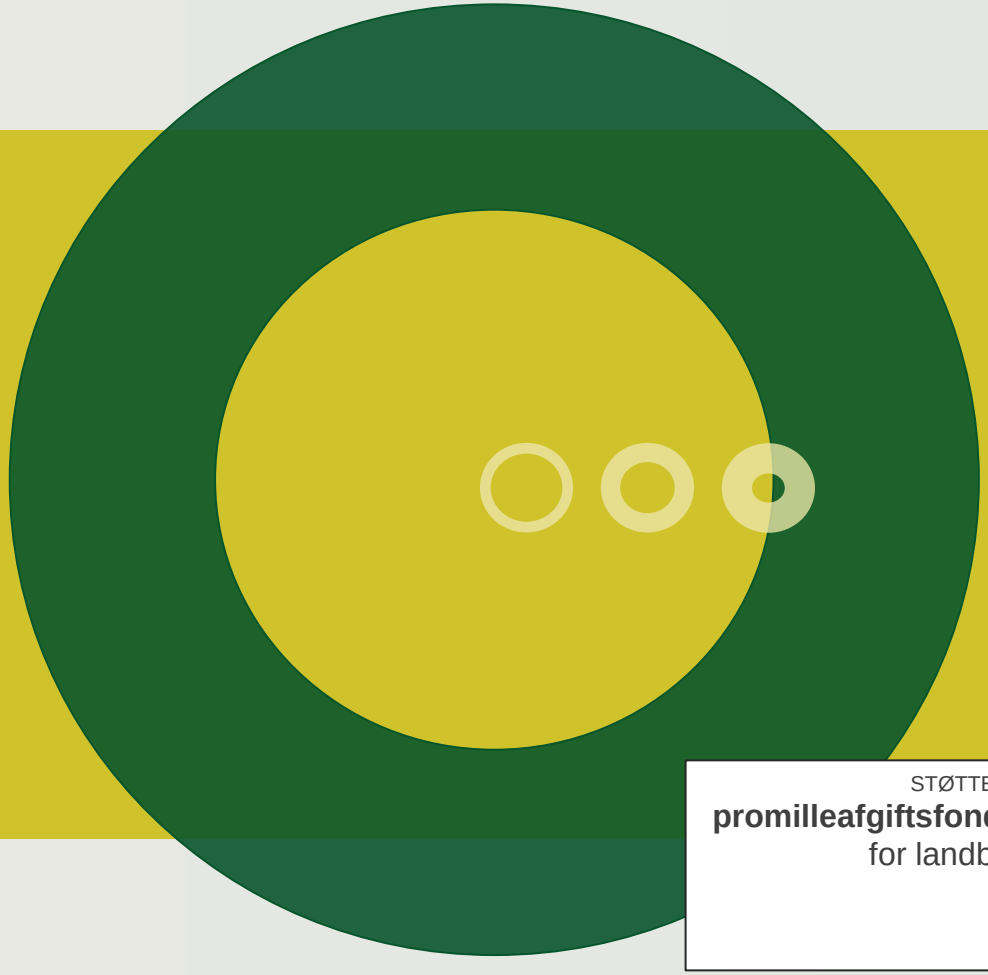
VIDENCENTRET FOR LANDBRUG

Forbedring af afgrødernes udbytte og produktionsmæssige egenskaber (FAUPE)

Lars Eriksen

Hotel Nyborg Strand

3/3 - 2014



STØTTET AF
promilleafgiftsfonden
for landbrug

PARTNER I
DLBR

Program, morning

- 9.00-9.30 Welcome and introduction
- 9.30-10.00 Purpose and goal of the project (Lars Eriksen, Svend Christensen, Torben Asp)
- 10.00-10.15 Coffee break
- 10.30-11.00 Genomics, Torben Asp, AU
- 11.00-11.30 Phenomics, Thomas Roitsch, KU
- 11.30-12.00 Methods for genomic screening and high performance computing, Torben Asp, AU
- 12.00-12.30 Automated methods for phenotyping of roots and canopy, under field conditions, Jesper Svensgaard and Kristian Thorup-Kristensen, KU
- 12.30-13.15 Lunch

