

RESEARCH BASED POLICY ADVICE

For Innovative solutions for sustainable
management of Nitrogen
- And a few other topics.....

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AGRICULTURAL AND FOOD SCIENCE AT AU/ST

DANISH CENTRE FOR FOOD AND AGRICULTURE

Departments

- Agroecology (AGRO)
- Animal Science (ANIS)
- Food Science (FOOD)
- Agricultural Engineering (ENG)
- Molecular Biology and Genetics (MBG)
- DCA – Danish Center for Food and Agriculture

Research centres

- AU Foulum
- AU Flakkebjerg
- AU Aarslev



KEY FIGURES - DCA

5 research departments

151 senior scientists

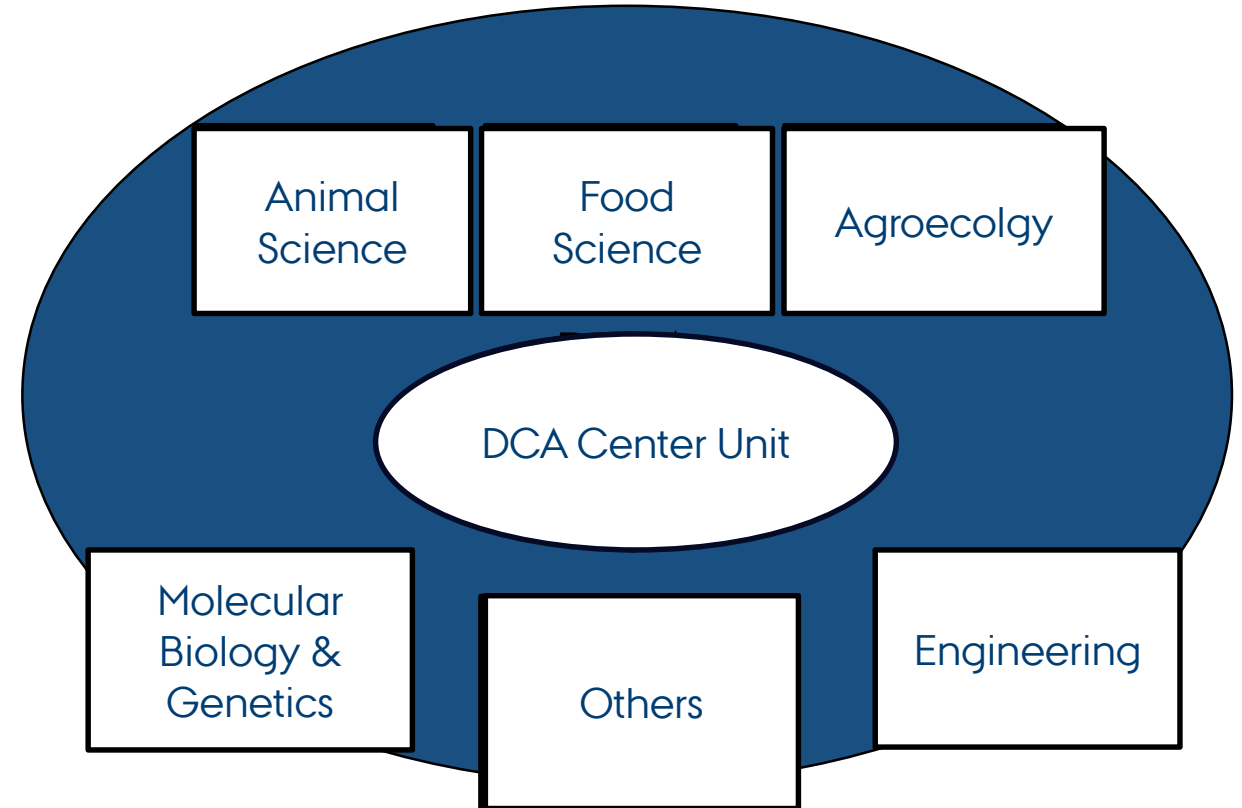
698 Peer reviewed publications in 2016

32 Ph.D.-defences

141 Post docs

Leading university:

- **#9** in US NEWS: Best Global Universities for Agricultural Sciences 2016
- **#10** in NTU Ranking of agricultural Sciences 2016



DCA APPROACH: INTEGRATION OF ACTIVITIES

Research based Advice to Ministry of Environment, Food & Agriculture

Current challenges in food and agriculture: Environment, climate, productivity, animal welfare etc.



