AGROECOLOGY EUROPE
FORUM 2023 IN HUNGARY
CONVERGING MOVEMENTS
FOR **RESILIENT FOOD SYSTEMS**
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Gyöngyös, Hungary

DIGITALIZATION IN SWEDISH AGROECOLOGICAL CONTEXTS

SYNERGIES, TECHNOLOGY UPTAKE AND FUTURE INNOVATION PATHWAYS

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CANDIES

SESSION 6: Agroecology and digitalization

ORGANISED BY:

WITH THE SUPPORT OF:

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PRESENTATION OUTLINE

- Which synergies can be found between digitalization and agroecology?
- What is the use and uptake of digital technologies in Swedish agroecological contexts?
- What are farmers' perspective on digitalization?
- What role do digital technologies play in sustainable food system transformations?

The Carbon Neutral Digestive Initiative – Enhancing Systems (CANDIES)

Investigates **how environmental information and digital tools** can potentially support a **transformative shift** in our food production and consumption patterns.

Funders: Vinnova, Formas

Partners: Nagoon, Urban Deli

RESEARCH DESIGN

GOAL: gain new insights on how digital tools can be used in the agroecological context

METHODOLOGY: a mixed-methods sequential explanatory design

Data collection:

- Survey shared between the months of May to August 2023
- Focus group discussions – upcoming

Data analysis:

- Quantitative analysis: descriptive and inferential statistics
- Qualitative analysis: social practice theory

SWEDISH CONTEXT

A SILENT PROTO-AGROECOLOGICAL TRANSFORMATION?

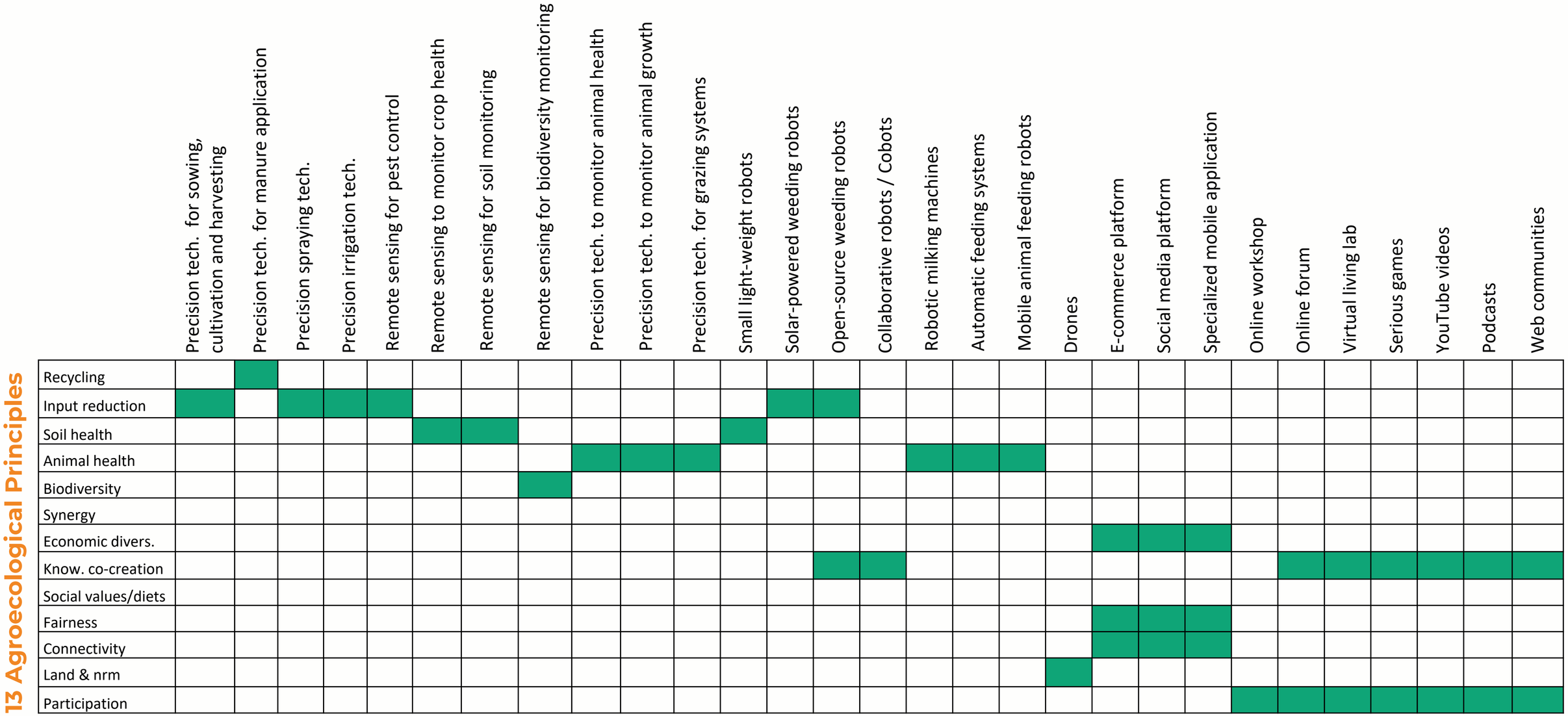
- Important share of small-scale mixed-farms and organically farmed agricultural land suggests that proto-agroecological practices are omnipresent
- Yet, to date the term is only used by a limited number of actors
- Sweden at the forefront of food system transformation?

