# ERA-NETs SUSFOOD2 and FOSC Joint Call

"Innovative solutions for resilient, climate-smart and sustainable food systems"

*Funded projects*

In 2021, the ERA-NETs SUSFOOD2 and FOSC launched a Joint Call for transnational research proposals on "Innovative solutions for resilient, climate-smart and sustainable food systems". Fourteen funding bodies from 13 countries (Algeria, Argentina, Belgium, Estonia, Finland, France, Ireland, Italy, Morocco, Norway, Romania, Turkey and UK) supported this initiative. As a result, 5 projects were funded for a total budget of 3.6 M euro.

## ABOUT SUSFOOD2 AND FOSC

The ERA-NET Cofund SUSFOOD2 "SUStainable FOOD production and consumption" started in January 2017, and is the continuation of the FP7 ERA-NET SUSFOOD (2011-2014). The strategic goal of SUSFOOD2 complements the EU bioeconomy and food policies, and aims to reinforce cooperation in research, development and innovation between EU members and associated states in order to maximize the contribution of research to the development of more sustainable food systems from production to consumption. The scope of SUSFOOD2 covers the entire food supply chain, with the main focus on food chain sustainability beyond the farm gate. The farm level is considered if it has direct impact on the sustainability of the other steps in the food chain. SUSFOOD2 has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727473.

SUSFOOD2 promotes a cross-sectoral and multi-disciplinary approach from biology to food engineering and social sciences. It addresses the following socio-economic and environmental goals: (i) to develop sustainable food systems from production to consumption, (ii) to increase food production sustainably whilst reducing waste in the food supply chain and limiting environmental impacts; (iii) to improve the quality of life by improving food quality in a sustainable way and to ensure the resilience of the food supply chain; (iv) to encourage sustainable consumer behaviours and food choices; (v) to improve competitiveness and economic growth in the European food industry with special attention to SMEs. For more information, please consult: **http://susfood-era.net**

FOSC is the ERA-Net Cofund action on "Food Systems and Climate". It is built upon and supported by the experience from FACCE-JPI and LEAP-Agri. FOSC was launched in October 2019 and will run for five years. The consortium consists of 28 partners from Europe, Africa and Latin America. FOSC has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 862555. FOSC addresses one of our world's major challenges: how to feed 10 billion people by 2050. The ambition of FOSC is to implement a range of joint activities to contribute to the creation of a strong and effective transnational research and innovation network between Europe, Africa and Latin America.

Images: Shutterstock, Pixabay

The main challenge of FOSC is to contribute to the achievement of food and nutrition security within the context of sustainable food systems, considering the three dimensions of sustainability (social, environmental, and economic). The main research themes of FOSC cover the following topics: i) Assessment of climate change-related risks for food value chains; ii) innovative technological solutions to build sustainable and resilient food value chains; iii) increased resilience and reduction of volatility in agri-food systems to sustainably improve food security in the context of climate change; iv) reduction of food losses under climate change, including the valorisation of side streams and reduction of food waste.

FOSC promotes a system approach that includes the addressing of scales: i) spatial scales – local, regional and global level, and ii) time scales, using the 2050 time horizon to include the expected climate risks and demographic changes. Inter-national and intercontinental collaboration within research projects and additional activities is an important aspect of FOSC. The global character of food chains asks for an international joint approach in the context of food system transformation. For more information, please consult: **https://www.foscera.net**


## JOINT FORCES

This Joint Call initiative by SUSFOOD2/FOSC network originated under the premise that attaining resilient and sustainable food systems would require a transition from current linear food production systems, which are vulnerable to system shocks, to resilient circular systems that encompass efficiency, side-stream valorisation and avoidance of food loss and waste and consider the interdependencies within the systems and its stakeholders. Such a transition will have to be accompanied by substantial progress in the organization and management of food systems and supported by the development of novel technologies, which will play a key role to support the transformation of food systems so that they operate within natural resource boundaries with minor climate change impact. Food systems comprise food production activities, processing and packaging, distribution and retail, as well as consumption. Various factors, like environmental and socio-economic drivers, influence the systems and therefore, different approaches can affect the resilience and sustainability of such a complex network. Moreover, the diversity of food systems (local, high-tech, traditional, etc.) raise the need to find the right approach to increase their sustainability and resilience.

