Finland's strengths and future priorities in food research and innovation

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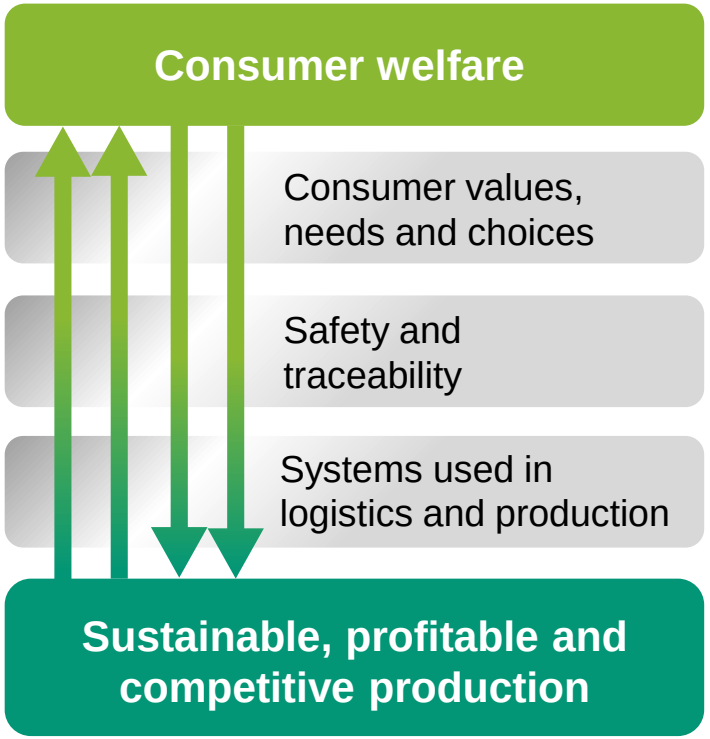
Why now?

Latest national food research strategy was made 10 years ago as part of European Technology Platform (ETP) Food for Life Finland node

- Time to revisit the strategic research agenda and develop an implementation plan
- During the last 10 years
  - ETP Food for life national platform ended
  - Finnish Graduate School on Applied Bioscience: Bioengineering, Food & Nutrition, Environment ended
  - Currently, there is no national platform gathering researchers



Focus points of previous food research strategy

Global food system

Challenges

- Growing population
- Increasing demand for food
- Climate change
- Loss of natural resources and biodiversity

Facts

- One fourth of global greenhouse gas emissions
- Half of habitable land
- 70% of global fresh water goes for food system

Paradoxes

- Too much food is wasted when we need more
- People are suffering from obesity while others have undernourished
- Natural resources are used inefficiently and unsustainably, too much for feed rather than food

The aim of the Finnish food research and innovation strategy is to position Finland as a **key actor** in the transition towards a **healthful and sustainable global food system** and to simultaneously **create new economic growth** opportunities based on scientific knowledge and food innovation for the Finnish food producers and the food industry.

Finnish food system related targets

Target/ HyperLink	Set by
Halve the food waste by 2030	EU
Carbon neutral Finland by 2035	Government
16% less GHG emissions compared to 2005 levels (98.6)	Government
Double the value of Finnish food exports to 3 billion euros by 2025, and to increase the share of small companies in the international markets from 16% to 25%	Business Finland
Carbon footprint targets to reach 2.5 (tCO2e) in 2030, 1.4 by 2040 and 0.7 by 2050 per person	Sitra
More vegetables, fruit and berries: increased to 500g/day More dietary fibre to the diets: altogether 25-35 g/day - cereals as whole grain, increase the consumption of vegetables, berries and fruits Less salt, saturated fats, added sugar, red and processed meat.	Finnish Food Authority

Strengths

- Recognized knowledge in food and nutrition
- Safe and transparent primary production.
- Animal health and welfare standards are high.
- Abundant amounts of clean water and environment

Weaknesses

- Fragmented initiatives, working in silos
- Difficulty to build critical mass in research expertise due to lack of research area focus.
- Lack of public scientific communication
- Inadequate funding for research, innovation, infrastructure and go-to-market activities

SWOT

Opportunities

- Biotechnical food production, cellular agriculture
- Regenerative agriculture
- Green capital and value creation through clean water resources
- Big data as tool for development and innovation

Threats

- Policies and research strategies do not align.
- Regulations risking the opportunities
- Climate change and decrease in biodiversity
- Increased risk of foodborne zoonoses and also new emerging infectious threats.

