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HOW DIFFERENT SYSTEMS TRADITIONS MIGHT ENGAGE IN FARMING IN THE FUTURE, AND BRIDGING SYSTEMS APPROACHES

Systems Thinking and Practice in PhD Research:
PhD course Berlin 2014

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INTRODUCTION AND PROGRAM FOR THIS AFTERNOON:

- Learning goals and introduction
- Session 1: Group exercise on the link between the representation of the system, the problematics and the systems approach of you PhD project
- Session 2: Challenges to systems approaches in studying future agricultural food systems
- Coffee break
- Session 3: A farm as an autopoietic system (Noe and Alrøe)
- Session 4: Group work: Contextualising your own PhD research

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FROM COWBOY TO AUTOPOIESIS AND ON…

- Born on a farm at the west coast of Denmark - reproduction of labour ☺
- Agronomist in 1992 from KVL – Modelling composting processes, Integrated plant production – Hawkesbury, Bawden – Sri
- Research centre Foulum: Farming systems research. Sustainable crop rotations → Cannot talk about sustainability without context → Way of thinking → understand farmers' way of perceiving sustainability.
- Farm management - Values, rationality and decision making – Second order cybernetics – Bateson – M&V – Systems closure (autopoiesis) - Luhmann –
- PhD finally accepted ☺
- To be continued in session 3

SESSION 1: DIFFERENT "SYSTEMS APPROACHES", "SYSTEMS" AND "PROBLEMATICS"

- Individual (10 min):
- reflect on your answers to these three questions, and write them on post-it:
  1. What is the "system" that is the object for your study, how do you picture/define it?
  2. What is the problem you want to address in your study of this system?
  3. What is the systems approach you apply to address this problem?

- Group (15 min):
  - Compare and discuss similarities and differences in the systems approaches you (want to) apply, and the links between how you picture the system and the questions/problem you are addressing.
  - What are the main differences within your group? (make a poster)

- Plenum (10 min):
  - Present the main points from your discussion.

SUMMING UP

Different systems perspectives/approaches have:

1. different ways to understand and picture the system they are observing, and to draw the borders between system/environment (working ontology)

2. different ways to phrase the problematics they are dealing with

3. different ways to observe the systems (epistemology)

SOME FIRST POINTS ON BRIDGING SYSTEMS TRADITIONS (FROM MY PERSPECTIVE):

- Acknowledge that there are different systems approaches and ways to understand systems
- Respect that different systems approaches have different strengths and weaknesses in addressing the complexity of the “real world”, and thereby also be aware of the limitation of your own perspective!
- Working ontologies belong to the perspectives and not to the world observed. Systems perspectives can therefore not just be merged.

SESSION 2: CHALLENGES TO SYSTEMS APPROACHES IN STUDYING FUTURE AGRICULTURAL AND FOOD SYSTEMS

Three parallel kinds of developments are increasingly challenging systems approaches in dealing with the complexity of farming systems in the future:

- **Development in science**
- **Development in technology**
- **Development in food production systems**

DEVELOPMENT IN SCIENCE

→Specialisation and differentiation of scientific perspectives

→Increase of partial knowledge

→Increase of complexity (paradoxical knowledge asymmetries)

→Lack of ways to handle complexity

DEVELOPMENT IN TECHNOLOGY

→ Increased complexity (number of possibilities)

→ Specialisation in order to utilise new technology

→ Partial increase in efficacy

→ Global decrease in sustainability

DEVELOPMENT IN FOOD PRODUCTION SYSTEMS

→Specialisation (even within organic agriculture)

→ Horizontal differentiation (of farming systems)

→ Vertical differentiation in the food chain

→ Globalisation
- →Global market
- →Transgress increasingly national regulations

TWO MAIN CHALLENGES TO THE DIFFERENT SYSTEMS APPROACHES

A) What is the relevant systems to study:
- › how to draw the borders between system/environment
- › What are the consequences of the demarcations we make?

B) How to deal with the increased complexity and lack of structural couplings?