Global agenda & international collaboration

- › Focus: sustainable/eco-functional intensification, food security, climate change

Collaboration with sector/industry

- › Focus on innovation and solution of problems: Smart, environmentally friendly growth, bioeconomy

WHAT IS RESEARCH BASED POLICY ADVICE?

Policy making in the twenty first century requires robust evidence, impact assessment and adequate monitoring and evaluation.

High quality scientific advice, provided at the right time in the policy cycle, will improve the quality of EU legislation, and therefore contribute directly to the better regulation agenda.

Scientific advice needs to be independent of political or institutional interests, bring together evidence and insights from different disciplines and approaches, and ensure adequate transparency.

European Commission, 2015: Strengthening Evidence Based Policy Making through Scientific Advice



Evidence-based scientific policy advice gives weight to hard empirical facts and restrictions.

Klaus F. Zimmermann, 2014; IZA Policy Paper No. 90, Bonn University



WHAT IS AU/DCA'S CONTEXT FOR PROVIDING RESEARCH BASED POLICY ADVICE?

**According to AUs contract with the Ministry,
DCA should:**

Provide research-based, relevant and applicable consultancy services to the Ministry within thematic areas

Sustain up-to-date research capacity within specific thematic areas

Perform solution-oriented research and development within the thematic areas (including industry cooperation)

Communicate research based knowledge to the Ministry, the industry and other relevant interested parties



KEY FIGURES - THE RESEARCH BASED POLICY ADVISE

Main thematic areas:

- Plant production
- Animal production
- Food quality and consumer preferences

Contract: 36.5 mill. Euro for research and policy advice

95.5 mill. Euro in total turnover DCA w external funding
(App. 9.4 mill. Euro from European research programmes)

Cooperation with sector/industry in 36,6 percent of all activities

App. 180 policy advice deliveries yearly



FOCUS AREAS IN PLANT PRODUCTION THEME

- Plant breeding, plant health, crop protection and IPM
- Climate smart production
- Fertilizers and N-forecasts
- Crop technology
- Soils and soil conditions
- Green transition and biomass
- Targeted regulation and measures
- Agricultural reforms and public goods

Guided by strategic documents on respectively

1. Research based policy advise
2. Research and knowledge building

CASE: NEW PARADIGM FOR N-REGULATION

Back ground

Previous regulation was based on limitation on the use of nitrogen (so-called reduced fertilizer standards by crop type)

and requirements for reduced leaching from fields (catch crops etc).

Discontent among farmers and farm organizations

Political initiatives

The “Food and agricultural package” adopted by the parliament in 2016 after debates – and partly based on Advice from DCA/AU.

- 30 initiatives enabling Danish agriculture to increase production without increasing total N leaching to aquatic environment
 - including re-installment of N quotas based on economic optimum N fertilisation by crop type
- A new concept for environmental regulation limiting the leaching of nitrogen into the aquatic environment instead of limiting the use of nitrogen (and yields)

RESEARCH BASED ADVICE TO ENABLE NEW N-REGULATION

Deliveries prior to the legislation on new N-regulations

- In order to change regulation paradigm, knowledge of the consequences of abandoning the old regulation was needed.
- DCA and DCE delivered app. 20 reports and notes calculating the consequences on total N-leaching of removing different instruments, e.g. “reduced N standards”, compulsory catch-crops, ban on soil cultivation etc.

