

AARHUS UNIVERSITY

Department of
Agroecology
Strategy
2023-2025



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Ambition and mission

At the Department of Agroecology, we carry out research into and work with agroecology, which is the interaction between plants, soil, animals, environment, climate, and people. We develop sustainable and resilient solutions based on agroecological principles to support the green transition of society.

Ambition

We continuously work to strengthen our position as an internationally highly recognised research environment for the agricultural green transition solving current and future global and local sustainability challenges driven by the growing demand for foods, energy, and biomaterials.

Through research, innovation, policy support, educational programmes, talent development, business collaboration and communication to society, we will contribute to sustainability paradigms within agriculture that meets multiple sustainability objectives.

We will enable a thriving working environment for the benefit of staff well-being and work quality.

Mission with many aspects

We will meet our ambitions through activities within eight focus areas of paramount importance for the green transition of society meeting the needs for sustainable production of more foods, energy, and biomaterials with less external material inputs.

We support these focused efforts through interdisciplinary collaboration within the faculty and the university, with external partners, and within national and international research projects.

We work with multiple stakeholders and in multiple settings to accelerate the agricultural green transition process.

We further work across spatial scales from field to farm to landscape and seek to integrate research across scientific disciplines spanning natural and technical sciences and the humanities.



Eight focus areas

1

Low carbon footprint farming

Agricultural production systems have large pressures on land, water, and climate. Reducing greenhouse gas emissions, increasing carbon uptake in soil and vegetation, and decreasing resource consumption are crucial to achieving the goals of limiting climatic change.

This requires development of new technologies, management systems, and food and biomass systems that apply agroecological principles.

2

Climate resilient cropping systems

Cropping systems are threatened by climatic change, including increased climatic variability and extremes.

Adapting to these changes requires increased resilience while maintaining high productivity with a low environmental impact, where particular emphasis needs to be given to the management of climatic extremes.

The research will focus on management of the resource base, including landscapes, soils, and genetics.

3

Low pesticide-input farming

There is increasing concern about the adverse effects of chemical pesticides on human health and the environment, and pesticide legislation in the EU is constantly resulting in fewer chemical pesticides on the market.

This requires developing and documenting alternative approaches, including field and landscape scale management, to ensure efficient crop protection without a yield loss. Non-chemical methods, site-specific treatments, host resistance and biological control agents are examples of tools that need to be further progressed and combined.

4

Low nutrient emission farming

Agriculture is met with increasing demands for reduced emissions of nitrogen and phosphorus to the aquatic environment and to the groundwater to an extent which may constrain agricultural land use. Meeting these demands requires closing nutrient cycles at all scales.

This involves improved plants and cropping systems, alternative farming systems and new technologies for reducing nutrient emissions at field, catchment, and landscape levels. It also requires developing new methods for targeting and incentivising measures.

5

Maintaining and improving soil quality

Cultivated soils are key to sustainable agricultural production but are currently under threat due to loss of organic matter and biodiversity, erosion, compaction, and pollution.

Research into soil functions and management practices with geographical and functional characterisation of soils in the landscape is crucial to sustaining soil functions and ecosystem services. It also requires a better understanding of how sustainable land use and soil management is implemented in practice and how it is incentivised.

7

Farming for biodiversity

Biodiversity in plants, soils and animals across the agricultural landscape is key to the functioning of agricultural systems. Farmed crops interact with organisms in natural ecosystems and depend on them for their functions.

Dependencies include soil health, the reduction of pests by their natural enemies and the pollination of plants by insects. The agricultural landscape also interacts with non-cropped areas.

Research will explore how biodiversity can be enhanced in the agricultural landscape and benefit agricultural and food production and adjacent non-cropped areas.

6

Sustainable digital-based farming

The technological development within sensors and data processing increasingly apply AI technologies offering new possibilities for monitoring, controlling, and managing production systems.

This entails automation of production processes using robotic technologies integrated with novel proximal sensing technologies.

