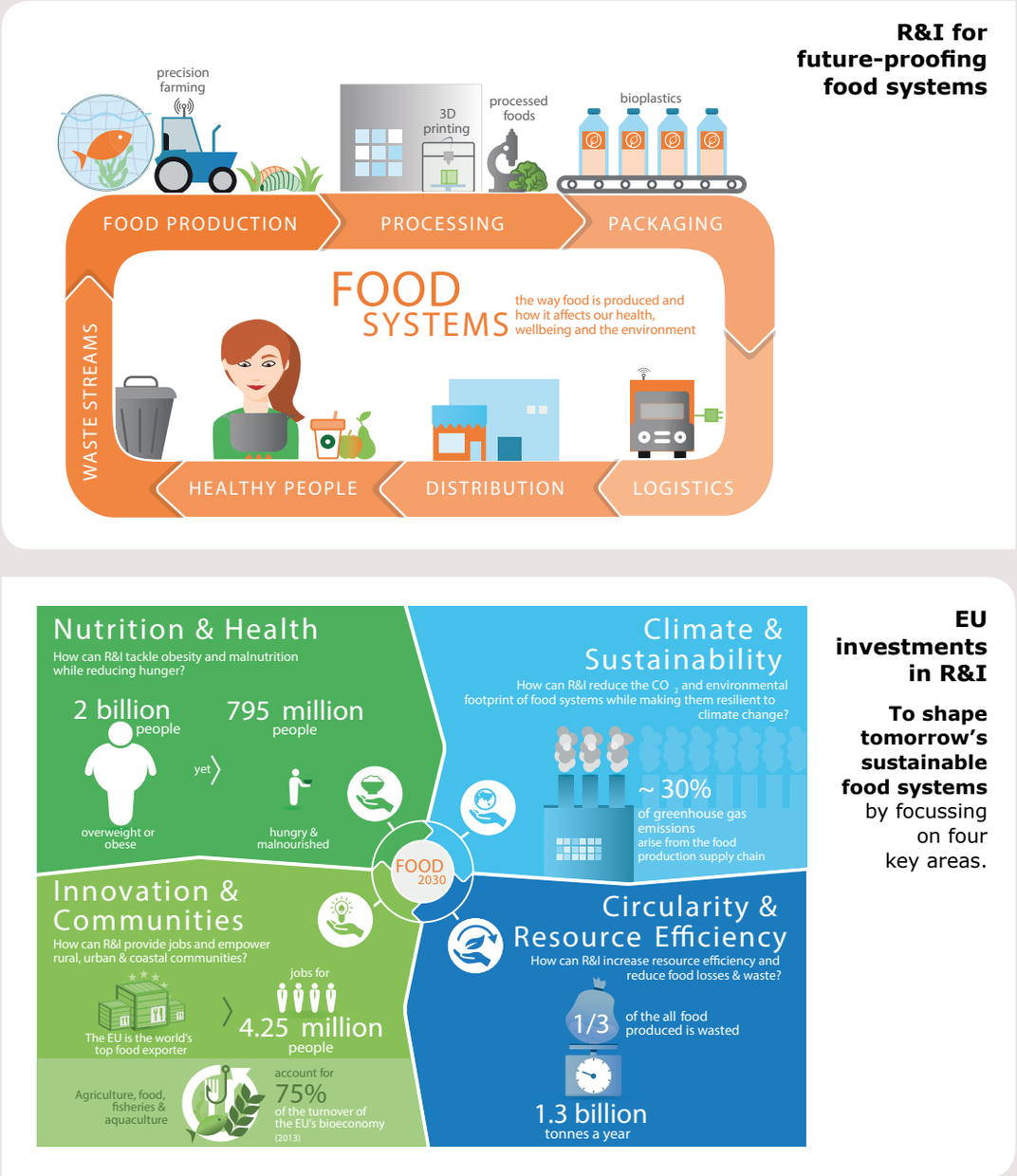
The SCAR FOOD SYSTEMS SWG recognizes that food systems **should not only deliver food security but also nutrition security**. Food systems produce and provide sufficient, affordable, safe, convenient, tasty and nutritious food for healthy and sustainable diets for all citizens. Food systems also need to be environmentally sustainable ('resource smart'), implying a sustainable and efficient use of natural resources, and limiting negative environmental impacts.

In this respect, building blocks of food systems should encompass the entire value chain in its broadest sense and their interactions; from ecosystem services to primary production (agriculture, aquaculture and fisheries), harvesting, storage, processing, packaging, distribution, retailing, food services (restaurants, catering, hospitality, etc.), waste stream management and recycling, food and feed safety, all the way to consumers, nutrition for citizens' health and well-being, and diet related diseases. To ensure Food Nutrition Security (FNS), the European R&I policy agenda should focus on future-proofing food systems by making them more sustainable, resilient, responsible, diverse, competitive, and inclusive. This will contribute reaching the Sustainable Development Goals (SDGs priorities) by 2030 and it will contribute to the FOOD 2030 priorities: NUTRITION for sustainable and healthy diets, CLIMATE smart and environmentally sustainable food systems, CIRCULARITY and resource efficiency of food systems, INNOVATION and empowerment of communities.

R&I is the key to find high-impact solutions for future-proofing of food systems. R&I helps to avoid fragmentation, ensure policy coherence and adopt an effective food system approach. For this reason, the SCAR FOOD SYSTEMS SWG provides strategic intelligence and orientation by integrating and analysing the different regional, national, European and international initiatives already in place. This document allows for sharing best practices, knowledge and data, and stimulates the standardisation and harmonisation of data gathering, monitoring and R&I policy alignment within and amongst SCAR Member States as well as with the non-EU countries that are participating in the EC's International Bioeconomy Forum (IBF). **Figure 1** shows the Food 2030 food system categories and the 4 areas of focus for R&I that will make the food system more sustainable.

1 _ http://ec.europa.eu/research/conferences/2016/food2030/pdf/food2030_ conference_background.pdf#view=fit&pagemode=none

Figure 1: FOOD 2030 food systems categories and 4 key focus areas



EU investments in R&I

To shape tomorrow's sustainable food systems by focussing on four key areas.

In Europe, public-funded R&I relevant to food systems is generally fragmented across different international/European/national/regional programmes funded by different ministries and agencies.

Until now, most of the R&I in this field has been targeted to exploring specific parts of the food system (e.g., primary production, nutrition, food processing) without much attention to linking land and sea, connecting producers to consumers, or engaging different sectors and actors within the food value chain.

The importance of future-proofing our food systems to make them environmentally sustainable and climate-proof within a rapidly changing geographical, geopolitical and demographic global context has now been recognised. This is at the heart of the new Sustainable Development Goals, all of which are connected by 'food'. To tackle the current challenges of ensuring food and nutrition security whilst ensuring citizen health and well-being and the competitiveness of the European food-related sectors, EU R&I policy must be rethought in order to provide high-impact solutions that can lead to systemic change. Better R&I policy will foster better policy coherence, programme alignment and leveraging of funds.

The qualitative and quantitative mapping in Member States provides a baseline assessment of:

- existing policies and strategies that are linked to food and nutrition security,
- public R&I funding at national and regional level related to food systems and their alignment with the FOOD 2030 priorities.

These findings will serve to:

- inform and underpin discussions within and among the EC services and EU institutions about the current situation and the R&I investment gaps that need to be addressed, particularly with the next EU Multi-Annual Financial Framework in view,
- catalyse future reflections and discussions at national and regional level regarding the need to work across institutional silos in order to tackle food system transformation from a systemic perspective,
- provide the SCAR FOOD SYSTEMS SWG further advice on the development of a long-term national, European and global strategic approach to food systems transformation in MS (next steps of FOOD 2030) and will aid the determination of future R&I investment needs at national level (where, how much, and how long).

1.1 Qualitative mapping of existing Member State policies and strategies linked to food and nutrition security

The results from the qualitative mapping is based on answers collected from 21 countries **(Figure 2)**.

"Food and nutrition security" (FNS) was defined at the World Food Summit (FAO, 1996) as: "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life".

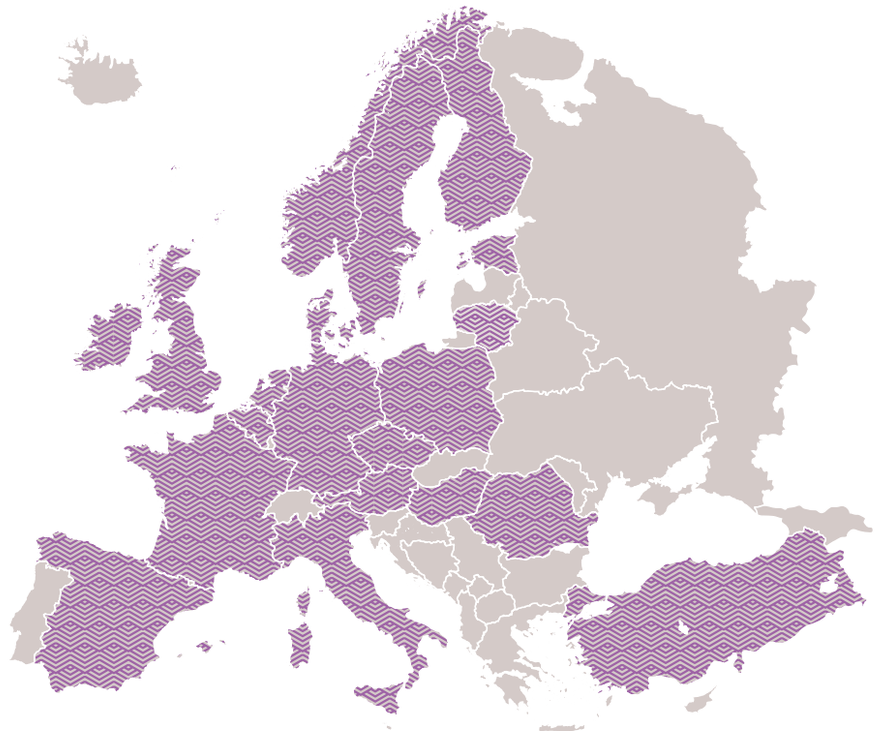
The aim of the qualitative mapping was to provide insight into existing policies and strategies that are relevant to food and nutrition security and the priorities of FOOD 2030.

For this purpose the SWG developed a 3-part questionnaire to collect input from participating countries (Appendix 1):

- FNS related policy and strategy documents (using keywords such as agriculture, health, food safety, climate, fisheries, etc.)
- Bioeconomy strategy
- R&I policy and programming

Each country performed a self-analysis of its situation at the level of integration of FNS strategies/policies, its ambitions and the R&I gaps to be filled.

Figure 2: The 21 countries involved in the SCAR FOOD SYSTEMS SWG qualitative policy mapping



1.2 Quantitative mapping of R&I funding on food systems research in Member States

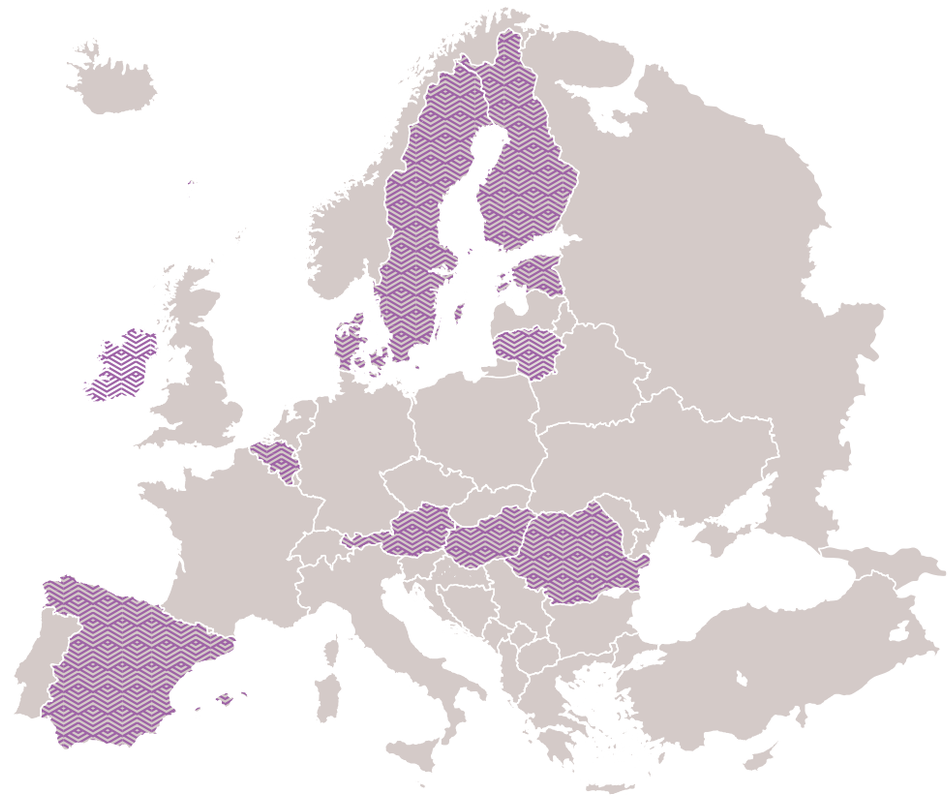
The results from the quantitative mapping is based on answers collected from 11 countries **(Figure 3)**.

The transparent and systematic methodology used to map R&I funding in Member States guaranteed the possibility of reproducing the questionnaire and generating comparable results. Appendix 2 presents the agreed-upon data collection guidelines. The guidelines were prepared by 3 pilot countries (Finland, Hungary, Belgium) and the Chairperson's country (France), in consultation with the EC. After results were received from the first pilot country (Finland), the countries used an Excel template for data collection. Our aim was not to rank the countries by total funding, but rather to reveal how the funding was distributed to the different parts of the food system. Due to the limitations in the data gathering methods, these data can only be used for this purpose.

A timespan of 5 to 6 years is sufficient for a good idea of the relationships and ratios of national food system R&I inputs. It also shows the total amount of funding per country. This can be used for discussion at a national level and for comparison with the total R&I investments. The food system not only provides food and nutrition security; it is a significant job provider and represents an opportunity for growth through innovation. Quantitative mapping results call for national reflection if the inputs to the food system R&I are sufficient to exploit the momentum that the food system possesses. By arranging the food system R&I investments into categories and using percentages of the total food system investment, we could compare the priorities between the countries to show similarities and differences.

At the time this report was written (May 2018), 11 European countries had completed the quantitative mapping: Finland, Hungary, Belgium, Denmark, Spain, Sweden, Lithuania, Estonia, Ireland, Austria and Romania. Other countries are still gathering data to achieve their quantitative mapping. A more complete vision of R&I European Member States investment in food systems should be obtained by the end of 2018. Despite the common protocol and agreed process, it is important to keep the limitations of the mapping results in mind, especially the amount of detail that can be drawn from the conclusions due to the limited number of countries represented (11 of 28).

Figure 3: The 11 countries involved in the SCAR FOOD SYSTEMS SWG quantitative policy mapping



2

RESULTS REVEAL A NEED FOR **POLICY COHERENCE AND LEVERAGING OF FUNDS**

2.1 Results of qualitative mapping

The multitude of strategic and policy documents from the various Member States generated a great deal of information, including links to various websites (although often hindered by the lack of an English version of the documents on those sites). The list of keywords provided to identify the relevant segments of these policies serves as a basis for the summary of results in **Figures 4 and 5**.

Figure 4: Existing policies and strategies on the scope of Food and Nutrition Security (21 MS or Associated Countries)

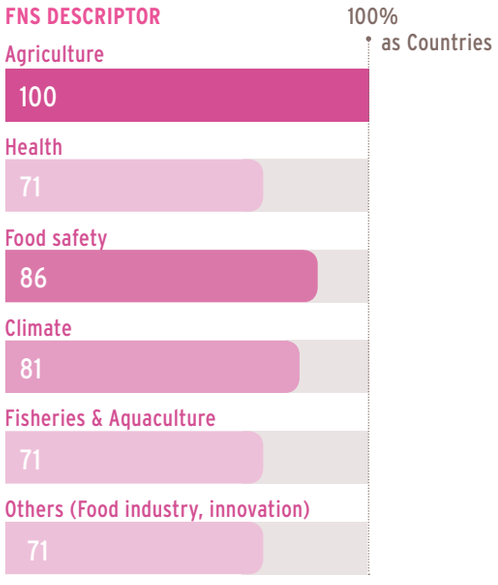
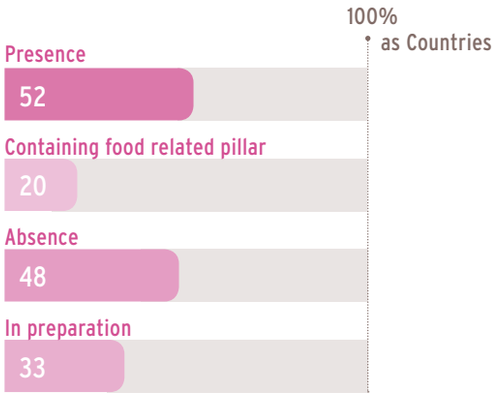


Figure 5: Existing Bioeconomy strategy (21 MS or Associated countries)



The agricultural part of FNS is covered by policy/strategies in all countries, followed by food safety and climate issues. The food industry/innovation and health parts are less well covered.

