



The EU Strategy 2020

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Smart, Sustainable, Inclusive

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Implications for My University



**Johan Schnürer, Pro Vice-Chancellor
Professor food microbiology
Swedish University of Agricultural Sciences (SLU)**



SLU Mission

“Develop the knowledge of biological natural resources and their sustainable use and management”

Education, Research, Environmental monitoring and assessment – in collaboration with society at large

Good life



Rich environment



Sustainable production





SLU in Sweden

**SLU facilities all over the country:
campus areas, research stations, field facilities**

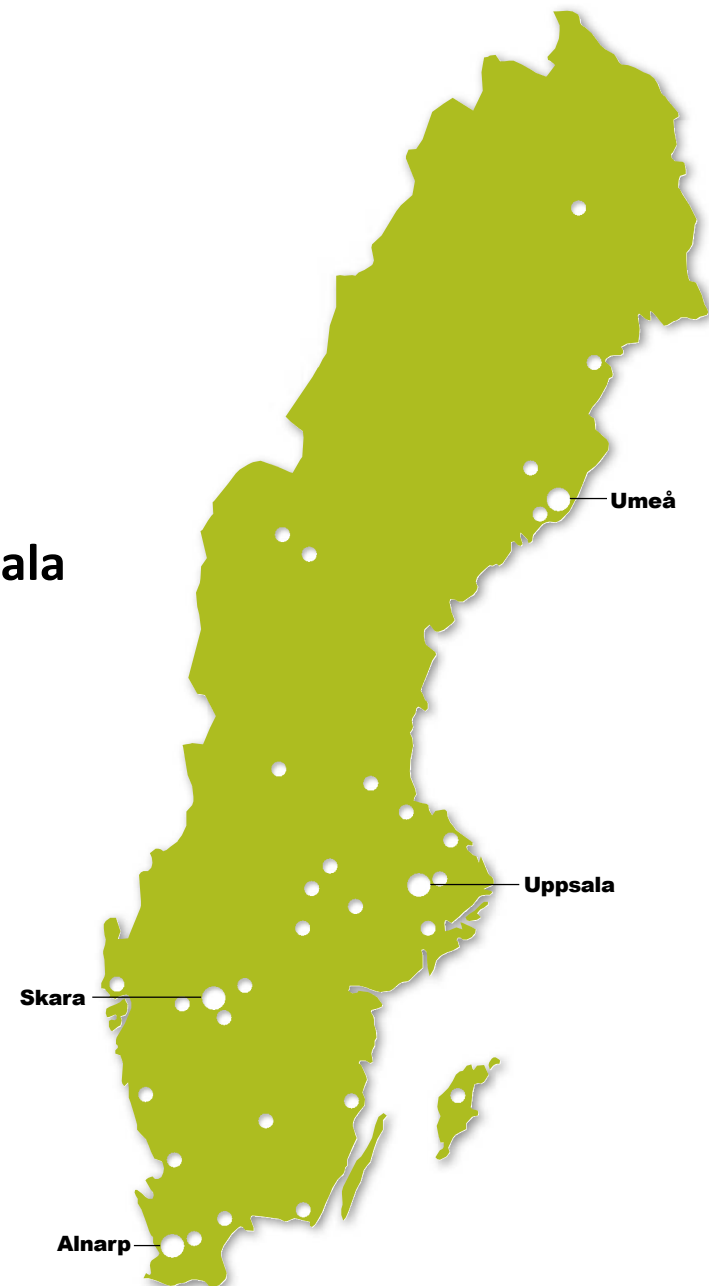
Larger campus: Alnarp, Skara, Umeå and Uppsala

67 % Research and postgraduate education

**11 % Environmental monitoring and assessment
("nature health check")**

22 % Undergraduate education

3300 employees (240 professors, 740 PhD students)



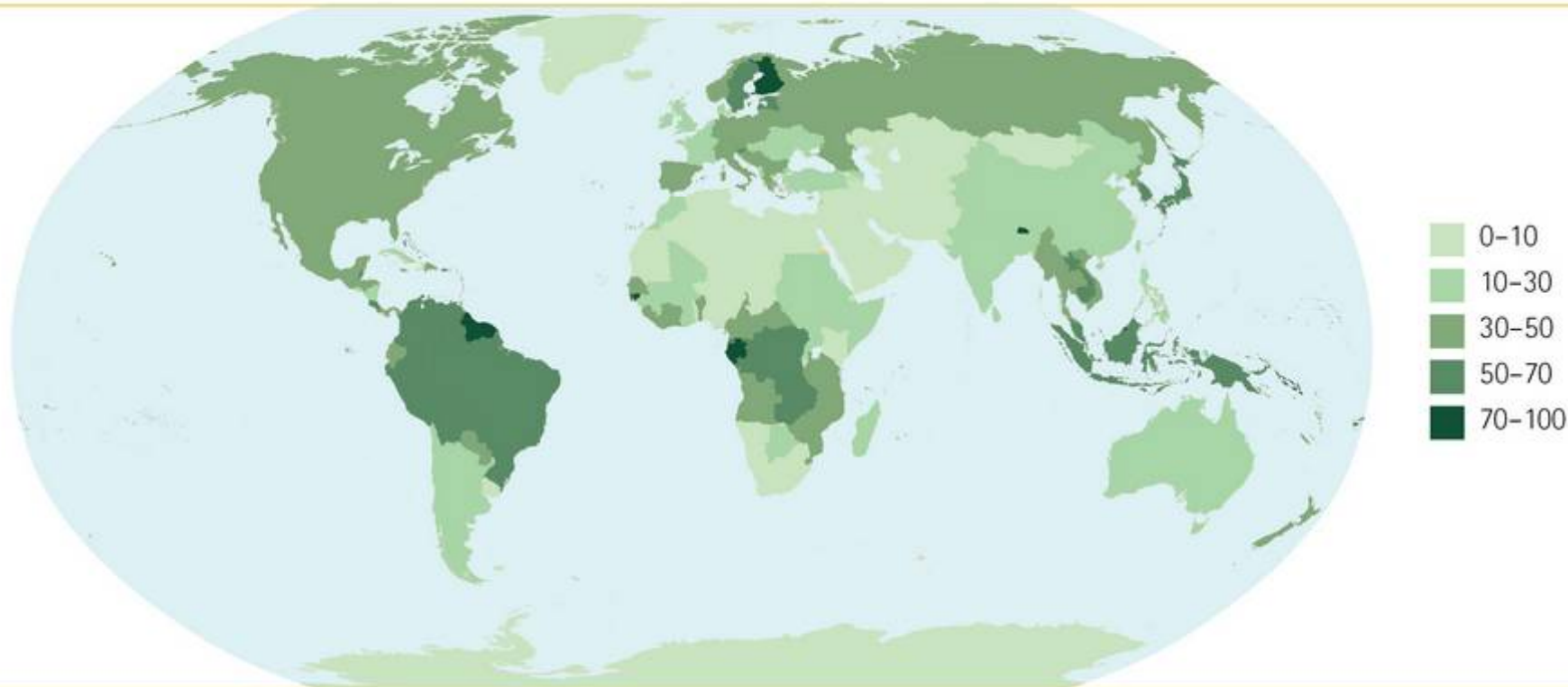


SLU in the Swedish context

- 9.7 million, area \approx 2 x UK, rich in natural resources (land, forests, rivers ...)**
- Growing economy through recent financial crises**
- Net EU contributor (25.2 billion SEK, (37.7 -12.4; 2014)***
- Strong political support for science and HE regardless of government**
- Large immigration – extremely homogenous to high diversity in 30 years**



