



Update, January 2021

## Pre-announcement of the 2021 Joint Call on

# “Circularity in mixed crop and livestock farming systems, with emphasis on greenhouse gas mitigation”

The ERA-NET Cofunds **SusAn** (Sustainable Animal Production Systems), **FACCE ERA-GAS** (Monitoring & Mitigation of Greenhouse Gases from Agri- and Silvi-culture), **ICT-AGRI-FOOD** (ICT-enabled agri-food systems) and **SusCrop** (Sustainable Crop Production) will launch a joint call for transnational interdisciplinary research projects.

Details presented in this pre-announcement may be subject to change before the launch of the call. The call announcement will be published in February 2021.

**Summary of Call:** This call is about research on (re-) integration of crop and livestock farming systems with the aim to enhance circularity between these systems and thereby improve the sustainability of farms.

### Preliminary timeline:

(1 – step procedure, i.e. without pre-proposal phase)

Feb 2021	Launch of the call
May 2021	(Full) Proposal submission deadline
Dec 2021	Start of projects

**Who can apply:** Universities and other higher education institutions, public research institutions, private non-profit organisations, and private companies can apply subject to the national regulations and eligibility criteria. Research consortia should consist of a minimum of three partners seeking funding from at least three participating countries. Funding of the participating research organisations will be provided by their respective national funding organisation according to their legal terms and conditions for project funding. A provisional list of partner countries is given below – the funding organisations’ names and national regulations will be published with the call announcement.

**To date the following countries are funding the 2021 Joint Call:**

Basque government		Hungary		Romania	
Belgium, Flanders		Ireland		Slovakia	
Bulgaria		Italy		Spain	
Denmark		Latvia		The Netherlands	
Estonia		Lithuania		Turkey	
Finland		New Zealand		UK	
France		Norway			
Germany		Poland			

Please note that the information in this table is provisional and that more funders might still join the call.

**Call Secretariat**

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## **Background**

In former times mixed crop-livestock farming was common practice in many areas of Europe. Since the 1960s however, crop and livestock production became increasingly specialised and less connected. The consequences of this development are, among others, higher regional concentrations of animals, large-scale imports of feed, simplification of crop rotations, higher use of mineral fertilizers and pesticides, and landscape homogenisation. This has contributed to water contamination, loss of soil quality, climate change and decline of biodiversity.

In this call, circularity integrates crops, animals and soil as cornerstones of sustainable agricultural production. Circularity aims at closing the loop of resources. Waste should be prevented, re-used or recycled. The (re)-integration of crop and livestock farming systems offers the possibility to reduce emissions, be more efficient at using natural resources, reduce or abandon external inputs (e.g., pesticides, mineral fertilizers and imported feed), be more resilient and contribute to maintain and restore biodiversity. Use of locally produced feed instead of imports, and use of manure instead of synthetic N-fertilizer may contribute to reduce greenhouse gas (GHG) emissions. The ability of livestock to use a diversity of plant biomass may favour crop diversity. Crop diversity is an effective element in reducing inputs, managing plant health and soil fertility, and it may enhance resilience. This is a circular system in which plants, livestock, soil and biodiversity play central roles, notably in the management of carbon, nutrients and water.

In research, naturally, this requires a systems approach, whether a project focuses on whole systems or on key elements of the system at the pertinent scale of one farm or groups of farms. The development or comparison of whole systems needs to be "grounded" by links to real life examples of agriculture and the investigation of selected key elements requires a description of the role and interaction of these elements in the system.

To exploit the potential of a (re-) combination of crop and livestock farming under the concept of circularity requires renewed knowledge that fits current production and market conditions. Good practices are always context specific and require a thorough understanding of the system. For instance, the local type and extent of crop production depends on soil type, climate and distance to markets. Actual resource availability may depend on regional logistic infrastructure, value chains and business models, and partnership will determine what will be produced, by whom and how. Competition between food and feed for animals as well as for biogas and energy crops must be avoided even though they may all be part of the system, and the emissions of GHGs must be minimised with regard to the overall sum of products and services delivered. Linear approaches need to be complemented or replaced by more holistic approaches.

Information and Communication Technology (ICT) can facilitate complex networks, support decisions (through data collection and analysis) and improve farm management and farming technologies. It can potentially contribute to improve the sustainability of the agriculture and food sector.

## Scope of the call

### Proposals must:

- a) Focus on mixed crop-livestock farming systems. These systems can occur within single farms or can be achieved by connecting separate crop and livestock farms.
  - Livestock farming includes the major terrestrial species (e.g. beef and dairy cattle, sheep, goats, pigs & poultry), but may include other (e.g. rabbits or honey bees)
  - Crops are primarily meant to be arable crops here, but cropping systems may include grassland swards, horticulture, biomass crops and agroforestry
- b) Address the monitoring and/or mitigation of GHGs from agriculture or agroforestry.
- c) Contain an Information and Communication Technology (ICT) dimension, for example the use of sensors, communication technologies, data analytics, modelling, robotics, precision farming or decision support systems.
- d) Take a systems approach. The circular economy approach to mixed crop-livestock production will include synergy and complementarity with sectors such as environmental protection. As appropriate<sup>1)</sup>, this **may** mean addressing other issues that arise from the individual project's approach to mixed crop-livestock systems, i. e. in addition to (a), (b) and (c). These could include, for example, soil quality; biodiversity; adaptation to climate change; increased protein autonomy; business models and consumer oriented approaches; or the limitations or trade-offs that may occur within mixed systems.

