Minutes of the Workshop results in Paris, December 5&6

Priority Area A: Achieve Sustainable Diets For People and Planet

Priority Area A was designed to explore ways in which we can achieve a balanced diet for people and planet. This is a very broad pathway which aims at increasing diet quality for all in a sustainable fashion. This pathway therefore links most closely with Mission 2: "Net zero food system". In discussions with Mission 2, there should be consideration of how the environmental cost of foods should be assessed. For instance, cardiovascular disease (CVD) is a likely primary NCD target due to its prevalence and associated mortality. The overwhelming evidence from the scientific literature is that increased fruit and vegetable and oily fish consumption can reduce CVD risk, however the cost of producing and supplying these foods is typically only focused on cost per kg instead of some element of cost per nutrient supplied.

While improving overall diet quality will tend to reduce the risk of NCDs, impact will depend on initial diet quality and any co-existing factors such as degree of adiposity, smoking prevalence etc. Priority Area A therefore focused on these 5 key NCDs to achieve the overarching outcome of improving healthy consumption in order to reduce NCDs.

Expected outcomes

Outcome 1: Improve knowledge of food/nutrition across life course by 2030.

In order to achieve an improvement in healthy consumption, it is important to first improve knowledge and understanding of food and nutritional intakes and their impacts across the life course. The premise of this outcome is therefore to establish better education in relation to food consumption to improve the knowledge across the life course and across social groups, according to their needs, concerning nutrition, healthy food choice and cooking. This would require early education, for instance from 5 years of age, on how to prepare food so that when young adults leave the house, they will know to prepare, cook, and store food. Consumers should also be educated with respect to healthy food choices, and the importance of other factors such as exercise and low adiposity. While this is seen as a very important goal, uncertainties were expressed about how this outcome would be achieved, and it will also be important to consider the role and influence of non-nutritional knowledge areas, such as exercise and low adiposity. Better guidance would also enable health care and other food professionals to talk more effectively about healthy eating and support the creation of healthy eating solutions.

Outcome 2: Establish one true definition for health and dietary guidelines by 2025.

In order to achieve Outcome 2, it is recognised that there must first be consensus on health and dietary guidance, as this is currently not the case in the EU region. For instance, the optimal number of daily portions of fruit and vegetables for health varies between countries and is not supported by consistent or targeted research. Also, the definition of unhealthy may be challenging since this also depends on the amount consumed. There is a therefore a growing need to establish a consensus on health and dietary guidelines to provide 'one true definition' to help guide the industry, and ultimately consumer messaging. However, it is also recognised that different European regions have different diet-related health priorities for tackling NCDs, according to food consumption patterns

which differ across national borders. So, definitions for health and dietary guidelines will need to take national and cultural differences into consideration, which will create challenges for globalized healthy eating guide recommendations which also take into consideration planetary health. Consideration should also be given to understanding consumer behaviour, and the barriers faced by consumers in achieving healthy diets.

Outcome 3: Restrict promotion and placement of unhealthy food, and limit unhealthy fat, sugar, and salt content in foods by 2030.

Regulation of the retail environment was identified as a key outcome area, specifically the restriction of promotions on unhealthy food, and restricting where unhealthy food can be displayed and sold in stores. Increased and stronger regulations limiting fat/sugar/salt content within 2 years were also recommended. Regulation of this nature was seen to offer support for health care professional when talking about healthy eating with consumers, and this recommendation was seen to benefit consumers with respect to NCD risk more generally rather than a specific NCD. However, it was noted that the definition of 'unhealthy' may be challenging since this also depends on the amount consumed.

Outcome 4: Improve and incentivise reformulation of healthy European food products.

This worthy but challenging outcome focuses on increasing the production of healthy foods and decreasing the amount of marketing for unhealthy food. Achievement of this outcome is envisaged through increasing the number and availability of food products that are affordable, tasty and nutritious in supermarkets and canteens. Examples given included the re-arrangement of supermarket layouts to enable 80% more healthy food choices, promotion of healthier foods within 5 years, and commitment by 85% of food manufacturer and retailers to increasing their healthy sales by 50% by 2025. To monitor this commitment would require consistent measurement of what is sold in supermarkets, healthy food sales, and how much is being sold. Industry stakeholders expressed a wish for a change in regulation to enable retailers to promote foods on the basis of healthy food content (i.e., fibre, legumes, beans) rather than unhealthy content (sugar, salt, unhealthy fats), and to allow health professionals to promote healthy products. More food meeting consumer needs (good food is good business). CVD is likely to be a primary target due to its prevalence and mortality, as increased fruit, vegetable, and oily fish consumption can reduce CVD risk. While this outcome was seen as being a great aspiration, it was perceived as being unlikely to be achieved for all components. There should also be consideration of how the environmental cost of foods should be assessed to take into account the maintenance of a healthy diet. Environmental cost is normally calculated in terms of cost per kg, however it should also include some element of cost per nutrient supplied.

Outcome 6: Improve consumption of and attitude to healthy foods so that 95% of people are following food based dietary guidelines every day by 2030

This final outcome follows on from all previous outcomes, in particular requiring improved consumer knowledge and knowledge of food and healthy food choices. Consumer attitudes to food will be shaped by approaches and strategies adopted in the food supply chain by producers, manufacturers, distributors, and regulators, as well as scientific facts. It was proposed to achieve this by educating key opinion formers in academia to create new attitudes in consumers and industry through the use and development of healthy ingredients to achieve 20% higher acceptance rates of new healthy foods in 5 years, and to make healthy eating the norm within 10 years for 50% to 75% of consumers.

Picture: Canvas Day 1

Table 1

Priority Area A. Achieve a balanced diet for people and planet

NCDs with potential relevance	What is the relevance?	Paris outcomes aimed at supporting NCD reduction		
		Outcome	**Benefits**	**Counterbalancing issues that need to be considered.**
All diet-responsive NCDs are relevant. But priorities are needed based on prevalence, diet responsiveness, associated costs to health services etc.	Improving overall diet quality will tend to reduce the risk of NCDs but impact will depend on initial diet quality and any co-existing factors such as degree of adiposity, smoking prevalence etc.	1. Improving knowledge of food/nutrition across life course by 2030.	Very important but how achievable?	Improved knowledge of the importance of exercise and low adiposity should accompany that for food etc.
CVD likely primary target due to prevalence and mortality	Increased fruit and vegetable and oily fish consumption can reduce risk	2. & 3. Improve and incentivise reformulation of EU food products	To impact which NCDs?	
		2. & 3 Incentivise the production of healthy foods (reduction of sugar, salt, fat, increase fibre, wholegrain etc. by 2024	Broadly sensible and should impact on CVD (salt, sugar, fat), type 2 diabetes (sugar), colorectal cancer (fibre)	Type of fat needs consideration
		4.&6 Restricting promotions on unhealthy food, restricting where unhealthy food can be displayed etc by 2030	Generally, as above but untargeted.	Definition of unhealthy may be challenging since this also depends on amount consumed.
		5. Establish one true definition for health and dietary guidelines	Potentially beneficial	As above
		7. Increased production, affordability, availability, consumption of and attitude to healthy food so that 95% of people are following FBDGs every day by 2030	Great aspiration but unlikely to be achieved for all components.	

Trends and Drivers

Providing context for the identification of opportunities for Priority Area A, the selected trends and drivers identified focus largely on health, economics, and technology rather than the environment. For health, nutrient and health regulations, nutrient and health policies and the health- and food-conscious consumer were considered as key drivers for this pathway. Rampant inflation and increased expenditure for the food industry were also highlighted along with poverty, inequality, and social security (social welfare system). Finally, new technologies in food production and in the food system were seen as important drivers of healthy food choice. Environmental drivers were seen as only indirectly affecting healthy eating, particularly with respect to the availability and quality of water, land, and soil.

Needs and Opportunities

Focus area 1: Encourage production of healthy foods

Working with food industry, this focus area intends to encourage production of foods with reduced salt, less saturated fat and sugar content and more fibre, taking into account food processing technologies, which preserve the nutrient content and support healthy and sustainable food products for people and planet. Key considerations: Costs of ingredients and goods to create healthier foods, farming land capabilities, incentives to produce healthier food, and a level playing field: harmonized and clear evidence-based legislation to enable food business organisations to produce healthier food. The following opportunities were identified for this focus area on healthy food production:

1. Food system incentives to produce healthy and healthier food: Stakeholder dialogue and engagement (e.g. farmers, FBO manufacturers, retailers, food service, out of home sector)
    - Innovation grant, subsidies
    - Tax reduction
    - Communication of the actors' efforts to produce healthy foods (claims)
    - Legislation/regulation limits innovation: Claims possible if reduce less than 3% the sugar (1924/2006, art. 9): make it easier to replace sugar with sweeteners, i.e., change the 3 % rule in 1333/2008
2. Level playing field in Europe *(not selected for further discussion)*
    - Harmonized European legislation on sustainable dietary guidelines (European definition of sustainable: health, ethics, environment, finance)
3. Map of food production needs (land use and food production needs)
    - Wheat in Ukraine, rapeseed oil
    - Land use
    - Availability of healthy ingredients
4. Technology innovation:
    - Equipment, product development (product & process innovation)
    - Education of food scientists
    - Education of teachers, chefs, food service
    - Connecting people from different capabilities/background: niche, academia research connects with food manufacturers and the other way around)