Forest area as percent of total land area by country, 2010



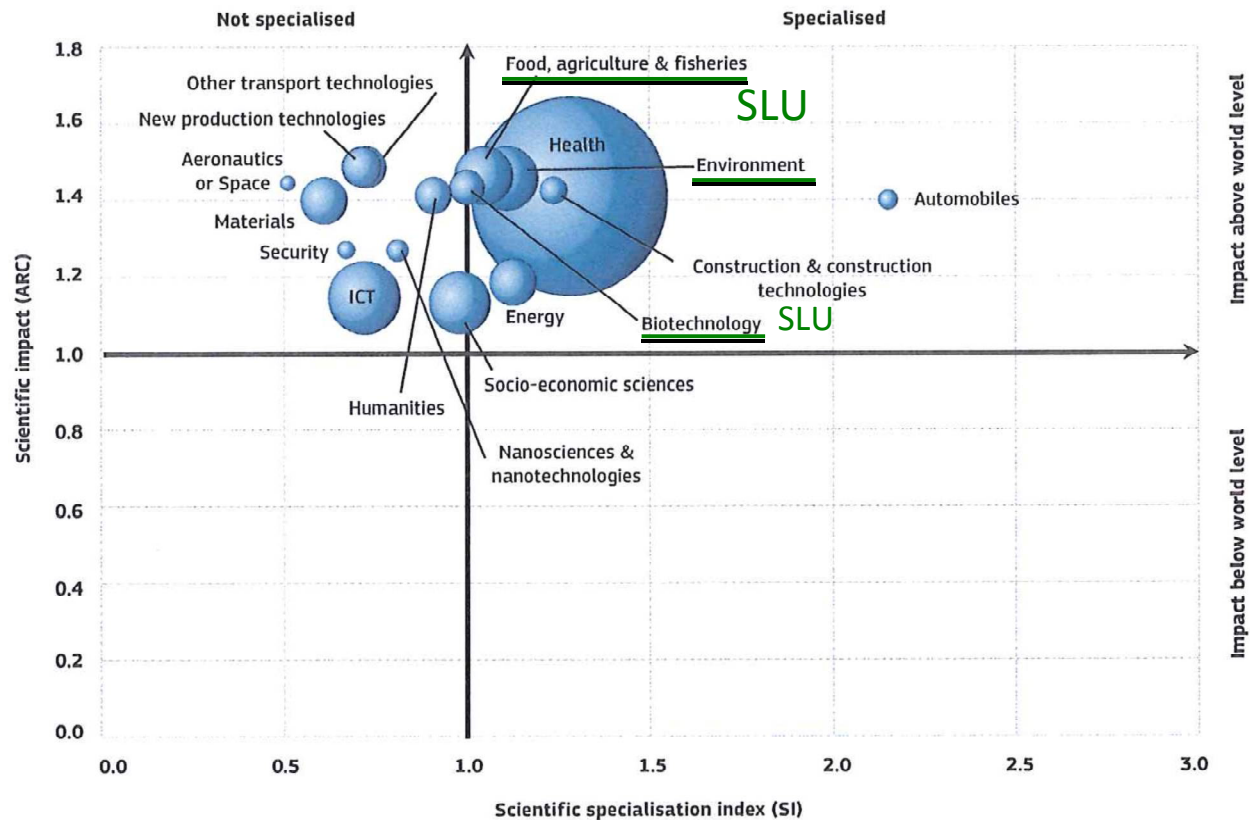
Sweden – 69% of land area covered with forests

1% of global forest resources

The graph below illustrates the positional analysis of Swedish publications showing the country's situation in terms of scientific specialisation and scientific impact over the period 2000-2010.

The scientific production of the country is reflected by the size of bubbles, which corresponds to the share of scientific publications from a science field in the country's total publications.

► Sweden – Positional analysis of publications in Scopus (specialisation versus impact), 2000–2010



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
 Data: Science-Metrix Canada, based on Scopus
 Note: Scientific specialisation includes 2000–2010 data; the impact is calculated for publications of 2000–2006, citation window 2007–2009.



Key indicators for Sweden*

	2012	EU Average	Rank within EU
Employment (% ages 20-64)	79	68	1
Business R&D (% of GDP)	2.3	1.3	2
Patent applications (/GDP)	10	4	2
Renewable energy (%)	≈50	13	1
Public R&D (% of GDP)	1.1	0.7	1
New PhD/population (ages 25-34 yr)	2.8	1.8	1
Composite indicator research excellence	88	48	1
But:			
Math performance 15 year old (PISA)	478	495	21 !

Additional challenges :

Economic difficulties for agriculture, a polluted Baltic Sea and reduced public understanding of agriculture and forestry

Sweden,

*Research and Innovation performance,

Country Profile 2014, European Commission

Baltic Sea is unique in Europe

Connecting H2020 to the EU strategy for the Baltic Sea Region



Sustainability challenges in northern Europe for 90 million inhabitants and

- Aquaculture
- Fisheries
- Agriculture
- Forestry
- Tourism

Accelerating need for innovation and international cooperation to protect the Baltic Sea.



Severe algal problems (toxic)



County map of Sweden scaled according to area or population



Length: 1570 km

450 000 km² total “land area”

