

Research infrastructure and living labs

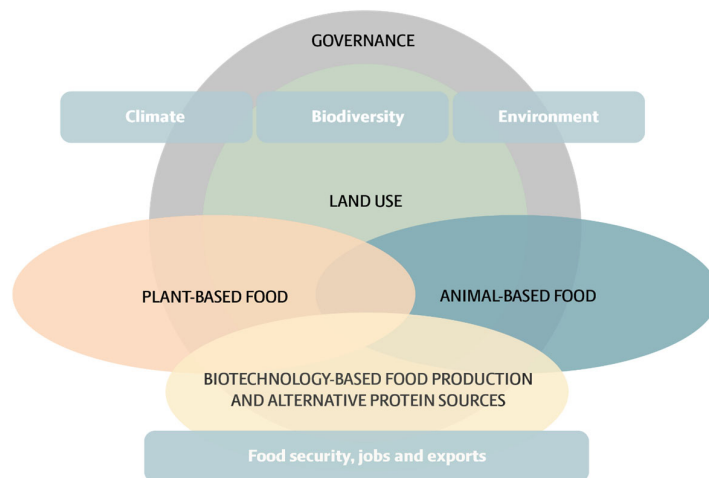
Professor Jørgen E. Olesen



AGRO contributes to the green transition

- Lower GHG and environmental footprint
- Enhance biodiversity (inside and outside farming)
- Less pesticide use
- Land area for other purposes (infrastructure, nature, recreation, climate change adaptation)
- Increased production of
 - Food (globally +45% by 2050)
 - Bioenergy
 - Biomaterials
- Increase use efficiency of scarce resources
- Jobs and economy outside cities

AgriFoodTure roadmap



Roadmap developed by universities and agroindustry in Denmark

DEPARTMENT OF AGROECOLOGY



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Long-term experiments explore C and N cycles over time

Long-term cropping systems experiments at Aarhus University exploring future systems:

- RowCrop: Organic and conventional arable cropping systems varying in crop rotations (legumes), cover crops and manure
- CENTS: Arable systems varying in crop rotations and tillage intensity
- DONG: Biomass production systems for food, feed and bioenergy, emphasizing high biomass productivity
- EcoServ: Organic rotational grassland systems for dairy production



But the green transition requires new infrastructures

Study trip to France, Belgium and the Netherlands (28-30 September):

- INRAE (Dijon)
 - CA-SYS (whole farm divided into different systems aimed to eliminate pesticides at field scale)
- ILVO (Belgium)
 - Farm living lab (organic farm)
- WUR (Netherlands)
 - Farm of the Future (technologies and agroecology)
 - Agroforestry
 - NPEC



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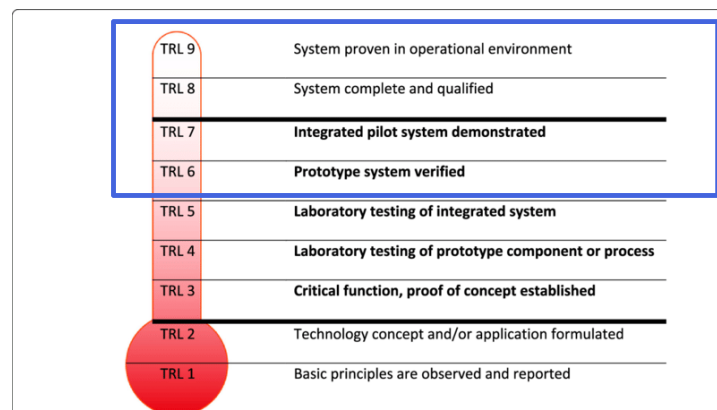
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What are living labs?

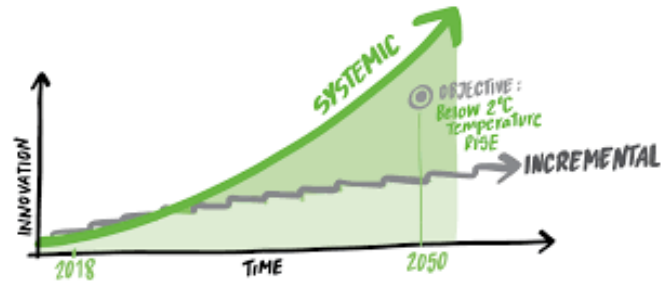
- Wikipedia: A living lab is a research concept, which may be defined as a user-centered, iterative, open-innovation ecosystem, often operating in a territorial context, integrating concurrent research and innovation processes within a public-private-people partnership.
- Agroecosystem living labs: Transdisciplinary approaches which involve farmers, scientists and other interested partners in the co-design, monitoring and evaluation of new and existing agricultural practices and technologies on working landscapes to improve their effectiveness and early adoption

Technological readiness level



Why do we need living labs?