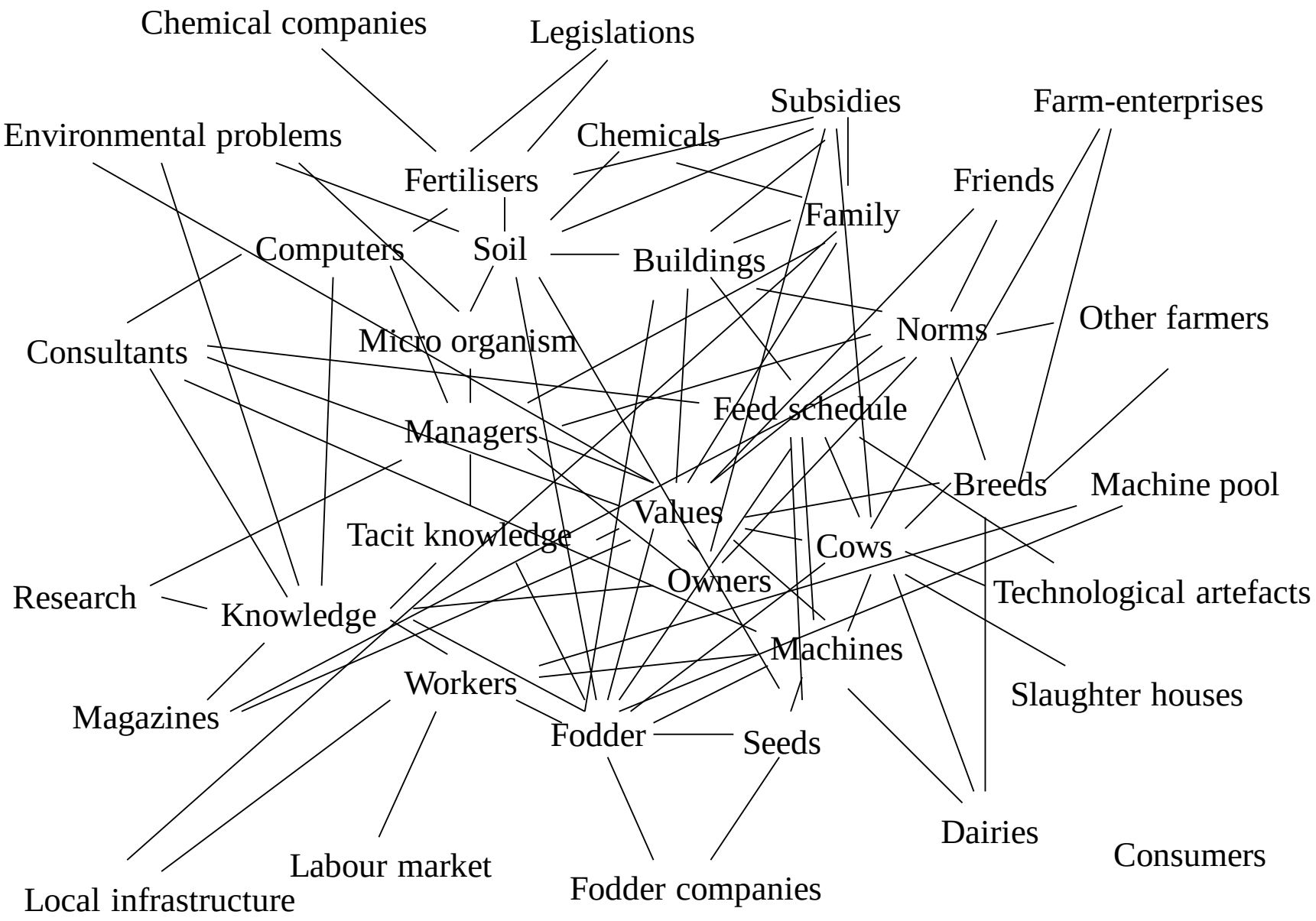
You will work with these two questions in relation to your PhD projects in the next group work session, but first I will introduce you to the way Hugo Alrøe and I have tried to deal with these two questions.