  ✓ Ambitious policy targets for organic farming
  ✓ KRAV-label
  ✓ REKO-Ringen – short food supply chain network

- High-level of digital literacy, limited digital divide
- Sweden ranks 2nd on the global innovation index

CONCEPTUAL FRAMEWORK

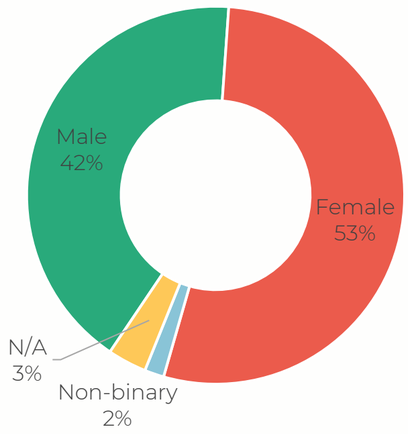
INVESTIGATION OF SYNERGIES ACROSS AGROECOLOGICAL PRINCIPLES



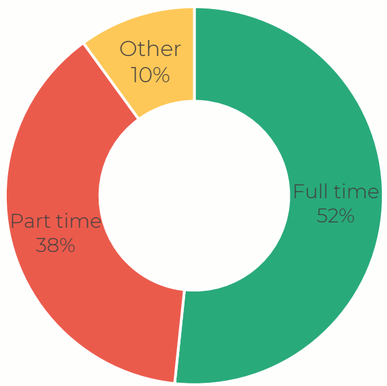
RESULTS

SAMPLE DESCRIPTION

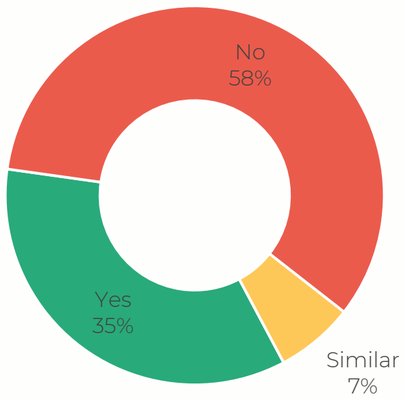
Gender



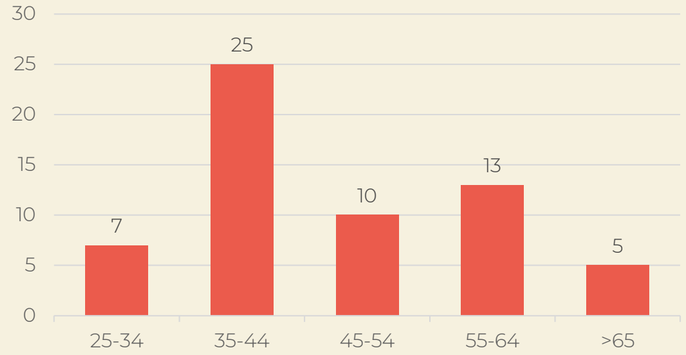
Occupational status



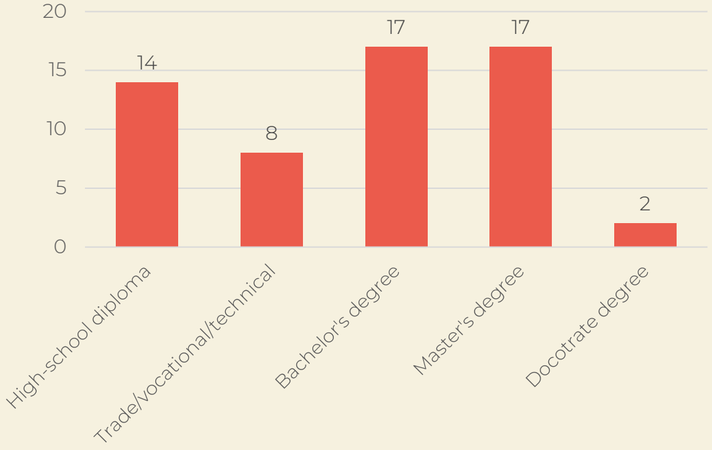
Agricultural Education



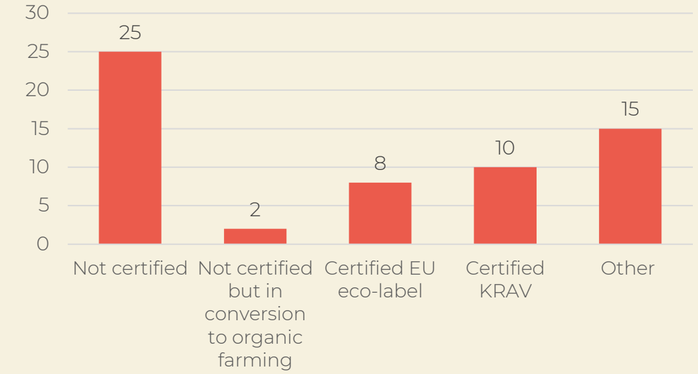
Age Range



Education



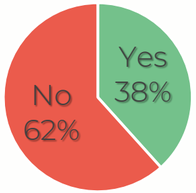
Certification status



RESULTS

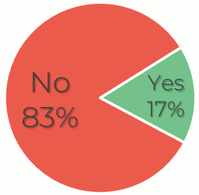
TECHNOLOGY UPTAKE

USE OF PRECISION TECHNOLOGIES



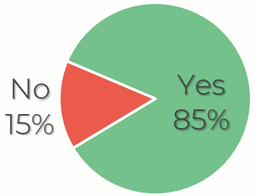
- 17% Precision irrigation technologies
- 8% Precision technologies for sowing, cultivation and harvesting
- 5% Precision technologies to monitor animal health
- 3%
  - Remote sensing to monitor crop health
  - Precision technologies for grazing systems
- 2%
  - Remote sensing for pest control
  - Remote sensing for soil monitoring

USE OF ROBOTIC EQUIPMENT



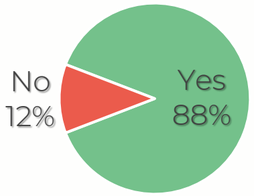
- 8% Drones
- 5% Automatic feeding systems
- 2%
  - Robotic milking machines
  - Collaborative robots

USE OF DIGITAL SALES PLATFORMS



- 80% Social media platforms
- 27% E-commerce platforms
- 10% Specialized mobile applications

USE OF DIGITAL TRAINING AND LEARNING PLATFORMS



- 65% YouTube videos
- 40%
  - Online workshops
  - Web communities
  - Podcasts

RESULTS

BARRIERS TO ADOPTION ACROSS 4 CATEGORIES OF DIGITAL TECHNOLOGIES

Barriers to adoption	Precision Technologies	Robotic equipment	Digital sales platforms	Digital platforms for training and learning purposes
High investment cost	25	30	5	1
Equipment is too complex to use	6	6	5	3
Equipment is not appropriate for my farm's context and size	23	27	6	N/A
The added value is unclear	12	16	5	3
Equipment is not compatible with my farming objectives	10	12	1	2
Equipment is difficult to integrate with current equipment	12	12	N/A	N/A
Access to neutral and reliable information on the equipment is limited	6	5	5	2