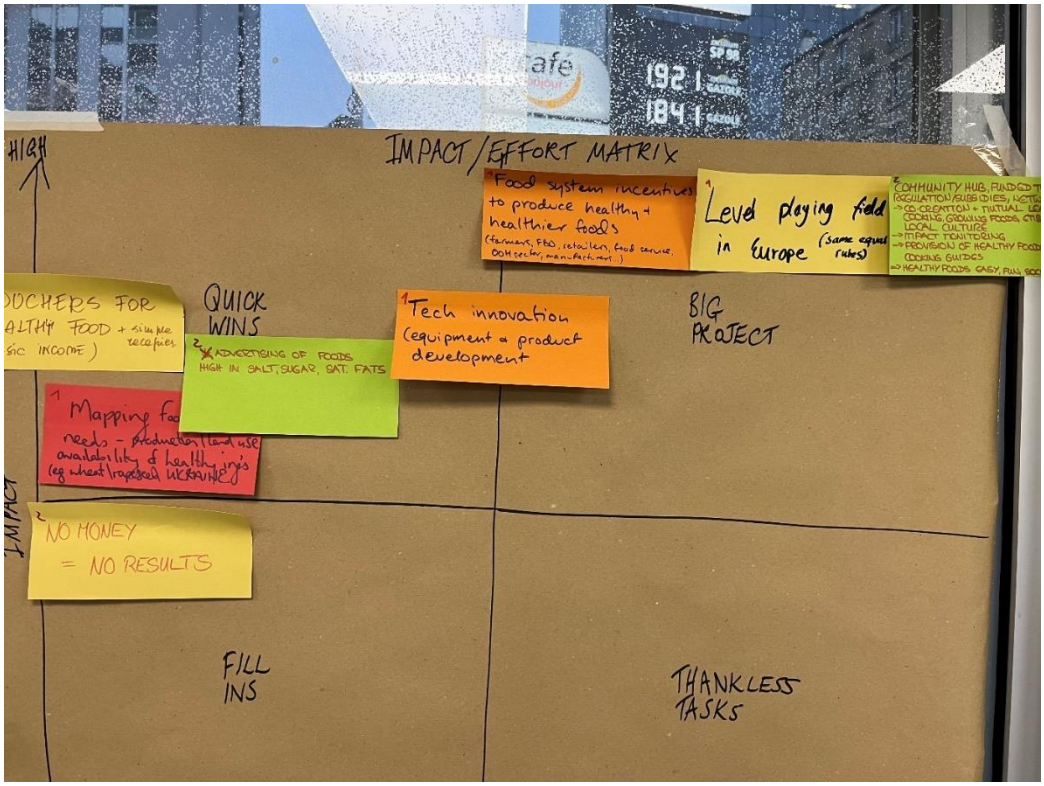
Focus area 2: improve dietary patterns and increase the intake of inadequately consumed foods

Working with consumers, this focus area considers consumer behaviour and education to encourage higher intake of fruit coma vegetables, whole grains, et cetera. Targeted nutrition, enabling nutrient deficiency compensation or covering special nutritional needs should be considered in this focus area. Consumer education on how to choose more nutrient-dense foods or achieve more protein

diversity in the diet should be a part of this focus area. **Key considerations:** availability and affordability of healthy foods, equivalence of product portion size healthy vs unhealthy foods, enabling consumers to make healthier food choices, proposing food offers with culinary advice to increase satiety of healthy food, and proposing easy and convenient solutions to enable people to change their unhealthy eating behaviours. For this area in particular, investment was considered key: "no money – no results".

1. Community hub network (funded by subsidies):
    - Establish places for mutual learning through regulation, network effort, subsidies (co-creation effort): how to prepare and grow foods; provision of foods and ingredients through the hub; embed in the local culture, take cooking guides home (availability of healthy food and social aspect)
2. Vouchers for healthy food (basic income):
    - Provide tasty, healthy, and affordable food to people
3. Social prescribing for fruit and vegetables *(not selected for further discussion)*:
    - Public health approach
    - Policy and financial incentives/penalties
4. Restrict promotion and placement of unhealthy food (*changed from:* Ban advertising of foods high in salt sugar saturated fats)
    - Change regulation
    - Social media
    - Influencers

Picture end result impact matrix



Opportunities influencing outcomes

6 opportunities were selected from the focus areas and mapped onto the previously identified outcomes:

Outcome	Opportunity influencing the outcome	Degree of influence
1. Improve knowledge of food/nutrition across life course by 2030	• Community hub	• Strong
2. Establish one true definition for health and dietary guidelines by 2025	• Food system incentives • Community hub	• Medium • Medium/ Strong
3. Restrict promotion and placement of unhealthy food, and limit unhealthy fat, sugar and salt content in foods by 2030	• Advertising of healthy food	• Strong
4. Improve and incentivise reformulation of healthy European food products	• Food system incentives • Tech innovation	• Strong • Strong
5. Increase production, affordability, availability of healthy foods to enable 95% of people to follow food based dietary guidelines every day by 2030	• Food system incentives • Tech innovation	• Strong • Strong
6. Improve consumption of and attitude to healthy foods so that 95% of people are following food based dietary guidelines every day by 2030	• Tech innovation • Advertising of healthy food • Mapping food • Vouchers for healthy food	• Medium • Strong • Strong • Medium

How do the opportunities fit with the EIT food portfolio?

Opportunity	Synergies	Conflicts	EIT food portfolio
1. Food system incentives	Links to 3 & 4: food system incentives need innovation to produce tech innovation and advertising regulation Links to 5 & 3: mapping food production help to map technological innovation in the food system		Innovation and Entrepreneurship
2. Community hub	Links to 5: vouchers working together with community hubs and vouchers for healthy food		Innovation and Entrepreneurship
3. Technological innovation	Links to 5: mapping food production help to map technological innovation in the food system	3 & 4 tech innovation and advertising are in conflict if the innovation doesn't work out: why bother innovating from enterprise perspective if regulation is not moving.	Public engagement, education
4. Advertising of healthy food	Links to 1: food system incentives need innovation to produce tech innovation		Public engagement

5. Mapping food	Links to 1 & 3: mapping food production help to map technological innovation in the food system	Technologies evolve. Certain technology needed to keep map up to date, but sensors are changing/new innovations might be incompatible with database design/operation	Mapping production needs an innovation baseline product
6. Vouchers for healthy food	Links to 2: vouchers working together with community hubs and vouchers for healthy food		Public engagement

Public engagement could be developed/extended within EIT food (so far EIT food focuses on consumers)

Capabilities & Technologies

Capabilities and technologies were identified as follows:

1. **Food system incentive**: To produce healthy/healthier food, considering stakeholders along the value and supply chain. Capabilities/technologies: Machinery (air fry instead of oil), engineering, mapping of ingredients, food miles
2. **Tech innovation**: Equipment & product development. Capabilities/technologies**:** Equipment and product development : consumer centric AI to make more informed decision but also food provider and new product development (reformulation) (industry 5.0 – consumer focus)
3. **Community hub**: Co-creation and mutual cooking, growing food incl. local culture. Impact monitoring. Provision of healthy cooking guides. Healthy foods. Making it easy and fun. Capabilities**:** Community builders and facilitators (connectors, who can interact, technology enablers). No need for new technology itself, build on what is already there
4. **Advertising of healthy/healthier foods** by changing regulations around promotion of healthy foods by retailers. Healthcare professionals need to be able to communicate healthy foods legally (currently unable to communicate health benefits of products if funding is received from industry. Capabilities**:** Health care professionals to be allowed to communicate health benefits of specific food products.
5. **Mapping food production needs**: Production/land use, availability of healthy ingredients (e.g., wheat/rapeseed – Ukraine). This is a quick win because a great deal of data is already available (it just needs to be consolidated). Capabilities**:** Major automated data collection tools, training, quality insurance, data scientists
6. **Vouchers for healthy food**: Where basic income does not enable consumers to eat healthily, provision of healthy food vouchers would enable supplementation of diet with healthy foods. Could be accompanied by simple recipes. Capabilities**:** Operation of the scheme.

Enablers

Enablers were identified as follows:

1. **Food system incentive**: To produce healthy/healthier food, considering stakeholders along the value and supply chain. Enablers**:** Equal rules EU wide, uptake of farmers' produce, myth busting (legislators approved, but consumers unaware). UNESCA and all other sector organisations, Copa cogeca, FDAE Food drink association Europe
2. **Technological innovation**: Equipment & product development. Enablers**:** Digital, manufacturing, out of home industry producing healthier food solutions, incubators, finance Research development innovation, intellectual property, interdisciplinary knowledge (disciplinary and interdisciplinary knowledge to develop curricula to bring in people with different backgrounds)
3. **Community hub**: Co-creation and mutual cooking, growing food incl. local culture. Impact monitoring. Provision of healthy cooking guides. Healthy foods. Making it easy and fun. Enablers**:**

Impact monitoring infrastructure (how many people adopt diet, how is health improving, school kind facilitation – education credits); local government for perception and engagement, engagement of food industry (Bauhaus, mindful chef?) dark kitchens, "olio" app

4. Advertising of healthy/healthier foods by changing regulations around promotion of healthy foods by retailers. Healthcare professionals need to be able to communicate healthy foods legally (currently unable to communicate health benefits of products if funding is received from industry. Enablers: Pan European guidelines, pan European nutrient profile. Implementation of pan European guidelines by DG Sante (department E)
5. Mapping food production needs: Production/land use, availability of healthy ingredients (e.g., wheat/rapeseed – Ukraine). This is a quick win because a great deal of data is already available (it just needs to be consolidated). Enablers: Buy-in for all involved, health professionals (to provide context on needs on what is required)
6. Vouchers for healthy food: Where basic income does not enable consumers to eat healthily, provision of healthy food vouchers would enable supplementation of diet with healthy foods. Could be accompanied by simple recipes. Enablers: Retailers /food service / out of food providers support to vouchers/transaction, loops for evaluation of voucher design, define needs at national level (social/cultural/health needs), involvement of national communities, Need for help with funding (government and potential industries) connection between agriculture, food industry, (form farm to fork vouchers), policy reviews with public consultation

Stakeholder groups to include:

- Primary Producers (farmers, growers)
- Food Industry (manufacturing and marketing - R&D scientists, technologists, marketers, strategists)
- Researchers
- Consumers
- Educators (Schools, Universities, Ministries & Administrators)
- Nutritionists / Dietitians / Other health care professionals (HCP)
- Policy makers
- EIT Food partners

Timeline


Tech innovation (equipment + product development
Food system incentives to produce healthy + healthier foods
SYNERGIES
OVERLAPS
CONFLICTS


MISSION A
2025
2030
Achieve a balanced diet for people and planet

Pathway on timeline

Food system incentive

UNESCA and all other sector organisations, Copa cogeca, FDAE Food drink association Europe

Timeline	Task #	Task/activity description	Stakeholder
Now	1	Mapping exercise (baseline & future potential)	
	1>2a	Create incentives/pan European guidelines	DG Sante – Clair Bury's directorates (saunte. E)
	1>2b	Communication to get rid of myth busting	NGO: Eufic, consumer organization (Beuc), food unfolded, BNf.
	2a>3a	Engage with all food industry actors (KOF, EU legislators, NGO)	FDE (food and drink Europe), sector organisations (e.g., copa cogeca)
	3b	Funders: EIC – EU innovation Council, Horizon Europe	
	3a>4a	Communication capability of reformulation efforts → changing rules 1924/2006	DG Sante propose council and EP adopt
	3b>4b	Investment planning across all food system players (ahead of new rules adoption	Funders: EIC – EU innovation Council, Horizon Europe
	4b->4c	Machinery (deep fat fryers vs air fryers) Engineering technology to reformulate/innovate	Funders: EIC – EU innovation Council, Horizon Europe
	4b>4d	Uptake of farmers healthy produce when we have equal guidelines/incentives/rules for reformulation	
2025	4a>5a	New rules and guidelines/ equal rules for all EU actors on dietary guidelines and nutrient profile (what is healthy)	
	4a>5b	Evidence based messaging (not myth-busting, i.e., sweeteners already approved)	NGOs
	5a>6a	Healthy/healthier products market launch after 3-year transition period for new rules (2028-ish)	
2030	-		
2050	-		

Observer note: Many of the steps described can apply partly as prerequisite for the opportunity "Technological Innovation".