Coffee break


Session 3: A farm as an autopoietic system (Noe and Alrøe)

…..TO AUTOPOIESIS AND ON TO THE ANT TURN…

- problems with closure - loss of materiality ☹
- Farming systems become more and more open in terms of elements and actors involved (not reproducing labour any more☺)
- ANT turn - network of interactions, hard to tell what belongs to the system and what belongs to the system's environment (think of the Hawkesbury model), ANT a strong analytical tool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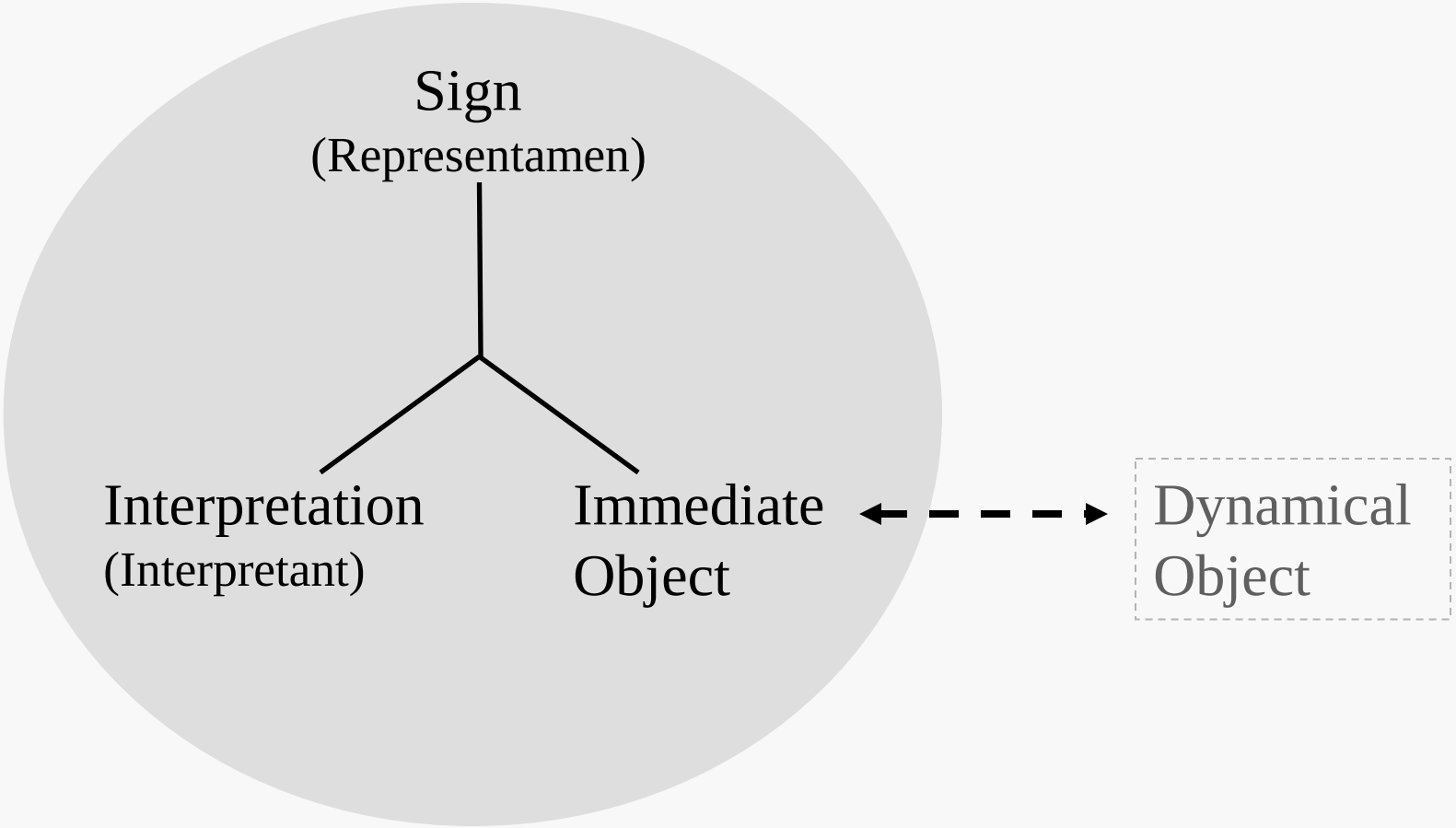
Workers
Slaughter houses
Magazines
Fodder
Seeds
Dairies
Consumers
Labour market
Fodder companies
Local infrastructure