- Notat om tilbagerulning af tre generelle krav: normreduktion, obligatoriske efterafgrøder og forbud mod jordbearbejdning i efteråret
- Beregning af kvælstofeffekt ved anvendelse af MFO-elementerne efterafgrøder, randzoner, brak og lavskov
- Opdaterede omregningsfaktorer mellem efterafgrøder og forøgelse/nedsættelse af kvælstofkvoten
- Notat vedr. alternative kvælstofnormer
- Periodisering af effekten ved trinvis udfasning af normreduktionen
- Virkemidlers udbredelsespotentiale
- Vurdering af ressourceforbrug ved landsdækkende kortlægning af potentielle områder til etablering af konstruerede minivådområder
- Analyse af muligheden for mertildeling af kvælstof på bedriftsniveau ved etablering af konstruerede minivådområder med overfladeafstrømning
- Notat vedrørende model for beregning af minivådområdernes effektivitet i tilbageholdelse af kvælstof fra vandmiljøerne
- Udbytter og proteinindhold ved trinvis udfasning af normreduktion
- Faglig kommentering af notat "Kvælstofudvaskning - mere end blot marginaludvaskning"
- Vurdering af effekten på kvælstofudvaskningen af nye undtagelser til det eksisterende forbud mod jordbearbejdning
- Effekt af randzoner
- Randzoneeffekt – nedre estimat
- Revurdering af baseline"
- Notat vedr. SEGES' kommentering af udkast til revurdering af baseline

RESEARCH BASED ADVICE TO ENABLE NEW N-REGULATION

Deliveries in connection with implementing legislation on new N-regulations

The new paradigm for N-regulation calls for reducing nitrogen and phosphorus losses to the aquatic environment via the use of filters in the landscape (outside the field).

DCA/DCE are required to deliver research based knowledge on:

- Constructed wetlands with and without filter matrix,
- Bioreactors (compact filter matrix) and bio-chemical reactors
- Controlled drainage
- Intelligent Buffer zones
-
- Thus, building new competences, new projects, time issues, re-prioritization of resources,



CHALLENGES FOR RESEARCH BASED POLICY SUPPORT

- Political differences in Parliament resulting in numerous hearings and politically motivated requests for science based Advice
- New legislation was approved before research based knowledge was in place
- Demand for specific research results on new measures and with a short notice – difficult to recruit researchers with the right expertise
- Arena for political battles between agricultural organisations and NGOs resulting in different interpretations for research
- Profound interest from press and medias
- Individual AU researchers expressing different opinions from the official Advice from AU
- Extremist organisations trying to discredit researchers and research results
- Farmers organisations claiming that proof of new measures' positive N reducing effects are well established in other countries
- Further pressure on researchers to produce “quick answers” to complex questions

FIRST INITIATIVES



November 2016. International workshop on:
Estimation of nitrogen loads to the marine environment around the time of the year 1900



April 2017. International workshop/expert meeting on:
Various filters in the landscape for reducing nitrogen and phosphorus losses to the aquatic environment



STRUGGLING WITH ALTERNATIVE FACTS ?

How can we avoid an erosion of respect for research-based knowledge?

How do we ensure the future role of **research-based** government advice in Europe?

First ideas

Increased international dialogue and cooperation on research-based Adviceto government?

The trans European perspective?

Quality check and second opinions?

*Alternative facts are not facts —
they're falsehoods*



Trump administration's 'anti-scientific statements' alarm ex-energy secretary:

“These are anti-scientific statements, which in my view fundamentally cut to the core of democracy ... in the sense of, if we’re not going to have fact-based discussions it’s very, very difficult to have an informed electorate and informed opinions.”

Former energy secretary to the Obama Administration Ernest J. Moniz

INVITATION 😊

Should we work more closely together internationally in producing policy Advice?

The "TFRN"-type collaboration is a good starting point ...

Can we work more closely together across Europe on specific research based policy Advice?

- Different forms of alliances
- Reciprocal quality check procedures
- Joint contracts