Missions towards 2035

GRAND MISSION

Finland will be a global standard for a healthful and sustainable food system which leads to economic growth and wellbeing of the society.

Mission 1 Healthy, safe, and sustainable diets are viable for all in Finland.

Mission 2 Food and feed production in Finland is sustainable, competitive, and resilient.

Mission 3 Resource efficiency and zero waste are key determinants in the Finnish food system.

Mission 4 Finland is a forerunner and leading testbed for sustainable food system research and innovations.

Mission 1

Healthy, safe, and sustainable diets are viable for all in Finland by 2035

RESEARCH GOALS & PRIORITIES

Combine research expertise in nutrition, food science and behavioural sciences to investigate the health effects of foods, healthy eating and support nutritionally high-quality food choices.

PHYSIOLOGICAL RESPONSE

- Increase understanding on bioavailability and bioaccessibility
- Address health effects of foods at the individual and population level including vulnerable groups
- Role of gut and microbiota in producing health effects

TECHNOLOGY

- High-quality healthy and sustainable foods
- Increase safety of new food sources
- Support efficient use of nutritious side streams
- Data driven solutions and concepts to support healthy eating

FOOD ENVIRONMENT & EDUCATION

- Find efficient ways to increase awareness, accessibility and availability of healthy foods and diets
- Create solutions and environments to facilitate and motivate consumers towards healthier choices and eating

Create and validate indicators to evaluate the impact and cost efficiency of solutions and policies.

Healthy, safe and sustainable diets

Key focus points for Finland:

- **increase understanding of food consumption**, dietary patterns, and dietary intake in relation to health in **vulnerable population groups**, e.g. in children, adolescents, and the elderly
- focus on gut microbiota and gut barrier function, the immune system, and inflammation in mediating the **health impact of food**
- address role of **food and digital technologies** and choice architecture in promoting and enabling healthful eating
- investigate the variability in physiological responses and examine predictions for individual variability by using **machine learning and data science**

Mission 2

Food system in Finland is based on sustainable, competitive, resilient food and feed production by 2035 – and beyond

RESEARCH GOALS & PRIORITIES

To reach environmentally sustainable food and feed production with economic, social and cultural sustainability by inter- and transdisciplinary research.

RESILIENCE AND SECURITY

- Enhancing crop yields and quality
- Resilience to biotic and abiotic stress
- Novel food and feed sources (eg cellag)
- Animal health and welfare (OneHealth)