Bioeconomy strategies are present in the majority of countries, whereas more than 2/3 of countries who did not indicate a presence have such strategies in preparation.

If we compare the results of **Figures 4 and 5**, we observe that the number of existing policies and strategies related to food and nutrition security is larger than the number of policies related to bioeconomy. A possible explanation for that is that bioeconomy is a relatively recent policy topic.

The degree of food and nutritional security integration is country-dependent, as illustrated by the questionnaire results. The main highlights are presented in **Table 1**.

Table 1: Self-analysis by Member States (20 MS or associated countries)

	Specific situation FNS
Austria	Depends on Ministry of Health and Ministry of Agriculture
Belgium	Value chain sometimes separated between Wallonia and Flanders – Flanders, top agri-food exporter
Czech Republic	Depends on Ministry of Agriculture, Ministry of Health and Ministry of environment – Existence of a Czech technology platform for foodstuffs
Denmark	Global responsibility in feeding the world (due to exporting situation) with sustainably produced and healthy food
Estonia	Mostly small and microenterprisess – Technically advanced primary productions – Low level of use of plant protection products
Finland	Has 10 national FNS related policies; 7 led by Ministry of Agriculture. Nutrition policy led by Ministry of Health
France	Food related policies and bioeconomy strategy led by Ministry of Agriculture – Nutritional policy led by Ministry of Health
Germany	Several strategies and programmes, led mainly led by Ministry of Food and Agriculture, and Ministry of Education and Research (high-tech strategy, bioeconomy)
Hungary	History of support of Central Eastern European (CEE) regions to improve agri-food through CAP resources – Present need to shift the emphasis to R&I cooperative actions to achieve synergies – Mapping may be incomplete, as based only on information available to participating researchers at the time of investigation
Ireland	Global competition – Biodiversity loss and reduced water quality – Challenging GHG and air emission targets
Italy	Large agri-food biodiversity in the country, facing climate and socio-economic changes – Agri-food industry paying more attention to sustainability and health issues – great attention to FNS issues at public procurement level
Lithuania	Need for a sustainable environment for FNS – Make agriculture and food systems sensitive to nutrition and food safety – Develop long term strategies for sustainable use of resources and promote targeted research
Malta	In agriculture plant protection issues: high quality seeds, quality of soil, irrigation water – Public health issues: overweight, obesity in children and adults (Malta food and nutrition policy and action plan)
Norway	Small amount of agricultural areas – Short growth season – Rich support of seafood/farmed fish – Good plant and animal health; good food safety
Poland	Underlying policy: strategy for sustainable development of rural areas, agriculture and fisheries (SSDRAAF) led by Ministry of Agriculture and Rural Development
Romania	Remarkable potential of agriculture and food industry, forestry
Spain	Policies and strategies in Food Security depends on Ministry of Agriculture and Fisheries, Food and Environment (MAPAMA). Food Safety depends on Ministry of Health, Social Services and Equality (MSSSI). The National Bioeconomy Strategy depends on the Bioeconomy Observatory at INIA. There are regional bioeconomy strategies developed by each autonomous government – Two main national objectives are: - Resilience to the impact of climate change - Food safety

Specific situation FNS

Sweden	National Food strategy for Sweden (2017) and strategy for sustainable consumption (2016)
Turkey	strategic location for agriculture; agricultural products and production capacity – capacity for aquaculture production – long term agricultural policies insufficient
United Kingdom	UK has a broad range of FNS relevant policies, with embedded R&I focus – Industrial strategy Merger of Research Councils UK and Innovate UK into UK R&I

Integration of FNS policies

Austria	Aim of healthy nutrition with high quality food for all
Belgium	Health and food safety at federal level – Flanders and Wallonia having different regional policies – No global regional strategy on FNS
Czech Republic	Insuring strategic level of production for self-sufficiency in basic foods – Increasing the supply of safe, high quality and affordable food to the consumers
Denmark	New updated strategic framework Research 2025 containing a specific focus on bioeconomy and food systems + "World class food innovation towards 2030"
Estonia	Opening of a new strategic planning period 2020-2030 with the objective to improve collaboration between ministries
Finland	Government report on food policy in 2017; 85 action points
France	Lack of integrated FNS policy
Germany	BMEL concept for global food security and nutrition: to achieve the human right to food in Germany, Europe and the world
Hungary	Existence of the BIOEAST CEE initiative for knowledge-based agriculture, aquaculture and forestry in the bioeconomy
Ireland	International cooperation and contribution to global FNS
Italy	Recent initiatives with a more integrated approach to FNS: – National Technology Platform – Agri-food Cluster – IT Bioeconomy Strategy
Lithuania	Agriculture, food and fisheries research and experimental development – National research programme "Healthy and Safe Food" – Sustainability of agricultural, forest and water ecosystems – Integration needed
Malta	Lack of alignment between agriculture and fisheries sector and public health objectives
Norway	No mention of health policies
Poland	Several other FNS related strategies /programs, mainly: Strategy for Energy Security and the Environment : – Human Capital Development Strategy – Biostrategic – Strategic research and development program in the area of natural environment, agriculture and forestry (which covers issues in the area of food safety and food systems) FNS related strategies, including SSDRAAF are being updated, integrated and subordinated to one National Strategy for Responsible Development.
Romania	Lack of connection between stakeholders in the agri-food chain – See gaps
Spain	Food systems poorly integrated because multiple levels of dependence (MAPAMA, MSSSI and autonomous governments)
Sweden	Integrated approach with national Food Strategy – Strengthened R&I on sustainable food production and consumption
Turkey	FNS covered by Agricultural Research Master Plan (2016-2020) + National Food R&D and innovation strategy – No mention of health policies
United Kingdom	Coordination of R&I regarding global food security (governmental departments, research councils) – Global Food Security Strategic Plan (2017) for multidisciplinary integrated research – New council for food and drink sector

Ambitions

Austria	Research strategies and actions to support provision of high quality food for all
Belgium	Improve sustainability – Innovation – Different elements at regional level
Czech Republic	Food security – Food safety and consumer protection Environmentally-friendly growth in food efficiency and productivity – Promoting food research and implementing its results in practice – Research on food safety, functional foods – Improving consumer awareness of healthy eating and nutrition
Denmark	Within the Danish food cluster: – supply of high quality raw materials in the circular bioeconomy – Foods for a healthier life – Food design, from molecular interaction to excellent eating – ICT enabled agri-food systems
Estonia	To be a country with a competitive and sustainable agriculture and food sector – Ensuring the supply of safe and nutritious food to consumers
Finland	Vision of the Finnish food policy for 2030: – Tasty, healthy, safe Finnish food, produced sustainably and ethically –Transparent, skilled and flexible food systems – Well coordinated, high-level RandD, innovation and teaching
France	A new governance for food following the national food conference (EGA, 2017) – Aim: to provide healthier, safer, more sustainable and affordable food for all – New governmental roadmap for food policy 2018-2022
Germany	Providing a suitable environment for FNS – Making agriculture and food systems sensitive to nutrition and food safety – Long term strategies for sustainable use of resources and targeted research
Hungary	Developing sectorial R&I strategy and related agro-innovation database (organisational foundations are being laid in an inter-organisational R&I working group)
Ireland	Maintain sustainable and efficient food production systems – Improve environmental footprint – Prioritise research funding for sustainability Consumer/citizen oriented agri-food industry – Increase innovation capability – Address greatest societal challenges – New bioresources in food production
Italy	Sustainable and efficient food production systems from farm to fork – Quality of food products linked to dietary requirements and promotion of healthy diets (food safety and nutrition security) – Innovation, new technologies along the entire food chain – Development of food districts strengthening cooperation among FS actors and increasing agri-food contribution to the bioeconomy – Increase agri-food contribution to the bioeconomy
Lithuania	Potential for the development of sectors (food, agriculture and fisheries) – Potential of research and experimental development – Cross-sector activities to support the knowledge flow from scientific research to practice – Dialogue and co-design with stakeholders along the food chain
Malta	Plant protection – Public health, food security: issue of self-sufficiency – Strategic plan for the environment and development
Norway	Sustainable and efficient food production – Self-sufficiency in agricultural production – Use of new bioresources – International cooperation and contribution to global FNS
Poland	Regarding FNS: – Food safety (maintaining & improving the quality of agriculture and fish production – high quality agrifood products, safe for consumers – fair competition rules, complying with community & global market in agrifood products – awareness & knowledge of agrifood production & nutrition rules for producers and consumers) – Increase productivity & competitiveness of agrifood sector: (developing research, advisory services – increasing innovation – developing and improving R&D infrastructure) – Environmental protection & adaptation to climate change
Romania	Increasing awareness of the consumers of the importance of food quality in prevention and sustainability from production to consumption: assuring better food quality, personalised food for the consumer, diversification of agri-food resources, biodiversity (plants, animals) in the context of climate change, competitiveness of Romanian agri-food SMEs
Spain	Maintenance of primary agricultural production under a sustainable system – Improvement of relationship between agriculture and environment – Sustainable and efficient food production – Innovation in food industry
Sweden	Increase overall food production: competitive food supply chain; growth and sustainable development – Rules and conditions; consumers and market; knowledge and innovation
Turkey	Sustainable agriculture and food production – Increase food production efficiency – Innovation in agriculture and food production – Increase food safety and quality – Development of long term strategies
United Kingdom	Global perspective, sustainable, safe, affordable and nutritious diets: resilience; sustainable production and supply; nutrition, health and well-being

Gaps to be filled

Austria	Need to move from a "silo" to a "collaborative systemic" approach
Belgium	Considering FNS as a whole (federal vs regional; competences spread across different ministries) – Agriculture and food production in the context of climate change
Czech Republic	Climate change – Avoiding losses in the food chain and minimising food waste – Increase productivity of food industry – Better cooperation between stakeholders of food systems – Better cooperation between food industry and research
Denmark	Produce "more with less" – Maximise the yield and quality per unit (sustainable intensification) – Strategic research accommodating the complex interactions in food systems
Estonia	Sustainable supply chains and cooperation in the chains – Need for more innovative solutions in the food industry
Finland	Lack of awareness of the importance of sustainable food systems – Differing drivers for FNS outcome and achievements – Working in silos – Improve research financing on resource efficient food systems
France	The present situation is far from the ambitions of the EGA: – to guarantee the food sovereignty of France – healthy and sustainable food choices – reduced inequalities of access to quality and sustainable food/diets
Germany	Many conflicting interests in the FNS area: production, trade, health protection, sustainable use of resources
Hungary	Lack of relevant sectorial strategy and database
Ireland	New technologies, digitisation – development of new capabilities for R&I – Environmental and climate impact of agriculture and food production – Food safety and authenticity risks
Italy	Long term impact of climate change on agriculture and food industry (resources management, food availability and accessibility) – Innovation, digitisation within the agri-food systems – Maintaining a good food safety: strengthening monitoring programmes – Small size of enterprises, low R&I investments – Dietary survey systems including production to nutrition data flow to support policies on FNS
Lithuania	Having an integrated food systems perspective – Understanding climate change effects on food systems and food composition
Malta	Plant protection: more cooperation between entities involved – Public health: conflicting interests in the area of FNS, need to enhance local production
Norway	Boreal resilience to the impact of climate change – Parasites/challenges in fish farming – New bioresources, innovation – Maintenance of good food safety situation
Poland	More cooperation between different drivers and actors engaged in implementing the strategy – Increasing the synergy in the implementation of programs and strategies
Romania	More cooperation between producers and processors – Increase of funding for research activities in the agri-food field – Cross sector programme for research in the food and nutrition area (interactions food and health)
Spain	Lack of indicators for monitoring FNS (economic, environmental, social) – Development of common European protocols for diagnosis and management of pathogens – New bio-resources, technologies, products – Nutritional needs (different ages)
Sweden	Pending update for bioeconomy strategy
Turkey	Agriculture/food production linked with impact of environment and climate – Decreasing water resources
United Kingdom	Driving productivity through enabling innovation in the agri-food chain – Resilient and secure food system – Ensuring consumer confidence in food and drink – Supporting sustainable food production

CONCLUSIONS OF THE QUALITATIVE MAPPING:

Diversity characterizes the countries' answers to the questionnaire*: situations, contexts and goals differ greatly among respondents. Some common elements should be emphasized such as shared ambitions and common gaps.

Common ambitions:

- Responding to the grand societal challenges of FNS (as reported in FOOD 2030)
- Considering the global food and nutrition system as a whole
- Developing projects regarding the transformation of food systems
- Maintaining a good level of food safety

Shared gaps:

- Consideration of FNS as a whole; there are only few integrated national strategies
- Weak policy coherence and coordination between countries regarding food nutrition systems
- Food policy and nutrition policy led by different ministries. Need for a systems approach spread across different sectors and stakeholders
- Lack of adequate indicators to monitor food systems and FNS

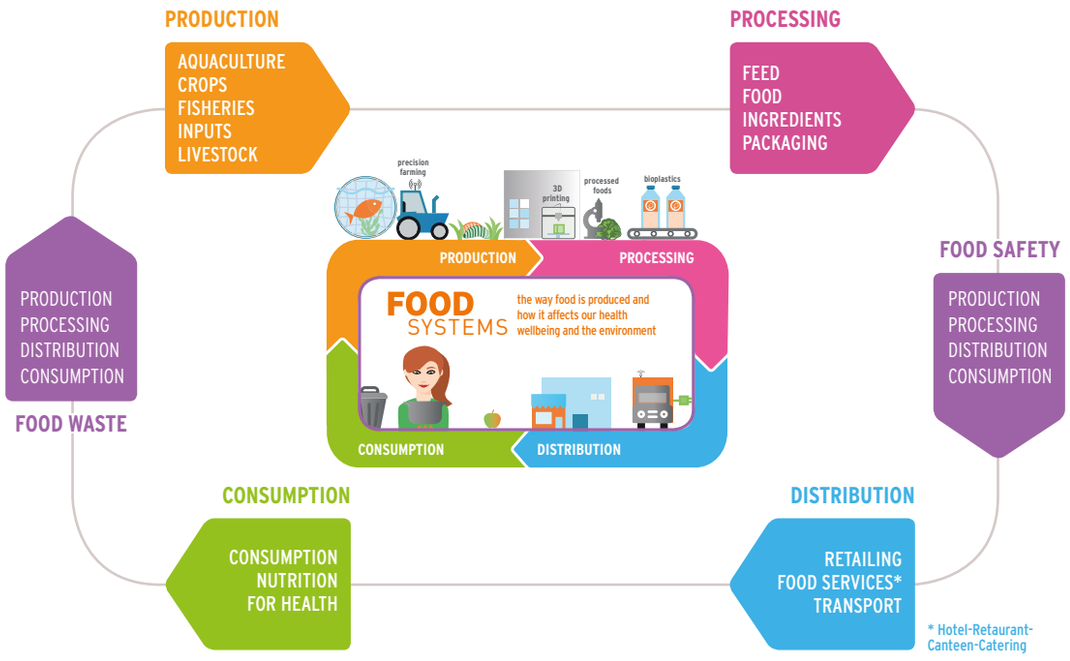
* The full questionnaires from the 21 countries are accessible on the SCAR website: https://scar-europe.org/

2.2 Results of quantitative mapping

FOOD SYSTEMS CATEGORIES AND SUB-CATEGORIES

Quantitative mapping of public R&I funds assigns collected data into food system categories and sub-categories **(Figure 6)**.