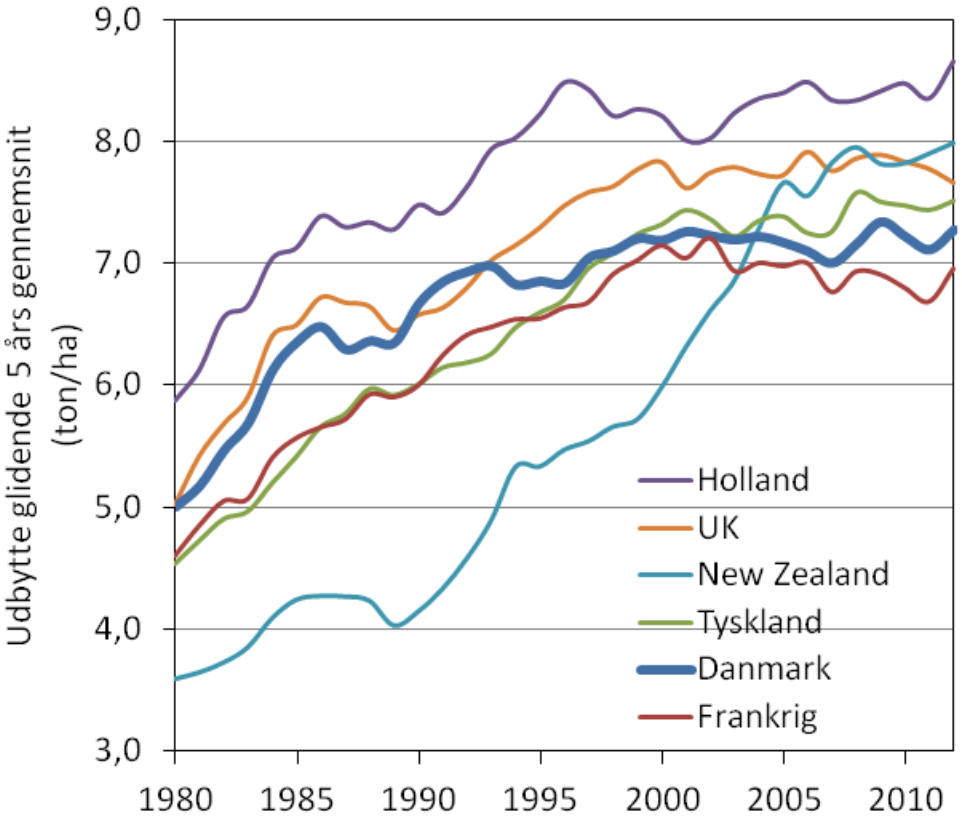
Program, afternoon

- 13.15-13.45 WP2 Genomics, Torben Asp, AU
- 13.45-14.15 WP1 Plant Phenomic Infrastructure and WP3 Validation, Svend Christensen, KU
- 14.15-14.30 Coffea break
- 14.30-15.15 Data exchange, Torben Asp, AU
- 15.15-15.30 Report 2014 and application for 2015, Kirsten Klitgaard, VFL