Tech innovation:

Timeline	Task #	Task/activity description	Stakeholder
Now	1a	Establish framework for open innovation & IP protection mechanisms	EU IP office, LERU(?), EITs, working groups (?): technological developers, university, policy makers EU level

	1b	Define needs, content, calls and budget to finance tech innovations	EU, EIT & national …
	2a	Acceleration of current tech innovators	Rising food stars (e.g., food pairing), incubators, SMEs
	2b	Universities and EITs start program to educate in multi-disciplinary	EIT Food/health/ manufacturing/ digital, government, all, continuous learning centres
	3	Development and advancement of AI and tech solutions for reformulation and health food development (targeted EU and regional)	
2025	3>4a	Researching consumer behaviour choices, nutrition production modelling	University & res institutions: 1. Institute Paul Bocuse 2. Wageningen 3. AZTI 4. etc.
	3>4b	Development of innovation to accelerate change	Industry: Food pairing PepsiCo, Danone bis FMCGs Start-ups/scale ups Restaurants Machinery incubators
	5	Food industry tests new product development technology with actual general and targeted consumer group (adoption, acceptability/liking, less waste)	FMCGs Catering canteens
	6	Food industry implements healthier food products considering target groups as per industry 5.0 (at least 2 target areas)	FMCGs Canteens Catering Schools
2030			
2050	7	Expansion of tech innovation: all target areas and EU-wide focus (and beyond?) through targeted and tested solutions	Innovators (food) Manufacturers FMCGs Universities EC/DGs EITs consumers

Community hub

Timeline	Task #	Task/activity description	Stakeholder
Now	1	- Pilot city in each geographical region	

		- Different NCDs (context and local culture) - Scoping and initial planning - Land secured	
	1>2	- Figure out education credit - Figure out funding model with local government between government, food industry, EIT - Figure out what tech is needed per city	
	2> 3a	Set up core outreach (team per city 1) Community engagement 2) Local government 3) Land/space 4) Food suppliers, industry, producers 5) International infrastructure including monitoring staff	
	2>3b	Continuous health indicator monitoring in communities for impact monitoring	
	2>3c	Continuous training, exposure, capacity building of community builders	
	4a	Broad community engagement to involve local groups in hub activity planning - Communication to prevent stigma also incl. NCD education) - Education - Working - What you grow in the garden	
	4b	Co-creation and planning : - community builders build out teams	
	4c	Secure land and space for 2-3 hubs per city	
	4d	Establish links within local supply chain (incl. dark kitchens (and suppliers/food industry to contribute goods & services	
	5a	Community builders from across networks develop m&e framework with input from other actors (e.g., suppliers) and health care professionals	
	5b	Mutual learning exchange infrastructure	
	5c	Regular engagement by community builders with wider community to understand what NCD concerns they have and how to provide support / advice from trusted providers	
2025	6a	Establish 2-3 hubs in each pilot city by 2035	
	6b	Establish internal infrastructure e.g., comms, monitoring, inter-city & intra city	
	6c	External comms strategy	
	7	Guidelines / toolkits model comms	
	8	Expansion into follower cities (30), land secured	

2030	9	Community hubs primarily play role in bring people together rather than driving down incidence of NCDs	
2050			

Observer note: pathway not specific enough, responsibilities not clear

Advertising of healthy/healthier foods by changing regulation

Timeline	Task #	Task/activity description	Stakeholder
Now	1a	Propose change of 1924/2006 Co-legislators adopt change (> in all EU countries)	DG Sante, E
	1b	Pre-proposal: engagement with all stakeholders	NGO, FDE (food and drink Europe), Copa Cocega, Beuc, etc.
	1>2a	Health care professionals' capability to communicate nutrition and health claims (vs. TV Star) (regulation 1942/2006)	
	1>2b	Pan European possibility to communicate about reformulation/innovation (step by step) → change article 9 in 1924/2006	
2025	1>3a	Pan European nutrient profile model (definition of health	
	3a>4	After adoption of nutrient profile model: pan European guidelines on advertisement of healthy food for industry (food industry, all actors) & health care products	
	2b>3b	Organisations that communicate evidence-based information	Eufic, food unfolded
2030			
2050			

Mapping food production needs

Timeline	Task #	Task/activity description	Stakeholder
Now	1	Recruiting data scientist providing infrastructure and funding	- FOA/WHO
	1>2a	Identify what data is available & in what format	
	1>2b	Identify user needs (incl. industry, governments)	
	2a>3a	Data collection alignment	
	3a>4a	Develop consolidated data bank	
	4a>5a	Develop/test interface for sharing data	
	2b>3b	Identify data gaps	
	2b>3c	Regular reassessment of impact KPI, data collection process, update of programs and processes	
	3b/c->4b	Prioritizing gaps in data (to fill them)	
	4b>5b	Infrastructure needs (e.g., server, sensors for automatic collection, staff, skills)	

2025	5b>6a (feedback to 4a)	Establish infrastructure and data collection	
2030			
2050			

Observer note: FAO/ WHO initiates and maintains database

Vouchers for healthy food

Timeline	Task #	Task/activity description	Stakeholder
Now	1	Define needs: national mapping of socio-cultural-economic groups (include collection of status quo data), habits & health Challenges and goals per group (knowledge, choices, consumption	National ministerial, DG Health, communication, EIT Food/health
	1>2	Call for actions based on gap analysis government and industries: - Interventions and financing - Provide IT connection system (information, tracking participants, choice follow up	(national level)
	2>3	Implementation: develop the "food voucher system" (farm to fork) Coming to population (school, health centre, local communities, etc.)	Public bodies, cities, agriculture food production, restaurants, NGOs
2025	3>4	Evaluation of improvement: - Data collection and analysis - Policy review, public consultation - Refining and adjustment	EU/national public bodies, health institutes, universities, NGOs
	4>5	EU Roll-out: - Other countries - Other groups - Wider scale	EU/national public bodies, health institutes, universities, NGOs
2030			
2050			

Priority Area B: Diversify Protein Sources in Food Consumption

Area B deals with the increase in protein diversification to address the challenges related to both human health and sustainable production (strong link to Mission 2). This Priority Area is articulated in two subareas: the first one aiming at increasing the awareness of known alternative proteins (e.g., those coming from pulses) by different stakeholders in the food system, while the second focuses on the exploration of new protein sources. It is well accepted that current primary production systems, especially animal, but also plant, need to be redesigned to achieve goals in terms of sustainability for the planet and of health for the citizens ("good for people, good for the planet").

By increasing the availability of diverse sources of proteins, it can be expected that the production of animal proteins will decrease, thereby reducing their presence in human diets, therefore mitigate the burden related to NCDs, where, at least for some of them, it has been well documented and demonstrated their link to consumption of foods containing specific ingredients, mainly of animal origin. The diversification of proteins must follow defined implementation actions, which will be able to address several challenges to be able to increase the consumption of non-animal origin proteins (e.g., legumes) and to promote new protein sources (algae, fungi, and insects). For this reason, it is necessary to use a systemic approach which will have to take into consideration technological, social, government/policy and legal challenges.

The participants to the Priority Area B working group were asked at the beginning of the session, to consider the content of the Area and reflect on its vision. As shown in the Figure, the reflections included the link of food to nutrition, impact new products and the differentiation. Other recurring words were education, accessibility, affordability, and sustainability.

Expected Outcomes

Five outcomes were identified after analysing the contributions of the panel: the first one overarching, which can be considered as the ultimate goal of the Area (outcome 1), while the others focusing on one specific domain (outcome 2, consumer education and awareness; outcome 3, farmers; outcome 4, technologies; outcome 5, policy). The suggested differentiation between the focus areas (Encourage diversification to include a wider range of sustainable protein sources / Encourage and explore 'unusual' protein sources) was abolished and not considered further.

Outcome 1: Increase Protein Diversification in Food Consumption.

There is an urgent need to diversify proteins in human diets and consequently increase the diversification of the sources for food production and consumption. It is foreseen to switch from the big 5 (pork, beef, chicken/poultry, sheep, fish) to the big 10, where also legumes/pulses, algae, insects, new crops and fungi are considered.

The following suggestions emerged during the discussion:

- Eliminate processed meat snacks, bad for human & bad for animals from fast food – and push plant-based alternatives;
- Reduced carbon footprint from protein food production;
- Change of public discourse on animal rights;
- Costs scalability, sensibility;
- Costs of precision fermentation / cultivated meat decrease;
- Production costs of "unusual" protein sources decrease;
- Consumption of (red /processed) meat decreases;
- Consumption of pulses increases;
- Increase consumption of plant-based proteins;
- Affordability – price of alternative protein sources for average working person must decrease;
- Accessibility must increase (e.g. availability in small local grocery store);
- Ranking of protein sources and creation of "conversion rates";
- Mapping of available protein sources improved.