Figure 6: The food system categories and sub-categories used in the quantitative mapping



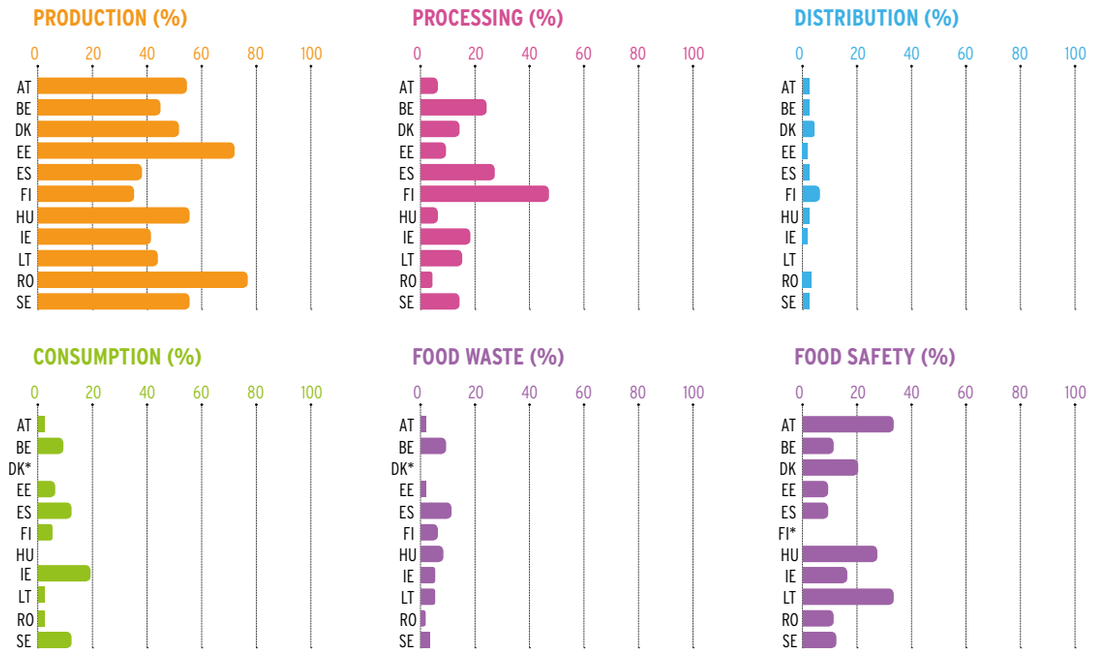
The detailed results of mapping the public R&I research funds are presented in **Table 2, 3, 4** and in **Figures 7 and 8**. Total amount of funding (in €), total number of projects and the food system R&I funding division (%) into food systems categories is presented in **Table 2** and **Figure 7** shows country specific allocation. Further division of the funding into food system sub-categories is given in **Table 3** and **Figure 8** shows country specific allocation. **Table 4** gives the number of projects per food system sub-category.

Table 2: The food system R&I funding (euros) in Member States and its division (%) into the food system categories

COUNTRY	PRODUCTION (%)	PROCESSING (%)	DISTRIBUTION (%)	CONSUMPTION (%)	FOOD WASTE (%)	FOOD SAFETY (%)	TOTAL EURO	PROJECTS (NUMBER)	YEARS UNDER REVIEW
AT	56	6	2	2	1	33	9,419,900	47	2011 to 2017
BE	46	24	2	8	9	11	184,315,650	611	2012 to 2016
DK*	53	14	4	n/a	n/a	20	176,107,383	n/a	2014
EE	74	9	1	6	1	9	12,030,623	95	2012 to 2016
ES	39	27	2	12	11	9	907,684,455	3,355	2012 to 2016
FI	36	47	6	5	6	n/a	162,048,477	928	2011 to 2016
HU	57	6	2	0,2	7,8	27	85,964,359	216	2012 to 2016
IE	41	18	1	19	5	16	155,311,931	755	2012 to 2016
LT	45	15	0	2	5	33	10,667,261	183	2011 to 2016
RO**	79	4	3	2	1	11	24,821,672	112	2011 - 2013 - 2015
SE	57	14	2	12	3	12	183,683,776	667	2011 to 2016

* 9% of DK mapping falls under an "other" category. n/a data not available, due to the timing of the mapping
** RO data based on main projects' competitions only

Figure 7: Division of food system R&I funds (%) per food system category



* Data not available.

Table 3: Food system R&I funding as percentages (%) of euros per Food System sub-category

COUNTRY		AT	BE	EE	ES	HU	IE	LT	RO	SE
PRODUCTION	Aquaculture	0	3	0	10	8	9	2	0	18
	Crops	34	52	40	58	30	30	42	46	43
	Fisheries	0	3	28	1	1	14	4	3	5
	Inputs	0	13	0	7	41	10	30	17	13
	Livestock	66	29	32	24	20	37	22	34	21
PROCESSING	Feed	0	1	0	7	0	3	19	0	6
	Food	100	45	100	33	7	69	78	61	81
	Ingredients	0	39	0	42	54	18	3	39	0
	Packaging	0	15	0	18	39	10	0	0	13
DISTRIBUTION	Retailing	100	9	81	21	0	0	0	0	8
	Food services*	0	5	0	15	0	100	0	0	2
	Logistics - Transport - Storage	0	86	19	64	100	0	0	100	90
CONSUMPTION	Consumption	0	14	33	17	100	21	11	100	20
	Nutrition for health	100	86	67	83	0	79	89	0	80
FOOD WASTE	Production	0	8	22	54	34	0	88	0	59
	Processing	0	56	76	41	66	96	0	0	32
	Distribution	100	36	2	0	0	0	12	100	0
	Consumption	0	0	0	5	0	4	0	0	9
FOOD SAFETY	Production	18	42	88	28	85	54	75	68	51
	Processing	6	28	9	56	2	44	20	19	6
	Distribution	20	5	0	4	0	1	5	5	12
	Consumption	56	25	3	12	13	1	0	8	31

Sub-category data not available for FI and DK, due to the timing of the mapping.
* Hotel - Restaurant - Canteen - Catering

Table 4: The number of projects per Food System sub-category

COUNTRY		AT	BE	EE	ES	HU	IE	LT	RO	SE
PRODUCTION	Aquaculture	0	13	1	167	1	22	5	0	36
	Crops	10	166	45	943	87	95	34	48	135
	Fisheries	0	15	4	18	2	39	15	0	17
	Inputs	0	48	1	92	34	39	24	13	65
	Livestock	13	106	10	453	15	170	37	34	76
PROCESSING	Feed	0	2	0	65	0	3	4	0	14
	Food	2	61	4	210	4	81	13	3	74
	Ingredients	0	31	0	368	13	25	2	2	1
	Packaging	0	10	0	116	3	14	0	0	18
DISTRIBUTION	Retailing	3	2	3	12	0	0	0	0	10
	Food services*	0	1	0	14	0	6	0	0	1
	Logistics - Transport - Storage	0	11	1	23	5	0	0	3	18
CONSUMPTION	Consumption	0	9	3	60	6	29	1	2	19
	Nutrition for health	3	32	8	258	0	94	2	0	79
FOOD WASTE	Production	0	3	1	154	1	1	5	0	7
	Processing	0	16	1	88	5	23	0	0	0
	Distribution	1	16	1	0	0	0	1	1	6
	Consumption	0	0	0	19	0	4	0	0	10
FOOD SAFETY	Production	5	26	7	102	21	63	32	8	66
	Processing	1	19	3	144	7	41	7	2	11
	Distribution	2	4	0	7	0	1	1	1	14
	Consumption	6	20	2	42	12	5	0	1	28

Sub-category data not available for FI and DK, due to the timing of the mapping.
* Hotel - Restaurant - Canteen - Catering

Figure 8: Division of food system R&I funds (%) per food system sub-category

The results of mapping the public R&I research funds presented in the previous tables and the country specific allocation are described in the following sections.

Production

All countries had strong financial input to food production related R&I. The financial inputs to primary production (% of total food system R&I funds) varied from 36% to 74%. Finland was the only country to prioritise financial R&I support to processing over-production (47% vs. 36%). Sub-categorisation of the production into aquaculture ("aqua"), crops, fisheries, inputs (seeds, fertilisers, energy etc.) and livestock revealed more country specific allocation of funds. Funding of crop-production-related R&I was most common except in Hungary, Ireland and Austria. In Hungary, input-related R&I dominated primary production funding (41% vs 30%). For Ireland and Austria livestock R&I investments dominated (37% vs 30% and 66% vs 34%). Livestock-related R&I or inputs (seeds, fertilisers, energy etc.) took second place for the majority of countries (BE, EE, ES, RO, SE). Fishing-related R&I funding was of interest to Estonia (28%) and Ireland (14%), with little interest (0 to 5% of production related R&I funds) in other countries. Sweden and Spain had 18% and 10% financial input, respectively, for aqua-related R&I.

Processing

Financial R&I inputs into food processing was of interest for the majority of the countries, but variation was large (from 4% to 47%). Sub-categorisation of processing into feed, food, ingredients development and packaging showed further country specific allocation of funds. Processing related to food (for human consumption) was the main receiver of funds (AT, BE, EE, IE, LT, RO, SE), but depending on the country, there were also significant financial inputs into ingredient development (ES, HU, BE, RO). Packaging as part of processing divided the countries as it was of minor interest (0%) for Austria, Estonia, Lithuania and Romania, of moderate interest (10 to 18%) to Belgium, Spain, Ireland and Sweden and of significant interest (39%) to Hungary.

Distribution

R&I inputs into distribution in the food system was a minor priority for all countries ranging from 0 to 6% of total food system funding. Distribution related R&I funds were sub-categorised into 3 sections: Food services (hotel-restaurant-canteen-catering), Transport (including logistics and storage) and retail. Transport-related R&I projects received the most funding in Belgium, Spain, Hungary, Romania and Sweden. For Austria and Estonia the focus was on retail (100 % and 81%) and for Ireland on hotel-restaurant-canteen-catering (100%).

Consumption

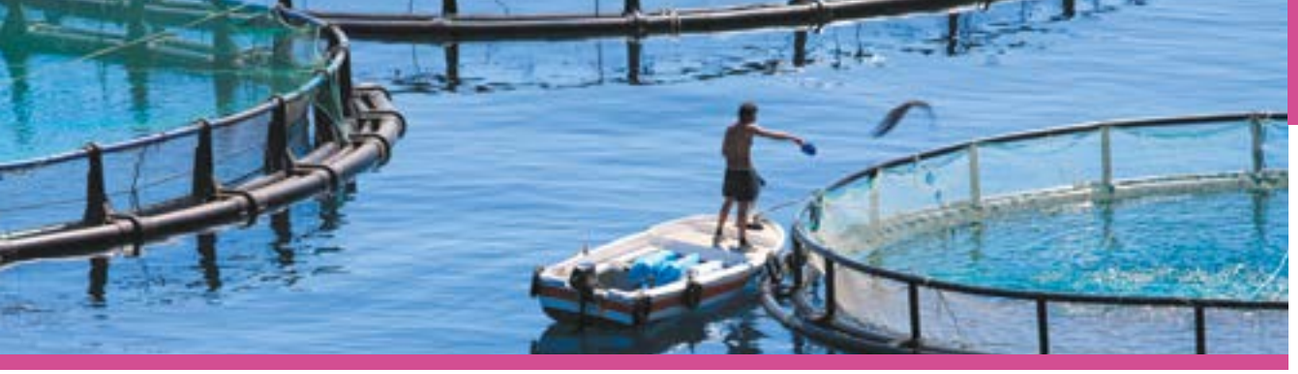
Ireland invested 19% of the food system R&I funds to consumption. Spain and Sweden allocated 12% of food system R&I funds to food consumption. But for the majority of the countries food consumption related R&I investments were low (0 to 8%). Consumption sub-categories were nutrition and consumption (consumer research). For the majority of countries focus was on nutrition and this category includes all type of nutrition related research projects.

Food waste

Food waste R&I projects received some funding in all of the countries. The financial inputs varied from 1% to 11%, being generally more than for distribution or consumption related projects, but less than for food safety allocated funds. Food waste was sub-categorised further to production, processing, distribution and consumption. Food waste funding was directed most often to production (54% to 88%) and processing (56% to 96%) and consumption was least funded (0% to 9%). Austria and Romania prioritised food waste at distribution (100%).

Food Safety

Food safety R&I represents a group of sub-categories, i.e. production, processing, distribution and consumption. Food safety was of interest to the countries: 9% to 33% of all food system funds were allocated to food safety R&I. For Austria (33%), Denmark (20%), Hungary (27%) and Lithuania (33%) food safety was the second biggest receiver of R&I funds after production. The key interest areas varied between countries. Food safety at production was the main interest for the majority (BE, EE, HU, IE, LT, RO, SE). Food safety at processing was of main interest to Spain. To Austria focus was on food safety at consumption. Food safety data was not available for Finland because their mapping was completed before the Excel template for data collection was finalised.



FOOD 2030 key areas

FOOD 2030 priorities represent the way forward, i.e. how to make the European food system sustainable, resilient, responsible, diverse, competitive, and inclusive. The 4 FOOD 2030 priorities are NUTRITION for sustainable and healthy diets, CLIMATE smart and environmentally sustainable food systems, CIRCULARITY and resource efficiency of food systems, INNOVATION and empowerment of communities.

Countries mapped the food system R&I funds into these FOOD 2030 priorities to see where the national interest has been in recent years. It is important to remember that mapping of the priorities is even more prone to variation than mapping the funds into the food system categories, as there is more room for interpretation. In addition, country specific innovation policies play a role as for Denmark they did not have an innovation category, since innovation is a default for R&I projects. All of their projects would fall under innovation. The food system R&I funding division (%) into FOOD 2030 key areas is presented in **Table 5** and **Figure 9** shows country specific allocation.

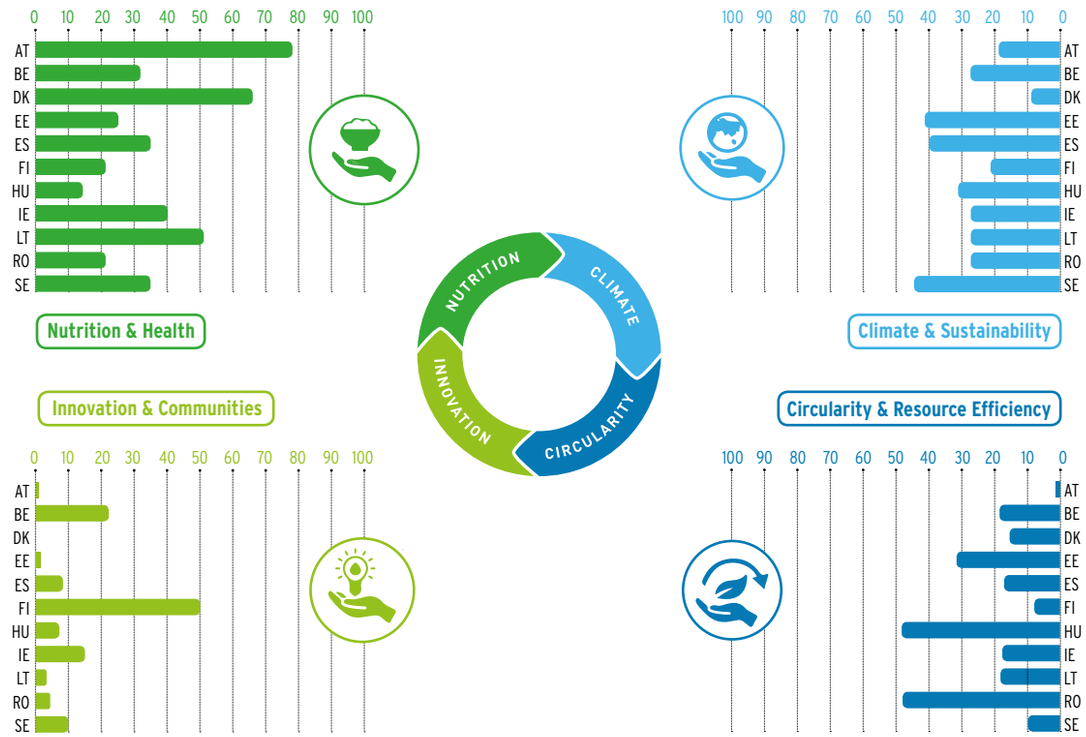
Table 5: Food system R&I funding division (%) into the FOOD 2030 key areas. Main interest per country is marked in pink

COUNTRY	NUTRITION AND HEALTH (%)	CLIMATE AND SUSTAINABILITY (%)	CIRCULARITY AND RESOURCE EFFICIENCY (%)	INNOVATION AND COMMUNITIES (%)
AT	78	19	2	1
BE	32	27	19	22
DK*	66	9	16	*
EE	25	41	32	2
ES	35	40	17	8
FI	21	21	8	50
HU	14	31	48	7
IE	40	27	18	15
LT	51	27	19	3
RO	21	27	48	4
SE	35	45	10	10

* DK mapping did not include «innovation» category

The results show that the key areas are overlapping R&I themes covering the whole food system from production to consumption, including food safety. The key area of nutrition and health received major inputs from Austria, Belgium, Denmark, Ireland and Lithuania. This reflects the research inputs into food safety, as food safety is a health factor. Climate and sustainability was of major interest for Estonia, Spain and Sweden. For Finland the key area of interest was innovation and communities and for Hungary and Romania circularity and resource efficiency.