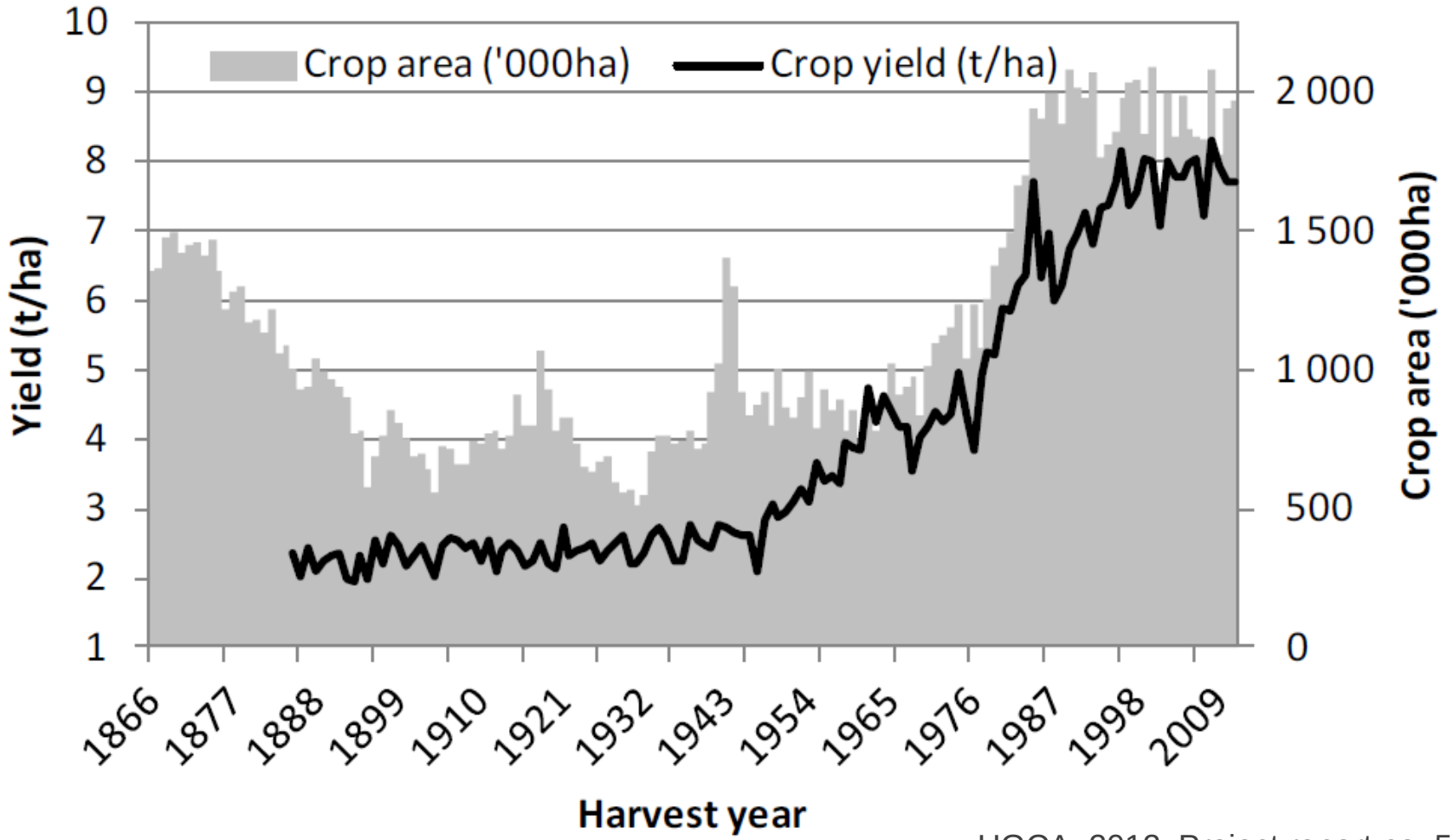
Two projects: FAUPE and ”Ny Udbyttefremgang”

- Initiated by: The committee for prioritizing initiatives within plant production
  - Agricultural organisations
  - Plant breeding industry
- Funded by ”Promilleafgiftsfonden”
- Planned as three year projects
- One year funding