KPIs

- increase of 40% of non-animal proteins in human diet.

Outcome 2: Increased consumer/citizen awareness through targeted education

The consumers must increase their awareness towards diverse proteins. The existence of well-known protein sources, such as legumes, has to be communicated via different strategies which have to be designed based on the target audience. It would be important to create curricula at universities and teaching activities in the secondary schools to promote the adoption of proteins different from the traditional ones. Investing in elementary schools for courses focusing on healthy diets, including the importance of diversification of proteins, are foreseen.

To consider for this outcome to be reached:

- Educate people to increase acceptance of soy protein (or whatever sustainable protein it is) to result in increase in sales of good proteins and decrease of sales of bad proteins by 10%;
- Increase consumer acceptance of new protein sources & bottom-up changes;
- Increase awareness of healthy eating patterns;
- Consumer acceptance and cultural shift to accommodate alternative proteins (without compromising on taste and flavor);
- Increase awareness of plant-based protein sources;
- Cleaner & sustained communication & education on benefits and risks – appropriate marketing => better understanding (Provide scientific evidence!);
- Improve accessibility of plant-based proteins => education food knowledge / cooking skills.

KPIs:

- 20 course curricula on alternative proteins at education level (primary, secondary and University levels)
- 40% more people being aware of protein diversity
- 10% increase in sales of proteins coming from different sources apart from animal

Outcome 3: Helping farmers into diversification (subsidies, policy)

Primary systems devoted to the production of animal proteins need to be reconverted and helped to diversify their outcomes. This is also valid for plant based primary systems, which must switch from extensive monoculture, mainly used for animal feeding, to the cultivation of plants rich in proteins for human consumption. This transition must be supported by the Member States and the EU, through the establishment of subsidies for those farmers who agree to initiate this transition. Suggestions that were formulated in the group:

- increase wider range of high-quality plant proteins being formed in a soil friendly way;
- Decrease in animal farming;
- Increase number of new crops as protein source (good yield);
- Figure out how to breed /grow a bean that has all the essential amino acids;
- Figure out a way to satisfy cow farmers so they can produce less red meat => increase prices and decrease consumption – subsidization system – invite farmers to differentiate.

KPIs:

- Increase of farmers (20%) growing/breeding alternative protein sources;
- 30% increase in harvests from complementary protein sources vs. decrease in production of "big five".

Outcome 4: Technologies and production methods in place for scalable cost effective, sustainable diverse protein (products)

The need for new technologies and the adaptation of existing ones to properly treat proteins for human consumption must be addressed. Key aspects to address are taste, rheological characteristics, and nutritional profiles. It is imperative to have those technologies established at industrial levels and be able to scale them up. Elements to further consider:

- Identify key enabling technologies for different sustainable proteins;
- Identify challenges for the scale-up of processes;
- Industry standards need to be established (i.e., to compare conventional proteins to alternative proteins).

KPIs:

- Increase of 30% in the products containing "new five" complementary proteins;
- Increase of 50% of companies producing products with complimentary proteins.

Outcome 5: New policies in place related to use of diverse protein sources in food formulation (without falling into "novel food regulation")

It is imperative to facilitate the use of different sources of proteins in food production without increasing the burden for their commercialization. The European legal framework is complex and does not really allow for a prompt exploitation of new sources of proteins, if they are not "traditionally" used. The novel food regulation hinders innovation in the formulation of food

products, especially when new sources of proteins are considering. There is a strong need for simplification of the regulation, promoting an efficient transition of food companies towards an improved use of alternative and new proteins. For this outcome to be successful, outcome 3 and 4 must be implemented as well, because only in case of proper primary production, food industry can engage with new transformation technologies to produce food products containing improved quantities of diverse proteins.

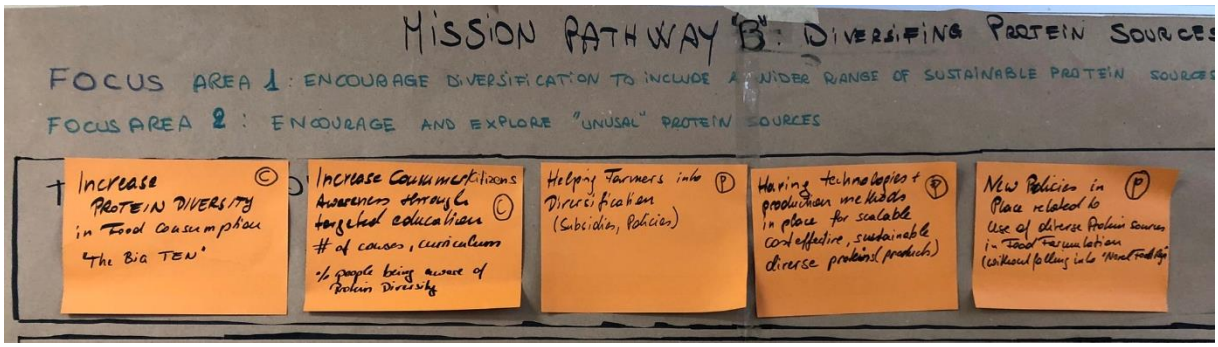
To consider:

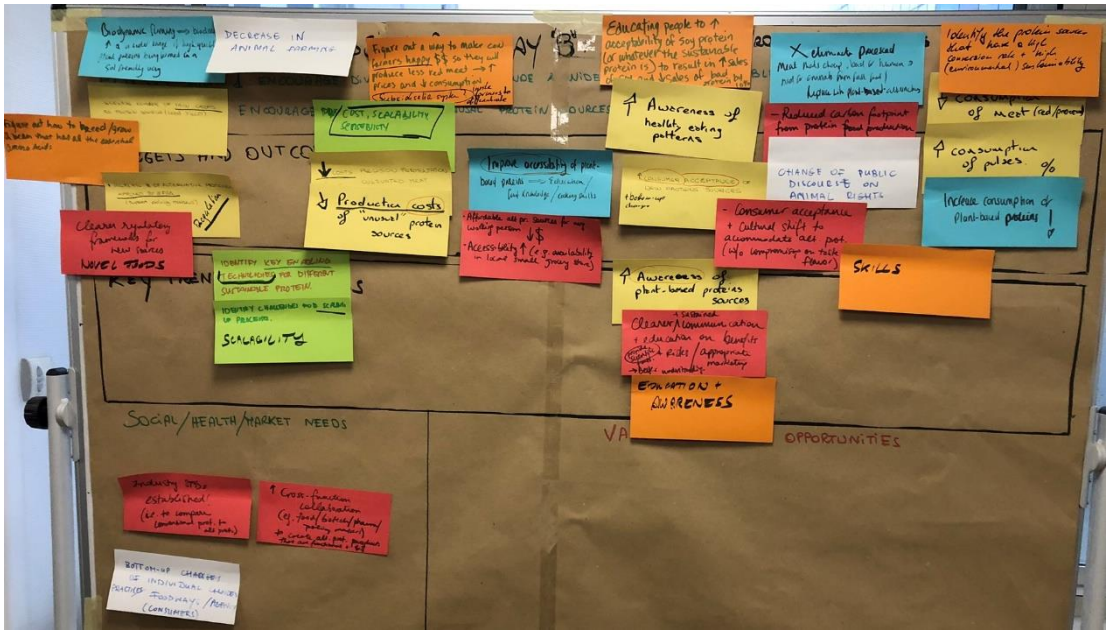
- Increase of alternative proteins approved by EFSA (support policy makers)
- Clearer regulatory frameworks for new sources –novel foods

KPIs:

- New regulatory framework separate from the novel food regulation, allowing a proper and prompt exploitation of the opportunities linked to the use of new protein sources.

Picture end result





Trends and drivers

The following trends were classified by the participant of high relevance in the context of Pathway B:

Table 2

Factor	STEEP	Rating
Changes in Farm Structures	Economy	4
Sustainable financing models	Economy	3
Availability of raw materials / global use of or demand for raw materials	Environment	3
Social media, Influencers and food	Society	7
Consumer Engagement	Society	4
Health and Food Conscious Consumer	Society	3
Alternative Protein Sources	Technology	6
New Technologies in Food Production / in the food system	Technology	5
Cultured / In-Vitro Meat	Technology	4

Societal trends as well as social media and influencers were considered instrumental to diversify protein sources in human diets. This is strongly connected to the actual availability of alternative protein sources, which was rated high in the technology trends. Other trends such as farm structure, consumer engagement, new technologies and cultured/in vitro meat, also received attention.

Needs

To achieve the goals of this Priority Area, the following needs have been identified:

Industry oriented:

- Establish industry standards (i.e., to compare conventional proteins to alternative proteins)
- Reduce production costs
- Market test to understand what stakeholders find interesting along the value chain
- “Clean label” formulation
- Scale up technologies (to address investments and skills gap)
- Safe alternative protein sources
- Peer to peer knowledge transfer

Consumers oriented:

- Bottom-up changes of individual choices and practices / foodways / agency (consumers)
- Education
- Collaborative approach to consumers
- Food pyramid and infographic: inclusion of new protein sources
- More transparent for consumers about sustainability
- Consumer acceptance considering traditions and cultural habits

Policy oriented:

- Incentives for primary producers to produce “unusual” proteins
- Clearer policy & regulation
- Increase in cross-function collaboration (e.g. food/biotech/pharma/policy makers) to create alt. protein products that are functional & affordable

Opportunities

Several opportunities have been identified to create value in delivering this Priority Area. They were basically clustered in 4 big areas:

- Technology developments
- Consumer education
- Primary production diversification
- Appropriate policy and regulatory framework.

By analysing the efforts and the impacts of the different opportunities, it was possible to prioritize them in those that are quick to implement and those that need more time to be carried out.