Figure 9: Division of food system R&I funds (%) per FOOD 2030 key areas



MAIN RESULTS FROM THE QUANTITATIVE MAPPING OF FOOD SYSTEM CATEGORIES AND SUB-CATEGORIES:

- All countries had strong commitment to primary production and food processing related R&I funding. Sub-categorisation of production and processing related funds revealed more country specific details and variation between countries.
  - Production related R&I funds were most likely to be directed to crop or livestock–related R&I.
  - Processing related R&I funds were most often directed to food processing and ingredient development. Packaging as part of processing received no funding in many cases but moderate to significant funding in some countries.
- Food safety is of interest to all of the countries. Allocation of funds in the food system sub-categories (production, processing, distribution and consumption) varies according to national priorities, but food safety at the production was the most prevalent.
  - Food safety is a major health factor as eating contaminated food is an important cause of illness, disability and deaths around the world.
- Food waste R&I was of interest and received funding. Funding was directed towards processing and production, with minor R&I investments to consumption, despite households being the biggest contributors (in kilograms) to food waste. Food distribution and food consumption related R&I received minor funding. Food consumption was of medium interest only to Ireland, Spain and Sweden.
  - Low investments in nutrition for citizens' health and well-being.
- Past R&I funds allocated for food system key priorities (as in FOOD2030) varied between countries but provide information and support in alignment of the R&I funds and food system policies.

3

CONCLUSIONS AND NEXT STEPS

1

R&I investments are primarily found in primary production and processing, with lower funding at consumer level. This reflects the fragmented R&I investments on food systems, as well as the low interest in food systems shown by non-primary production stakeholders. To improve the current situation, stakeholders should be more involved in R&I on food systems. The lack of collaboration limits the opportunities to bring diversity to the production. Including fish and other aquaculture products would strengthen food and nutrition security as well as diversity of the foods available.

2

Food safety is of great importance to European food systems. Food safety R&I inputs had strong production focus. This was not surprising as food safety starts with good practices in primary production, but food systems R&I funds also focused on primary production. Distribution related R&I investment were minor in all countries completing the quantitative mapping. In the future food is likely to travel even longer from its site of production to its consumption due to issues such as climate change and urbanisation. This progress calls for good logistics systems and innovative packaging to keep the products safe and fresh.

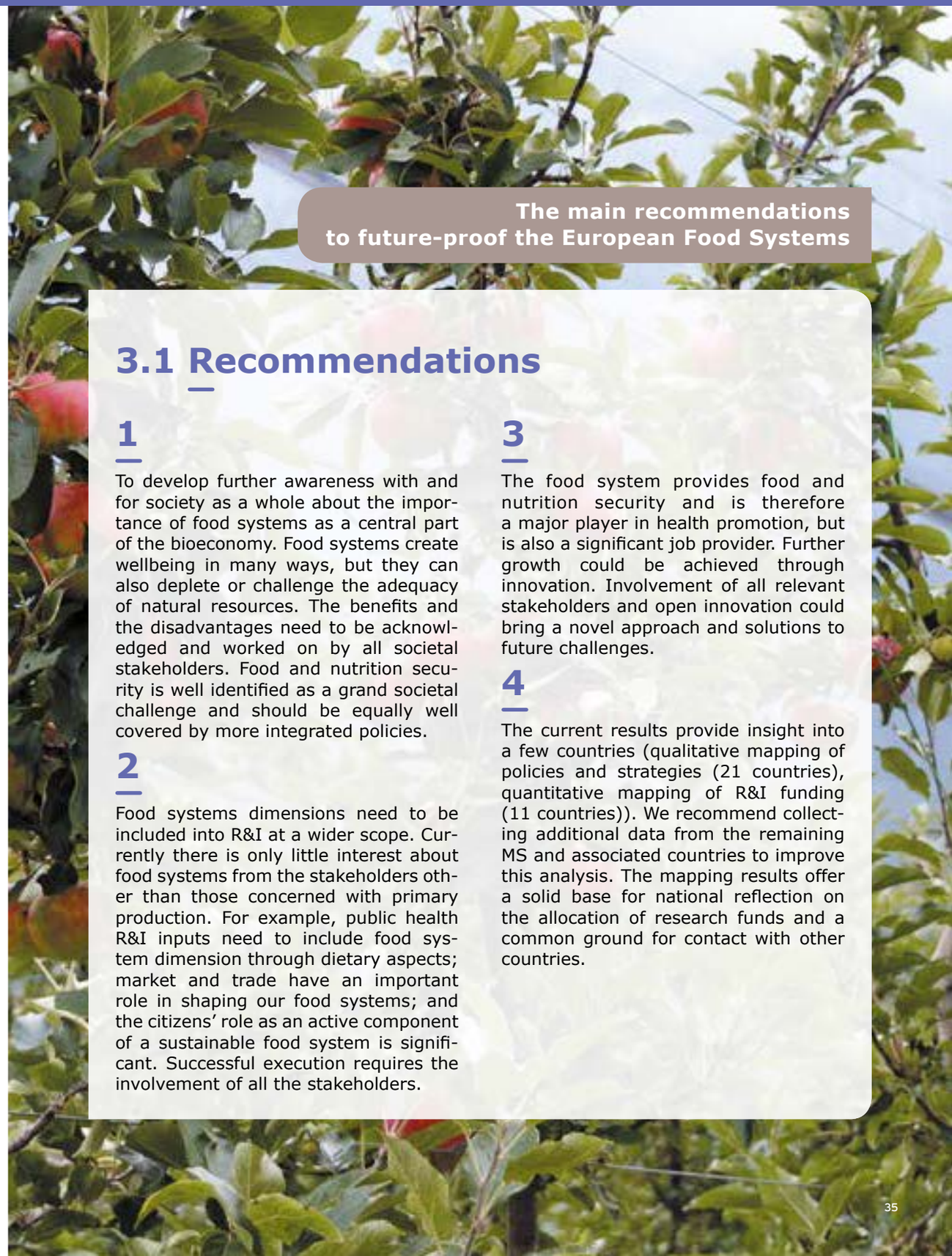
3

Including consumers or citizens in the scope of food systems R&I is necessary to improve public health through diets and to tackle the burden of non-communicable diseases (NCD). Currently only minimal investments are made on food consumption related R&I. This requires careful evaluation of the tools available vs. the tools needed to change the trend from treating NCDs to preventing NCDs. Public health R&I inputs need to include food system dimension through diet. Citizen inclusion is necessary to build a sustainable food system, including from a food waste perspective. Household food waste reduction is needed to reach the sustainable development goal of halving food waste by 2030.

Based on the quantitative mapping exercise results, it is clear that the food system elements need to be included into various research programs to gain R&I input for the missing parts. This can be done in collaboration between countries. Especially the fields of food consumption and distribution currently lack R&I inputs and projects. Food safety R&I investments in primary production are an important dietary health factor, but to overcome the burden of nutrition related health issues, we need public health R&I inputs to include food system dimension with dietary aspect. Moreover, citizens' role as an active part of sustainable food system is significant. For example food waste related targets can be reached only if the whole food system is involved. We need novel approach to create food environment contributing positively to health and consumer expectation.

The quantitative mapping results call for national reflection on the allocation of research funds. There is little interest in food systems from the stakeholders of society other than those with a primary production focus. The question is: are the inputs to the food system R&I sufficient to exploit the potential of the food system? It provides food and nutrition security and is therefore a major player in health promotion, but is also a significant job provider and even more growth could be achieved through innovation. Involvement of all relevant stakeholders and open innovation could bring a novel approach and solutions to future challenges.

This mapping does not give information on integrated projects. However it is unlikely that one project could cover the entire food system. Therefore, we recommend to paying attention to integration of parts of the food system whenever possible to create links between food system categories and priorities. Possible solutions to fill the current information gaps could be found by stimulating existing working platforms to enable collaboration between the different sectors and stakeholders. This type of system thinking along the process provides stronger and prolonged influence. To see the future progress in strengthening food and nutrition security we also need to create adequate indicators for monitoring, indicators that cover the whole food system and reflect the outcome. Tracking the progress made would show that we are future-proofing the European food systems by making them more sustainable, resilient, responsible, diverse, competitive, and inclusive.



The main recommendations to future-proof the European Food Systems

3.1 Recommendations

1

To develop further awareness with and for society as a whole about the importance of food systems as a central part of the bioeconomy. Food systems create wellbeing in many ways, but they can also deplete or challenge the adequacy of natural resources. The benefits and the disadvantages need to be acknowledged and worked on by all societal stakeholders. Food and nutrition security is well identified as a grand societal challenge and should be equally well covered by more integrated policies.

2

Food systems dimensions need to be included into R&I at a wider scope. Currently there is only little interest about food systems from the stakeholders other than those concerned with primary production. For example, public health R&I inputs need to include food system dimension through dietary aspects; market and trade have an important role in shaping our food systems; and the citizens' role as an active component of a sustainable food system is significant. Successful execution requires the involvement of all the stakeholders.

3

The food system provides food and nutrition security and is therefore a major player in health promotion, but is also a significant job provider. Further growth could be achieved through innovation. Involvement of all relevant stakeholders and open innovation could bring a novel approach and solutions to future challenges.

4

The current results provide insight into a few countries (qualitative mapping of policies and strategies (21 countries), quantitative mapping of R&I funding (11 countries)). We recommend collecting additional data from the remaining MS and associated countries to improve this analysis. The mapping results offer a solid base for national reflection on the allocation of research funds and a common ground for contact with other countries.

VOCABULARY

APPENDIX

FNS

Food and nutrition security, as defined at the World Food Summit (FAO, 1996): *"when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life"*

Food systems

The definition of food systems goes beyond the production and delivery of sufficient food for all (quantity) to include the provision of safe and nutritious food for healthy and sustainable diets (quality). A definition of a food system includes the processes and infrastructure needed to feed a population: growing, harvesting, processing, packaging, transporting, marketing, consumption, and disposal of food and food-related items. The food system also includes the inputs needed and outputs generated at each of these steps. Food systems operate within and are influenced by social, political, economic and environmental contexts.

Food services

Hotels, restaurants, canteens and catering

IBF

International Bioeconomy Forum, forum established by the European Commission to share and cultivate affairs of the parts of the economy that use renewable biological resources from land and sea.

NCD

Non-communicable disease, non-infectious diseases such as diabetes type 2, cardiovascular diseases and some cancers. NCDs are the leading cause of death in Western countries. Many risk factors are lifestyle related, such as poor nutrition and lack of physical exercise.

SCAR FOOD SYSTEMS SWG

Strategic Working Group (SWG) focusing on food systems under the Standing Committee on Agricultural Research (SCAR)

SDG

Sustainable Development Goals, United Nations set of 17 goals to transform our world to end poverty, protect the planet and ensure prosperity for all set out in the 2030 agenda for sustainable development.

APPENDIX 1

QUALITATIVE

SCAR FOOD SYSTEMS SWG

QUALITATIVE MAPPING QUESTIONNAIRE*

Participating country in SCAR FOOD SYSTEMS SWG: Representative(s) first and last name:	
Representative's organisation:	
e-mail:	
Telephone:	
Date of submission of questionnaire:	

PART 1
FNS related policy:

List the relevant national/regional policies or strategies that are relevant to ensure food and nutrition security (e.g.: agriculture, health, food safety, climate, fisheries, etc).

Weblink to the policies/strategies:

- What issues do each of them cover?
- Which institutional actors are responsible for each policy/strategy?
- Are these policies/strategies focussed on your country only, on Europe or do they target International cooperation and development?
- Do any of these policies/strategies contain an R&I focus? If yes, describe.
- Are there any new relevant national/regional policies or strategies being currently developed that are relevant to ensure food and nutrition security? If yes, describe.

PART 2
Bioeconomy Strategy

- Does your country have a national Bioeconomy Strategy?
- If yes, what does it cover?
- Does it have a food related pillar? If yes, describe.
- Weblink to the Bioeconomy strategy:
- If there is no Bioeconomy Strategy yet, is there one being developed at the moment?

PART 3
Research and Innovation Policy and Programming

List specific national/regional R&I policies/strategies/funding programmes relevant to food and nutrition security (e.g.: agriculture, health, food safety; climate, fisheries, etc).

* The full questionnaires from the 21 countries are accessible on the SCAR website: https//scar-europe.org/

APPENDIX 2

QUANTITATIVE

SCAR FOOD SYSTEMS SWG

QUANTITATIVE MAPPING GUIDELINES

SCAR FOOD SYSTEMS Strategic Working Group

PART 1
Raw data collection

- All past public R&I funding will be mapped – per year - over a period of 5 years from 01/01/2012 up to and including 31/12/2016 (this means public R&I funding for project started in 2012, 2013, 2014, 2015 and 2016 will be mapped).
- The template forsees the insertion of the year of the call under which a project was selected (yyyy) as well as the start year of the project.
- The total or full costs of each project should be taken (according to EC rules). Any costs should be entered in EURO (the date of the exchange rate will be the one of data input).
- The number of R&I projects funded per year should be counted in total and per category/subcategory.
- Only count a project once (so one project per row in Excel).
- Only map national and regional public funded research and innovation projects.
- EU funded and co-funded R&I projects and ERA-Nets are excluded (they will be mapped by the EC).
- Structural funds, LIFE, Interreg, COST projects are excluded.
- Privately funded R&I projects are excluded (e.g. funding through foundations).
- The public funding of public-private partnerships or to private organisations should be included. For the public-private projects, the amount of public funding should be specified. The total amount of R&I funding of the public-private project may be provided in a separate column.
- All type of research and innovation projects can be included as long as they have a link to food and nutrition security and/or one or more parts of the food system. These include basic and applied research, IT/ICT research, socio-economic research, epidemiological research, agricultural research, marine seafood research, international development cooperation, bioinformatics research, veterinary research, food related public health research as well as innovation, demonstration and pilot actions. The nature of the study/experimentation could include: R&I projects on soil/crops/plants, animals, humans, micro-organism, cells, genes and may include in silico, in vitro, in vivo experimentation and omics technologies.
- In case of holistic projects, usually, it is more focused on one of the category and in this case select this category as the main one (e.g. production or processing). In the case, it is equal for several or all the categories, it is recommended to choose one of the category but signal in the last column «comments box»: «Systemic approach». This will allow to identify those projects easily and make further analysis, if necessary, at a later stage.

APPENDIX 2

QUANTITATIVE

PART 2
Data Analysis

The total or full costs of each project should be taken (according to EC rules). Hence, once the projects have been categorised, the data will be expressed as:

- the total amount of funding in € per year,
- the total amount of funding per year in € and as a % of total funding for each of the food systems categories, food systems sub-categories, and FOOD 2030 priorities.