…..AND BACK TO AUTOPOIESIS AND ON…

- problems with closure again how to understand decision making and coherence – how is agriculture possible? ☹
- Complexity, contingency and the compulsion of selection - Systems logic revisited.
- The semiotic turn:

How does science represent?

Charles S. Peirce's semiotics: the triadic sign



What do we mean by “cow”?

DAIRY COW

A cow that produces milk for an income

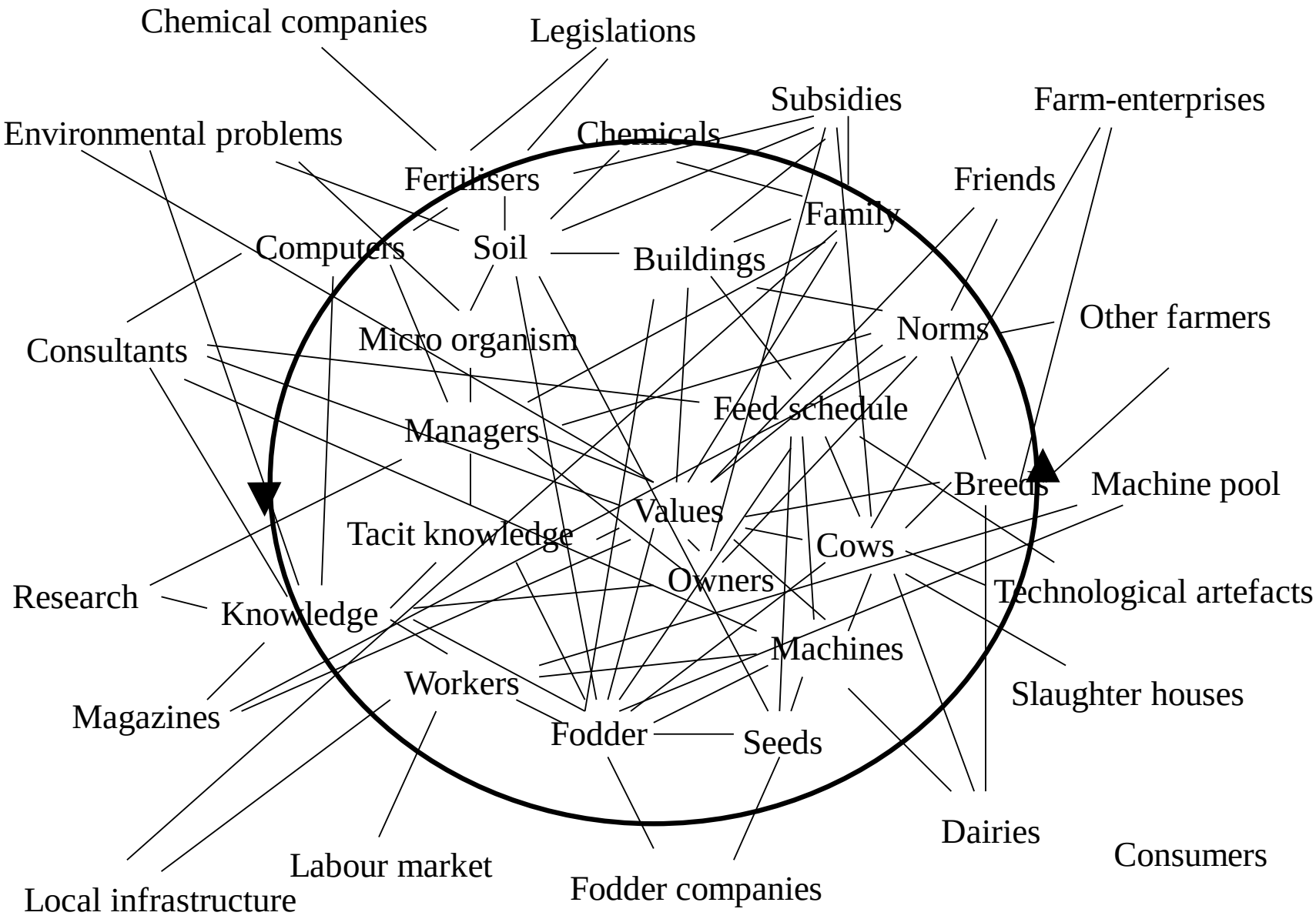
Animal with a surplus of possible functions