## AIM OF THE JOINT CALL

The aim of the call is to foster scientifically excellent multi-disciplinary and multi-actor research, development and innovation projects. We will support projects taking a food systems approach considering all relevant aspects that have potential to increase sustainability (Topic I) and resilience (Topic II). Spatial scales can be different, from local focus to projections at the regional or macro regional levels.

## JOINT CALL TOPICS

>**TOPIC I**: INNOVATIONS TO IMPROVE FOOD SYSTEMS SUSTAINABILITY, WITH A FOCUS ON INCREASING RESOURCE EFFICIENCY AND REDUCING WASTE

>**TOPIC II**: FOOD SYSTEMS ADAPTATION AND RESILIENCE TO SYSTEM SHOCKS

## RESULTS

Thirty-one research proposals, involving collaborations of more than 195 research partners from 10 different countries, were submitted by August 2021. The proposals were evaluated by international peer-reviewers following the criteria and procedure stated in the call announcement and evaluation guidelines. Based on this scientific peer-review process and the limits of available national/regional funding, the Call Board recommended 5 research projects, consisting of 34 partners, for funding with a total requested amount of about **3.6 M euros**. Out of the five selected projects, four projects contribute to the first topic of the joint call: "Innovations to improve food systems sustainability, with a focus on increasing resource efficiency and reducing waste", and one project contributes to the second topic: "Food systems adaptation and resilience to system shocks". The projects start between April and May 2022 and have a runtime of 36 months.

SUSFOOD2

FOSC
ERA-NET Cofund on Food Systems and Climate

# MedAgriFoodResilience

Socio-environmental shocks assessment and resilience empowerment in Mediterranean agri-food heritage systems: Italy, Morocco, Algeria FAO GIAHS sites

## COORDINATOR

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Italy - University of Florence (UniFl)

## PARTNERS

Morocco - Mohammed VI Polytechnic University (UM6P)

Algeria - University of Biskra (UMKB)

Algeria - Scientific and Technical Research Center on Arid Regions (CRSTRA)

Morocco - University of Ibn Zohr (UIZ)

## INTRODUCTION

Traditional agri-food systems are increasingly receiving attention at international level. This is thanks to their multifunctional role and as examples for alternatives to agricultural models based on maximizing productivity. Traditional agri-food systems developed through the centuries by local communities are still actively supporting the livelihood of local farmers, providing solutions for climate change mitigation and adaptation as well as contributing to the preservation of agro-biodiversity, traditional knowledge and cultural identity. The importance of traditional agri-food systems is recognized by the Food and Agriculture Organization (FAO) and the establishment of the Globally Important Agricultural Heritage Systems (GIAHS) Programme. The GIAHS Programme has the aim to identify and preserve worldwide sites characterised by agricultural systems created and managed over time by local communities, that today represent examples of local adaptation and mitigation towards global challenges, contributing to food security and sustainable development of rural communities.

## AIM

The importance of traditional agri-food systems is recognized by the Food and Agriculture Organization (FAO) and the establishment of the Globally Important Agricultural Heritage Systems (GIAHS) Programme. The GIAHS Programme has the aim to identify and preserve worldwide sites characterised by agricultural systems created and managed over time by local communities, that today represent examples of local adaptation and mitigation towards global challenges, contributing to food security and sustainable development of rural communities.