310 000 km² forests

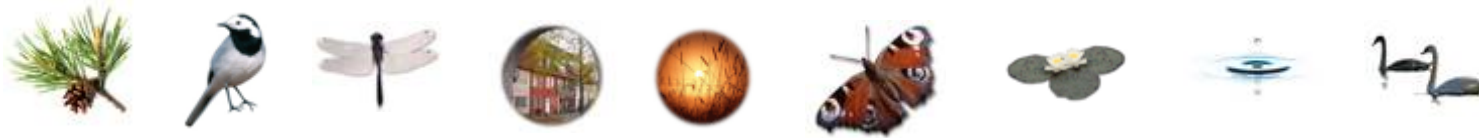
40 000 km² lakes and rivers

29 000 km² arable land

527 000 km rivers and streams

2 400 km costal length

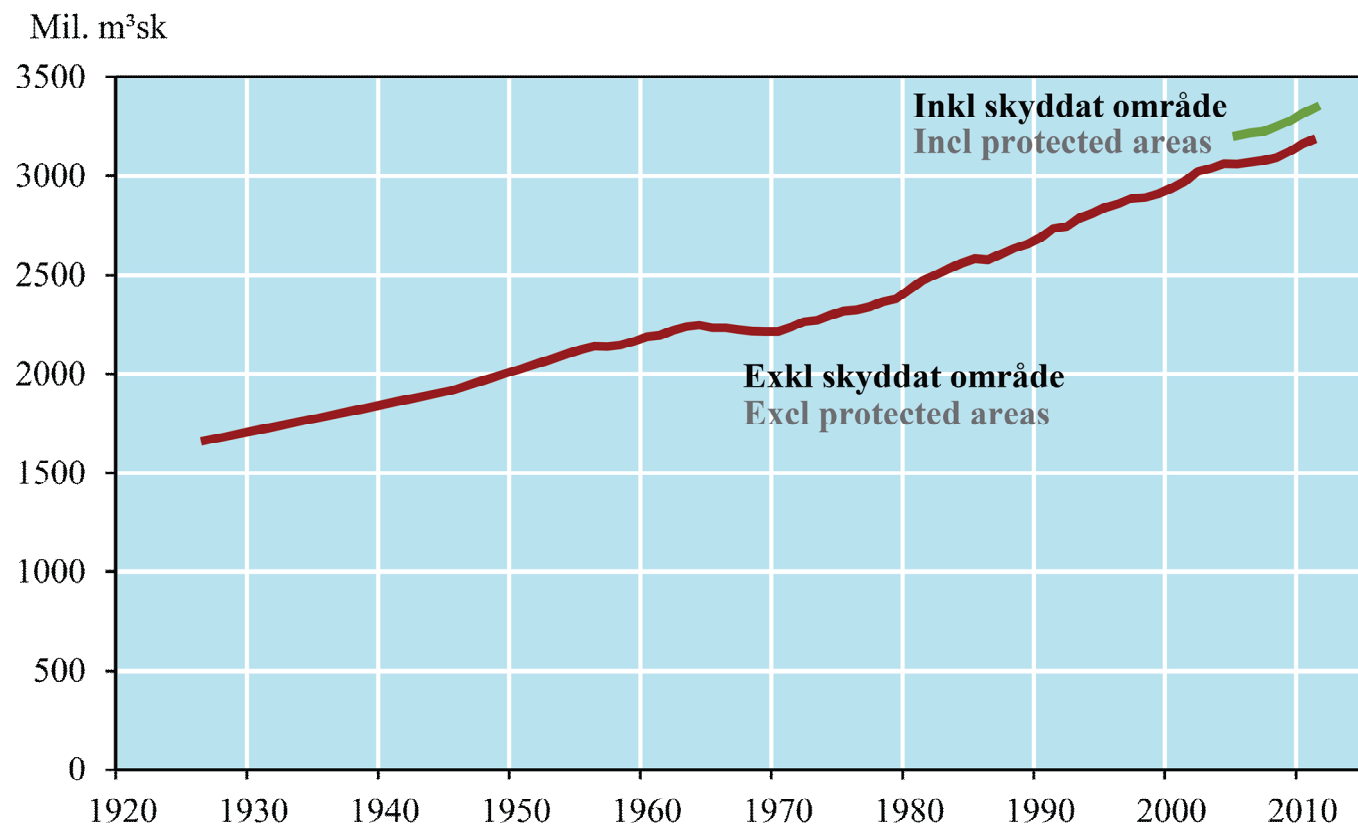
Environmental monitoring and assessment...meeting Swedish National environmental objectives and sector responsibility



- Forest
- Agricultural landscape
- Lakes and watercourses
- Coastal and sea areas
- Built environment
- Climate
- Acidification
- Non-toxic environment
- Eutrophication
- Biodiversity

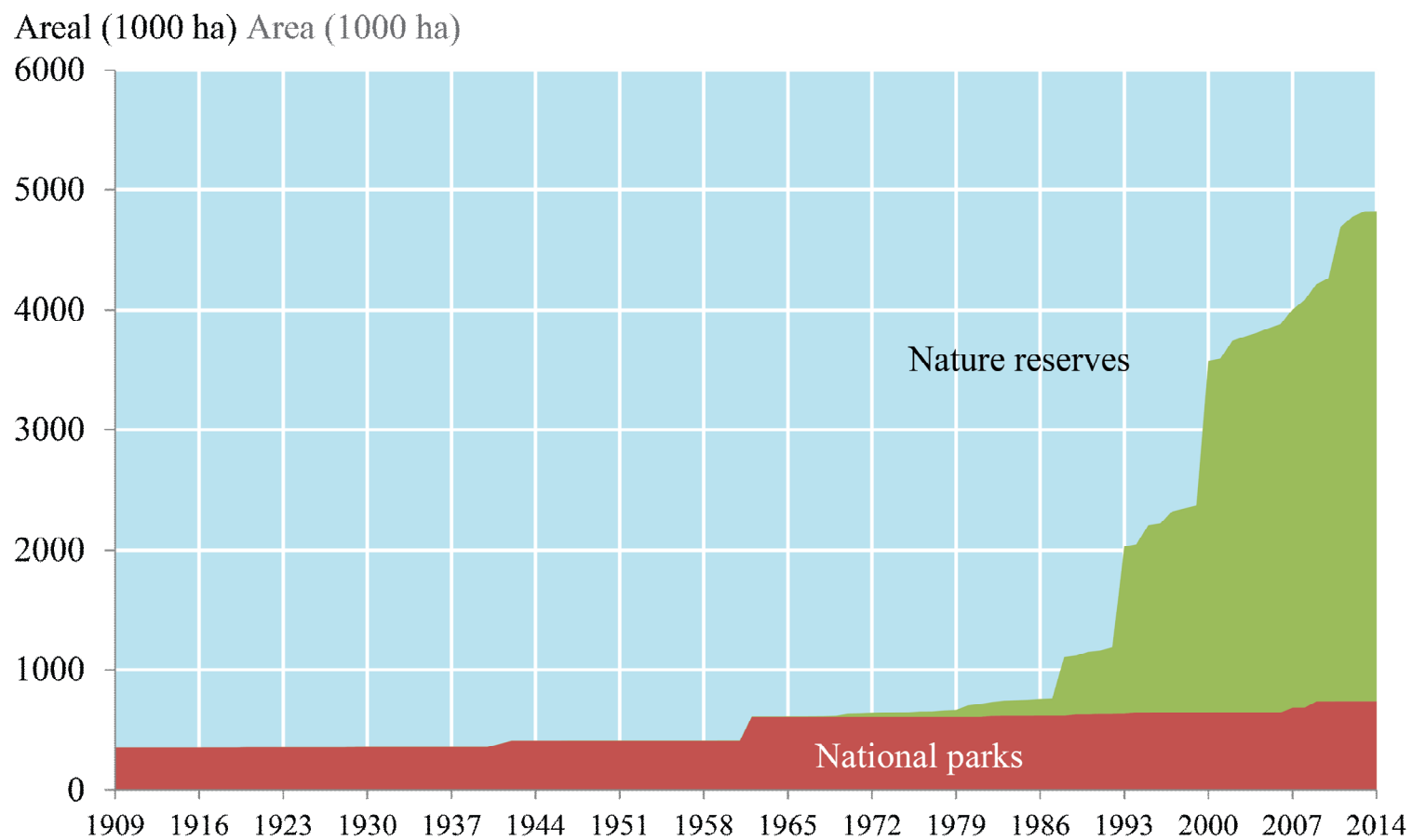
≈ 45 million Euro per year

Productive forest land – standing volume



- Mean value for the first two inventories 1923-29 and 1938-52, followed by moving five year average.
- Source: Swedish NFI

