



Sveriges lantbruksuniversitet  
Swedish University of Agricultural Sciences



# Long-term agroecological and organic field experiments

- what does it mean and why/how to network?

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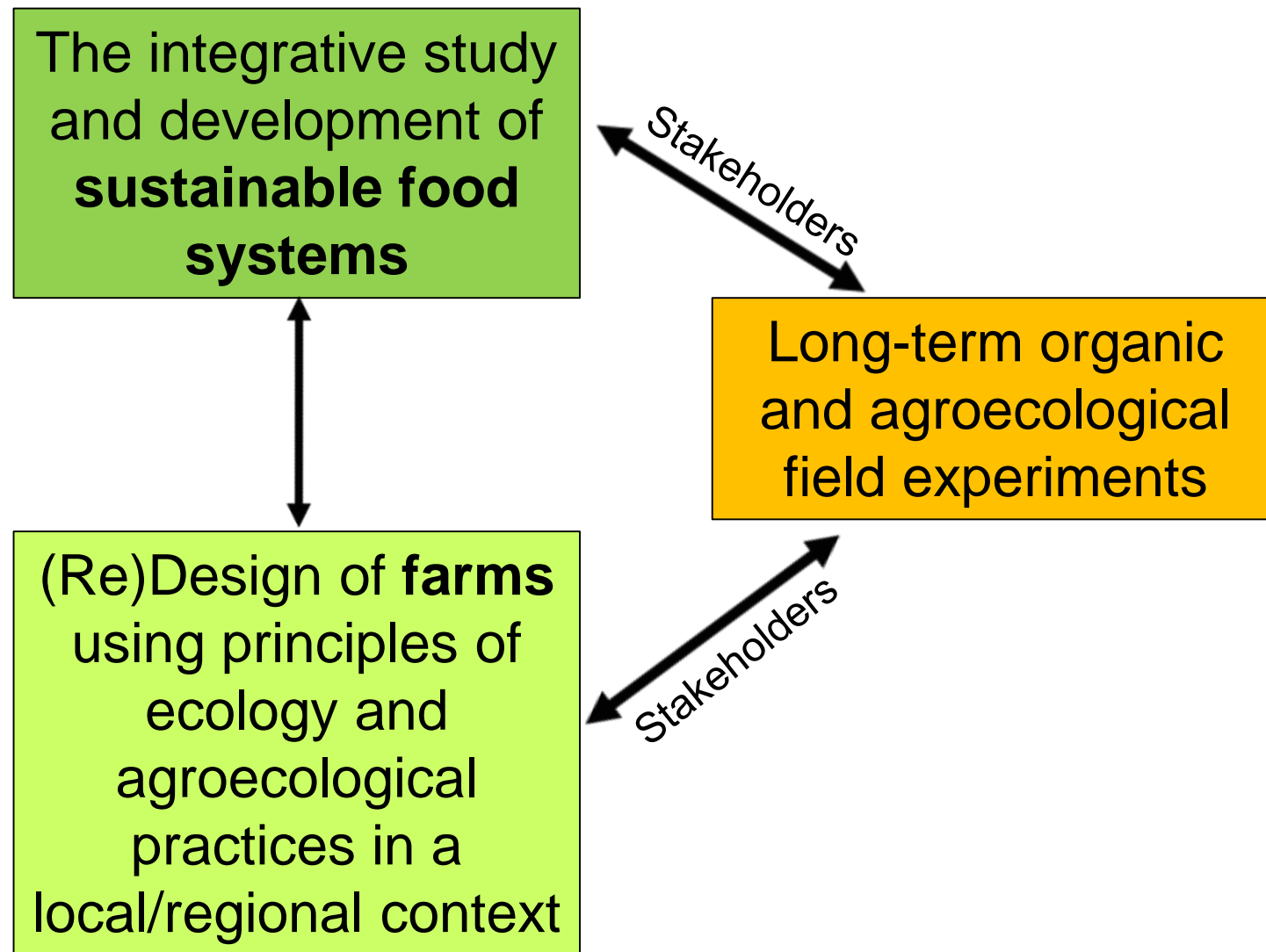
# ESJ LTE experience

- ***The Hill Organic FarmLab*** – KVL  
– 48 ha organic farm for research, teaching and demonstration close to Copenhagen, DK(1998-2003→?)
- ***SAFE*** - **S**wedish **A**groecological **F**ield **E**xperiment, SLU/SITES  
(2013-2022→?) 4 South Swedish cropping systems – 3 org. managed
- ***DRIM*** - **D**iversification by **r**otation, **i**nter- and **m**ultiple cropping for increased sustainability of south Swedish organic cropping systems  
SLU/DiverIMPACTS (2018-22→?)





# Agroecology







# Agroecological principles and practices

- Agroecology uses **ecological principles** for the design and management of **diversified** agroecosystems where external inputs are **replaced** by natural processes such as soil fertility and biological control
- AE **principles** take different technological forms as **agroecological practices**, when applied in a specific local context in terms of farmer socio-economy and biophysical conditions





# Long-term experiments (LTEs)?

- An experiment having an intended life span sufficient to reliably estimate steady-state conditions of key agroecosystem attributes
- Site to determine if system can continue in the long term without irreparable harm to the soil or the environment
- LTE: The experiment persist beyond:
  - Usual limits of funding
  - The length of time new ideas remain fashionable





# Why LTEs in agroecological research?

- Determination of gradual and small changes can only be determined over longer time periods.
- Changes due to: environment, including global change, new agroecological practices, .....
- On: agricultural productivity, system resilience, SOM dynamics, nutrient cycling and budgets, biodiversity, ecosystem services provision, etc.





# Which LTE design?

LTEs may be designed for one or more research strategies:

- Process studies (e.g. N<sub>2</sub> fixation, GHG emissions, soil erosion)
- Application of agroecological practices and the effects in a sustainability perspective (e.g. cover crops, intercropping, etc.) in factorial experiments
- Whole agroecological and organic cropping systems for determining the impact of different systems design and management on crop yield, soil C, environment, etc.

Fixed or changing management?

Engagement of actors and stakeholders in (re)design



# Why networking?

- Increase value of individual LTEs for more precise prediction of agroecosystem sustainability components
- Increase the understanding of agroecological systems by combining data from different LTEs
- Comparisons of different experimental designs and locations may lead to new insight
- Coordinate sampling and data collection of soil and plant materials across sites to test new research hypotheses
- Databases and sharing of datasets for testing hypotheses and validation of the ability of simulation models to reproduce agroecosystem performance (yield, nutrient balance, soil C dynamics, environmental effects)
- Joint development of scientific and technical staff skills in maintenance of LTEs and measurements (e.g. spectral cameras, isotopes, etc).
- Joint research applications



# How to network?

- LTE network organization: mission and vision
  - LTE partners and food system stakeholders in board -> executive board
  - Dissemination support (political, popular scientific)
  - Cross-cutting research groups
  - Coordination – databases of LTE data
  - Ad hoc synthesis groups for writing synthesis and joint research proposals
  - Training of new scientific and technical staff (coordination)
- Other means: staff and student exchange, conference, social media, .....



# Conclusions

## Agroecological and Organic Long-Term Experiment

- Designed within a **local/regional context**
- According to **agroecological and organic principles**
- Employs **agroecological practices**
- **Involves stakeholders** from the food system in design and development
- Designed for **process, practice or/and systems research**
- **Kept rather simple** – to ensure against funding fluctuations



The primary justification for establishment and maintenance of long-term agroecological sites may be their future role in answering questions not yet envisioned

Henry Janzen, 1995





**Thank you to  
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