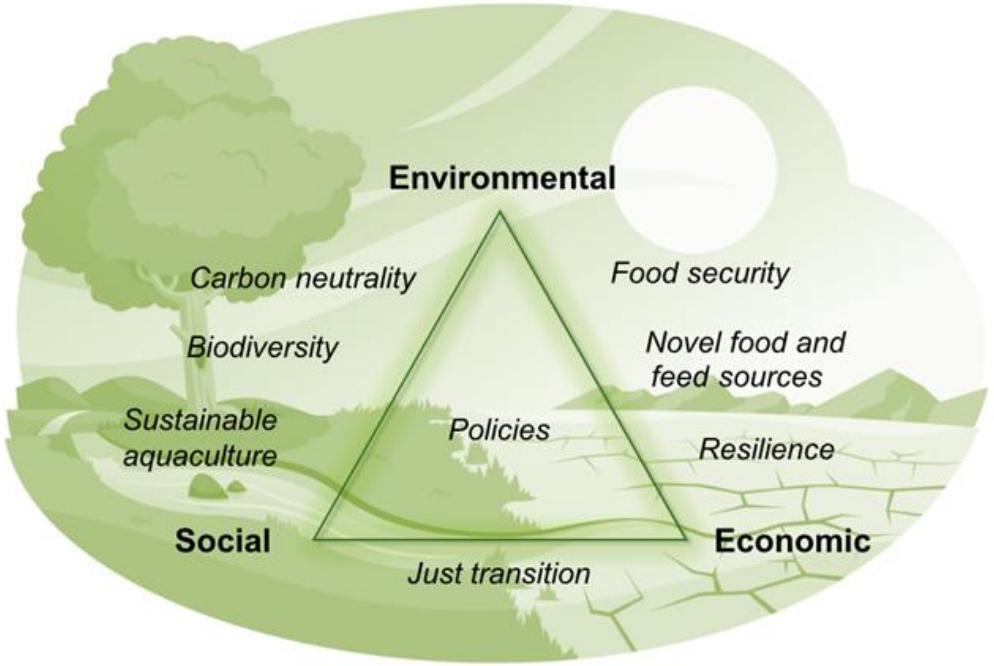
ENVIRONMENTAL SUSTAINABILITY

- Reduction of GHG emissions, fossil fuel dependency, and nutrient losses
- Land use strategies, healthy soils
- Sustainable aquaculture and fisheries
- Enhancement and protection of biodiversity

POLICIES FOR TRANSITION

- Effective, coherent and transformative policy means and strategies
- Up-scaling of sustainable production methods and products
- Social acceptability and fairness of policies

Sustainable, competitive and resilient food production



Key Focus points for Finland:

- **sustainable land and water use** including aquaculture
- **increasing profitability** and **resilience** (of primary production), assuring **security** of supply, reduction of import of required inputs, **transparency** with digital solutions
- **added value** from **Nordic hemisphere** in primary production for branding and increasing export

Mission 3

Resource efficient and zero waste are key determinants in the Finnish food system by 2035

RESEARCH GOALS & PRIORITIES

To identify and valorize side streams for high resource efficiency and zero waste agrofood system

RESOURCE EFFICIENCY

- Identification of gaps in the agrofood system
- Valorization of waste- and side streams
- Supply security
- Innovations and new integrates

PACKAGING AND SUPPLY CHAIN

- Packaging solutions
- Logistics and delivery solutions

SOCIETAL TRANSITION

- Business opportunities
- Consumer motivation
- Political actions

Resource efficient and zero waste Finnish food system

Key focus points for Finland:

- Development of a **digital platform** of **waste- and side-streams** from the (domestic) food value chain
- **New circular economy concepts** based on cross-sectorial strengths that improve existing technologies but also integrate disruptive technologies

Mission 4

Finland will be a forerunner and leading test-bed for sustainable food system research and innovations

RESEARCH GOALS & PRIORITIES

Combining technology and natural sciences with human-social sciences to empower the food system related research in Finland.

SYSTEMIC TRANSFORMATION

- Boosting disruptive innovations and systemic change.
- Effect of food production transition on diet.
- Utilization of transparent, traceable and secured data from farm to fork.
- Development of agile solutions to support personal wellbeing.

ENGAGING CITIZENS

- Empowering consumers and communities for systemic change.
- Co-creative activities in developing innovation ecosystem.
- New approaches to promote individuals towards sustainable choices.
- Food education for children and adults.

SUSTAINABLE BUSINESS CREATION

- Tools and knowledge to create responsible business models and competitive branding tools.
- New financing instruments and collaboration between researchers, companies, start-ups, accelerators.
- Development of sustainable, healthy and tasty foods accepted by consumers.

Triangle of research and innovation ecosystem

Key focus points for Finland:

- Developing **data-driven food systems** that apply a Finnish farm to fork chain that is transparent, short, and easy to manage
- **Engaging citizens and various actors in research** and innovation by taking advantage of the common willingness of Finns to participate in research and to test new solutions.
- Boosting an interdisciplinary approach that **connects the humanities and arts to technology and science** to fill the gap between consumer-oriented knowledge and the feasibility of food and eating solutions.

Implementation plan

- Establish a Finnish Food Research Forum
- Start a governmental food network
- Establish a network of business ecosystems

Links to the new research strategy

Sözer, N., Nordlund, E., Poutanen, K., Åkerman, M., Heinonen, M., Sandell, M., Kolehmainen, M., Maunuksela, L., Vilkki, J., Virtanen, S., & Yang, B. (2021). *Suomen ruokatutkimuksen ja -innovoinnin strategia 2021–2035*. https://doi.org/10.32040/2021.978-951-38-8829-9

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Thank you !

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