**Formally protected areas – forestry activities are prohibited.
Accumulated area in 1000 h for 1909-2014.**



Source: Swedish Environment Agency



SLU infrastructure investments for research and education

-Smart?

-Sustainable?!

-Inclusive – international collaboration most welcome!

SLU Uppsala new campus 2011-2015 (350 MEuro)

2014

Animal Center

**Veterinary medicine and Animal sciences
University Animal Hospital**

2011

BioCenter

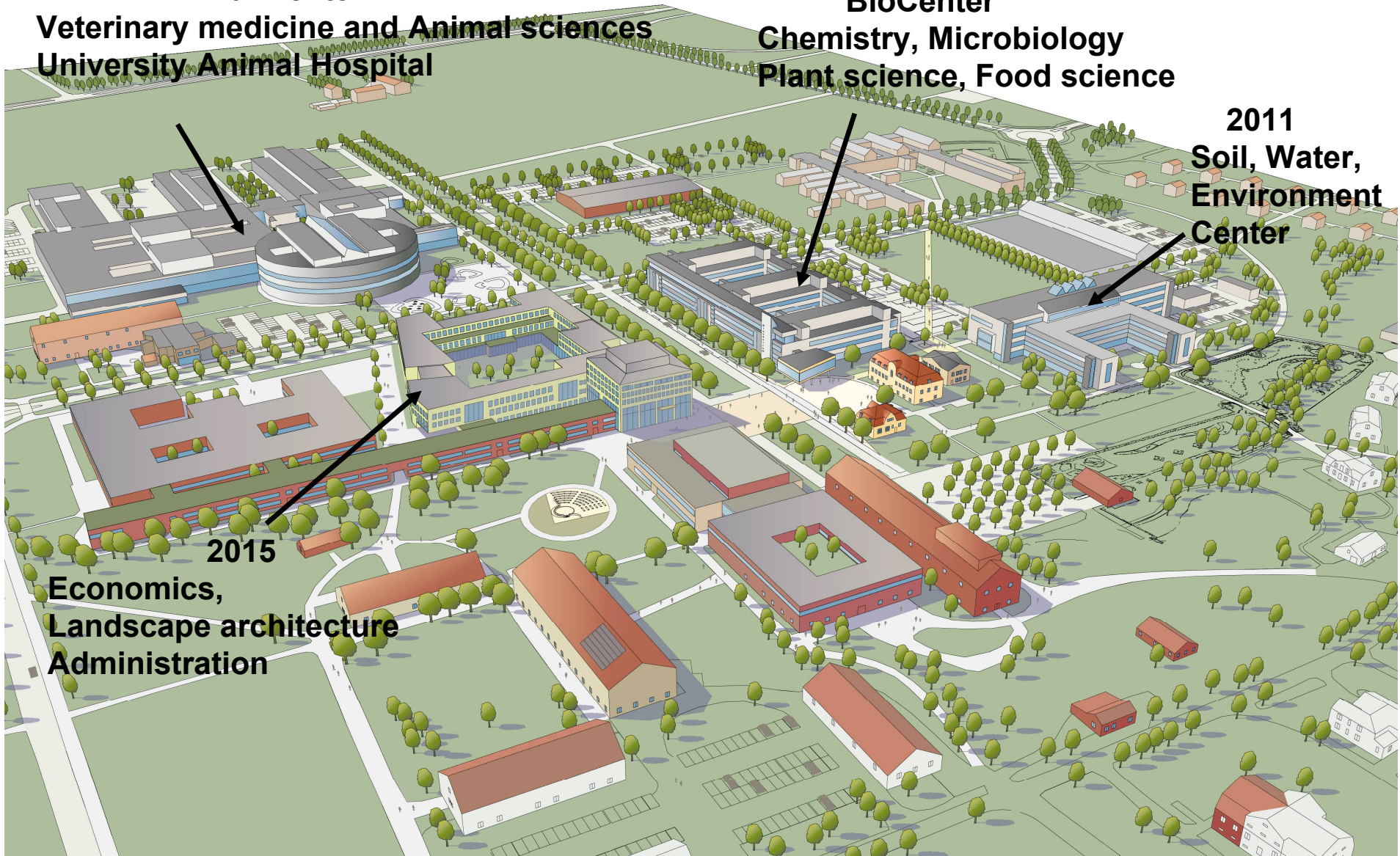
**Chemistry, Microbiology
Plant science, Food science**