Metadata: The columns in the excel template are as follows (those in green are essential columns, those highlighted in grey are essential drop-down menus):

Column header
PROJECT ID NUMBER (A Unique Identifier for the project. If there is none give the project a number)
COUNTRY THAT FUNDS THE PROJECT
ACRONYM OR SHORT NAME OF THE PROJECT
TITLE OF THE PROJECT (in English)
PROJECT KEYWORDS (in English)
CATEGORIZE THE PROJECT INTO ONE OF THE MAIN FOOD SYSTEMS CATEGORIES:
1. PRODUCTION: primary production
2. PROCESSING: includes food packaging
3. DISTRIBUTION: includes logistics, trade, catering
4. CONSUMPTION: includes consumer and consumer related activities
5. FOOD WASTE
6. FOOD SAFETY
CATEGORIZE THE PROJECT INTO ONE OF THE FOOD SYSTEMS SUB-CATEGORIES:
1. PRODUCTION: AQUACULTURE, CROPS, FISHERIES, INPUTS, LIVESTOCK
2. PROCESSING: FEED, FOOD, TRANSFORMATION-INGREDIENTS, PACKAGING
3. DISTRIBUTION: RETAILING, HOTEL-RESTAURANT-CANTEEN-CATERING, LOGISTICS -TRANSPORT-STORAGE
4. CONSUMPTION: CONSUMER RESEARCH, NUTRITION RESEARCH FOR HEALTH
5. FOOD WASTE: PRODUCTION, PROCESSING, DISTRIBUTION, CONSUMPTION
6. FOOD SAFETY: PRODUCTION, PROCESSING, DISTRIBUTION, CONSUMPTION
CATEGORIZE THE PROJECT INTO ONE OF THE FOUR FOOD 2030 PRIORITIES:
1. NUTRITION for sustainable and healthy diets
2. CLIMATE smart and environmentally sustainable food systems
3. CIRCULARITY and resource efficiency of food systems
4. INNOVATION and empowerment of communities
TOTAL COST OF THE PROJECT IN EURO - ONLY PUBLIC MONEY (express as € 1,000,000.00)
TITLE OF THE CALL
YEAR OF THE CALL (choose one of these years 2012, 2013, 2014, 2015 or 2016)
START YEAR OF THE PROJECT (choose one of these years 2012, 2013, 2014, 2015 or 2016)
START DATE OF PROJECT (DD/MM/YYYY)
DURATION OF THE PROJECT (IN MONTHS)
NAME OF THE FUNDING PROGRAMME
NAME OF FUNDING ORGANIZATION OR INSTITUTION
IS THE PUBLIC FUNDING NATIONAL OR REGIONAL?
WHO RECEIVES THE PUBLIC FUNDING: A PUBLIC, PRIVATE OR PUBLIC-PRIVATE RECIPIENT?
WHAT IS FUNDED: RESEARCH, INNOVATION OR RESEARCH AND INNOVATION?
ABSTRACT OF THE PROJECT
If the project is public-private, provide the total cost of the project (The public part of the funding should be provided in column "TOTAL COST OF THE PROJECT IN EURO"
COMMENTS BOX (if you have any remarks to make) If holistic/integrated projects, without predominant category, please mention "systemic approach"

APPENDIX 2 QUANTITATIVE

CATEGORISATION ACCORDING TO THE FOOD CHAIN ELEMENTS

Production	Processing	Distribution	Consumption	Food Waste	Food Safety
Includes sub-categories	Includes sub-categories	Includes sub-categories	Includes sub-categories	Includes sub-categories	Includes sub-categories
1. Aquaculture 2. Crops 3. Fisheries 4. Inputs 5. Livestock	1. Feed 2. Food 3. Transformation-ingredients 4. Packaging	1. Retailing 2. Hotel-Restaurant-Canteen-Catering 3. Logistics-Transport-Storage	1. Consumer research 2. Nutrition research for health	1. Production 2. Processing 3. Distribution 4. Consumption	1. Production 2. Processing 3. Distribution 4. Consumption

CATEGORISATION ACCORDING TO THE FOOD 2030 PRIORITIES

NUTRITION for sustainable, safe and healthy diets	CLIMATE smart and environmentally sustainable food systems	CIRCULARITY and resource efficiency of food systems	INNOVATION and empowerment of communities
Ensuring that nutritious food and water is available, accessible and affordable for all. It involves reducing hunger and malnutrition, ensuring high levels of food quality, safety and traceability, reducing the incidence of non-communicable diet related diseases, and helping all citizens and consumers adopt sustainable and healthy diets for good health and wellbeing.	Building climate smart food systems adaptive to climate change, conserving natural resources and contributing to climate change mitigation. It seeks to support healthy, productive and biodiverse ecosystems. Ensuring diversity in food systems (including production, processing, distribution and logistics) including in terms of cultural and environmental diversity. Natural resources (water, soil, land and sea) are used sustainably within the planetary boundaries and available to future generations.	Implementing resource-efficient circular economy principles across the whole food system while reducing its environmental footprint. Circularity is applied for sustainable and resource-efficient food systems and food losses and waste are minimized throughout.	Boosting innovation and investment, while empowering communities. A broad innovation ecosystem leading to new business models and value-added products, goods and services, meeting the needs, values and expectations of society in a responsible and ethical way. More and better jobs across the EU, fostering thriving urban, rural and coastal economies and communities. Through closer partnerships with industry and food producers, markets that function in a responsible manner thereby fostering fair trade and pricing, inclusiveness and sustainability. Scientific evidence and knowledge from a wide diversity of actors underpinning the development and implementation of FNS relevant policies, at all geographical scales (Local to Global).