<sup>1)</sup> *Meaning: "in the case in which it is appropriate"*

The following topics/activities/types of proposal will be considered outside the scope of this call, i.e. they will not be funded (examples):

- Single-discipline projects on crop or animal breeding or nutrition
- Studies with a main focus on soil, e.g. on soil carbon sequestration
- Aquaculture and aquaponics
- Insect farming (except honey bees)
- Animals that are bred and raised on fur farms, e.g., mink, fox, marten and chinchilla
- Proposals with focus on rewilding
- Technical development of anaerobic digesters

## Expected impact

The overall expected impact of projects funded under this call is to enhance circularity between crop and livestock farming systems.

Projects should also contribute to the following impacts:

- GHG Mitigation
- If applicable regarding the individual project's approach: Other relevant sustainability<sup>2)</sup> benefits of mixed crop-livestock farming systems, e.g. improved resilience of production systems, increased efficiency of farm operations and animal production systems, enhanced use of natural resources and reduction of waste, increased protein autonomy, more diversified and attractive landscapes. - Compare point (d) under 'Scope of the call'.

<sup>2)</sup> *Note that sustainability in this context refers to the three pillars of sustainability – economic, environmental and societal.*

*Please note: some systems already have a high level of circularity between crops and live-stock. If an applicant plans a proposal that solely focuses on such a system they will need to carefully consider how the expected impact can be achieved.*

### **Potential research areas**

*Please note that the list below is intended to provide inspiration to potential applicants. It is not an exhaustive list, the listing order does not reflect priorities and it does not exclude focus areas that are not on the list.*

- a) Effect of enhanced circularity and mixed crop-livestock farming on GHG emissions and adaptation to climate change.
- b) Trade-offs within mixed crop-livestock farming systems, including strategies to maximise net human edible protein production with special attention to food/feed competition within circular food systems.
- c) Recouple nitrogen, phosphorous and carbon cycle through, e. g., legumes, multi-species grasslands, manure, digestates from anaerobic digestion and other by-products; consequences for crop yield, pests and diseases, soil biology, structure and fertility, reduced use of mineral fertilizers and pesticides.
- d) Effect of diversification at different levels (plant/animal and production system) on ecological and economic resilience; identification of nature based solutions; production efficiency, short-term versus long-term financial profitability; ecosystem services and external costs.
- e) Self-sufficiency in animal nutrition, including protein feed and nutrient efficiency (notably N); animal health & welfare, genetics and product quality and nature inclusivity.
- f) Identification of crops and animals suitable for a circular approach / mixed crop-livestock farming.
- g) The effect and performance of mixed crop-livestock systems at different scales, from field to farm and landscape to region.
- h) Application and development of system evaluation, including participatory research; modelling, in-depth analysis of real life case studies, multicriteria analysis, long-term effects and life cycle assessment (LCA).
- i) Identification and development of business models that can be coupled with mixed crop-livestock production. Organisation of local cooperation and stakeholders in new value chains including biorefinery development. Consumer-oriented approach to generate added value of new products and services.
- j) New digital technologies related to, for example, sensors, robotics, big data or modelling to facilitate existing systems or help develop new mixed crop-livestock systems; data management; decision support systems.
- k) Investigations of conditions that allow mixed crop-livestock systems to succeed, including, for instance, soil-climatic aspects, production or trading systems and conditions, human and social capital, infrastructures, institutional environment. Understanding the bottlenecks in the development of circular approaches to mixed crop-livestock systems.
- l) Management strategies and practices for different conditions; using land, based on its quality and potential, for instance, with increasing precision and with application of sophisticated farming plans, customised fertilisation and prevention of pests, diseases and weeds, outdoor systems, mixed animal production systems integrating different animal types.

m) Identification of incentives to promote appropriate management systems and study of the way of implementing them.

**Further information on the subject:**

ATF and PlantETP 2020: Research and innovation towards a more sustainable and circular European agriculture. Policy Brief, April 2020. [http://animaltaskforce.eu/Portals/0/ATF/Downloads/ATF-PlantETP\\_Policy\\_brief\\_April2020.pdf](http://animaltaskforce.eu/Portals/0/ATF/Downloads/ATF-PlantETP_Policy_brief_April2020.pdf)

ATF and PlantETP 2019: Research and Innovation towards a more sustainable and circular European agriculture. Exploring synergies between the livestock and crop sectors. Joint Position Paper, Sep. 2019. <http://www.plantetp.org/research-and-innovation-towards-more-sustainable-and-circular-european-agriculture-exploring>

De Boer, I.J.M. & Van Ittersum, M.K. 2018: Circularity in agricultural production. Wageningen University & Research. <https://www.wur.nl/en/show/Circularity-in-agricultural-production.htm>

Dutch Ministry of Agriculture, Nature and Food Quality 2018: Vision Ministry of Agriculture, Nature and Food Quality. Policy note 19-11-2018. <https://www.government.nl/ministries/ministry-of-agriculture-nature-and-food-quality/documents/policy-notes/2018/11/19/vision-ministry-of-agriculture-nature-and-food-quality---english>

European Commission 2020: Farm to Fork Strategy - for a fair, healthy and environmentally-friendly food system. [https://ec.europa.eu/food/farm2fork\\_en](https://ec.europa.eu/food/farm2fork_en)

EIP-AGRI Focus Group *Grazing for Carbon* 2018: Final report, Sep 2018. <https://ec.europa.eu/eip/agriculture/en/publications/eip-agri-focus-group-grazing-carbon-final-report>

EIP-AGRI Focus Group *Mixed Farming Systems* 2017: Mixed farming systems: livestock/cash crops. Final report, May 2017. <https://ec.europa.eu/eip/agriculture/en/publications/eip-agri-focus-group-mixed-farming-systems-final>

EIP-AGRI Workshop on Circular Bioeconomy: Opportunities for farm diversification in the circular bioeconomy Final report, May 2019. <https://ec.europa.eu/eip/agriculture/en/publications/eip-agri-workshop-circular-bioeconomy-final-report>

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