What do we mean by “cow”?

GRAZING CATTLE

An animal
that conserves
meadows

Animal with
a surplus of
possible
functions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A farm as a self organising system

- The basis of this approach is to see a farm as a self-organising system that can be observed as a continuous process of decision making forming a more or less coherent strategy.
- From a systems theoretical point of view there are two important dimensions of a decision.
  - One is the systems closure dimension, what options belong to the system and what potential options are excluded from the system.
  - The other is the time dimension, that every decision needs to mark its present with a past and future.

HOW DO I PRACTICE?

- Not a particular methodology, but a theoretical fundament and a way of thinking and observing
- A small example:
- The High Crop project: Barriers for implementing principles of robust, high yielding organic cropping systems.

HOW DO I PRACTICE

- Traditional: How to convince the farmers to change practice
- My approach: How to understand the barriers for changing practice seen form the production systems.
- Involve the researchers to describe the principles and the operationalization of these (Multi-disciplinary)
- Involve them in planning and conducting interviews with the farmers, exploring the barriers from the systems/network perspective
- Involve them in interpretation and concluding

BACK TO THE TWO MAIN CHALLENGES

A) What is the relevant systems to study:

- how to draw the borders between system/environment
- What are the consequences of the demarcations we make?

The autopoietic turn makes the systems border an empirical question

B) How to deal with the increased complexity and lack of structural couplings

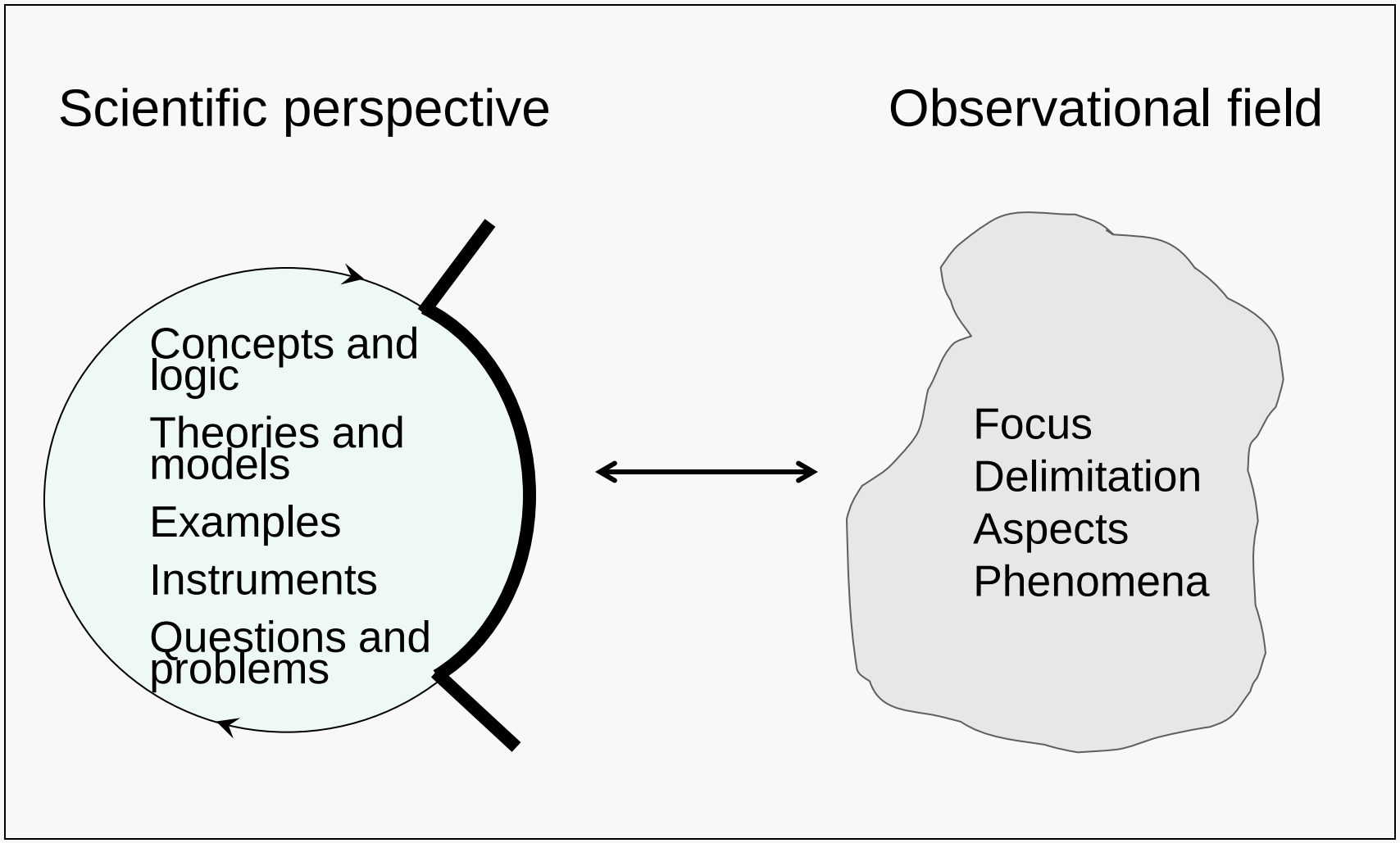
We look at how systems deal with complexity, and the possibilities for structural coupling between differentiated systems