This will support the development and design of new sustainable crop and farming systems with consideration of landscape aspects and the application of new technologies within plant breeding, crop protection, fertilisation, and soil management.

8

Plant-based food

The current animal-based food systems exert large pressures on land use, while plant-based food systems generally have lower impacts, but such systems are still underdeveloped.

There is a great need to explore how current and new food crops can be developed, grown, and processed to viably sustain healthy diets with low environmental and climate footprints.

This requires exploration of cropping systems for plant-based food with integrated nutrient cycles and integrated pest management that provide high-yielding quality production.

Strategy

Research

We conduct free and independent research aimed at supporting the green transition of agriculture. To achieve this, we work to strengthen international collaboration and research breakthroughs.

Policy support

Through policy support contracts with the Danish government, we underpin the green transition policy development in Denmark. We work to strengthen the viability of this policy support by involving a broader range of competences from various scientific disciplines, research groups and across university departments. We will also increase involvement of junior researchers in the policy support, considering the need for generational succession.

Education

We contribute to the education of skilled BSc and MSc graduates within the area of agroecology. The content of our programmes is closely linked to the focus areas of the department with an emphasis on the green transition of society. We continue to provide research-based teaching by active scientists. We will initiate a new BSc programme on “Plant and Food Science” at AU Viborg in 2024 and later a MSc in “Plant Science”. In the meantime, we will continue to support our agrobiolgy students at the AU Aarhus campus.

Business collaboration

We have intensive collaborations with several businesses across the agricultural, food, biomaterial and energy value chains, with businesses working across open landscapes, and with advisory services in related activities. We will seek to strengthen and broaden these collaborations with the aim of accelerating the uptake of research results into practices, thereby meeting the urgency the agricultural green transition.

Data management

Structured data management is essential to modern research processes and key to activities that underpin the research in the agricultural green transition. We will implement measures that put us at the forefront of data management to support the research process and research integrity.

Communication

Effective communication is essential for recruiting students and talented staff as well as for communicating research findings in a way that contribute to the agricultural green transition. We will improve and target our communication to increase visibility and credibility of our research and policy support.



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Talent development

Training of PhD students and supporting their talent development are core to our research and to the training of next generation researchers. We will strengthen our activities on scientific talent development with high-quality supervision and PhD courses.

Career and competence development

Sustainable and transparent career progression is essential at all career stages across all professions. We will increase the transparency of career progression in the department and support the careers of the individual within the department with a particular focus on the needs of junior scientific staff.

Working environment

A sustainable working environment is essential to achieving our ambitions. We support a thriving working environment where teamwork is encouraged. We actively work at improving the work-life balance and preventing stress.

Diversity and gender equality

An attractive working place requires focus on a diverse and inclusive working environment that respects cultural diversity and works for gender equality. We will work to increase diversity in appointments as related to gender, cultural, career and social backgrounds to ensure presence of diverse role models among senior staff and greater diversity of skills and perspectives among the departmental decision-makers.

Organisation

Our main activities are carried out at the research centres AU Viborg and AU Flakkebjerg as well as at the AU campus in Aarhus. In addition, we have a research station at Askov and a field experimental site at Jyndevad. We also maintain monitoring stations of water quality and pesticides distributed across Denmark.

With approximately 300 staff members, we are organised into eight research sections, three field experimental units, and a secretariat. The research strategy is implemented in these sections and supported by the experimental units and the secretariat. We encourage and support collaboration across these sections and units to achieve the strategy.

We have 11 committees who provide advice to the department management.

Strategy implementation

The implementation of the strategy will be overseen by the department leadership group, who will seek advice on the implementation from the respective advisory committees.

The respective committees will draft action plans every year to be approved by the department leadership, and this will be followed by annual evaluations of progress in the implementation of the strategy along with suggestions for revisions.



Cutting-edge knowledge
underpinning sustainable
growth through research,
policy support and
education

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