APPENDIX 3 SUMMARY OF COUNTRY SHEETS

2011 - 2017

AUSTRIA

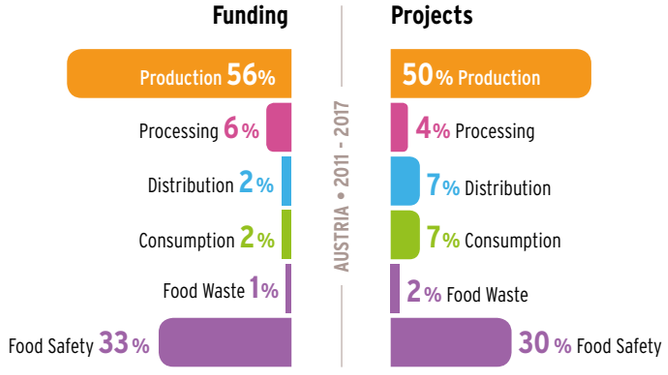
TOTAL No OF **PROJECTS** 47

FUNDING **ORGANISATIONS** 7

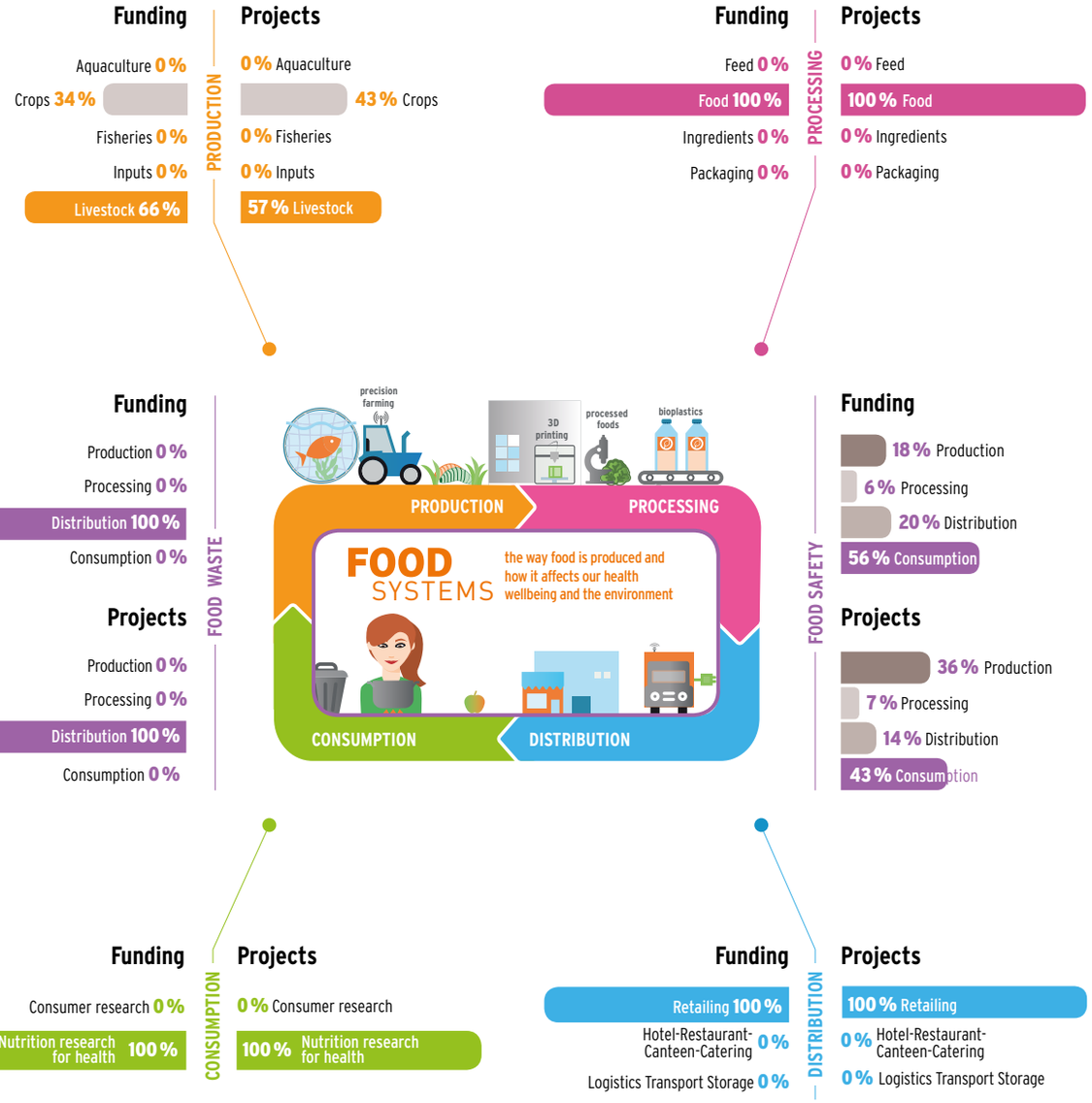
TOTAL AMOUNT OF **FUNDING** 9,419,900 €

FOOD SYSTEMS

R&I FUNDING PER FOOD SYSTEMS CATEGORIES

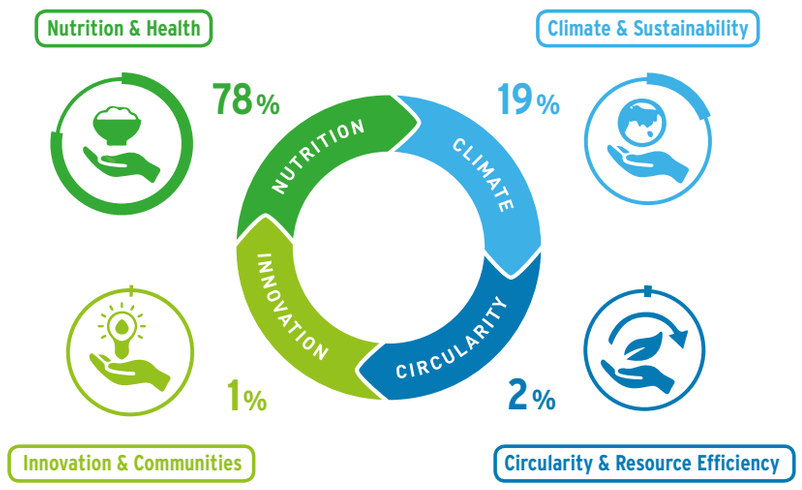


R&I FUNDING AND PROJECTS PER FOOD SYSTEMS SUB-CATEGORIES



FOOD 2030

R&I FUNDING PER FOOD 2030 PRIORITIES



2012 - 2016

BELGIUM

TOTAL No OF **PROJECTS** **611**

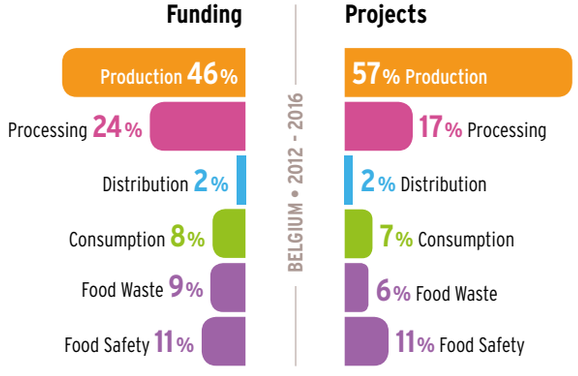
FUNDING **ORGANISATIONS** **8**

TOTAL AMOUNT OF **FUNDING** **184,315,650 €**

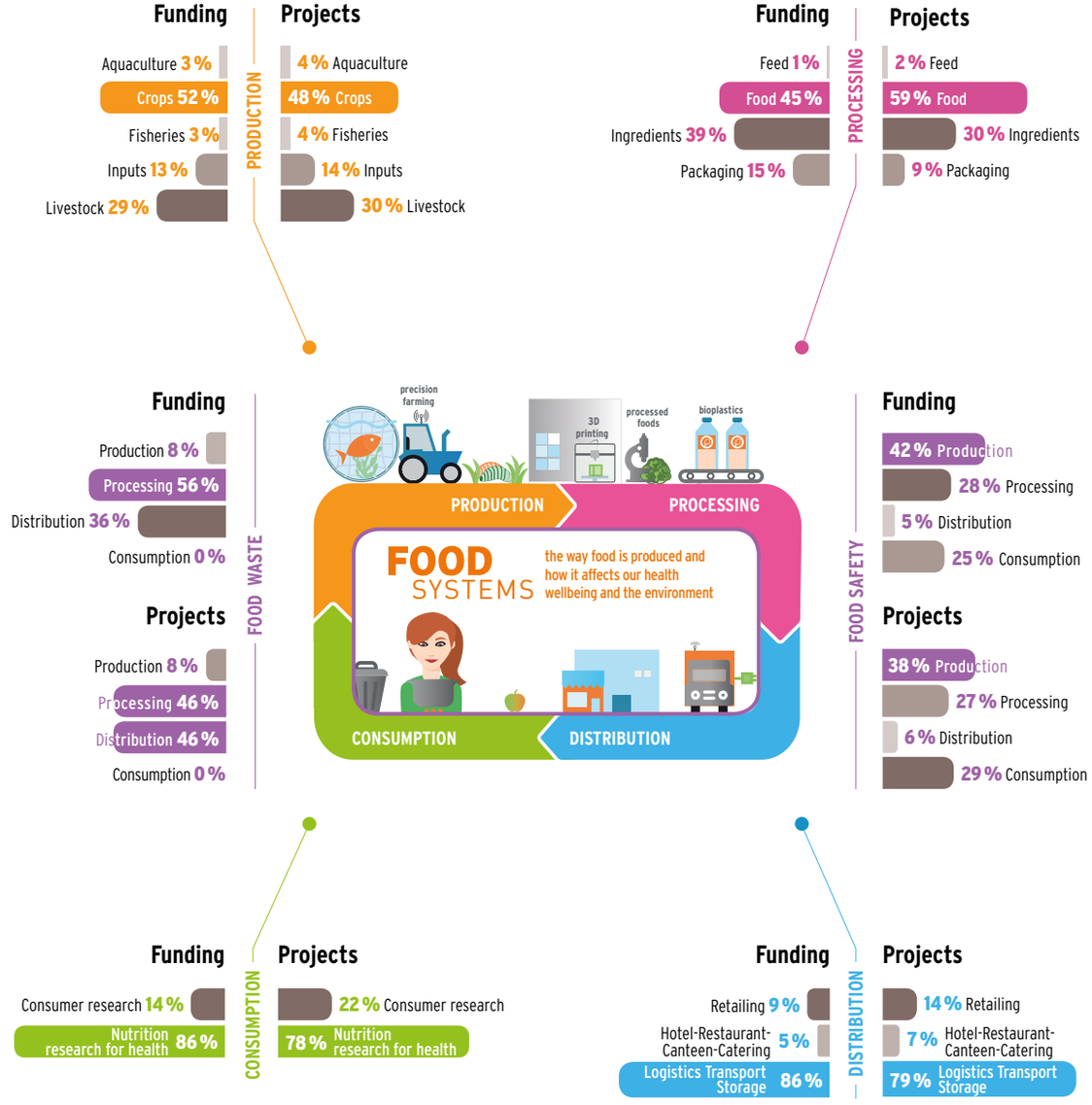
BELGIUM

FOOD SYSTEMS

R&I FUNDING PER FOOD SYSTEMS CATEGORIES

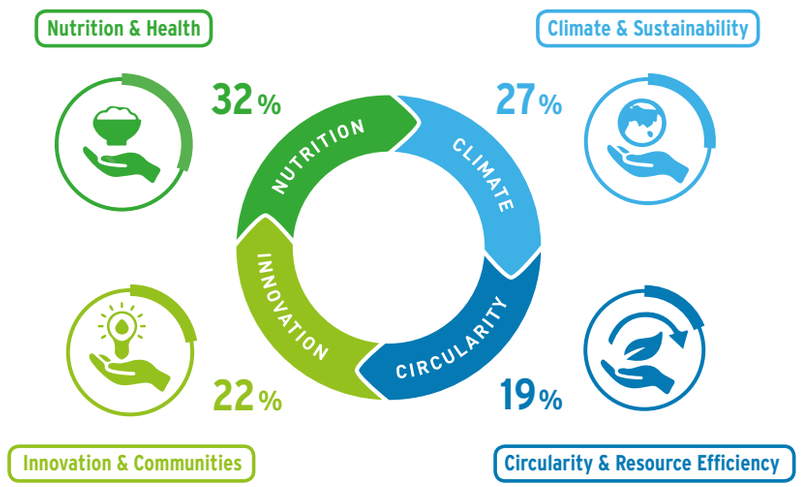


R&I FUNDING AND PROJECTS PER FOOD SYSTEMS SUB-CATEGORIES



FOOD 2030

R&I FUNDING PER FOOD 2030 PRIORITIES



2012 - 2016

ESTONIA

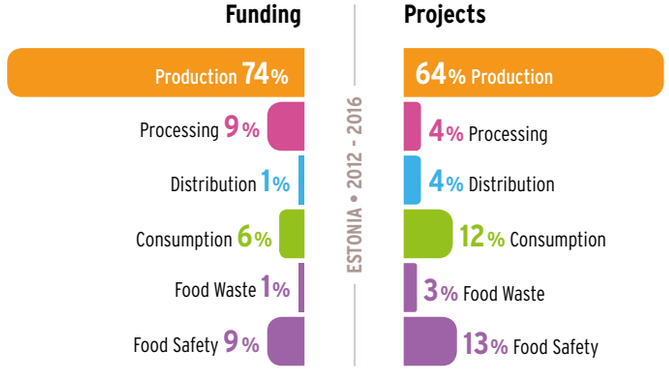
TOTAL No OF **PROJECTS** 95

FUNDING **ORGANISATIONS** 2

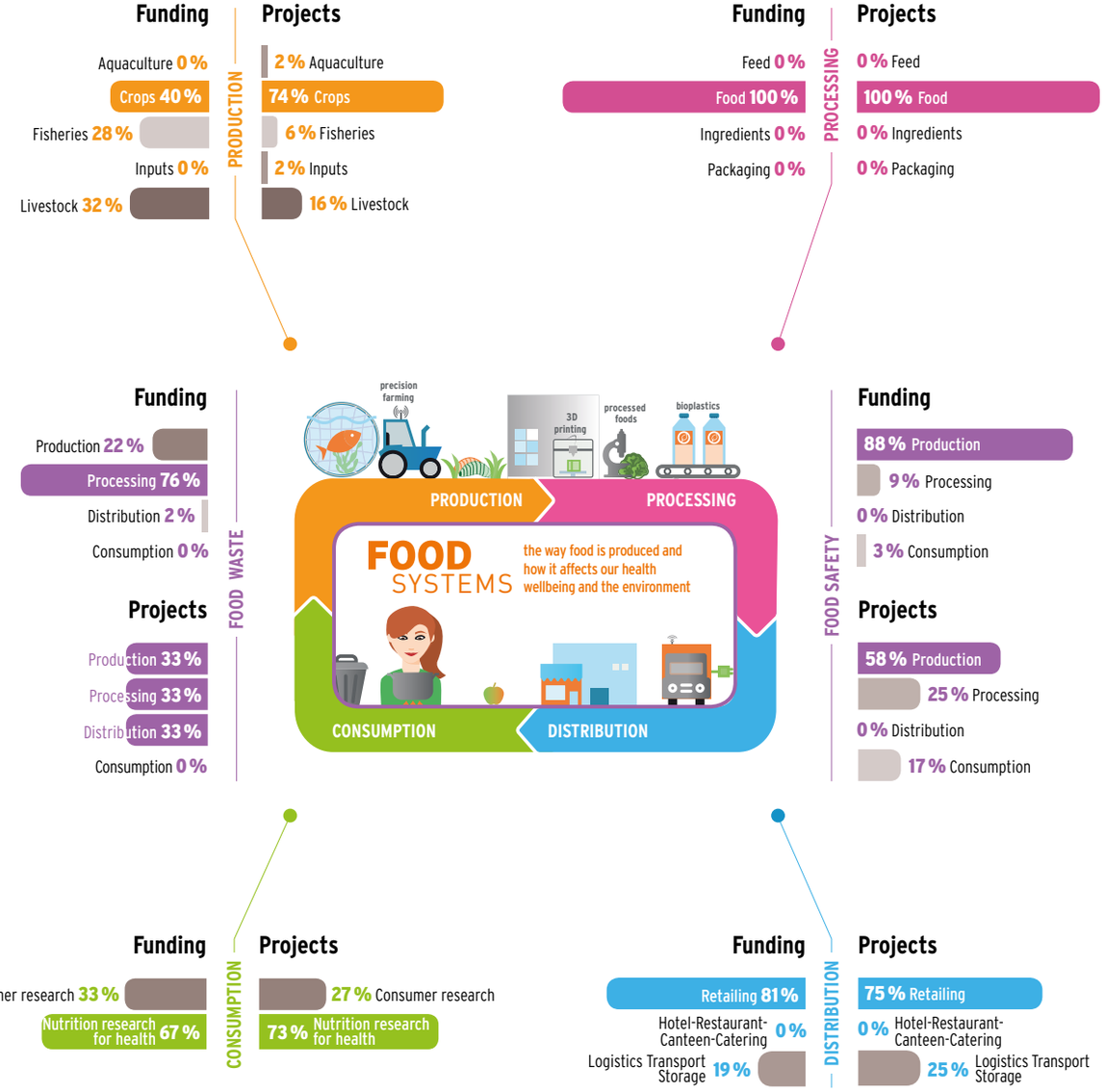
TOTAL AMOUNT OF **FUNDING** 12,030,623 €

FOOD SYSTEMS

R&I FUNDING PER FOOD SYSTEMS CATEGORIES

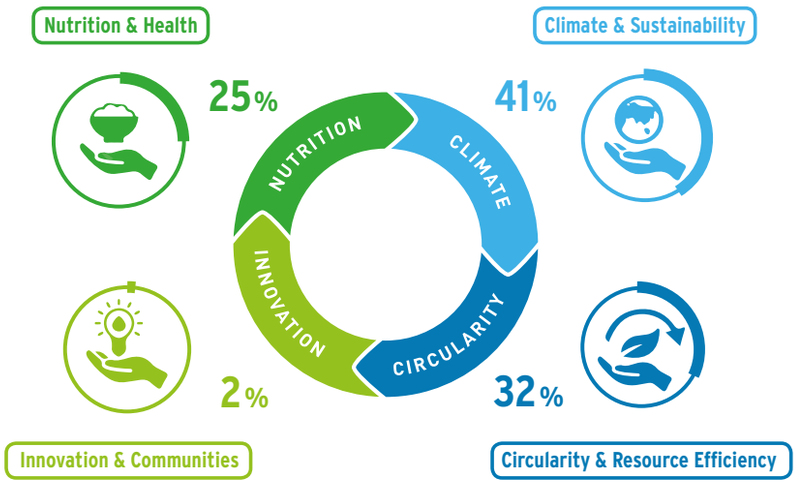


R&I FUNDING AND PROJECTS PER FOOD SYSTEMS SUB-CATEGORIES



FOOD 2030

R&I FUNDING PER FOOD 2030 PRIORITIES



2012 - 2016

SPAIN

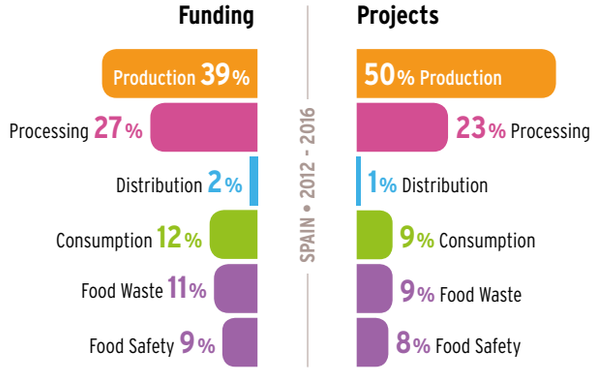
TOTAL No OF **PROJECTS**
3 355

FUNDING **ORGANISATIONS**
4

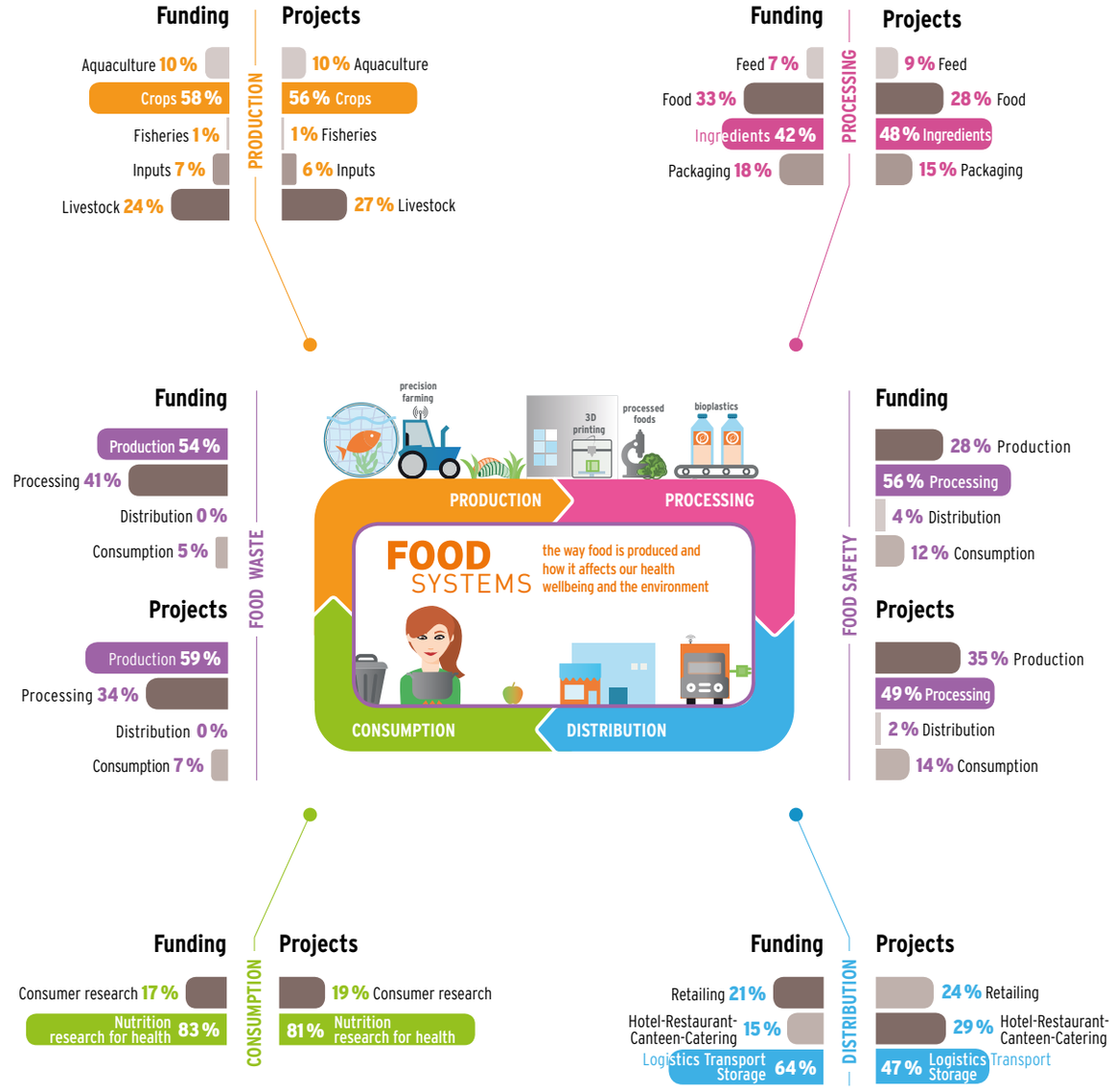
TOTAL AMOUNT OF **FUNDING**
907,684,455 €

FOOD SYSTEMS

R&I FUNDING PER FOOD SYSTEMS CATEGORIES

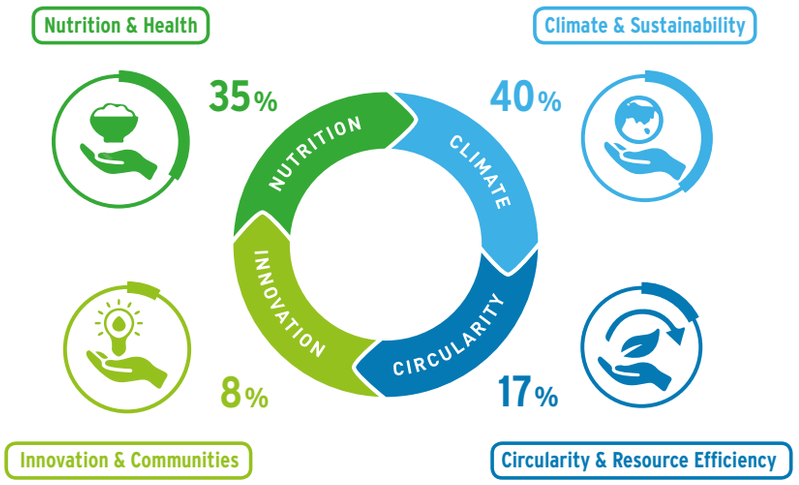


R&I FUNDING AND PROJECTS PER FOOD SYSTEMS SUB-CATEGORIES



FOOD 2030

R&I FUNDING PER FOOD 2030 PRIORITIES



2012 - 2016

HUNGARY

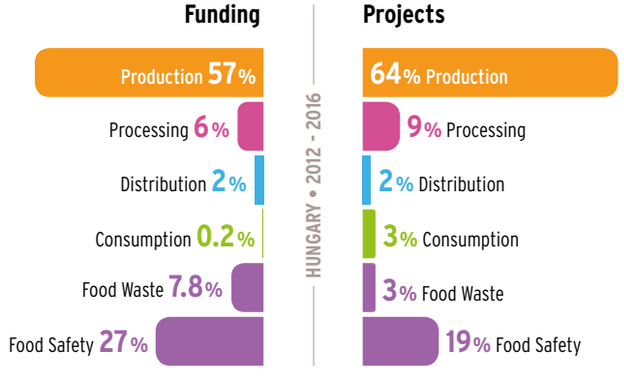
TOTAL No OF **PROJECTS** 216

FUNDING **ORGANISATIONS** 2

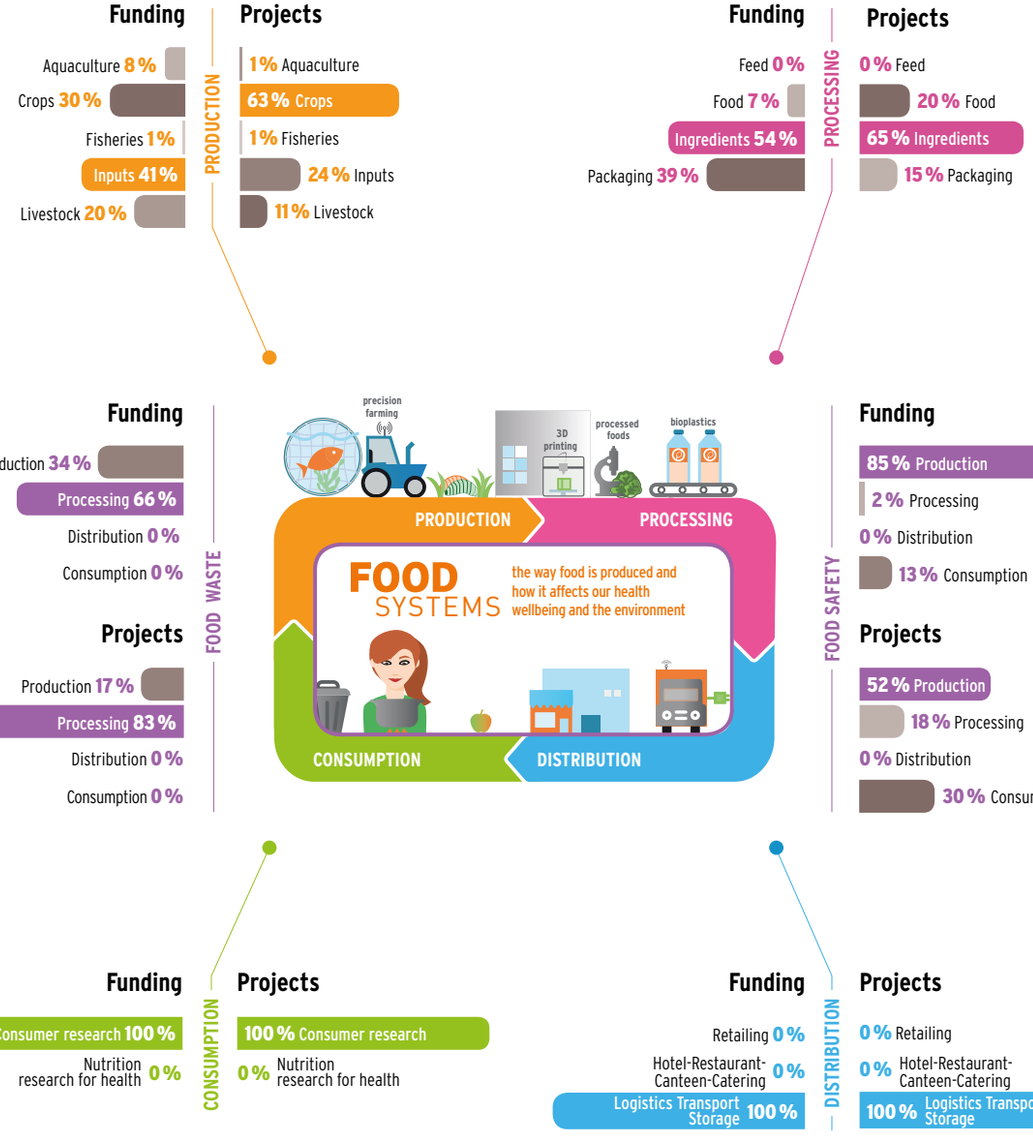
TOTAL AMOUNT OF **FUNDING** 85,964,359 €

