Tematisk innspill FP10 – Nofima AS

1. ***Hvilke tematiske områder er det spesielt viktig at vi samarbeider om på europeisk nivå i det kommende rammeprogrammet? Begrunn forslagene og forklar hvordan de vil bidra til europeisk merverdi.***

The EU food system stands as a global leader in food safety, quality, and sustainability. However, ensuring Europe's food security while enhancing competitiveness on the global stage requires continued investment in research, development, and innovation. Strengthening the EU's food innovation ecosystem is key to transitioning towards a more sustainable and resilient food system that meets global demands, while maintaining the high-quality standards that set the EU apart from the rest of the world. As a consequence of this, Food system need to be addressed as part of one of the societal challenges clusters in FP10.

Thematic area	**Efficient and intelligent production and processing of food**
Justification: The food industry must reduce its environmental impact and improve resource efficiency. Development and implementation of new technologies and digitalization are important tools towards achieving these goals.	
How to contribute to European added value: Reduce food waste, Improved resource efficiency	
Thematic area	**Safe, healthy and good food**
Justification: Diet-related and foodborne diseases are increasing health problems in Europe. More knowledge is needed on how food processing may influence both health, consumer acceptance and behaviour, food safety and food waste.	
How to contribute to European added value: Reduce food waste, Healthy diet	
Thematic area	**Novel raw materials for food and feed**
Justification: To increase future food production, new raw materials for food and feed are needed – from both land and ocean, as well utilization of current food side streams. This will require new knowledge related to production/harvesting, technical and nutritional properties, processing technology, as well as consumer attitudes. This thematic area aligns with the Norwegian mission on sustainable feed.	
How to contribute to European added value: Increase Europe's food security and self-sufficiency, Improved resource efficiency, Circular economy	
Thematic area	**Climate adaptation and mitigation**
Justification: Current food systems need to continue the adaptation to and mitigation of climate changes. For aquaculture this includes production of new species.	
How to contribute to European added value: Food security and self-sufficiency made possible through climate adapted food production	
Thematic area	**Direct and indirect food sources from the land and ocean**
Justification: Underutilised and/or novel resources of marine origin as input factor for healthy food directly or indirectly (as feed or ingredient)	
How to contribute to European added value: Increase food security and improve food induced health.	
Thematic area	**Fast-track to edibility**
Justification: Standardised regulatory dossier containing all relevant toxicological and nutritional information required to speed up novel food approval processes. Establish infrastructure to complete comprehensive suite of necessary analyses.	
How to contribute to European added value: Achieve faster implementation of novel food resources.	
Thematic area	**Food processing and packaging**

Justification: Improve food processing and packaging. New regulations require new knowledge.
How to contribute to European added value: Ensure food security, reduce food waste and improve competitiveness for improved value creation in the food industry while producing affordable and healthy food for the European population.
Thematic area **Diversification including low trophic species**
Justification: Research to develop the whole value chains (including reproduction, genetics, production, product development and marketing) of low trophic species. Included are non-food products with high potential for industry development, e.g. biofiltration and cosmetics.
How to contribute to European added value: Europe needs to produce more food with low carbon footprint. Utilise commercial potential to develop new food and non-food products.
Thematic area **Digitalisation in aquaculture production**
Justification: Digitalisation can improve the monitoring, auditing, evaluation and assessment of farmed aquatic animal performance, health and welfare. It can also enable less invasive and more robust data collection on certain KPI's and the welfare state of the animals we produce for food purposes. However, we need to improve the interpretation and use of the data from sensors so it serves the purpose of increasing performance monitoring, animal health and welfare. Decision tools and frameworks should also be improved, which can in turn enhance the reactive and proactive responses to potential health and welfare threats due to handling, weather, disease outbreaks etc, in addition to directing better mitigation practices. It can enhance predictive capabilities regarding fish health and welfare management and improve risk assessments for aquatic food animals and people.
How to contribute to European added value: Improve precision of European Aquaculture production.
Thematic area **Aquaculture farming technologies**
Justification: There is a need for technologies that separate fish from pathogens and to secure fish welfare during a changing climate and bad weather. We need to develop CO2 degassing and Carbon Capture, use physiological fitness proxies like thermal tolerance and hypoxia challenges. We need to develop disinfection methods.
How to contribute to European added value: Animal welfare
Thematic area **Animal health and welfare**
Justification: Many of the digitalisation opportunities outlined above are equally applicable to this section. Genetic analysis are still missing for many of the important health and welfare traits. Applications to include health and welfare traits- after validation for their efficiency in the field- in selective breeding are needed. Overall mortality and robustness of the fish needs to be addressed with improvements along the whole chain. The power of epidemiology to reduce mortality in aquaculture production has not been fully utilized, recording and statistical modelling methods need to be further developed. Effective epidemiological models that address the genetic potential to reduce infectivity are needed.
How to contribute to European added value: Improved health and welfare is mandatory for the aquaculture industry to improve its sustainability and increase production as well as keeping their "license to operate".
Thematic area **Gene editing**
Justification: Gene editing is a technology currently used for research and development, but with a potential for aquaculture industry applications. For this to happen, gene editing method development for large scale applications are needed. Industry application schemes for selective breeding that include gene editing need to be developed, including efficient ways to increase genetic gain while maintaining genetic variability in the populations. The dissemination of edited elite stocks at production level need to be optimised. Risk

assessment and traceability methods need to be developed. Also, fundamental studies on the traits with highest potential for editing are needed.	
How to contribute to European added value: Knowledge needed for development of regulation and industry regarding gene edited food products.	
Thematic area	**Realisation of the circular economy**
Justification: Overarching call requirement justifying that a project outcome is made circular by demanding market relevant prototypes (higher TRL level) in intended environments. Utilisation of low-hanging "fruits" by e.g. not only developing ingredients, but including them in actual products, placed in relevant stores.	
How to contribute to European added value: Commercialisation of food products.	
Thematic area	**Food system**
Justification: It is important that central challenges for the European food industry, both production and processing, are addressed in the coming FP10.	
How to contribute to European added value: Food security, Preparedness, Strong European food industry.	

2. **De europeiske partnerskapene og samfunnsoppdrag (missions) er virkemidler EU benytter i tillegg til regulære utlysninger. På hvilke områder er det særlig viktig for Norge at disse virkemidlene benyttes?**

Three current partnerships are important for the food systems:

- FutureFoods
- Sustainable Blue Economy
- Animal Health and Welfare

The thematic priorities described above are relevant also for these partnerships. In order to ensure transition of the European food systems, the thematic area need to be focused either in FP 10 or in one of these partnerships. We support to maintain and further develop these partnerships.

Er det andre forhold det er viktig å få fram i et nasjonalt tematisk innspill?

Other area	Justification
System approach	System approach is important to address many of the challenges in the food system. However, if barriers in the system are identified, it is important to address these barriers and challenges within a defined part of the food system.
Zero growth	There has been zero growth in European aquaculture since the beginning of 2000's. Most production takes place in small farms with cultural and natural differences and markets. New instruments may be needed to perform research and dissemination at farm level.