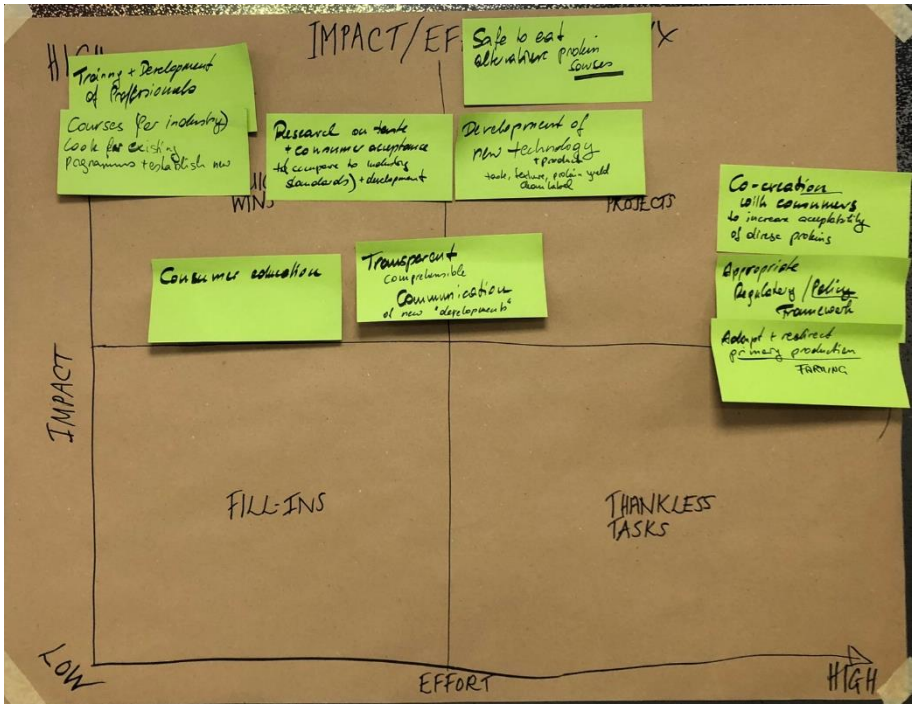
Quick wins:

- Training and development of professionals: in order to develop knowledge to be exploited in the production of new foods containing different sources of proteins;
- Courses for industry – look for existing programs & establish new ones: to push for technology transfer from research centres to industry so to simplify the implementation of new ingredients and new processes in the food industry;
- Research on taste & consumer acceptance – compare to industry standards (& develop them): to properly address the needs of consumers when it comes to new products containing ingredients which are new and give to the food new characteristics in terms of taste and consistency;
- Consumer education: to deliver correct and science-based information regarding the benefits of diversification of proteins in the diet;
- Transparent, comprehensible communication of new developments: aimed at delivering correct information to consumers who should engage with concepts related to sustainability and healthy diets.

Big Projects

- Safe to eat alternative protein sources: to properly demonstrate that the new ingredients obtained from new proteins are not harmful to human health in terms of allergens and presence of foodborne pathogens, which can be different from those found in current foods;
- Development of new technologies & products (taste, texture, protein yield, clean label): to correctly process new protein sources without impairing their nutritional content and at the same time reaching appropriate organoleptic standards;
- Co-creation with consumers to increase acceptability of diverse proteins: to involve the consumer in the process of product development so to improve consumer engagement;
- Appropriate regulation / policy framework: to facilitate in the future the adoption of new/diverse protein sources in food production without cumbersome legal or regulatory procedures to follow;
- Adapt & redirect primary production, farming: to diversify intensive monocrops cultures and animal production systems with more sustainable cultivations good for the planet, but also good for man when introduced in the diets.

Picture end result



Capabilities

For each of the opportunities described above, capabilities and enablers were identified. Moreover, it a pathway was constructed on timeline to be followed by implementing the opportunity in 2050.

Opportunity 1: Technology development

Capabilities/Technologies

- Waste valorization
- Ideation workshop
- Analytical science labs / research facilities
- Modelling & simulation
- Sensory labs
- Technical forums for academy & industry – streamlined platform
- Academic papers & patents
- Sustainable / safe / alternative packaging solutions
- Fermenters / bioreactors (technology & capability)
- Stem cell research / fermentation
- Fully personalized proteins
- Protein extraction & processing technology
- Apps to identify info on new product (QR code)
- Bioinformatics (AI)
- Metaverse
- Novel processing technologies

Enabler/Resources:

- Environmental scientists & from energy sector
- Venture capital/investors
- Industry leaders
- NGOs
- Start-ups / spin offs
- Ingredient evaluation
- Toxicology / risk assessment
- Precision agriculture
- Cross-disciplinary collaboration (transfer of skills& knowledge e.g., food ⇔ pharma)
- Biotechnology
- Regulatory framework
- Waste utilization (production of protein from waste) – circular economy
- Targeted funding

Opportunity 2: Consumer Education

Capabilities & Technologies:

- Chapter in GSCE /A-level (secondary school equivalent), curriculum/syllabus
- Science fairs
- Online topical courses for targeted audiences (e.g., consumers)
- Protein diversification forum /consortium
- Experience sharing (peer to peer transfer, hear from early adopters)
- Work with chefs & nutritionists => helps adaption
- Coherent, streamlined marketing strategies to reach different age & social groups
- Communication / dialogue between various stakeholders along the value chain
- Specialized university courses & professional development programs
- B2B, B2C "cooking" courses how to use alternative protein products
- Co-creation tools: focus groups; quali & quanti test; online questionnaire
- Co-creation methodology (or methodologies)
- Market test (shopper experience)
- Gamification
- Experimental learning
- VR / AR for immersive learning
- Neuroscience
- Learning management system (online infrastructure)
- Infographics e.g. inclusive food pyramid (elaborating other protein sources)

Enablers/resources:

- Media coverage
- Chefs & nutritionists
- Health care professionals
- Nutritionists & dieticians
- Regulators
- University professors & industry leaders
- Schools
- Cookbooks

- Food services (canteens, catering, restaurants)
- Educators (parents, teachers, caregivers)
- Health insurance companies
- Social media
- Funding
- Opinion leaders
- Data
- Knowledge
- Communities
- Culture/tradition / values

Opportunity 3: Adapt and redirect primary production, farming

Capabilities/technologies

- Peer-to-peer knowledge transfer
- Mentoring & reverse mentoring
- Workshops to share best practices
- Mapping of most profitable plant-based crops (high yield)
- Vertical farming
- Soil microbiome
- Aquaculture technique
- Precision farming (sensors, drones etc.)
- Algae technology
- Insect farming
- Mycoprotein technologies production

Enabler/resources:

- Funding mechanisms / incentive to adopt practices
- Procurement of goods and "supply chain"
- Mentors
- Governments, policy makers, regulators
- Influencers
- Communities / culture / local knowledge / traditions / values
- Subsidies for farmers drivers for changing primary production

Opportunity 4: Appropriate Regulatory / Policy Framework

Capabilities/technologies

- Body of knowledge & white papers
- Communication skills
- Low tech

Enabler/resources:

- EC DGs Agri & Sante
- Environmental agencies
- ETP European Technology Platforms (e.g. Food for Life)
- Lobbyists & think tanks
- EU Member States

- Networks / connections
- EIT food communities as a multistakeholder platform / group

Enablers

Synergies:

Synergies between the pathways were seen in the **formation of forums**, where subgroups for technologists, regulators or primary production could be founded. Also **sensory labs**, especially addressing consumers, are a good connection point between the identified opportunities. For **training and education** similar contents presented in different ways need to be developed, depending on the purpose of knowledge transfer (level of school education, training, upskilling, etc.). Connection points were also seen between supply chain logistics, retailers and manufacturer, as well as between manufacturing and consumers.

Overlaps:

Thematic overlaps between the identified opportunities are issues of **food safety and security**, as well as **regulation** for technology, farming and manufacturing practices. **Environmental scientists** should be involved in approaches to achieve more protein diversity. Also, special attention must be paid to **cross over technologies**, where especially technologies from pharmaceutical production were named. Overlaps were also seen to Mission 2 Net-Zero Food System and Mission 3 A Fully Transparent, Resilient and Fair Food System, when it comes to **adaption and assessment of farming practices**.

Conflicts and Barriers:

Cultural resistance to change was perceived as the biggest barrier to introduce new proteins, biggest issue for new products is taste, flavour, and texture to win consumers over. **Data science** is seen as enabler but bears a lot of conflict potential. The **political landscape and regulation** hindering the swift approval of new products and technologies was considered a barrier for implementing new protein sources. **Implementing (theoretical) projects into practice** was also mentioned as a conflict, for example for existing **farming structures and implementation of new farming models**.

Barriers are **accessibility to large or adequate funding** and **patents**, that might be affected for new technology or production methods.

How do the opportunities fit with the EIT food portfolio?

One of the challenges for EIT Food is the "new proteins", considering the new technology and the processes that are in development and the funding in places for those ones. There is a focus area on protein diversification in EIT Food with a White paper launched on December 15th 2022[1]. The contribution of EIT was seen as crucial but limited, with a need for thematic lobbying at central EU government and on regional level. The Prize based challenge, which was launched for applications until September 2022 on Personalized Nutrition for All and Cultivated Meat Innovation Challenge, also addressed

Furthermore, start-ups were discussed as playing a central role in achieving high impact and mapping of start-ups worldwide was suggested, not only in food industry but also in other sectors connected

[1] EIT Food White Paper on Protein Diversification (EIT-FOOD-WHITE-PAPER-PROTEIN-DIVERSITICATION-2022_FINAL15-12-22.pdf)

to it, in order to find clusters and see where the market is going in terms of protein diversification and to identify which infrastructure, human capital and other resources are missing.