## ACTIVITIES AND EXPECTED RESULTS

The project will focus on studying three GIAHS sites (in Italy, Morocco and Algeria) applying a multidisciplinary approach to identify the possible social and environmental shocks impacting agri-food heritage systems in the Mediterranean area, linking together landscape structure, climatological studies, social role and biodiversity assessment. Over the centuries, local communities have adapted to challenging environmental conditions such as a dry and hot climate, water scarcity and steep slopes. The selected systems produce for a Mediterranean diet and are still fundamental for the food security of local communities. They have demonstrated to be more resilient towards possible shocks than modern and intensive food systems. The results of the project will lead to the identification of the best practices to be replicated in other GIAHS sites and in other traditional agri-food systems to increase the adaptation and resilience to social and/or environmental systems shocks.

Image: pixabay

**Duration**

30 April 2022 – 29 April 2025

**Funding**

€ 370,000

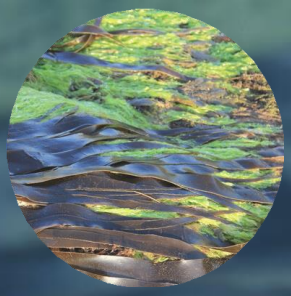
**Website**

https://www.medagrifood.eu/

https://foscera.net/en/foscera/Projects/MedAgriFoodResilience.htm

https://susfood-db-era.net/main/MedAgriFoodResilience

MedAgriFood RESILIENCE



# IPSUS

Climate smart food innovation using plant and seaweed proteins from upcycled sources

## COORDINATOR

Dr. Parag Acharya

United Kingdom - Natural Resources Institute, University of Greenwich (NRI)

## PARTNERS

Italy - University of Parma (Unipr)

Turkey - Istanbul Sabahattin Zaim University (IZU)

Morocco - National School of Agriculture in Meknes (ENA)

Romania - BEIA Consult International (BEIA)

Italy - Experimental Station for the Food Preservation Industry (SSICA)

Morocco - Mohammed V University (UM5)

Turkey - Kaanlar Food Inc.

France - KEDGE Business School

### Duration

14 April 2022 – 13 April 2025

### Funding

€ 830,000

### Websites

https://foscera.net/en/foscera/Projects/IPSUS.htm

https://susfood-db-era.net/main/IPSUS

## INTRODUCTION

Food choices impact human and planetary health. The negative environmental impacts of the food system, increasing food insecurity and the prevalence of unhealthy diets are driving policymakers, scientists, companies and consumers to demand sustainable solutions. Globally, livestock emits 14.5% of greenhouse gasses, is associated to 30% of biodiversity loss, and, with meat demand is projected to double by 2050, transitioning to diets that include more sustainable sources of protein is crucial. Plant-based proteins are currently the fastest growing food trend but are unsustainably dependent on soy.

## AIM

The IPSUS project will exploit inter-disciplinary and eco-innovative approaches to explore opportunities for upcycling plant and seaweed proteins from agri-food raw materials otherwise destined to join the ~1.6 billion tonnes of annual global food loss and waste (FLW). The quantity, quality, and upcycling opportunities of FLW occurring along the value chains of six protein-rich commodities (pumpkin, hazelnut, grape, potato, brewers' spent grain, and seaweeds) will be investigated in the UK, Italy, Romania, Turkey, and Morocco to contribute towards achieving Net Zero through linking sustainable protein shift and food waste valorisation.

## ACTIVITIES AND EXPECTED RESULTS

The types and quantities of FLW with protein upcycling potential within the focal value chains will be explored and compared. Novel protein extraction methods will be assessed to identify and optimise less energy intensive and more sustainable techniques. The nutritional quality and safety of the plant and seaweed sources and upcycled proteins will be assessed, taking bio-accessibility and potential allergenicity into account. In addition, incorporation of upcycled proteins into meat alternative and dairy alternative formulations will be tested at lab-scale, followed by prototype development at pilot-scale by the industrial partners. Functional and sensory acceptability of the prototypes will be evaluated along with improved nutritional (low salt/sugar/fat) and cleaner label (fewer food additives) offerings which are currently lacking in the plant-based meat and dairy alternatives. Exploration of consumer behaviours, preferences and the enabling regulatory and policy environment will reveal drivers and barriers of the sustainable protein shift via upcycled plant proteins.