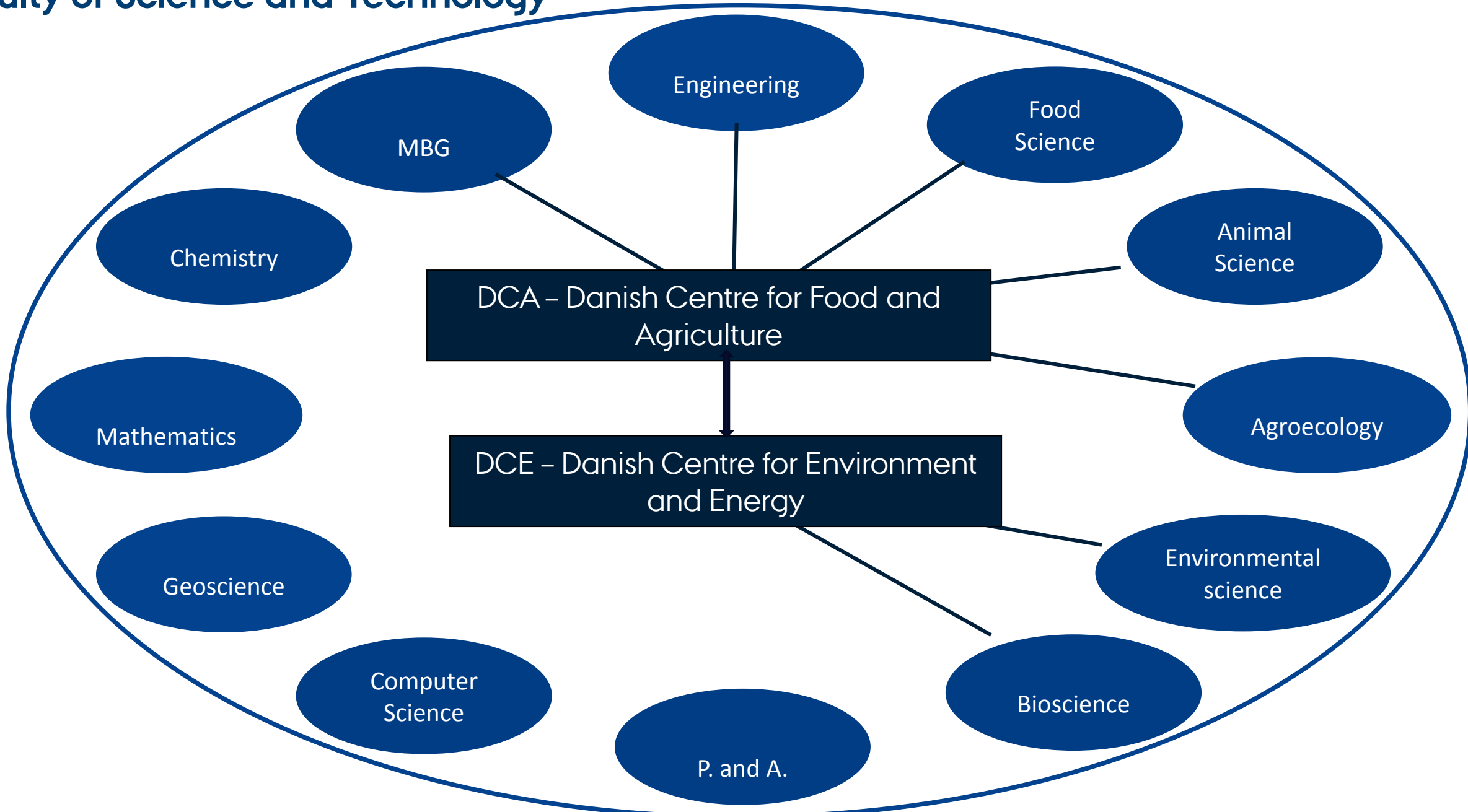
Thanks for your time!





AARHUS
UNIVERSITY

Faculty of Science and Technology



AU FOULUM

- App. 700 staff
- App. 400 scientific staff and Ph.D. students
- Combined area of approx. 590 ha
- Buildings covering 120,000 m²

Facilities include:

- State of art laboratories
- Livestock facilities
- Field experiments
- Bioenergy facilities
- Organic farming



HISTORY IN BRIEF

Established in 1883 as a research laboratory at the Royal Veterinary and Agricultural University in Copenhagen

Sector research institute under the Danish Ministry of Food, Agriculture and Fisheries

Merger between among sector research institutes machines, plants and animals

Faculty at Aarhus Universitet in 2007. Contract between the Ministry and Aarhus University on research based policy support

Reorganization of Aarhus University in 2011. Establishment of DCA - National Centers for Food and Agriculture & DCE – National Center for Environment and Energy

RESEARCH BASED POLICY SUPPORT

A contract between AU/DCA and the Ministry of Food and Agriculture :

- Provides the framework for research based policy advice
- Ensures that AU conducts research that supports the development of core policy areas
 - Research must be foresighted and effective in solving key agricultural, societal and industrial challenges
 - Support the development of the agricultural sector and the food industry
 - Ensure knowledge and technology transfer



ACTIVITIES AT DCA – CENTER UNIT

Research based policy support

Providing research-based advice to the Danish Ministry of Environment and Food

Sector cooperation

Supporting a well-functioning research and innovation cooperation with the agricultural and food sector.