Timeline

Opportunity 1	Now			2025	2030	2050 - aims
Task/ Activity	Mapping of industry leaders & other players (types, names) making it visible	Ingredients and protein sources Mapping	Precision Agriculture	Novel processing technologies	Metaverse	Having technologies & production methods in place for scalable, cost effective, sustainable diverse protein production
Stakeholder	GFI Spin-offs & start-ups X-KICs VC/investors, Funding Universities & research Industry Leaders SMEs			Regulators Environmental agencies, NGOs Retailers VC/Investors		
	Technical Forums for academy & Industry	Stem cell research / Fermentation	Modelling & stimulation	Toxicology / Risk assessment	Apps to identify info on QR code > Product	Fully personalised protein profiles established
Stakeholder		Fermenters / Bioreactors	Digital partners Computational biology / chemistry Bioinformatics (AI)			
	Ideation workshops	Protein extraction & processing Technologies	Waste valorization – utilization (production of protein from waste/circular economy)	Sustainable, safe, alternative packaging solutions		
Remarks from Gallery walk	Opportunity to create pilot plant, networks for start-ups		EFFoST			
	Considering the whole supply chain					
	Academic papers & patents					
	Environmental scientists & energy sector					
	Targeted funding					
	Regulatory Framework					
	Sensory Labs Analytical science labs					
	Research facilities					

Opportunity 2	Now to 2025			2025	2030
Task/ Activity	• Specialized university courses & professional development programs • Online topical courses for targeted audiences (e.g. consumers) • Protein diversification forum /consortium • Co-creation tools: focus groups; quali & quanti test; online questionnaire • Co-creation methodology (or methodologies) • Communication / dialogue between various stakeholders along the value chain • Experience sharing (peer to peer transfer, hear from early adopters) ➢ Gamification ➢ Experimental learning	• Market test (shopper experience) • Chapter in GSCE /a-level (secondary school equivalent), curriculum/syllabus • Coherent, streamlined marketing strategies to reach different age & social groups • Science fairs • Work with chefs & nutritionists => helps adaption ➢ Learning management system (online infrastructure) ➢ Infographics e.g. inclusive food pyramid (elaborating other protein sources)	B2B, B2C "cooking" courses how to use alternative protein products		
Stakeholder	*University professors & industrial leaders* *Opinion leaders* *Health care professionals* *Funding* *Communities* *Culture /traditions / values* *Media coverage* *Social media*	*Schools* *Educators (parents, teachers, care givers)*	*Health insurance companies* *Regulators*		
	Data *Knowledge*				
Stakeholder	*Cook books*				
	Food services (canteens, catering, restaurants)				

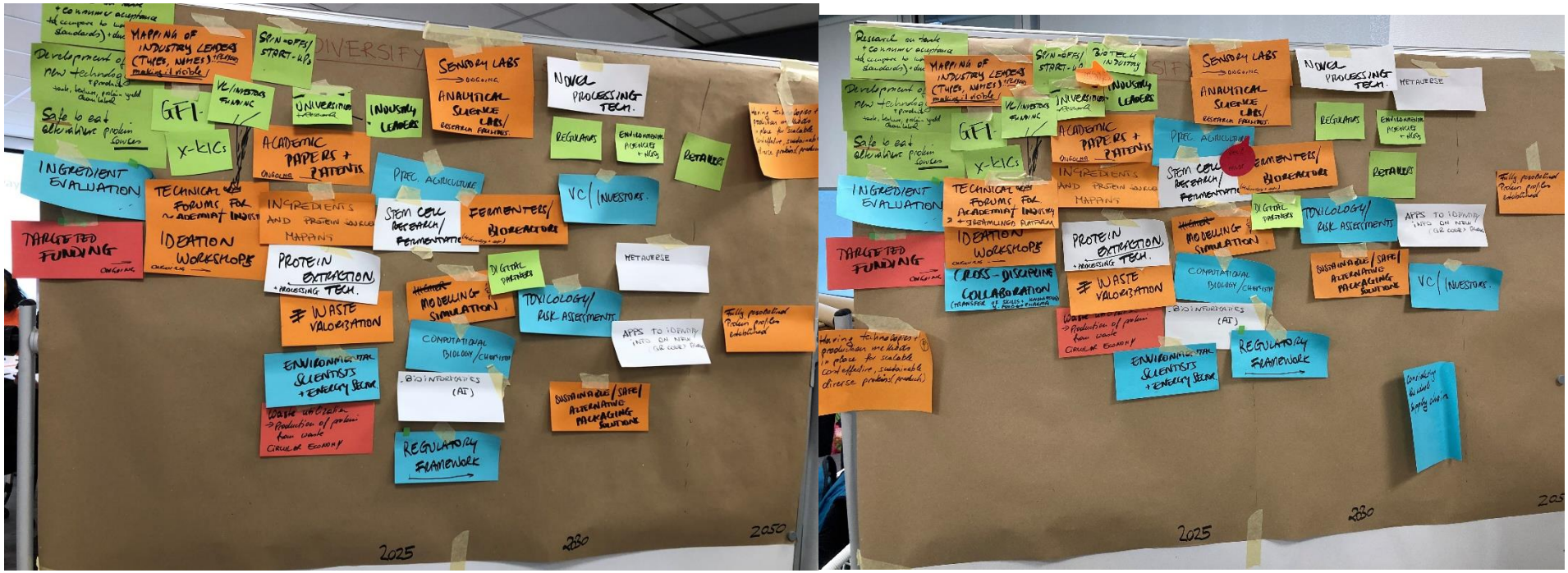
Opportunity 3	Now to 2025	2025-2030	2025	2030
Task/ Activity	Mapping of most profitable plant based crops (high yield)	Farmers Adaption →		
Stakeholder	Lobbyist Member states Farmers associations Early adopter			
	Workshops to share best practices Peer to peer transfer of knowledge Mentoring & reverse mentoring			
	Funding mechanisms / incentive to adopt practices Mentors	Supply chain logistics, procurements		
	Strategic planning of the future "5year planning" with all stakeholders			
	Governments, policy makers Influencers			
technologies	➢ Vertical farming ➢ Soil microbiome ➢ Aquaculture technique ➢ Precision farming (sensors, drones etc.) ➢ Algae technology ➢ Insect farming ➢ Mycoprotein technologies production		Cellular Agriculture Edu Stimulus Precision Fermentation	
Remarks from Gallery walk	Regenerative Live Stock? It's not the Cow it's the HOW! Technology to measure nutrient density and diversity (Bionutrient Pool association, Brightseed, DJ) Raw / unprocessed Plant Protein (Legumes)			

Opportunity 4	Now to 2025 and beyond
Task/ Activity	• Body of knowledge & white papers • Communication skills
Stakeholder	*DGs Agri & Sante* *Environmental agencies* *EU tech Platforms (e.g. Food for Life etc)* *Lobbyists & think tanks* *EU member states* *Networks / connections* *EIT food communities as a multistakeholder platform 7 group*

Table 3

Pathway B. Diversify protein sources

NCDs with potential relevance	What is the relevance?	Paris outcomes aimed at supporting NCD reduction		
		Outcome	Benefits	Counterbalancing issues that need to be considered.
Colorectal cancer	Reduction in red and especially processed meat consumption. Plant proteins may be accompanied by dietary fibre.	a. Increase protein diversification in food consumption	Unclear unless this leads to reduced red/ processed meat consumption.	Need to consider how to replace nutrients and functionality of animal products. Notably the need to replace iron and zinc supplied by red meat.
Type 2 diabetes	Reduction in red and especially processed meat consumption.	a. Increase protein diversification in food consumption		Replacement of dairy proteins needs serious consideration as they also provide calcium, magnesium, iodine, vitamin B12 and other nutrients. Of particular concern are adolescent females who may already be in suboptimal in these nutrients. Risk of chronic bone weakness as already seen in vegans/vegetarians
Alzheimer's disease/dementia.	Limited evidence that processed meat is associated with increased risk.	b. Increased consumer/citizens awareness through targeted education.	Always important	Must be evidence-based and not beliefs.
CVD	This is generally because many animal derived foods (especially dairy, red meat) are major suppliers of saturated fats historically believed to increase CVD risk. Whilst generally true for saturated fats from meat it is not the case for dairy for a range of reasons	a. The big five: pork, beef, chicken/poultry, fish, sheep.	Unclear, but presumed to be the key targets for protein replacement /NCD reduction.	They are not all equal and interesting that fish is included. If anything, consumption of fish should be encouraged. Overall dietary pattern needs to be accounted for.
		a. Increase in sales of good proteins and decrease of sales of bad proteins by 10%)	Not targeted	Dependent on what is defined as good or bad.
		d. Having technologies & production methods in place for scalable cost effective, sustainable diverse protein (products)	Benefit or not would depend on what was produced	Novel technologies would need to include knowledge on protein quality, not just amount.
		c. Helping farmers into diversification (subsidies, policy)	A long way from NCD consideration.	


MAPPING OF INDUSTRY LEADERS (TYPES, NAMES)
SPIN-OFFS/ START-UPS
SENSORY LABS
ANALYTICAL SCIENCE LABS/
NOVEL PROCESSING TECH.
GFI
X-KICs
UNIVERSITIES
INDUSTRY LEADERS
ACADEMIC PAPERS + PATENTS
REGULATORS
RETAILERS
INGREDIENT EVALUATION
PREC. AGRICULTURE
VC/INVESTORS
TECHNICAL FORUMS FOR ACADEMIA/INDUSTRY
INGREDIENTS AND PROTEIN SOURCES MAPPING
STEM CELL RESEARCH/ FERMENTATION
FERMENTERS/ BIOREACTORS
TARGETED FUNDING
IDEATION WORKSHOPS
PROTEIN EXTRACTION + PROCESSING TECH.
METAVERSE
DIGITAL TWINNING
WASTE VALORIZATION
MODELLING SIMULATION
TOXICOLOGY/ RISK ASSESSMENTS
COMPUTATIONAL BIOLOGY/CHEMISTRY
APPS TO IDENTIFY INTO ON NEW
ENVIRONMENTAL SCIENTISTS + ENERGY SECTOR
BIOINFORMATICS (AI)
SUSTAINABLE/SAFE/ ALTERNATIVE PACKAGING SOLUTIONS
REGULATORY FRAMEWORK
2025
2030
2050

Priority Area C: Increase and Retain the Nutrient Density of Food

The attraction of high nutrient density is that more nutrients can be provided with less associated energy than with low nutrient density foods. Potentially this has benefit for **managing energy intake and bodyweight.** The results of a Dutch prospective study with subjects over 55 years showed that a dietary pattern with a high nutrient density was associated with a lower risk of mortality, but not with a lower risk of CVD. Key food groups were vegetables, milk and milk products, fruit, bread, and potatoes, but it has to be stated that more studies are needed.