2011

**Soil, Water,
Environment
Center**

2015

**Economics,
Landscape architecture
Administration**

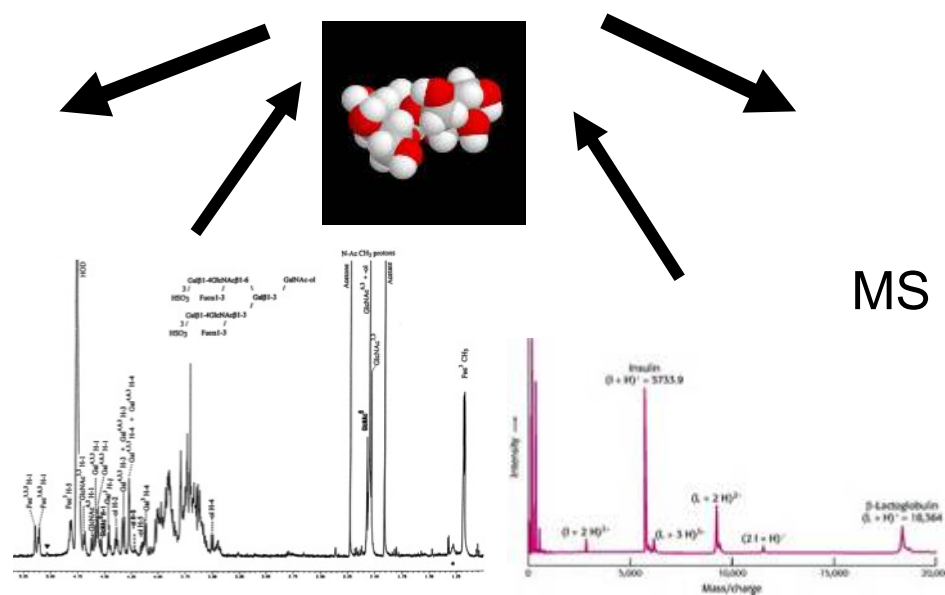




Chemistry and Molecular biology

NMR

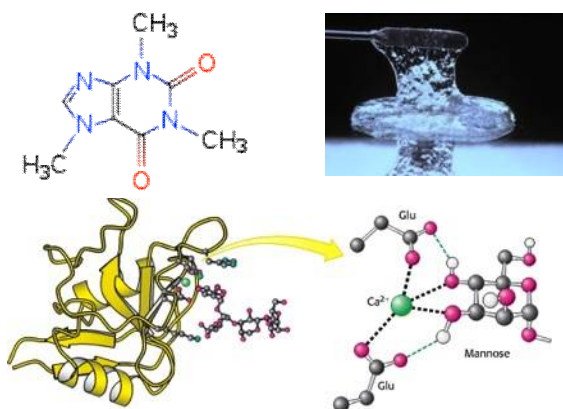
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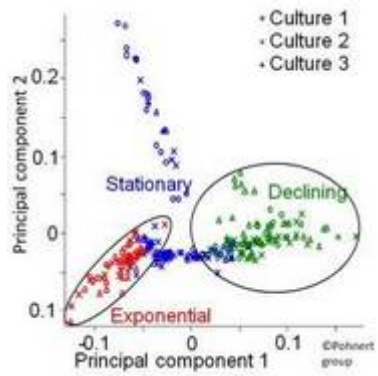
MS



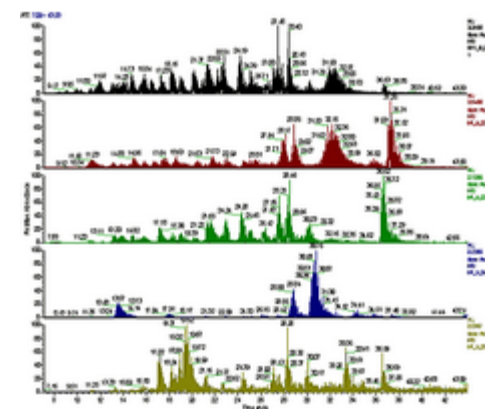
Structure-Interaction



Metabolomics



Proteomics



⇒ Activity - Function!

SLU Biobank for non-human material

- absolutely unique resource !
- canine material (dogs, diseases, DNA)



[Login](#) | [Logout](#) | [Contact us](#)

Home

Find sample collections

Links

- [SLU Biobank](#)
- [BBMRI.se](#)
- [Catalog of European Biobanks \(User: guest, Password: catalogue\)](#)
- [Svensk Nationell Datatjänst \(SND\)](#)
- [Molecular Methods Database](#)
- [NCI Biospecimen Research Database](#)
- [SciLifeLab - Uppsala](#)

Welcome Organizations Sample Collections

29/08/2014

Welcome to the Sample Collection Register at SLU!

The SLU Sample Collection Database is a register where researchers can submit information about their sample collections in order to make them searchable for prospective collaborators. Here you can find sample collections containing non-human biological material.

Current number of individuals/plots: 18726

To be able to register sample collections and studies you need to [apply for membership](#)

If you are a member, please [login](#)

You don't need a membership in order to search for sample collections. Simply go to the "Find sample collection" tab in the left panel.



www.slu.se/samplecollection





Lövsta Research Center Farm Animals (8 km from Uppsala)



Slaughterhouse (PPP)
(education, vet students)

Poultry

Biogas plant - electricity export
wood chips for heating
100% renewable energy

Pig production

Milk cows

55 million Euro, 2012



High productivity – breeding programs, high tech, animal welfare, low antibiotic use



Agricultural field station (Lanna, Västergötland)

- 155 ha cultivated since 1929
- 60 experiments annually
- Long term trials (1936), soil fertility and cultivation
- 59 separately drained plots for leakage studies (800-5000 m²)

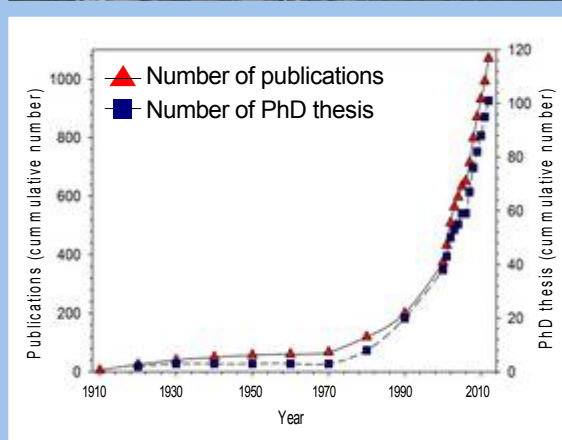


**Flow
measurements**



**Analyses
(Nitrogen,
pesticides)**

Advanced Forest Field Research Stations





Towards increased SLU participation in H2020

Grants Office (lowering administrative barriers)

- Support
- Application
 - Project implementation
 - Strategy

SLU Holding and Innovation Office

- Support
- IPR and commercialization

SLU EU Team (strengthening strategic dialogues)

- Dialogue
- Research groups
 - National stakeholders
 - EU stakeholders



Pre-contract

Post-contract

Commercialization



National infrastructure investments for research

-Smart

-Sustainable

-Inclusive – international collaboration most welcome!!!

Swedish Infrastructure for Ecosystem Science



Nine field stations with research and monitoring operations distributed all over Sweden. SLU coordinates.

Covering a range of ecosystems and climatic regions: tundra ecosystems, mountain areas, forests, wetlands, boreal catchments, inland waters, and agricultural land

Enabling field-based ecosystem research at world-class level

Available for all researchers on equal terms, regardless of affiliation



SciLifeLab

Advancing Life Sciences

SciLifeLab provides the molecular -omics tools, technical platforms and know-how enabling Swedish scientists to advance their research.

A government-founded national resource for the whole scientific community.