FOOD SYSTEMS

R&I FUNDING PER FOOD SYSTEMS CATEGORIES

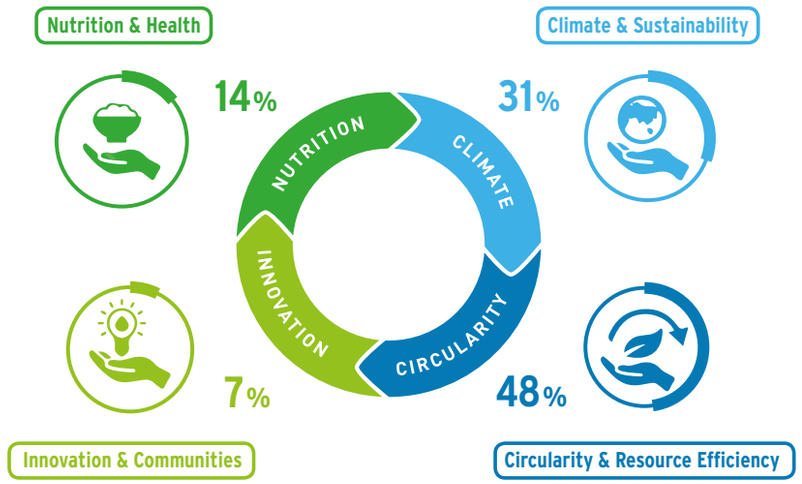


R&I FUNDING AND PROJECTS PER FOOD SYSTEMS SUB-CATEGORIES



FOOD 2030

R&I FUNDING PER FOOD 2030 PRIORITIES



2012 - 2016

IRELAND

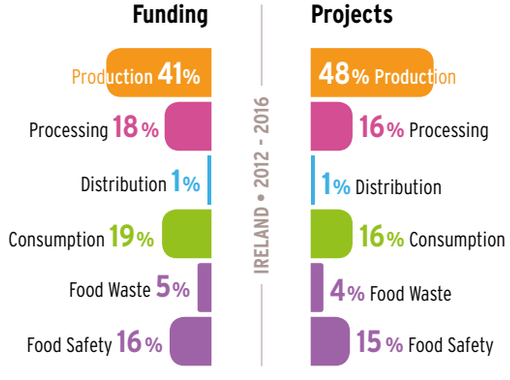
TOTAL No OF **PROJECTS** 755

FUNDING **ORGANISATIONS** 6

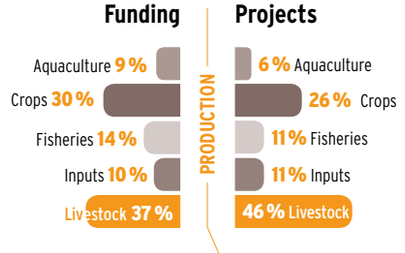
TOTAL AMOUNT OF **FUNDING** 155,311,931 €

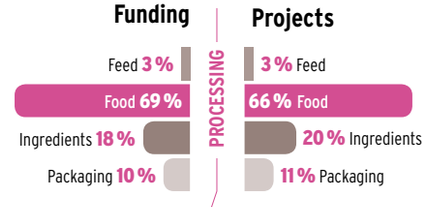
FOOD SYSTEMS

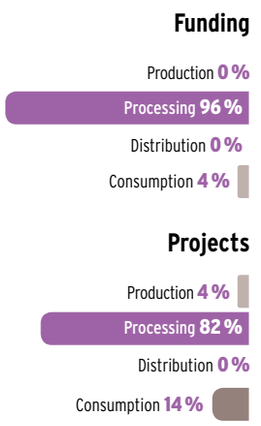
R&I FUNDING PER FOOD SYSTEMS CATEGORIES

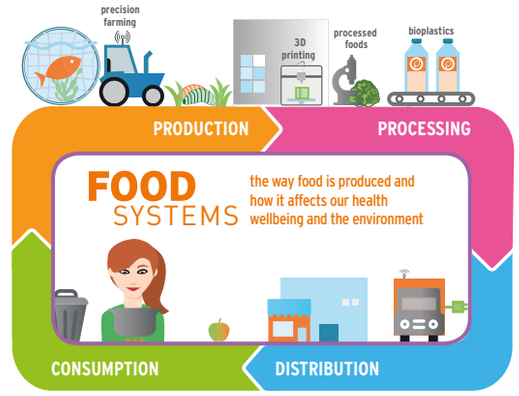


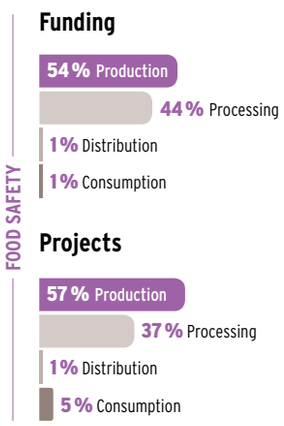
R&I FUNDING AND PROJECTS PER FOOD SYSTEMS SUB-CATEGORIES

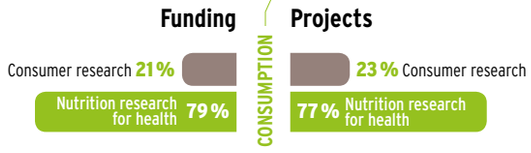


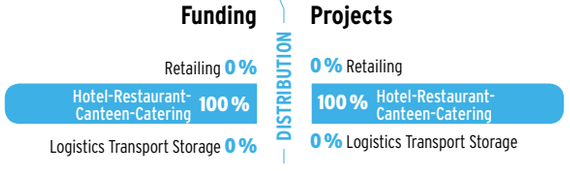






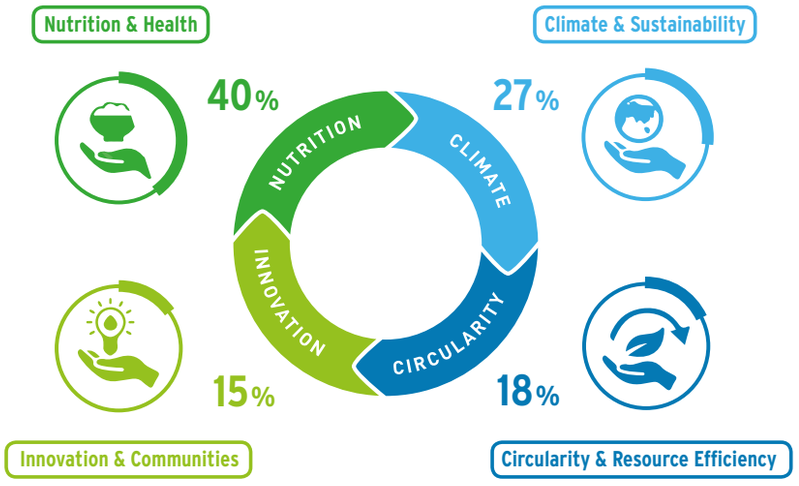






FOOD 2030

R&I FUNDING PER FOOD 2030 PRIORITIES



2011 - 2016

LITHUANIA

TOTAL No OF **PROJECTS** 183

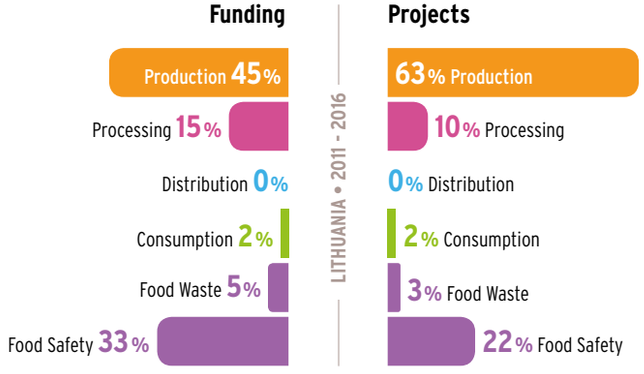
FUNDING **ORGANISATIONS** 5

TOTAL AMOUNT OF **FUNDING** 10,667,261 €

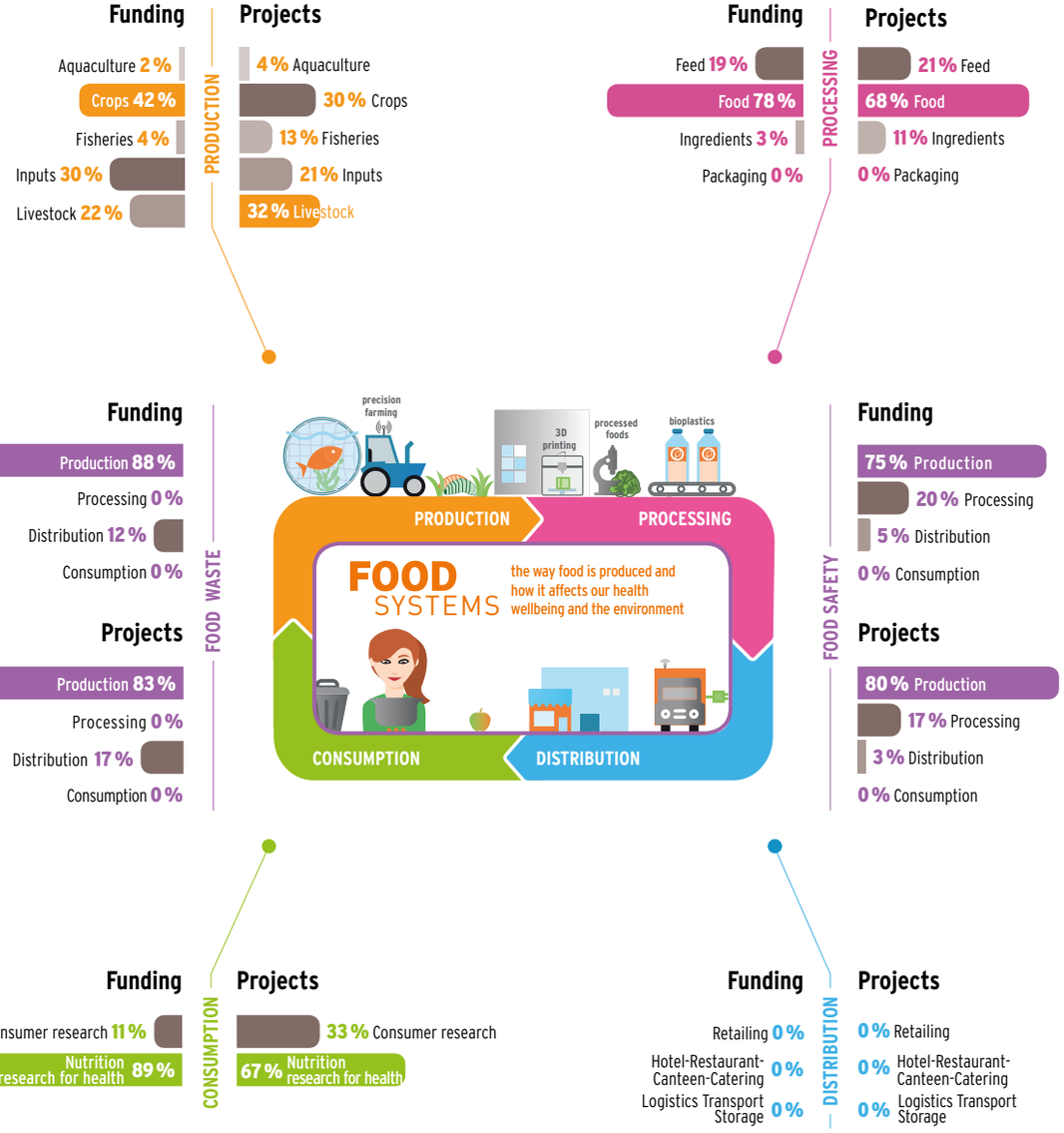
LITHUANIA

FOOD SYSTEMS

R&I FUNDING PER FOOD SYSTEMS CATEGORIES

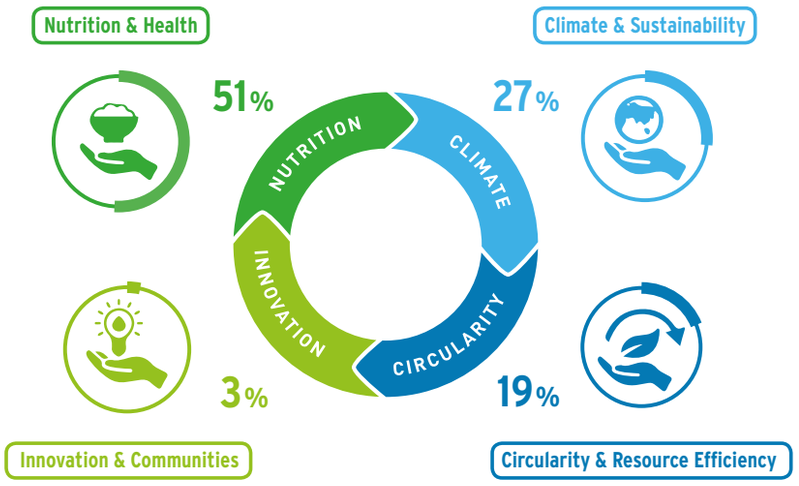


R&I FUNDING AND PROJECTS PER FOOD SYSTEMS SUB-CATEGORIES



FOOD 2030

R&I FUNDING PER FOOD 2030 PRIORITIES



2011 - 2013 - 2015

ROMANIA

TOTAL No OF **PROJECTS** 112*

FUNDING **ORGANISATIONS** 3

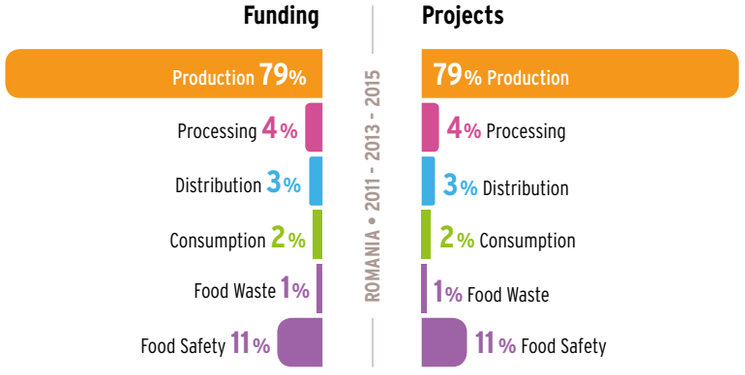
TOTAL AMOUNT OF **FUNDING** 24,821,672 €*