Priority Area C was thus designed to explore ways in which we can increase and retain the nutrient density of foods throughout the whole food value chain. This priority also links closely to Mission 3 "A Fully Transparent, Resilient and Fair Food System", and Mission 2: "Net Zero Food System", when the focus comes to primary production and healthy soils. The impact of this Area as to increase the nutrient density of foods through novel techniques in agriculture and aquaculture, but also gene technology and food fortification, while respecting natural production ecosystems (i.e., soil and water), favouring seasonal products.

Maintaining nutrient density is very important during food handling and preparation, furthermore consuming foods enriched in micronutrients is beneficial for preventing deficiencies, especially in populations at risk. It has to be stated that there are various ways of calculating nutrient density with some only accounting for 'positive' nutrients (e.g., protein, fibre, micronutrients) while others deduct the contribution from 'negative' nutrients like added sugar.

Expected Outcomes

Outcome 1: 10% reduction of deaths related to NCD in high prevalence countries by 2030

This outcome aims to substantially reduce NCD related deaths in countries with high prevalence. A substantially higher CVD mortality and prevalence is noticeable in Baltic and Eastern European countries. This is assumed to be primarily due to the higher intake of trans fatty acids of industrial origin, which was reduced in Western European countries by targeted campaigns and a vigorous reduction of industrial trans fatty acids in foods over the last 30 years. High sodium intake in several eastern European countries, foremost Bulgaria, has substantial impact on the high stroke rate, while diets low in calcium and dietary fibre, and high in processed meat are attributed to high rates in colorectal cancer in these countries. All this evidence provides an important target for reducing NCDs in these countries, where there is a need for manufacturers of relevant foods to alter ingredients to reduce trans fats in foods.

Outcome 2. 50% of EU population meeting minimum daily recommended vegetable & fruit consumption by 2030

Globally, consumption of meat, sugars, oils, and fats has been increasing during recent decades, whereas the intake of fibre-rich foods such as whole grains, pulses and roots has been declining. Suggested common dietary recommendations for preventing NCDs are diets high in vegetables and fruits, whole grains, pulses and nuts and seeds, with balanced, diverse protein intake and minimised consumption of red and particularly processed meat. Foremost dietary recommendations for the prevention of

Altzheimer`s disease and type 2 diabetes mellitus stress a high intake of fruits and vegetables, where the risk for most non-communicable diseases (NCDs) can be reduced with a diet consisting of high intake of fruits and vegetables: eating at least 5 servings per day, 3 of vegetables and 2 of fruit.

Outcome 3: 100% of EU children increase their consumption of vegetables & fruit by 10% by 2027

Healthy eating is essential for a child's good health, growth, and development. Healthy eating in childhood means they will have less chance of developing chronic diseases like heart disease, type 2 diabetes, obesity, and some cancers. It is vital, as for many, that healthy eating behaviour is trained at an early age, as less healthy eating habits established early on can create a pattern of lifelong obesity and increased risk of CVD, type 2 diabetes etc.

Outcome 4: All EU early years curricula to include food education by 2027

People need balanced and proper nutrition at every age, but children especially require the right nutrients to grow healthy and strong. When children truly learn about nutrition and the importance of physical activity, this sets a foundation for future eating habits and knowledge that they can apply for themselves as they grow up. Related to this is the importance of physical activity at all ages, which not only reduces NCD risk but can also enhance mental health. The importance of diet and exercise should be taught together. Consequently, this outcome was defined to include food education in early years curricula.

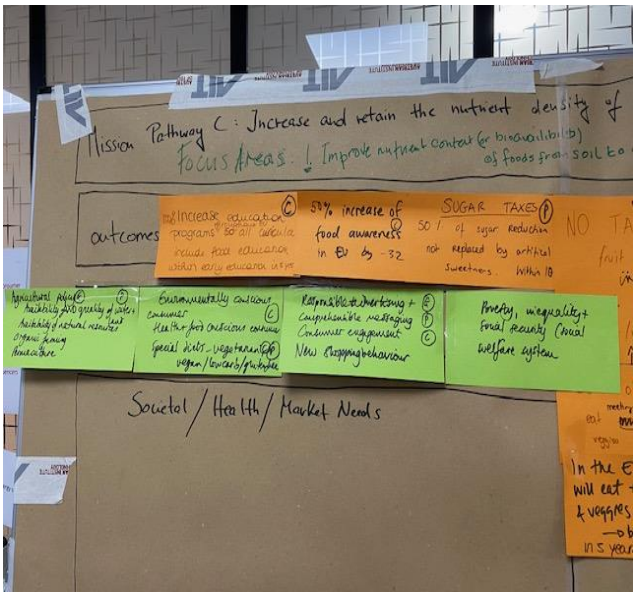
Outcome 5: 50% increase from current baseline of healthy food awareness in EU citizens by 2032

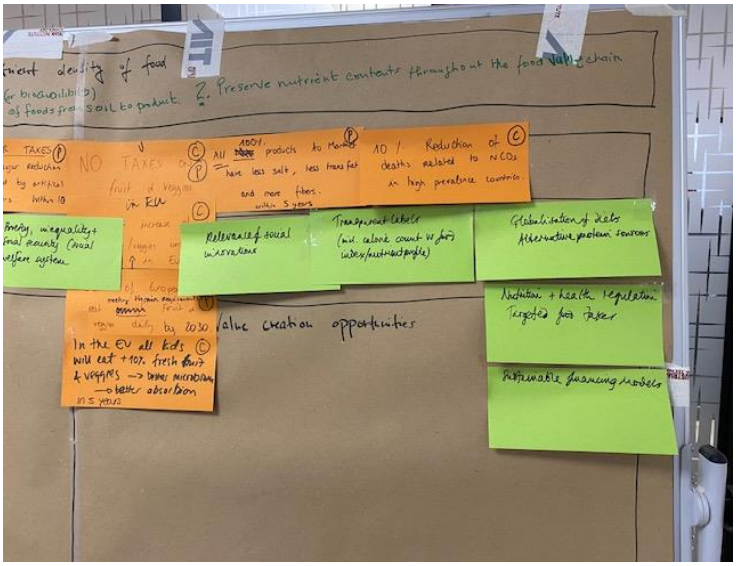
It is essential to promote an awareness of the nutrients contained in foods in relation to their roles in body maintenance, growth, reproduction, health, and disease prevention in humans. The message should be that eating a healthy diet is not all about counting calories and carbohydrates, but about eating the proper foods to support the body’s natural functions and maintaining an active lifestyle. Appropriate nutrition is important for a variety of reasons, including optimal cardiovascular function, muscle strength, respiratory ventilation, protection from infection, wound healing, and psychological well-being.

Trends and drivers

The selected trends and drivers for this Area C focus largely on agriculture, consumer behaviour, policy and labelling. Key drivers for increasing nutrient density of foods were seen in agricultural developments, encouraged by agricultural policy, increasing the proportion of organic farming to standard agriculture, permaculture, and ensuring the availability of resources through novel techniques in agriculture and aquaculture. The trend towards alternative protein sources noted here links with Pathway B. Consumers were also seen as strong drivers for pathway C, being more environmentally and health conscious, taking their shopping behaviour into account and their tendency to make changes in their diets for more globally sourced foods and vegan or vegetarian diets. Transparent labelling, adequate nutrition and health policies, responsible advertising and comprehensible messaging, and targeted food taxes were perceived as influencing factors. Social innovations and reduction of social inequality were seen as positive drivers. Also, adequate sustainable financing models were added as a positive trend.

Picture end result





Needs

To achieve the goals of Pathway C the following needs were identified:

Production oriented

- Lack of incentives to produce sustainable production (production/farmers)
- Funding for social innovations
- Scaling to deliver cost & affordability
- Food price

Consumer oriented

- Knowledgeable consumers
- Low food awareness
- Different diet patterns & resources
- Dietary habits
- Convenience (working hours) > shopping behaviour
- “One size fits all”

Policy oriented:

- Up to date regulatory landscape
- Create combined nutrition & ecolabel for food packaging
- Regulations EU wide that protect the environment (natural resources/water/land)
- Lobbying
- EU wide dietary guidance

- Green & affordable energy

Opportunities

A number of opportunities have been identified, for which it has to be stressed that ***all the opportunities were conditional on education as a transversal activity.*** Education on all levels, to train the trainer, for primary education, higher education, addressed at the agricultural sector as well as following up through the whole food system. The issue of taxation was heavily discussed, the option of reducing or erasing all taxes on fruits and vegetables was welcomed by all. However, increasing taxes on sugar was seen as highly controversial.

Quick wins:

1. School meals – breakfast, lunch/dinner – holiday cover

Quick wins, but big projects

2. Promote wholegrain and nutrient-dense crops from farm to fork by any means necessary
3. EU wide food big data platform - Real time data about consumption habits demand/production data> creating synergies and promoting short supply chain/sustainable practices – consumers, producers

Big projects

4. Help transition to regenerative farming for better soil> more nutritious foods
5. Fundamental nutritional content through supply chain – content in crops, sustained over time
6. Regulation and communication: no tax on veg & fruit; marketing, packaging & labelling (transparency, nutrients, esp. products aimed at children); enable producer network for economies of scale to promote veg & fruit advertising