International Collaboration

Supporting collaboration with national and international partners, contributing to the solution of global challenges in the food and agriculture area

Communication and knowledge exchange

Supporting communication and knowledge exchange with authorities, the agricultural sector, medias and national and international partners

FROM SECTOR RESEARCH TO UNIVERSITY

Main changes

- New cooperation partners
- Broader Interdisciplinary research
- Education and students
- Food and agriculture research may seem more invisible in a huge university
- Scientists are mainly evaluated on university terms and only in a minor degree according to relevance in relation to the agri-food sector

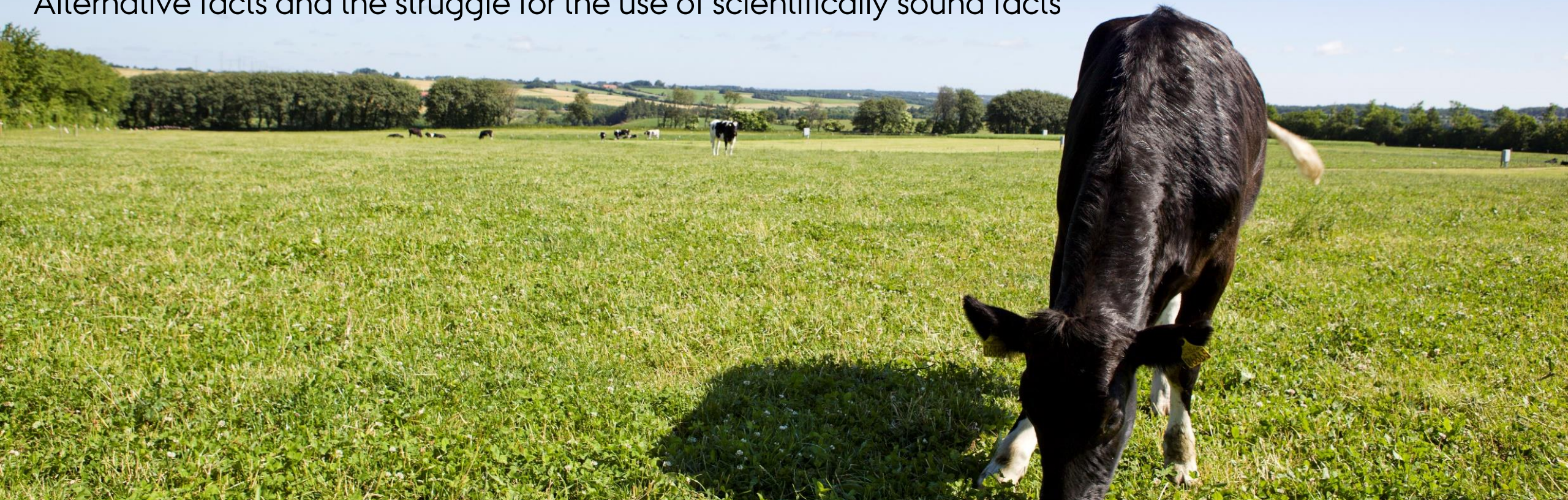
AGENDA

Short introduction to the agricultural and food science at AU/ST

Introduction DCA – National Centre for Food and Agriculture

Characteristics of the research based policy support (case)

Alternative facts and the struggle for the use of scientifically sound facts



THEMATIC AREAS IN THE CONTRACT

DCA

- Plant production
- Animal production
- Food quality and consumer preferences

DCE

Nature & water

Air, emissions and risk assessments

The arctic

Organisation

- Executive team for each thematic area (department heads and chiefs from the ministry)
- Strategic agreement on:
 - scientific content
 - advice or research
- Annual work program