Collaboration between four Swedish universities with additional satellite platforms



Karolinska
Institutet



Stockholms
universitet



UPPSALA
UNIVERSITET

Funding

National funds - 335 million SEK per year
(40 million dedicated to drug development)

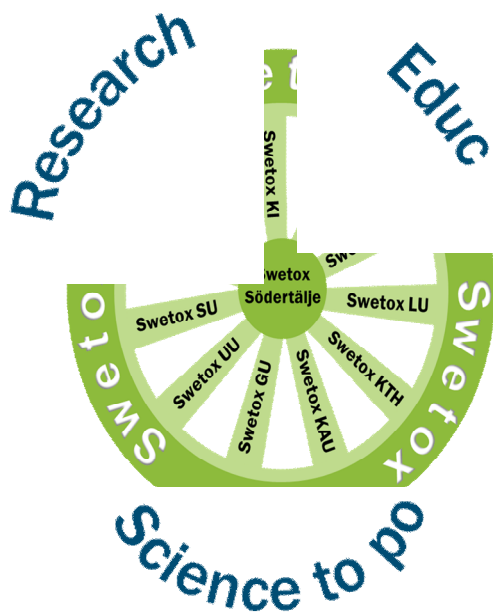
Additional support from The Knut and Alice Wallenberg Foundation and host universities

2013 – 2,235 projects performed for
researchers from all over Sweden

www.scilifelab.se

Swedish Toxicology Sciences Research Center

An interdisciplinary academic network



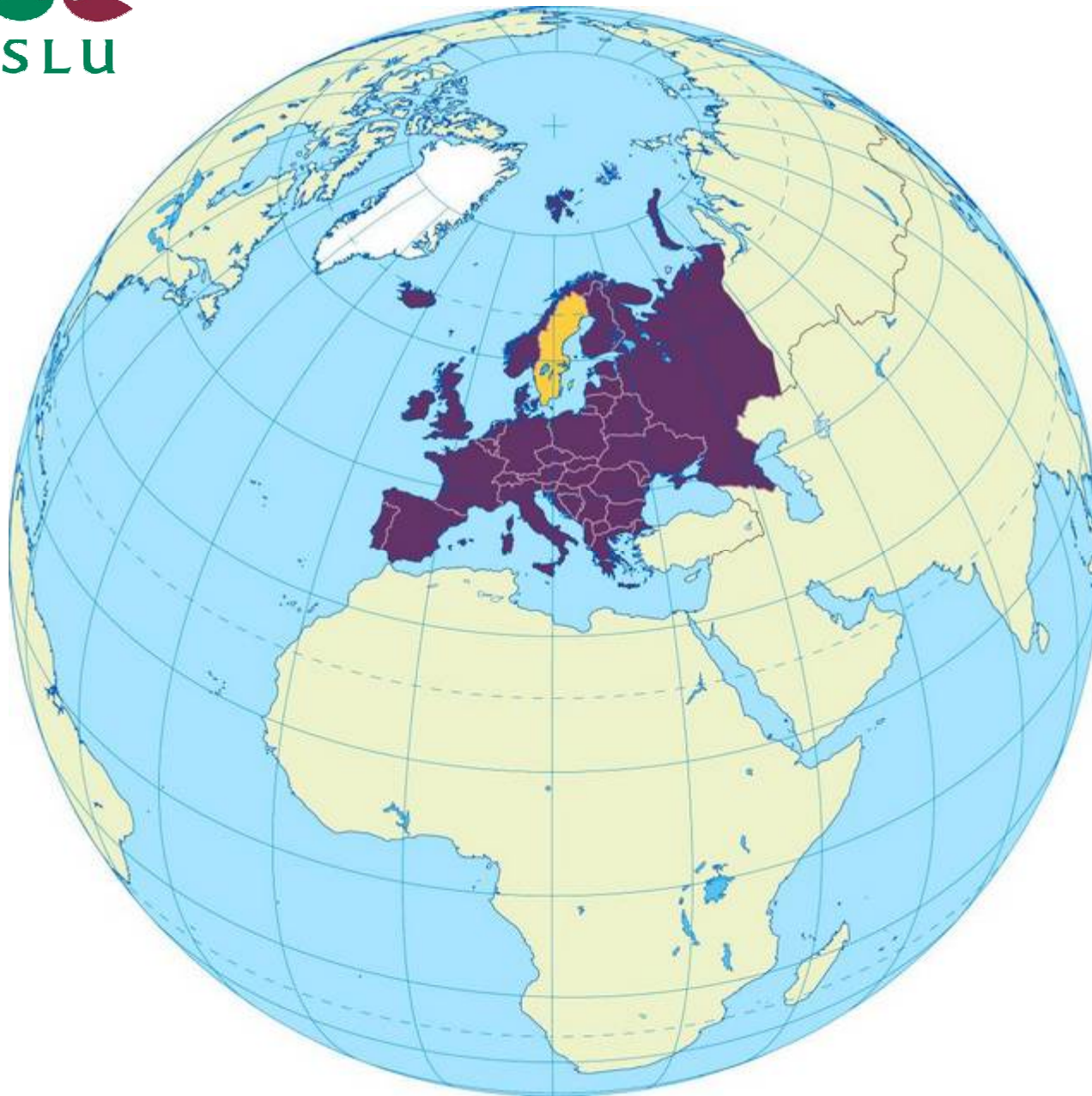
- Strengthen research on chemicals, health & environment
- Address any anthropogenic chemical
- Modernize risk assessment of chemicals
- Optimize and minimize animal experiments
- Improve contacts between disciplines and scientists
- Develop and optimize academic education in toxicological sciences