Yield stagnation



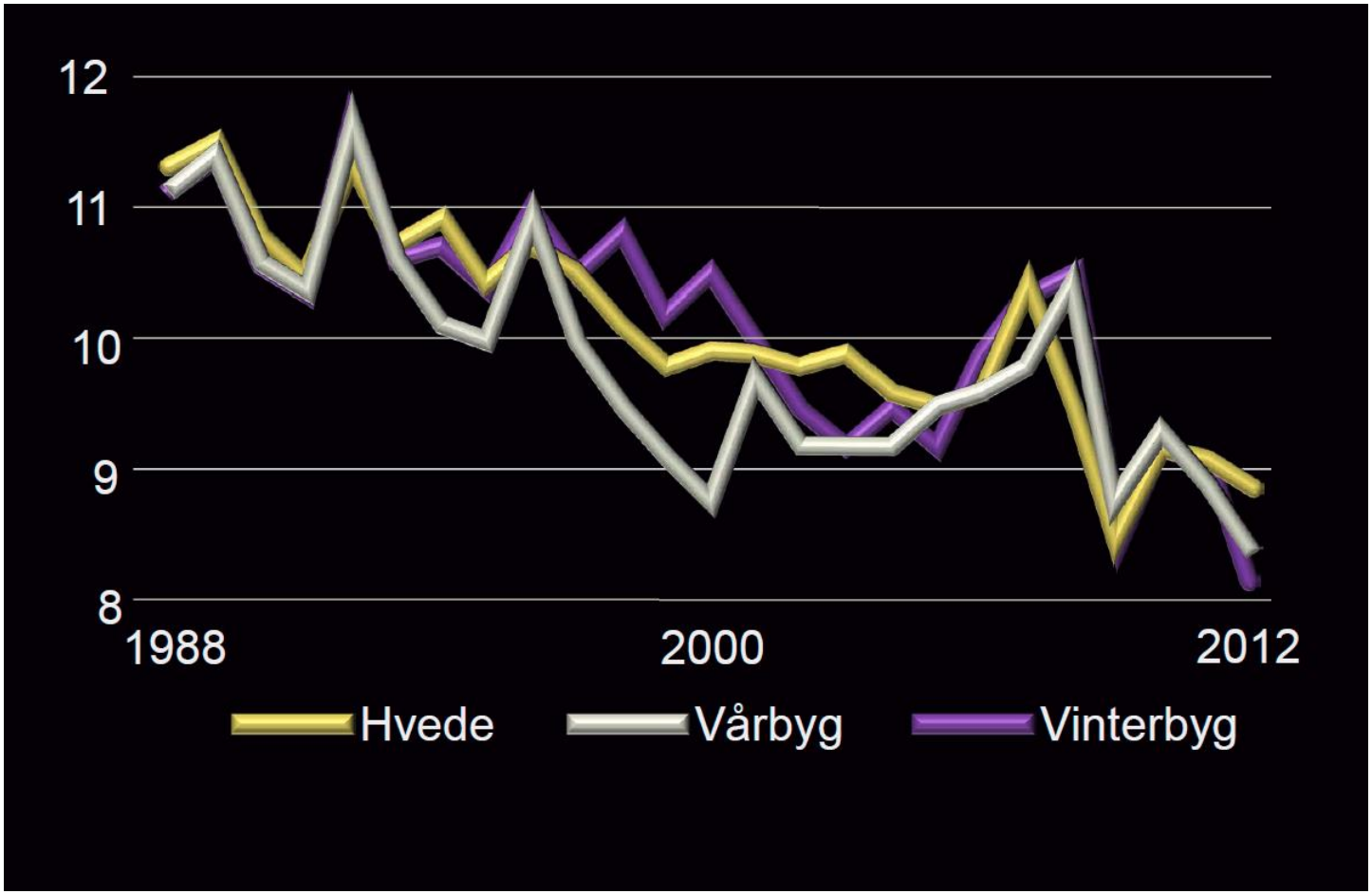
Wheat yields and area in the UK



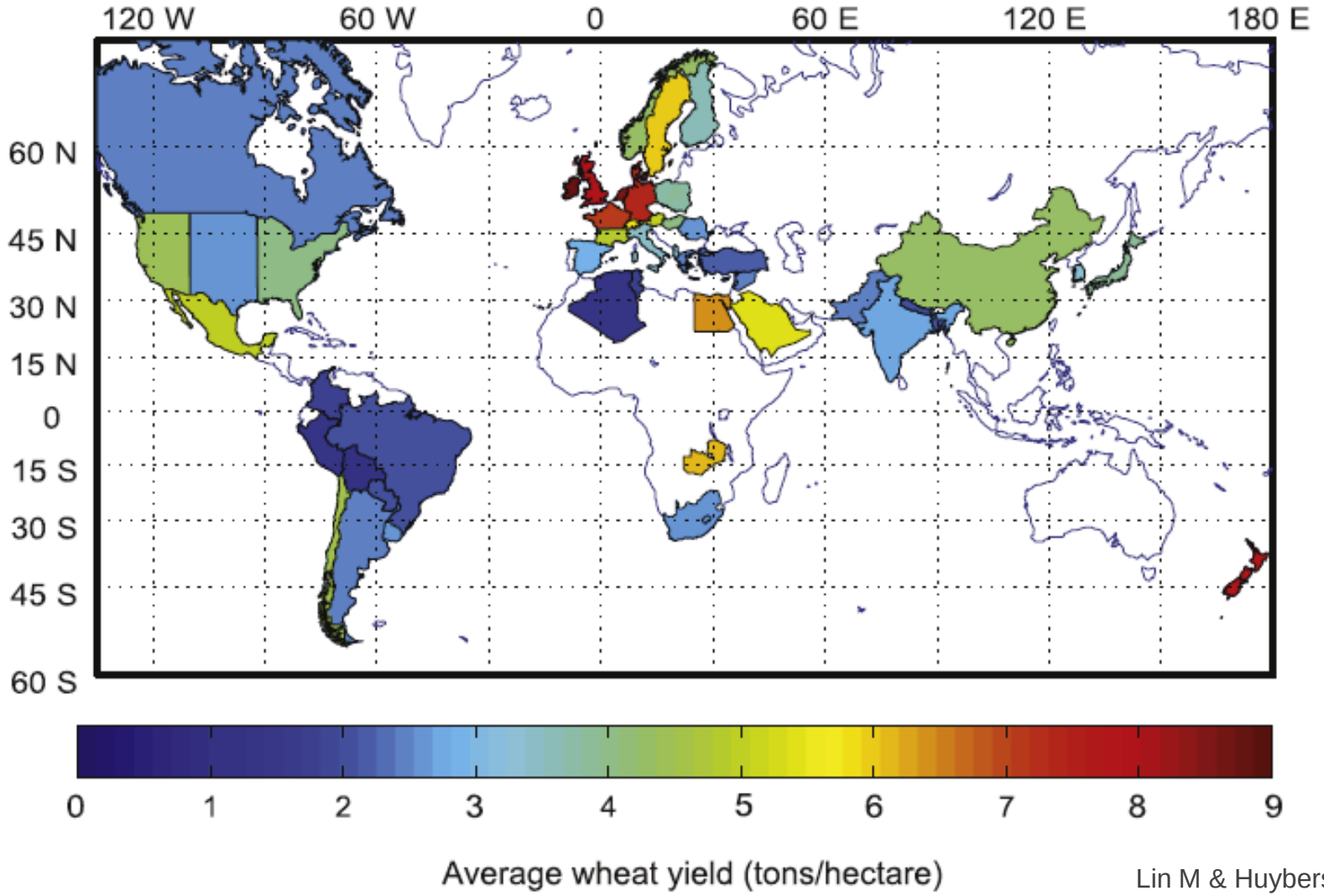
HGCA, 2012. Project report no. 502

Reduced quality, protein from 1988-2012

Videncentret for svineproduktion



DK in a high yielding part og the world



Lin M & Huybers P, 2012

”Ny udbyttefremgang”

- Trials on six locations
  - Winter wheat
  - Winter oilseed rape
  - Spring barley
- Intensified cropping
  - More nitrogen
  - More plant protection
  - Micro nutrients

FAUPE

- Participants
  - Copenhagen University
  - Aarhus University
  - Knowledge Centre for Agriculture
- Associated partners
  - DLF Trifolium, grasses
  - LKF Vandel, potatoes
  - Nordic Seed, cereals
  - Sejet Plantbreeding, cereals
  - CID, Crop Innovation Denmark

The goal of FAUPE

- Development of new, fast and efficient methods for screening and selection for NUE, RUE, WUE, drought and disease resistance
- 2) new software protocols for measuring, storing and analysing big genomic and phenomic data

FAUPE

- Faster breeding for complex traits
  - WP1: Plant phenomic infrastructure (Svend Christensen,KU)
    - Phenotyping, canopy and roots
  - WP2: Genomics (Torben Asp, AU)
    - Database
    - Analysis of pheno- and genotyping data
  - WP3: Validation (Svend Christensen,KU)
    - Field validation of methods for screening

Research objectives – Work Package 1 and 3

- Study the genotypic variation of NUE, WUE and RUE
- Upscaling from single plant root studies in green house experiments via row studies in semi-field root facility to the crop scale in fields
- Developing statistical robust designs for root and shoot studies
- Developing robust metods for measurement of nutrient and water uptake in semi-field root facility
- Developing high-through-put non destructive phenotyping for field experiments

Milestones in 2014

- October: Presentation with suggestion of soil sensors for field root phenotyping facility
- October: Presentation of results from multispectral imaging in cereal/potatoe cultivars
- November: A testing platform for automatic data/metadata transfer between field platforms, databases and analytical platforms.
- November: Final protocols vs 1 for multivariate image analysis, field phenotyping procedures, experimental designing and imaging strategies. Will include a protocol for some statistical work
- December: Sugestions for improved experimental setup for aboveground root phenotyping facility presented
- December: Pilot test with multispectral imaging for detection of roots and root growth finished and presented
- December: Suggested design for database system for phenotyping data including integration of root- and aboveground phenotyping data
- December: Present results on improved protocols/methods for root phenotyping and canopy phenotyping

Research objectives – Work Package 2

- Establishment of a high performance computing cluster
- Establishment of a CID genomics breeding decision support system