Lack of experimental access to equipment hinders adoption	12	16	4	N/A
Equipment does not allow me to reach the desired audience	N/A	N/A	5	N/A
Use of equipment is time intensive	N/A	N/A	N/A	14
All of the above	2	2	0	0
None of the above	5	5	26	32

RESULTS

FARMERS' PERSPECTIVES ON DIGITAL TECHNOLOGIES

MEANING

Disengagement: Farmers express a lack of interest in digital technologies

Misunderstanding: Farmers feel that their practices and challenges are poorly understood

Nature symbiosis: Farmers see the intimate relationship with nature in their work jeopardized by digitalization

Sustainable paradigms: Farmers are skeptical of the role digitalization plays in sustainable futures

MATERIAL

Affordability: high cost of equipment and limited investment capacity

Scalability: lack of flexibility of equipment makes it difficult to integrate in small-scale farms

Repairability: the increased complexity of equipment means that farmers can no longer repair it and have to seek external support

Added value: unclear to what extent digital technologies bring additional value

COMPETENCE

Complexity: Not-self teachable and requires external training

Time: Limited resources available

General alignment and perceived usefulness of digital tools on a 4-point Likert scale

3.52	Perceived usefulness of digital platforms for sales
3.28	Perceived usefulness of digital tools for training and learning purposes
2.71	Interested in using more digital technologies
2.27	Alignment of digitalization with farming practices
2.02	Perceived usefulness of precision farming technologies
1.91	Perceived usefulness of robotic equipment

RESULTS

WEAK SYNERGIES BETWEEN AGROECOLOGICAL PRINCIPLES AND DIGITAL TECHNOLOGIES

- Digital technologies are found to have a neutral to **moderately positive association** with agroecological principles…but with rather large divergencies amongst respondents (min standard-deviation > 0.80)
- Agroecological principles where digital technologies were found to be most in adequation with are “**co-creation of knowledge**” and “**participation**” while “**biodiversity**” and “**fairness**” were the least aligned.

- The surveyed farmers found their farming practices and objectives to be rather **strongly aligned** with the 13 agroecological principles (3.39).


THANK YOU!