**Swetox vision:
A chemically
safe world**

www.swetox.se



Swedish Toxicology Sciences
Research Center



Sweden

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Part of Europe

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Part of the World

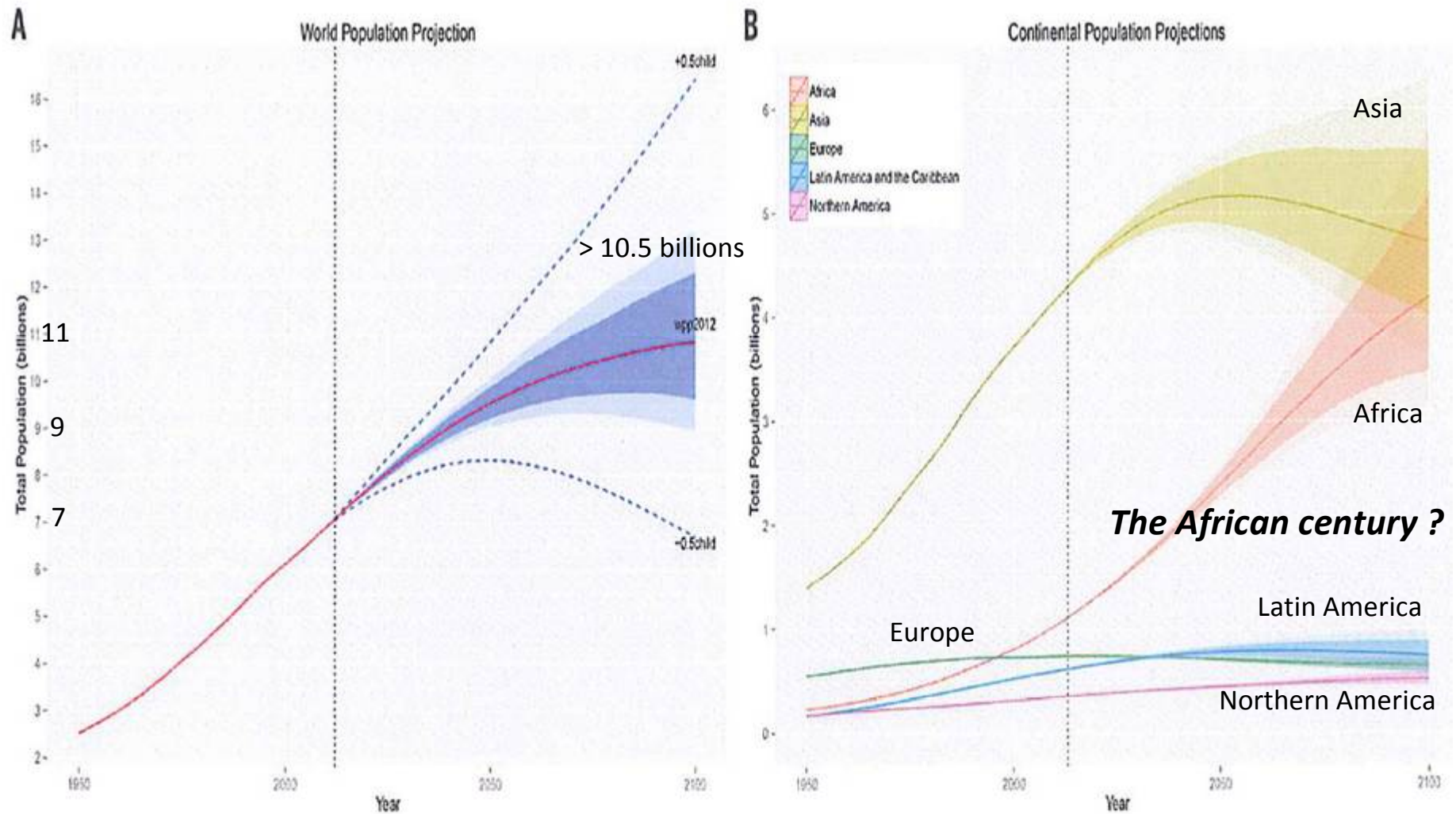


Fig. 1. (A) UN 2012 world population projection (solid red line), with 80% prediction interval (dark shaded area), 95% prediction interval (light shaded area), and the traditional UN high and low variants (dashed blue lines). (B) UN 2012 population projections by continent.



Major Global Challenges

+ > 2 billion people 2050 (UN), +>3 billion people 2100!

+ 70 % more food required 2050 (FAO)

**- use of more land, water, energy, pesticides
and P-, N-, K-fertilizers (Peak-P ?)**

+ 44 % more energy 2030 (US DOE),

- bioenergy requirements cause land use conflicts

and

+ 2° C global warming 2050?, + 4° C 2100? (IPCC)

**- sea level rise, drought, torrential rains,
new pests, migration, social unrest**



The Global Challenges University Alliance

**Co-operation with 4-5 selected leading universities per continent
*(cultural and climate zone diversity)***

Highest Quality

Asia, Oceania, North America, South America, Africa, Europe

Stepwise development of network to Alliance through:

- Thematic workshops (research) with 6-12 participating universities

Meetings with university leaders (11 universities so far)

- Global Challenges Summer Schools (PhD students/MSc students)



Global Challenges University Alliance Workshops



Biofuels and Biorefineries, September 26-28, 2012

(Cornell University, University of Tokyo, China Agricultural University, National University of Singapore, University of Pretoria, Makerere University, SLU)

The Future of Food – Security, Quality and Safety, May 22-24, 2013

(Cornell University, University of Tokyo, China Agricultural University, University of Sao Paulo, University of Ougaddogou, Addis Ababa University, Makerere University, Chulalongkorn University, Bogor Agricultural University, University of Queensland, University of British Columbia, Wageningen University, and SLU)

Environmental Monitoring of Invasive Species, September 3-5, 2013

(Cornell, Tokyo, Chulalongkorn, Wageningen, Pretoria, Nicaragua, SLU)

Green and Sustainable Cities – The Role of Landscape Architecture, March 12-14, 2014

(Melbourne, Guelph, Tokyo, Putra Malaysia, Lincoln NZ, UNA, St Petersburg, Chulalongkorn, Makerere, Cornell)

Forestry for the Future, June 25-27, 2014

(Tokyo, Melbourne, Murdoch(Australia), BOKU(Austria), Florence, University of British Columbia, Makerere, SLU)

Aquaculture – Providing Food for the Future, October 22-24, 2014

BOKU, Lilongwe (Malawi), Makerere University, Queensland, Putra Malaysia, Sao Paolo, Stirling (UK), Wageningen, SLU)

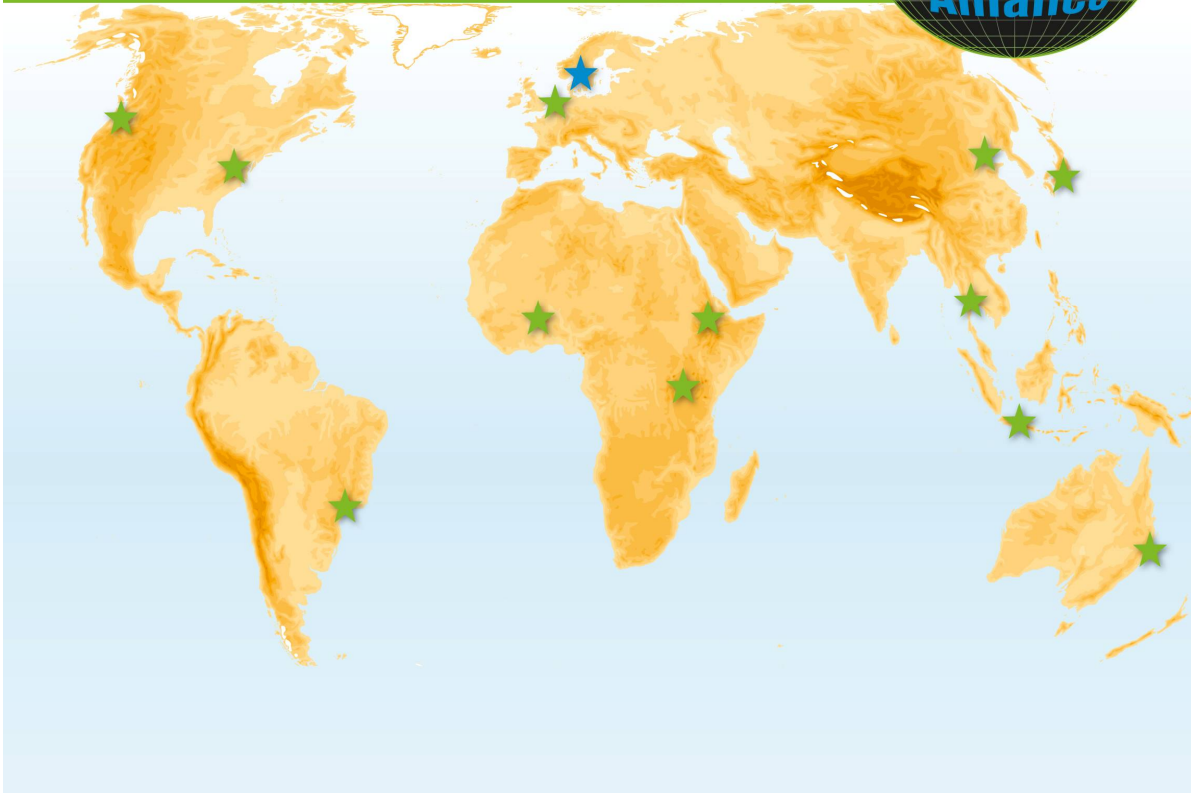
Vanishing Wildlife or Re-wilding the World, April 2015

Agriculture without Antibiotics, June 2015?