- Speed up the green transition, which requires dealing effectively with barriers to adoption and making technologies market-ready
- Adoption of technologies are often context specific
- Adjustment and adoption of new technologies and management requires user involvement (co-creation)



There are many types and scales of living labs

- Farm / field (management)
 - New management and technologies for growing crops and raising livestock
- Facilities (multiple farmers, cooperative)
 - Biorefining
 - Biogas
- Regional (governance)
 - Catchment (nutrients, water)
 - Landscape (biodiversity, recreation, multifunctional)

GreenLab i Skive

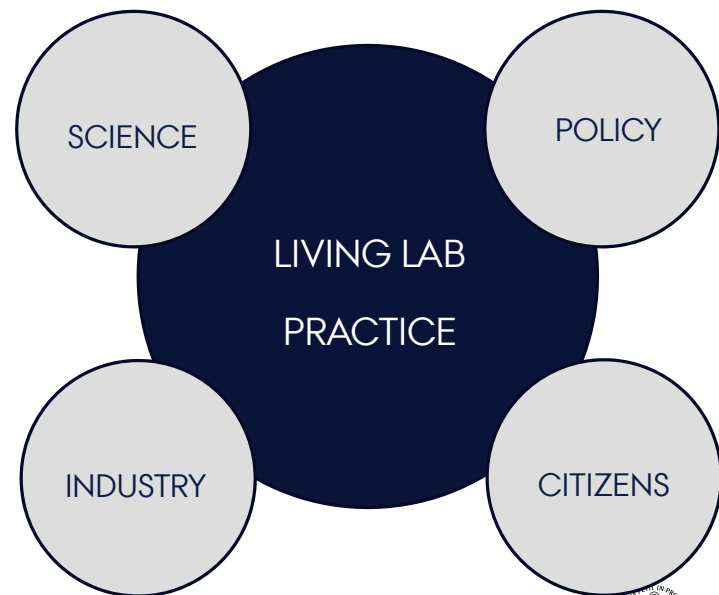


Working with living labs requires interdisciplinarity

Research in living labs requires a range of scientific competences (depending on the situation)

- Natural sciences
- Engineering
- Business
- Policy
- Humanities

But most importantly, the willingness to work with users and across disciplines

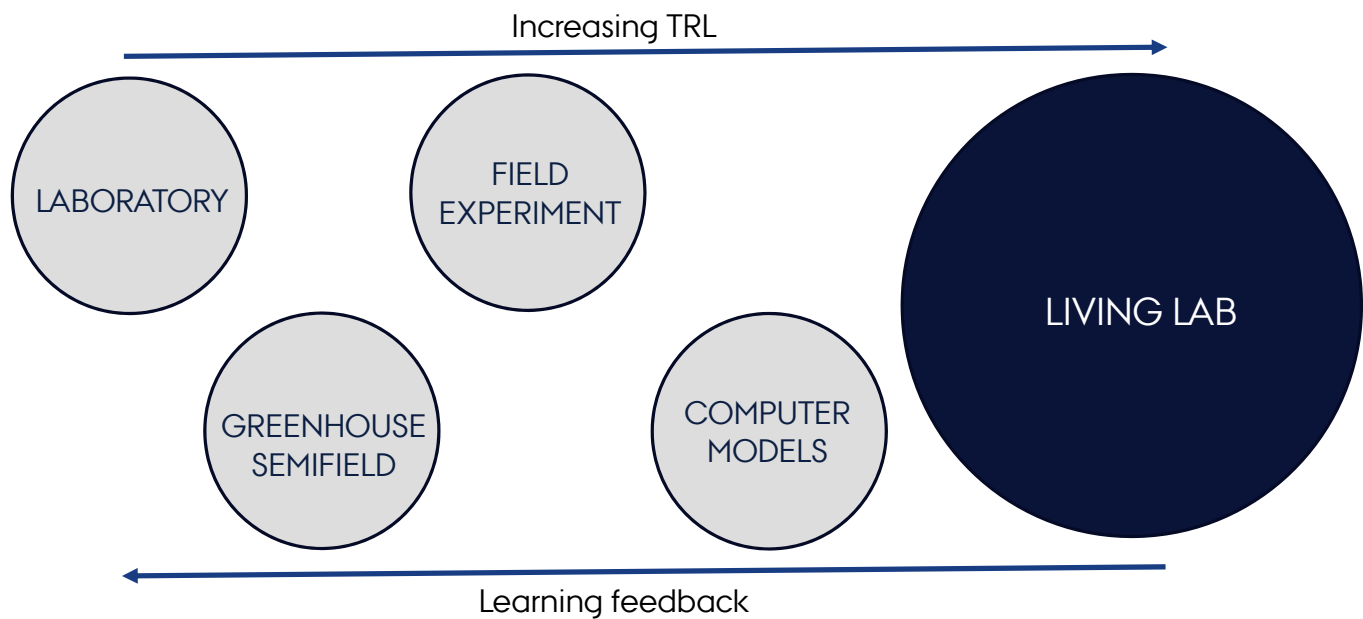


The role of science in living labs

- Support innovation (co-design)
- Document effects (sustainability impacts)
- Analyse barriers (to overcome them)
- Generate learnings (for society)



Living labs is one among many research tools



Research challenges with living labs?

- Is there a reference against which changes can be measured?
- Are changes sufficiently well defined?
- Is the role of researchers in the co-design process well defined (arms length)?
- Are technologies/methods available for measuring and documenting effects at the scale of the living lab?
- Do we need new standards for reporting and publishing from living lab studies?
- Interdisciplinarity requires additional effort for cross-disciplinary understanding



DISCUSSIONS IN THE GROUPS

- Need to improve existing research facilities
- Need for new research facilities
- Need for living labs

All to support the agricultural green transitions