FINALLY SOME REFLECTIONS ON BRIDGING BETWEEN SYSTEMS APPROACHES FROM A PERSPECTIVIST VIEWPOINT

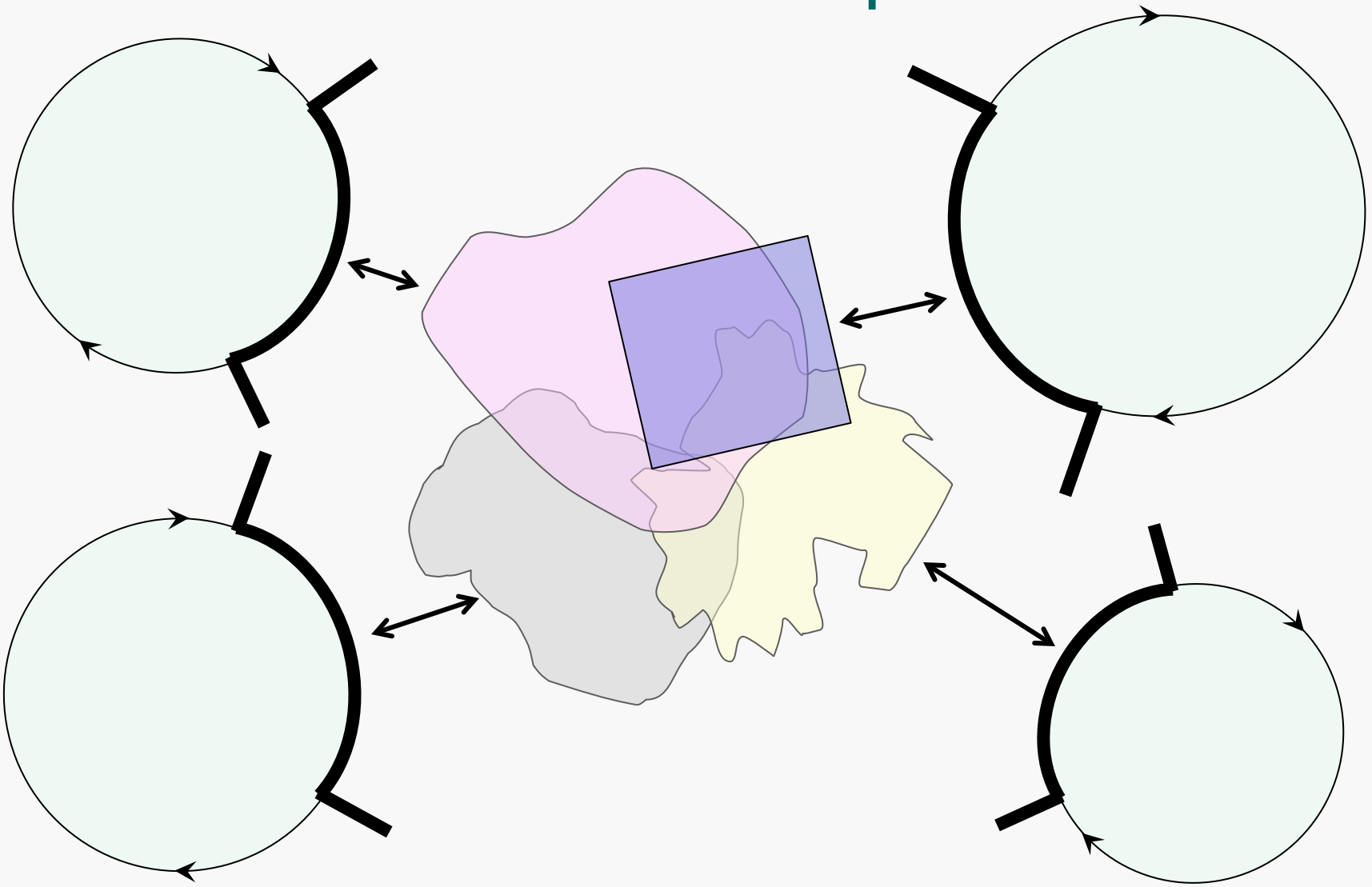
- The pitfall of systems approaches is the idea of a holistic view!
- Rich pictures (and world views) are always drawn form a certain perspective,