ROMANIA

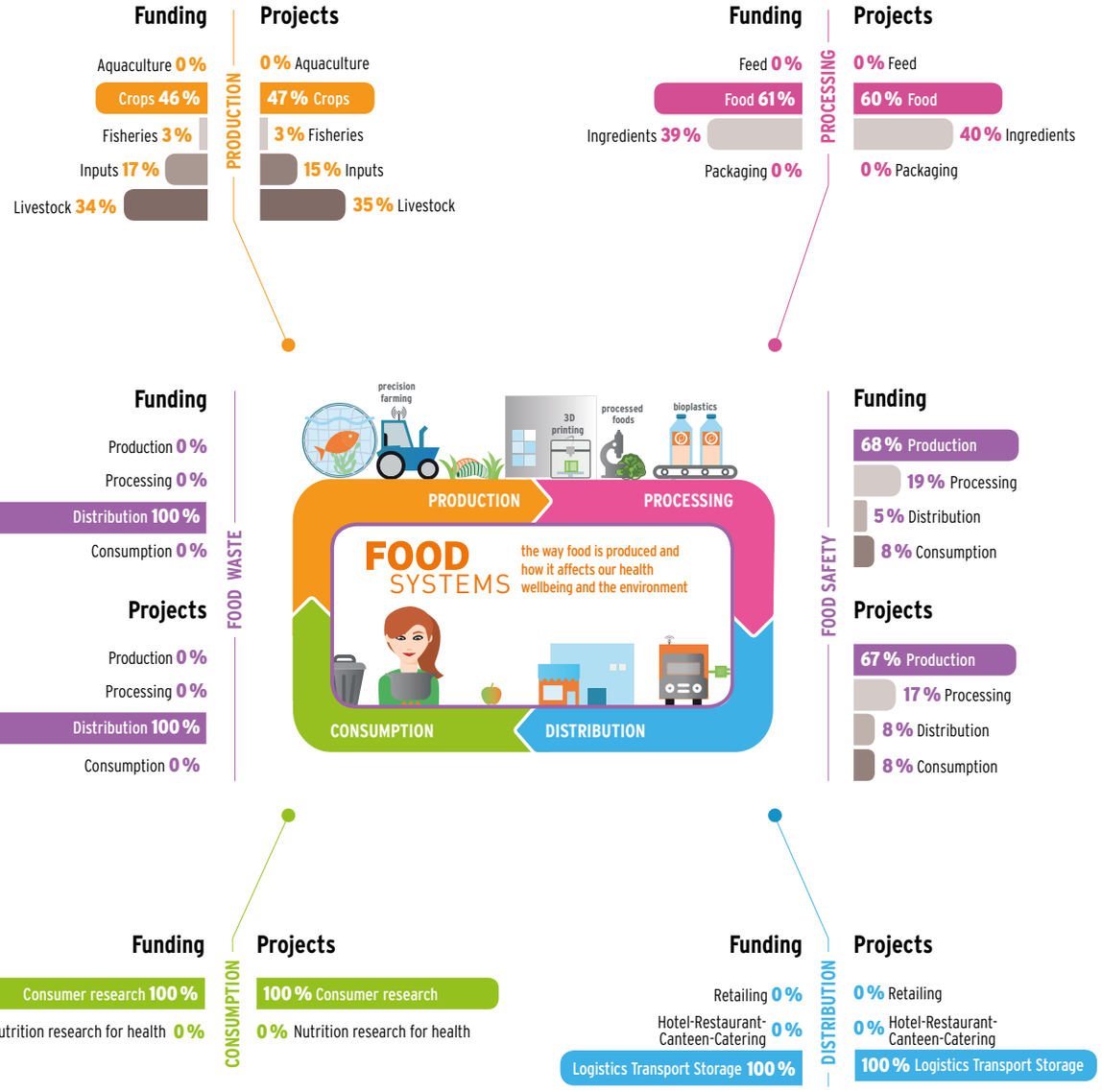
* data based on main projects' competitions only

FOOD SYSTEMS

R&I FUNDING PER FOOD SYSTEMS CATEGORIES

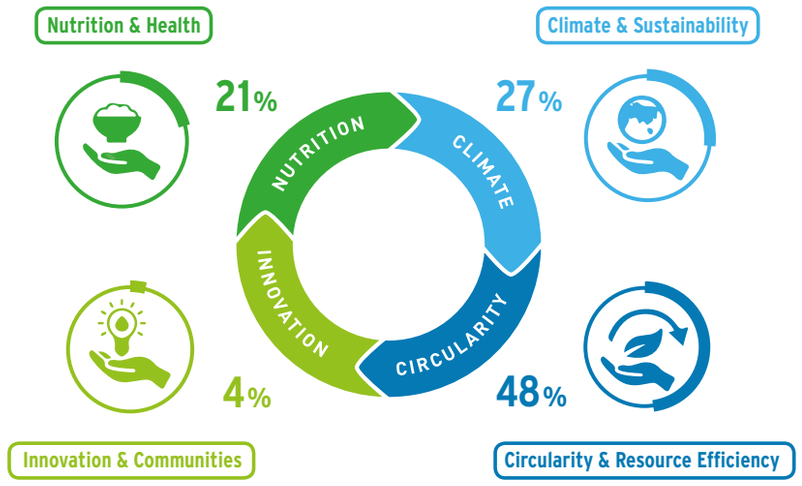


R&I FUNDING AND PROJECTS PER FOOD SYSTEMS SUB-CATEGORIES



FOOD 2030

R&I FUNDING PER FOOD 2030 PRIORITIES



2011 - 2016

SWEDEN

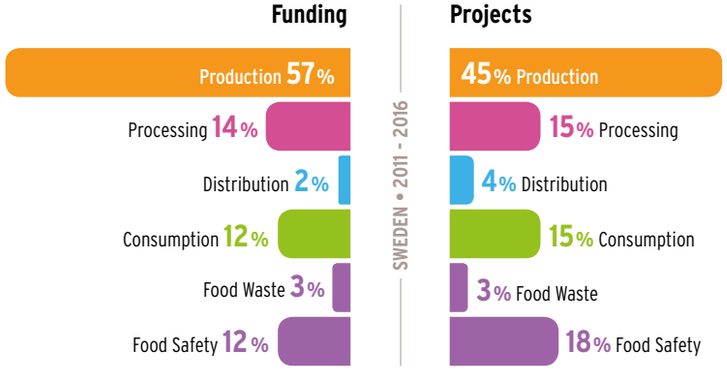
TOTAL No OF **PROJECTS** 667

FUNDING **ORGANISATIONS** 8

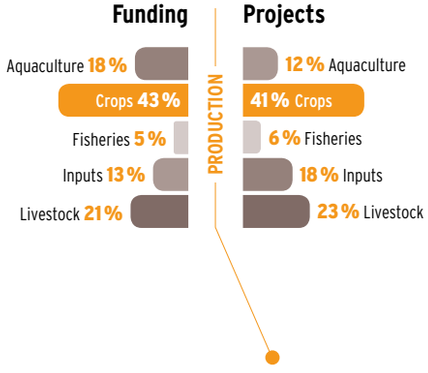
TOTAL AMOUNT OF **FUNDING** 183,683,776 €

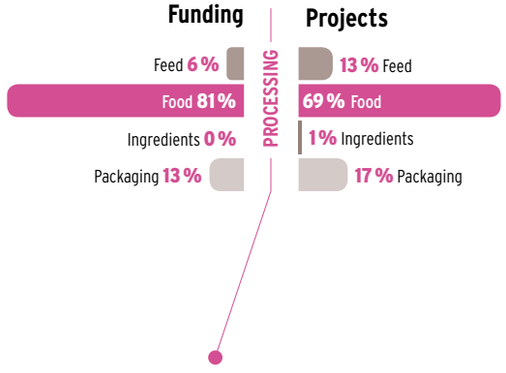
FOOD SYSTEMS

R&I FUNDING PER FOOD SYSTEMS CATEGORIES



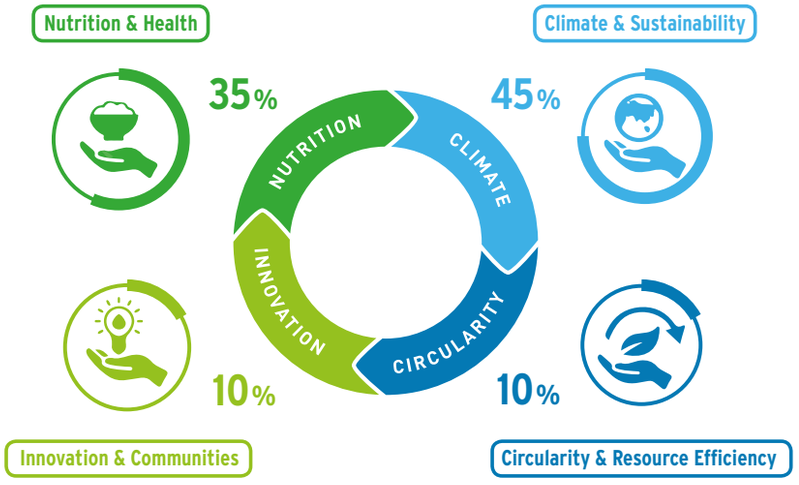
R&I FUNDING AND PROJECTS PER FOOD SYSTEMS SUB-CATEGORIES

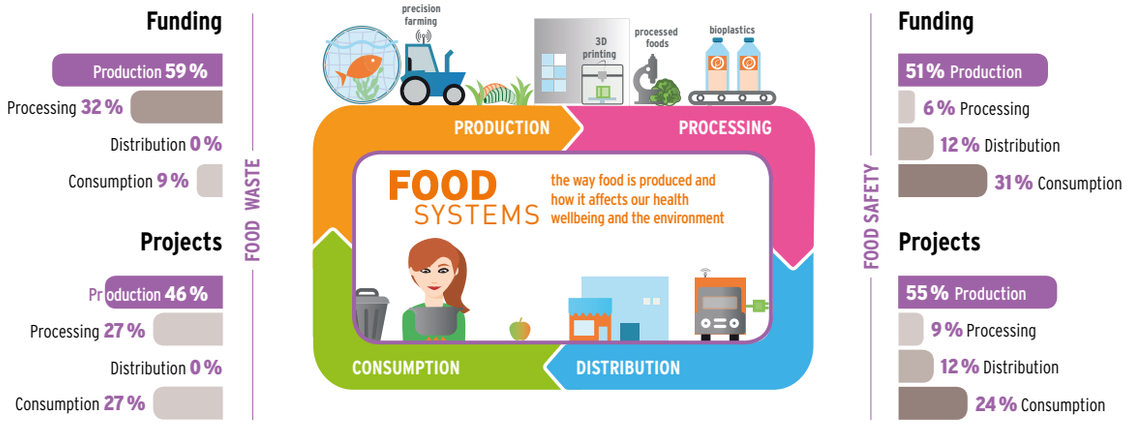


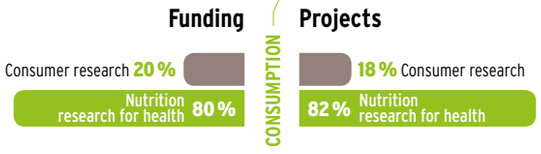


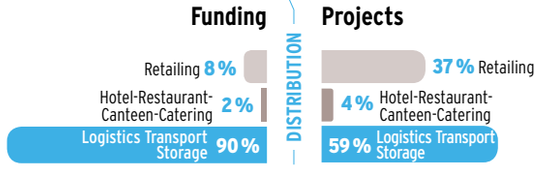
FOOD 2030

R&I FUNDING PER FOOD 2030 PRIORITIES









2014

DENMARK

TOTAL AMOUNT OF **FUNDING**

176,107,382 €

TOTAL No OF **PROJECTS**

n/a

FUNDING **ORGANISATIONS**

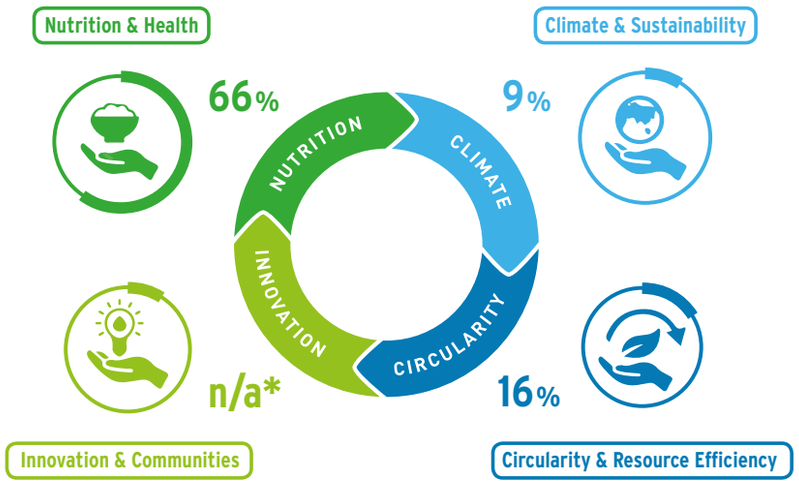
3

FOOD SYSTEMS — R&I FUNDING PER FOOD SYSTEMS CATEGORIES

Funding

- Production 53%
- Processing 14%
- Distribution 4%
- Consumption n/a
- Food Waste n/a
- Food Safety 20%

FOOD 2030 — R&I FUNDING PER FOOD 2030 PRIORITIES



2011 - 2016

FINLAND

TOTAL AMOUNT OF **FUNDING**

162,048,477 €

TOTAL No OF **PROJECTS**

928

FUNDING **ORGANISATIONS**

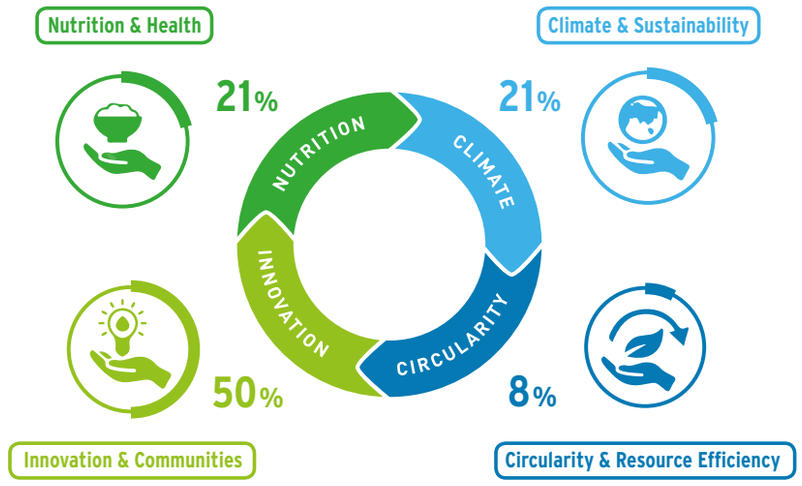
10

FOOD SYSTEMS — R&I FUNDING PER FOOD SYSTEMS CATEGORIES

Funding

- Production 36%
- Processing 47%
- Distribution 6%
- Consumption 5%
- Food Waste 6%
- Food Safety n/a

FOOD 2030 — R&I FUNDING PER FOOD 2030 PRIORITIES



* DK mapping did not include "innovation" category. The missing 9% falls in an "other" category.

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KI-02-18-461-EN-C

The EU and global food systems are affected by major challenges such as climate change. Research and innovation are the key to find high-impact solutions that will future-proof our food systems. To provide strategic aid on food and nutrition security related policy and strategy development, a SCAR FOOD SYSTEMS SWG mapped existing policies/strategies and research and innovation funding of the food system in EU Member States. Mapping results show that policies and investments focus on primary production and food processing. This reflects the fragmented R&I investments in food systems, as well as the limited interest in food systems shown by non-primary production stakeholders. To improve the current situation, stakeholders should be more involved in R&I on food systems. Because the food system provides food and nutrition security, it is a major player in health promotion. But it is also a significant job provider and food system innovation could lead to even more growth. The results of this study clearly show that food system elements must be included in various research programs to gain additional R&I input regarding food and nutrition, and to exploit the latent potential in the food system.

Research and Innovation policy

Publications Office

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