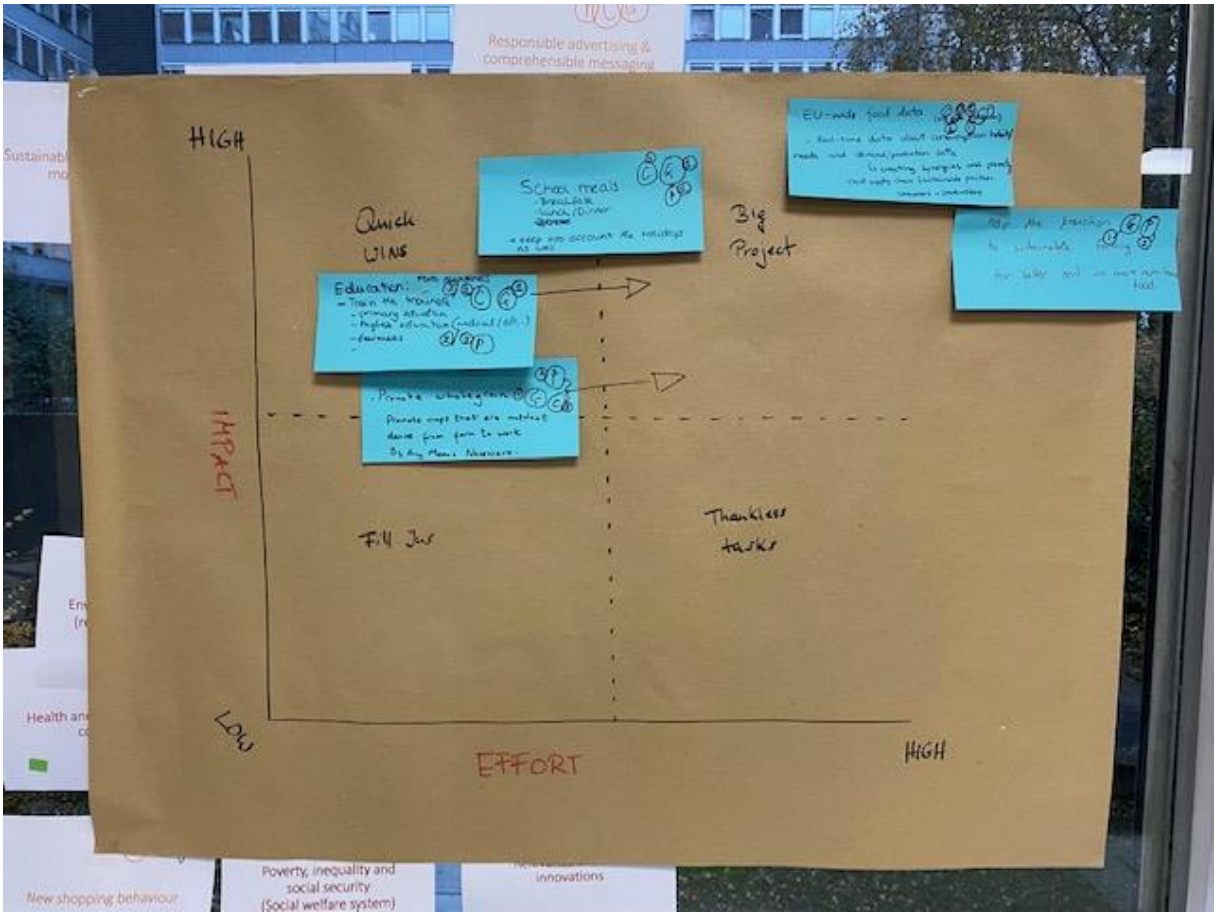
Capabilities & resources

1. School meals: Knowledge about nutrition for children, school and local school environment, coordination. Resources: money to fund, food partnerships to reduce costs, local producers, charitable organisations
2. Help transition to regenerative farming for better soil: Coordination; best knowledge about nutrition; farming; target groups of benefits it provides. resources: Marketing & communications expertise; trainers; Web interface IT,
3. Fundamental nutritional content through supply chain: Expertise/knowledge about regenerative/ organic/sustainable practices; resources: Expertise in practices; training support
4. Promote wholegrain and nutrient-dense crops: Education about whole grain diet and for producers the application of wholegrains (links with technologies); resources: Ensuring sufficient raw materials; education; Marketing & communications
5. Regulation and communication: Political willingness; Marketing & communications expertise; scientific data on nutrients; convening ability
6. EU wide food big data platform: Data analytical expertise; management; systems thinking; resources: Funding; wide adoption (usage widely)

Enablers

1. **School meals:** Pilot geographies; technologies: Measuring & monitoring baseline; Technologies:
2. **Help transition to regenerative farming for better soil:** Required curriculum (health); technologies: (Online) courses
3. **Fundamental nutritional content through supply chain**: Tax breaks/incentives for producers/farmers; technologies: Plant breeding techs and knowledge of what has been lost in development process since 40 years ago (orange arrow Post It)
4. **Promote wholegrain and nutrient-dense crops**: Breeding technologies; enhancing value of grain (fibre); reduce waste in grain processing/formulation/change processing technologies; increase natural sustainable shelf life; Technologies: Application of whole grains – not losing nutrients along processing chain
5. **Regulation and communication**: Education; policy; technologies: science behind nutrients
6. **EU wide food big data platform**: Consistent reporting metrics; expertise on measurement; technologies: Measuring & monitoring mechanisms/techs)

Picture end result impact matrix



Mapping of selected Opportunities onto Outcomes& How do the opportunities fit with the EIT food portfolio?

Outcome	Opportunity influencing the outcome	Degree of influence	EIT Food alignment
10% reduction of deaths related to NCD in high prevalence countries by 2030, reduce childhood obesity	**School meals** - reduce geographical variation - note early indicators/metrics - What does good food look like? - measure dietary adequacy	- strong	- Public engagement - Innovation (tool development) - Public affairs
Increase of regenerative agriculture in the EU by 2030 Increase nutrient content of crop harvest by 10%	**Transition to regenerative framing** - metrics to measure macronutrient content and bioavailability in finished food - nutrient sensitive agriculture - promote crops that are nutrient-dense from farm to fork		-Education -Innovation -Business creation -Public engagement (Communication)
10% reduction of deaths related to NCD in high prevalence countries by 2030, reduce childhood obesity	**Promote whole grain & nutrient-dense crops**		-Public engagement -Innovation (new products) -(Business creation)
Natural-low impact preservation of foods to increase shelf-life baseline 20%, reduce waste loss in value chain by 20%	**Food data** - short supply chains - bottom up local - scaling using big industry - suppliers – economies of scale		-Innovation -Public Affairs
No taxes on fruit and veggies in the EU to increase fruit/veggie consumption by 30%, 50% of Europeans will meet dietary guidance by 2030 (min fruit+veggies and max on salt+sugar) in the daily intake			-Public Affairs -Public engagement

Timeline

Table 4

	Now				2025		2030		2050
Opportunity 1: School meals – breakfast, lunch/dinner – holiday cover									
Activity Stakeholder	Map gaps, cost-benefit analysis G								
Activity Stakeholder	Network of NGOs P	Coordination projects			Roll out P				
Activity Stakeholder	Enable funding G								
Opportunity 2. Help transition to regenerative farming for better soil> more nutritious foods									
Activity Stakeholder	Rolling out existing project G,P				How much regenerative agriculture contributes to nutritional content; repeatable; Is it sustain supply chain		Education G,P		
Activity Stakeholder	Link to “regenerative farming” Philippe’s project P						Roll out Farmers adoption P		
Activity Stakeholder							Industry uptake P		

	Now				2025		2030		2050
Opportunity 3: Fundamental nutritional content through supply chain – content in crops, sustained over time									
Activity Stakeholder	Gap in diets-target content to enhance				Crop breeding, preservative tech = natural and sustainable →				
Activity Stakeholder									
Opportunity 4: Promote wholegrain – promote crops that are nutrient dense from farm to fork by any means necessary									
Activity Stakeholder	Baseline info	Interaction with industry	Identify barriers to take up	Consumer research	Roll out				
Activity Stakeholder					Tools according to barriers identified				
Opportunity 5: Regulation and communication: no tax on veg & fruit; marketing, packaging & labelling (transparency, nutrients, esp. products aimed at children); enable producer network for economies of scale to promote veg & fruit advertising									
Activity Stakeholder	Data requirement →	Information on current status of regulation	Bottom up action as well as top down						
Activity Stakeholder					Regulation from EU →				

Opportunity 6. EU wide food big data platform - Real time data about consumption habits demand/production data> creating synergies and promoting short supply chain/sustainable practices – consumers, producers									
Activity	Bottom-up network approach, scaling	Pilot regions, go local = glocal							
Stakeholder	Primary production, companies, retailors, G								
Activity					Select the metrics/indicators wanted to be measured (consumption, production)				
Stakeholder					G				
Activity							Build dashboard		
Stakeholder									

Table 5

Priority Area C. Increase and retain the nutrient density of food				
NCDs with potential relevance	What is the relevance?	Paris outcomes aimed at supporting NCD reduction		
		Outcome	**Benefits**	**Counterbalancing issues that need to be considered.**
The results of a Dutch prospective study with subjects >55 years showed that a dietary pattern with a high nutrient density was associated with a lower risk of mortality, but not with a lower risk of CVD. Key food groups were vegetables, milk and milk products, fruit, bread and potatoes. More studies are needed.	Potential benefit via moderation of BMI/adiposity which is on the causal pathway of diet and disease.	We need to know why there is a substantially higher CVD mortality and prevalence in the Baltic and east European countries. There was a question about whether there remained a higher intake of 'industrial' trans fats than in western countries.	This would inform on strategy on reducing CVD cases. Subsequently, evidence has been found that trans fat intake is indeed higher in these countries providing an important target for reducing CVD. This would in effect be reducing the 'nutrient' density of a 'bad nutrient'	The need for manufacturers of relevant foods to alter ingredients to reduce trans fats in foods.
Colorectal cancer	Risk would be reduced if density of fibre and calcium were increased. Milk has been shown to be associated with reduced risk in good part mediated by its high calcium supply.	Improving knowledge of food/nutrition in the public and farmers.	This would make consumers more selective when purchasing food and would encourage farmers to increase regenerative agriculture.	Influence on costs of food production and subsequently
Alzheimer's disease/dementias	Diets which provide more long chain n-3 fatty acids (DHA in particular) as found in oily fish maybe helpful particularly in females.	i. 10% reduction of deaths related to NCDs in high prevalence countries	A good target but will depend on obtaining data on causation. It is likely that the trans fat issue above would have a substantial impact.	
Type 2 diabetes	Potential benefit via moderation of BMI/adiposity which is a major risk factor. Also, protein rich diets also shown to reduce appetite with benefit for BMI control.	ii. Reduce childhood obesity	Very important. We are now seeing reduced insulin sensitivity in overweight children which is part of type 2 diabetes development.	Emphasis should be on diet and exercise.

		iv. Increase nutrient content of crops at harvest.	A good ambition but how achievable is it?	Impact at the whole diet level would need scrutiny.
		v. 50% increase in food awareness in EU by 2032	A valuable target	Means of achieving this would need a lot of thought
		vi. Increase education programs throughout EU so all curricula include food education within early education in 5 years	This is seen in the other pathways and is important	

Picture final paths