THE FUTURE OF FOOD

Security, Safety and Quality

22–24 May 2013 Uppsala, Sweden



PARTICIPATING UNIVERSITIES

- * UNIVERSITY OF QUEENSLAND, AUSTRALIA * UNIVERSITY OF SAO PAULO, BRAZIL * UNIVERSITY OF OUAGADOUGOU, BURKINA FASO
- * THE UNIVERSITY OF BRITISH COLUMBIA, CANADA * CHINA AGRICULTURAL UNIVERSITY, CHINA * ADDIS ABABA UNIVERSITY, ETHIOPIA
- * BOGOR AGRICULTURAL UNIVERSITY, INDONESIA * UNIVERSITY OF TOKYO, JAPAN * WAGENINGEN UNIVERSITY, NETHERLANDS
- * SLU, SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCES, SWEDEN * CHULALONGKORN UNIVERSITY, THAILAND
- * MAKERERE UNIVERSITY, UGANDA * CORNELL UNIVERSITY, USA

Hosted by: SLU, Swedish University of Agricultural Sciences



**Participants at the Second *Global Challenges University Workshop*
The Future of Food – Security, Safety and Quality , Uppsala, May 22-24, 2013**



Global Challenges Summer Course

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The Future of Food

Uppsala September 1-10, 2014

39 PhD and MSc students from Brazil, Canada, China, Ethiopia, Indonesia, Japan, The Netherlands, Sweden, Thailand, Uganda, and US

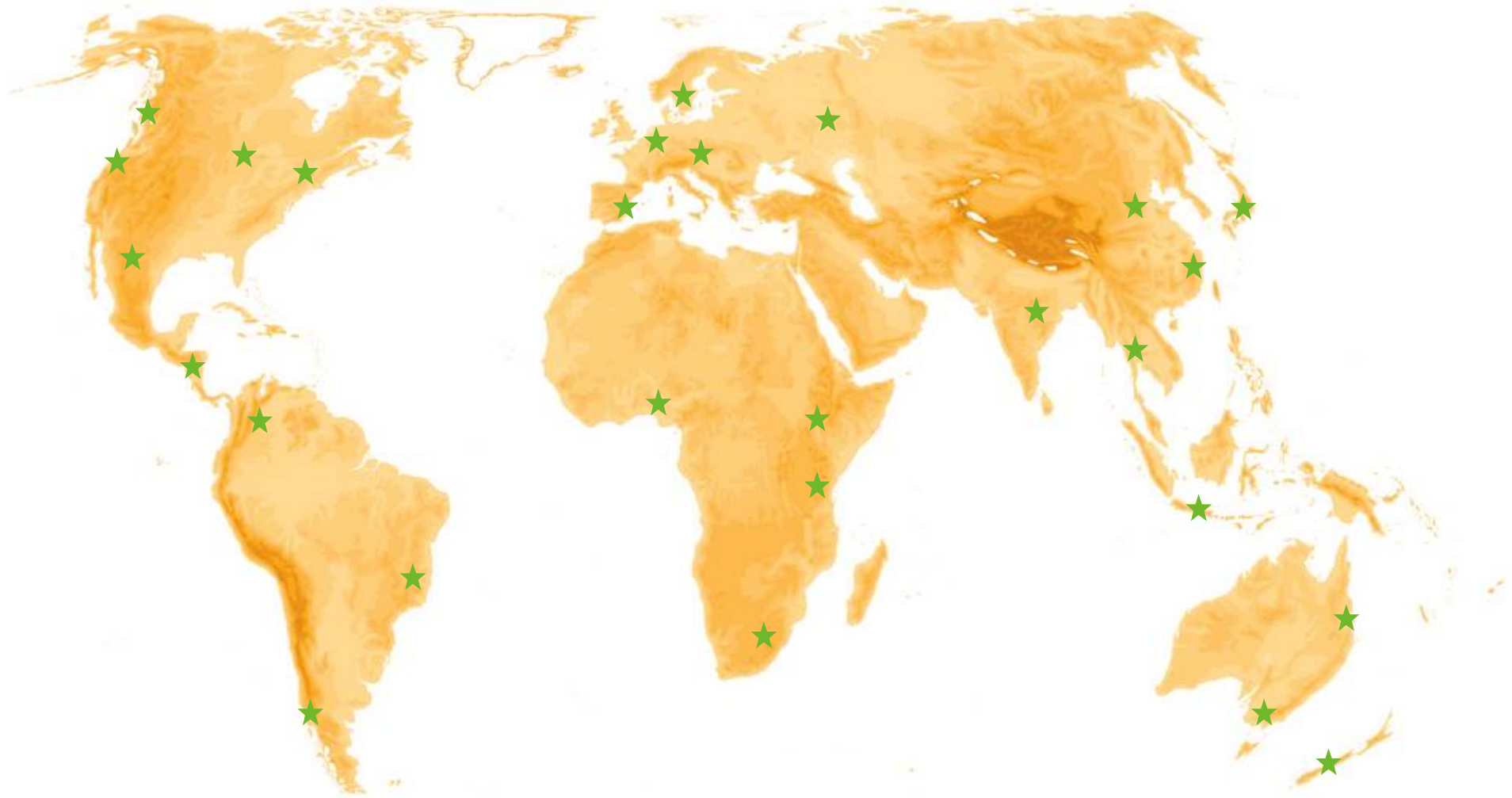
- Intense knowledge building and sharing
- Leadership development
- New colleagues – New friends – Global Challenges Network



**Students and teachers at the Global Challenges Summer School
The Future of Food, Uppsala, Sweden, September 1-10, 2014**



The Global Challenges University Alliance 2015



***The 25 Global Challenges Universities
(Leading Land Use Universities League)***



Global Challenges University Alliance

**Research and Education
of the
Future Leaders of a Sustainable Bioeconomy**



Global Challenges University Alliance

Smart, Sustainable, Inclusive