Image: pixabay

# SmartDairy

Climate-smart Dairy: Assessing Challenges, Innovations, and Solutions

## COORDINATOR

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Ireland - National University of Ireland Galway (NUI)

## PARTNERS

United Kingdom - University of Sussex

Italy - University of Ferrara (UNIFE)

Finland - University of Helsinki

United Kingdom - University of Reading

United Kingdom - University of Bristol

## INTRODUCTION

Food systems are responsible for one third of global greenhouse gas (GHG) emissions. Dairy production is a significant contributor to those emissions and, given that global demand for dairy is projected to increase, there is an urgent need to reduce emissions from this sector. For example, a clearer understanding of the functioning and acceptability of climate-smart innovations that can be implemented along the dairy supply chain can contribute to achieving a climate-neutral EU continent by 2050.

## AIM

This project aims to assess challenges, explore innovations, and create new solutions to achieve a climate-smart dairy system. Using a multi-actor, multidisciplinary approach across four European countries, we will explore interconnections and consequences of climate-smart innovations within the dairy system.

## ACTIVITIES AND EXPECTED RESULTS

We will use a living lab/stakeholder approach to co-design innovations that will subsequently be evaluated with dairy system stakeholders across the four countries. Specifically, in Ireland, we will assess the acceptability of dairy system carbon markets to accelerate the uptake of carbon mitigation measures by farmers. In Italy, we will simulate the implications of new climate-smart policies and business models along the dairy supply chain. In the UK, we will explore consumers' perceptions and willingness to pay for climate-smart innovations. In Finland, we will analyse socio-cultural issues related to the consumption of milk and alternative products, as well as dairy-based food waste reduction behaviour.

Country specific outcomes will be consolidated during the final stage of the project. Here, we will present findings from all countries to local stakeholders for co-creation of solutions that enable a climate-smart dairy system that is acceptable to all actors from farm to fork.

Overall, SmartDairy will create impact by reducing GHG emissions, increasing resource efficiency, and reducing waste, bringing us a step closer to a climate-neutral future.

Image: pixabay

### Duration

1 April 2022 – 31 March 2025

### Funding

€ 796,000

### Websites

https://foscera.net/en/foscera/Projects/SmartDairy.htm

https://susfood-db-era.net/main/SmartDairy

# AlgaeBrew

Unlocking the potential of microalgae for the valorization of brewery waste products into omega-3 rich animal feed and fertilisers

## COORDINATOR

Dr. Ronald Halim

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## PARTNERS

Italy - University of Camerino (UNICAM)

Turkey - Bilecik Seyh Edebali University (BU)

Morocco - National School of Agriculture in Meknes (ENA)

Belgium - Lambers Seghers (LS)

United Kingdom - Swansea University (SU)

Romania - University of Agronomic Science and Veterinary Medicine (USAMV)

## INTRODUCTION

As one the largest agri-food industries, beer production generates large amounts of nutrient-rich wastewater and spent grain. The conventional linear "collect-treat-discharge" way of handling waste is costly and environmentally unsustainable. AlgaeBrew will use microalgal bio-technology to convert these wastes into useful products, thereby creating new revenue streams for breweries, decreasing their environmental impacts and promoting a circular bioeconomy.

Eicosapentaenoic fatty acid (EPA) is essential for the immune system and widely used in dietary supplements for human and animals. Commercial EPA production relies on fish oil derived from wild-caught fish, thereby putting enormous strain on the fish stock and the ocean ecosystem. A group of microalgae known as Nannochloropsis produces EPA naturally and can be exploited as an alternative source of EPA. By recapturing waste nutrients, Nannochloropsis can help breweries treat their waste products while producing sustainable EPA. This will be a win-win solution for both breweries and EPA producers.