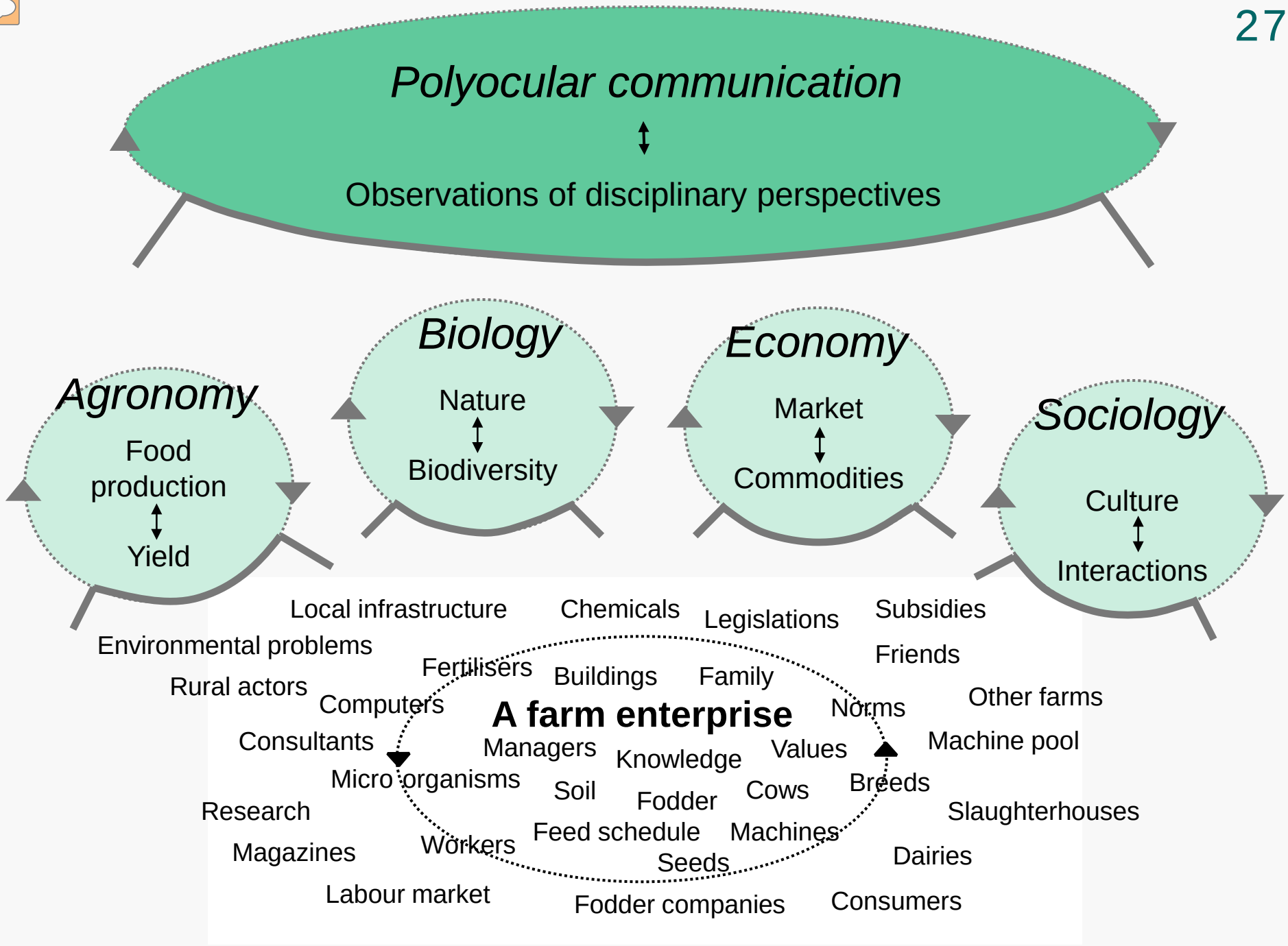
  not a God's eye
- Our claim is that "Reflexions need the involvement of other perspectives"

A scientific discipline is a differentiated and refined perspective on an observational field



The differentiation and specialisation of science creates strong monoocular knowledge - and new communication problems





(Noe, Alrøe and Langvad 2008)

Polyocular or multiperspectival communication

Disciplinary specialised perspectives offer a consistent, effective and precise knowledge in context of a sharply delimited research world.

Polyocular communication can unfold a multidimensional space of understanding based on second order observations of specialised perspectives.
(Including observation and communication of the cognitive context)

Polyocular communication can only happen with reference to a shared dynamic object that, it is agreed, can be observed in different ways.

(Noe, Alrøe and Langvad 2008)

Some conclusions

Bridging systems approaches

Not strive for a superior systems theory -The right perspective

But acknowledge the insights obtained from different perspectives to improve the understanding of the wicked problem (“dynamical object”)

Like other systems, a theory needs to be dynamically co-evolving with its environment. … And on…….

Session 4: Group work
Contextualising your own PhD research

- Based on your own PhD research, discuss how you deal with drawing the system and the system's border:
  - what is relevant to include and exclude?
  - what are the blind spots of your choices?
- How do you deal with the complexity of options in relation to the system/object studied?
- How does your reduction of complexity correspond with practice?