FACCE SURPLUS

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Sustainable and Resilient Agriculture for Food and Non-Food Systems

About

FACCE SURPLUS is an ERA-NET Cofund, formed in 2015 in collaboration between the European Commission and a partnership of 15 countries in the frame of the Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE-JPI).

FACCE SURPLUS is committed to improve collaboration across the European Research Area in the range of diverse, but integrated, food and non-food biomass production and transformation systems, including biorefining.

Aim and objectives

The overall objectives of FACCE SURPLUS are:

- To improve collaboration and cooperation across the European Research Area in the fields of diverse, but integrated, food and non-food biomass production and transformation systems, including biorefining.
- To link up and create a network of research platforms, enterprises and clusters of enterprises (as associations of family farms, SME's etc.) and facilities/research infrastructures across Europe working on the sustainable intensification of agriculture as well as focusing on innovation for increased, resilient and sustainable biomass production and product transformation processes for added value creation.
- To support innovation and value creation from biomass and biorefineries in synergy with the environmentally sustainable intensification of agricultural and other biomass production taking into account the required economic, environmental and social conditions.
- To fund and organise a joint call between funding bodies from Member States and the European Commission.

Furthermore, FACCE SURPLUS also aims at:

- Organising further joint calls without EU funding in the scope of the ERA-NET Cofund,
- Supporting the environmental innovation and value creation from biomass and biorefineries in synergy with environmentally sustainable intensification of agricultural production and
- Overcoming fragmentation & duplication, closing gaps on national level and generating maximal synergies for all funders and research providers in Europe in the field.

These objectives contribute to the strategic objective of FACCE-JPI to build a European Research Area in the domain of agriculture, food security and climate change as well as to the scientific objective of enhancing resilience in agricultural production systems. In turn, this contributes to tackling the Grand Challenge of ensuring food security and agricultural production in the face of climate change.

Challenges

Global food security, the use of renewable raw materials and production of energy from biomass are three of the “Great Challenges” for the 21st century. In line with the European Bioeconomy Strategy,

better use of biomass and waste from plant and animal terrestrial and aquatic production systems is a fundamental aim to fulfil human needs while preserving natural resources and biodiversity. All economic actors that produce, manage and otherwise exploit biological resources, including agricultural and other land based activity in its widest sense, such as in the food, animal feed, farmed fish and forest-based chains, as well as parts of the chemical, biotechnological and energy industries, should be considered as a whole in the bioeconomy. The concept extends beyond technological innovation to present new opportunities for organisational innovation in the development of novel production chains that will contribute to improving life for all. In this way, rural and coastal communities will be given greater opportunities for diversification at different spatial scales in line with local and regional development plans.

The current food system was created in response to meeting food production targets in the post-war era. It represents decades of investment in infrastructure and the creation of institutional arrangements that reflect the political and economic priorities of recent decades, up to and including the globalisation of food systems. However, in the past years it has become clear that a managed transition towards radically improved food and non-food systems by 2050 will be needed to make the most efficient and sustainable use of land and other natural resources across the EU.

New bio-technologies and industrial processes need to be developed and traditional relationships between actors in the various food and non-food production chains will need to change to accommodate innovations leading to a radical reorganisation of the agri-industrial sector and the emergence of a reformed bioeconomy. Industrial reorganisation is an ongoing process driven by the market and the growing demand for bio-based products.

A holistic view across research disciplines is a prerequisite of any research into the relationship between food and non-food systems: the interconnections between them lead to a weakening of the boundaries between production and product transformation. Alongside the increased demand for biomass for a variety of products, the world's available agricultural land area is steadily decreasing as a result of soil degradation and expansion of residential areas. Furthermore, climate change will increasingly affect agricultural productivity. All this impacts the resilience of agricultural food and non-food systems and their ability to tolerate and adapt to external disturbances. A resilient system should be able to speedily recover from climatic shocks and biological stress and should provide alternative means for satisfying services and needs in the event of changed external circumstances. Only resilient agricultural systems allowing growth and intensification of agriculture under the increasing stress of climate change, new pests and disease outbreaks and other environmental pressures will address these challenges adequately.

Transitions in farming systems towards sustainable intensification, and/or high nature value need to be integrated into the broader perspective of a bioeconomy that will combine the simultaneous production of food, fibres, feed, bio-chemicals, raw materials and bio-energy from biomass over a territory, the recycling of wastes and the utilisation of by-products and co-products. Holistic value chains need to be developed through the integration of industries across rural regions and cities. Alternative agricultural systems which are currently being developed and studied in (and outside) Europe should be compared with each other and networks of study sites developed to test holistic sustainable intensification metrics at farm, landscape and national scales.

Scope, goals and research topics

The scope of FACCE SURPLUS covers the thematic area of sustainable intensification of agriculture and focuses on innovation for increased, resilient and sustainable biomass production and product transformation processes for added value creation, including biorefinery. The network has launched 3 calls for proposals since 2015. The topics of the second and third call built further on the work done under the first call for proposals. All the topics remain relevant.

- Spatial targeting of land use to increase biomass production and transformation
    - Optimising the yield of green (plant-based) biomass per unit area of land
    - Innovations in the design and siting of environmentally advanced, minimum waste biorefineries
    - Integrated approaches for the primary production of green biomass as part of the whole biomass production and processing chain
    - Demonstrating how the resilience of agriculture and agro-forestry results from a range of spatial and temporal solutions across the same land area
    - How can biomass, including wastes and losses, and product expectations best be evaluated and modelled, using a systemic approach
    - Evaluating the synergy between ecosystem services and biomass harvesting from locally specialised crops, including the role of biorefining
- Developing markets
    - Designing new business models for biomass production and its transformation
    - Conducting foresight exercises on the regulatory framework for integrated food and non-food agricultural systems associated with the sustainable intensification of green biomass production.
- The sustainable intensification of integrated food and non-food systems of agriculture
    - Development of system-based approaches for the integration and improvement of food and non-food agricultural production systems
    - Evaluation of the synergies and trade-offs between increasing yields and biomass production for food and non-food uses and the impacts on the environment
    - Development of new agricultural systems in crop rotations to exploit seasonal growth cycles through intercropping, at farm level and at landscape scale
    - How may the use of biomass for biorefining in marginal agricultural areas and grasslands create synergy between economic value addition nature values
    - How can the integrated modelling of water, biomass, bioenergy, food, and chemicals in the production and transformation of biomass follow the requirements of environmental sustainability
    - Systems approaches assessing novel utilisation of agricultural products and exploring their potential for value
    - Economic and environmental assessment of integrated food and biomass systems under different agro-ecological conditions
- Small-scale biorefinery concepts and their potential role in enhancing the sustainability and productivity of EU agriculture, as well as their scope to benefit the rural economy

- Supporting innovation, value creation and sustainable intensification of biomass production, taking into account the required economic, environmental and social conditions and resilience to climate change
- Resilient agricultural systems allowing growth and intensification of agriculture under the increasing stress of climate change, new pests and disease outbreaks and other environmental pressures and preserving biodiversity and ecosystem services.

Products developed within FACCE SURPLUS projects.