## AIM

AlgaeBrew aims to develop scalable processes that use Nannochloropsis to upgrade brewery wastewater and spent grain into high-value EPA for the feed industry. The residual Nannochloropsis biomass after EPA extraction will be developed into biofertiliser to achieve a zero-waste goal. The project will address technical challenges associated with Nannochloropsis cultivation on brewery waste, EPA extraction, feed formulation and socio-economic analysis.

## ACTIVITIES AND EXPECTED RESULTS

The project will be undertaken by 7 universities, a beer producer (Diageo) and an animal feed producer (Lambers Seghers) across 4 EU (Ireland, Belgium, Italy, Romania) and 3 associated countries (Morocco, Turkey and the UK). Our estimation suggests that the brewery-microalgae system proposed by AlgaeBrew has a future potential to treat up to 26.8% of spent grain and 19.3% of brewery wastewater produced globally, while replacing the global demand for 21.6% of fish oil.

Image: cultivation system at Swansea University (UK)

### Duration

1 April 2022 – 31 March 2025

### Funding

€ 1,300,000

### Websites

https://foscera.net/en/foscera/Projects/AlgaeBrew.htm

https://susfood-db-era.net/main/AlgaeBrew

# Olive3P

Innovative sustainable food system for olive oil production converting solid and liquid by-products into edible yeast and biopesticide

## COORDINATOR

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Algeria - Ecole Supérieure des Sciences de l'Aliment et des Industries Agroalimentaires (ESSAIA)

## PARTNERS

Morocco - Cadi Ayyad University (UCAM)

Morocco - University of Sultan Moulay Slimane (USMS)

Turkey - Olive Research Institute, General Directorate of Agricultural Research and Policies (GDAR-ORI)

Turkey - DÜZEN Biological Sciences R&D and Production Inc.

## INTRODUCTION

The Olive3P project aims at transforming conventional olive oil production into an integrated innovative food system through treatment of solid by-products along with treatment of olive mill effluents combined with the recovery of novel products comprising activated carbon, edible yeast, and biocontrol agents containing polyphenols.

## AIM

Biochar obtained from carbonisation of solid residues (branches from olive harvest, olive stone from the milling process), will undergo physicochemical activation. Biochar and activated carbon will be applied as adsorbent for polyphenols capture from olive mill effluent and recovered as a natural biocontrol agent with biocidal activity. Polyphenols will be extracted from biochar and activated carbon by conventional and supercritical CO2 extraction using green solvents and tested as biopreservative in table olive conservation, whereas adsorbents (activated carbon or biochar) containing residual polyphenols will be applied as soil conditioner, and their biopesticide potential on soil-borne pathogens of olive seedlings will be evaluated.

Treated olive mill effluents with reduced concentrations of inhibitory polyphenols will be applied for efficient cultivation of edible yeast, adding cheese whey as a low-cost nitrogen source for optimal yeast growth. Harvested edible yeasts will be evaluated as health-promoting animal feed rich in carotenoids with potential application in poultry and fish production.

## ACTIVITIES AND EXPECTED RESULTS

Lab scale results will be transferred at a pilot scale by the participating Turkish company in view of future commercial exploitation. The evaluation of the innovative system in Food Systems Approach (FSA) will be applied on following drivers:

(1) Healthy diet: Quality and safety of edible yeast and biocontrol agent,

(2) Cost and revenues: Socio-economic feasibility of the innovative food system for small 3-phase olive oil factories, and relation to current sustainable practices,

(3) Food security: Resource-efficiency evaluated by mass/energy balance and Life Cycle Analysis, compared with current practices.

Image: pixabay

## Duration

1 May 2022 – 30 April 2025

## Funding

€ 361,000

## Websites

https://foscera.net/en/foscera/Projects/Olive3P.htm

https://susfood-db-era.net/main/Olive3P