



Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Dep. of Plant Protection Biology



Participatory action research on sustainable crop protection with organic apple growers

Co-innovation Workshop
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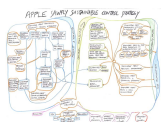
Participatory Action Research



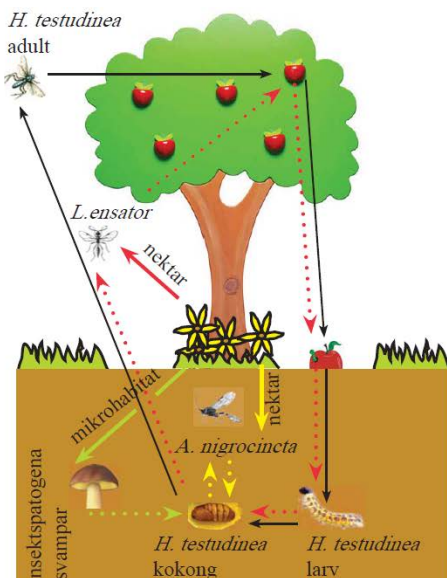
Photos: Weronika Swiergiel & Mira Rur



Objectives – work in progress



- 1) To investigate how **collaborative learning** can be used to develop and implement sustainable crop protection.
- 2) To develop a **concept of an sustainable pest control system** for organic apple production in Sweden through participatory action research.
- 3) To expand the **apple sawfly forecasting** system and adapt it to Swedish conditions.
- 4) To investigate the persistence of **soil inoculated *Beauveria bassiana*** and its efficiency as control agent against the apple sawfly (*Hoplocampa testudinea* Klug) under field conditions.



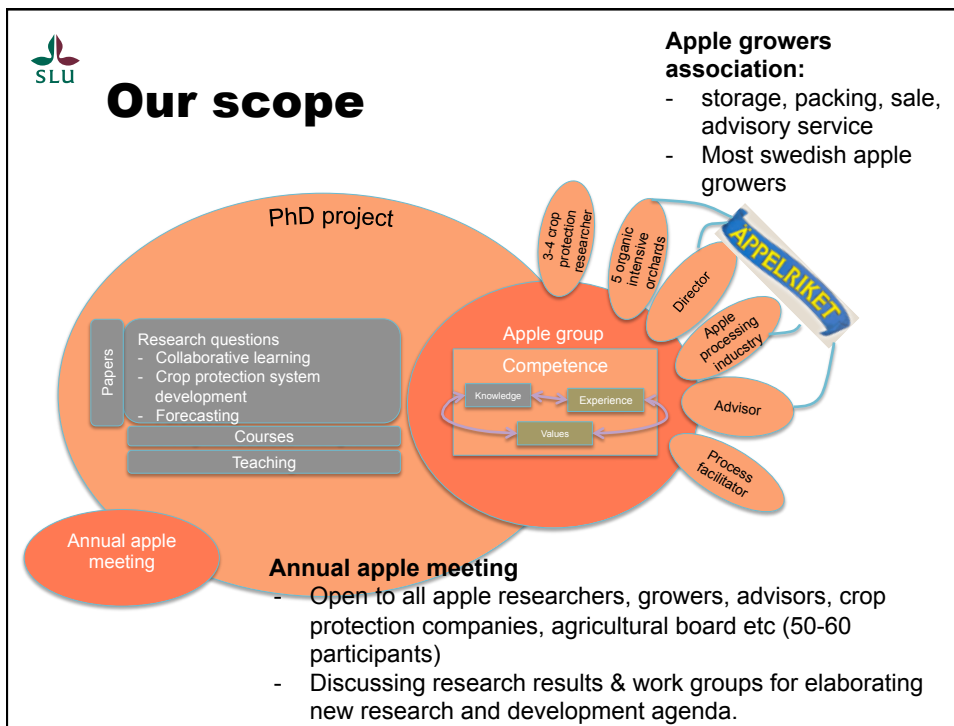
Figur 1. Det föreslagna odlingsystemet för kontroll av bl.a. *H. testudinea*.

Problem

- One of the most important pests on apple in Europe.
- May reduce harvest by 95%
- Damage increases exponentially over few years if not controlled (not in all cases?).

Control

- Swedish IPM management: acetamiprid
- App. 50% of organic orchards in Europe use *Quassia amara* extract – side effects?
- Nematode application – unsecure results.
- Fungi application – lacks experience (not allowed today)
- Naturally occurring fungi, nematodes and parasitoids (predators?).



SLU

Apples and Swedish agriculture

236 apple producing companies → 1371 ha

- ~ 9 % of horticultural production area
- ~ 80% of total fruit production (apple, pear, cherries, plums)
- ~ 6% (+ few mixed)* area organic apple
- ~ 15 %* organic apple producing companies

* Data from survey with 50% response frequency

Perhaps 4% (9 orchards?) are organic growers with intensive production?

- ~ 2,6 miljon ha cultivated area
- Plant production employs ~180 000 persons



1) To investigate how collaborative learning can be used to develop sustainable crop protection measures and increase their implementation.

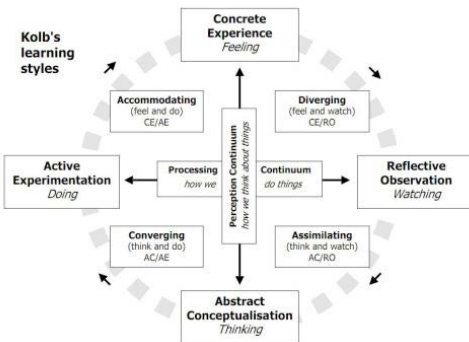


Photo: Weronika Swiergieł



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Expectations at start

Growers expectations:

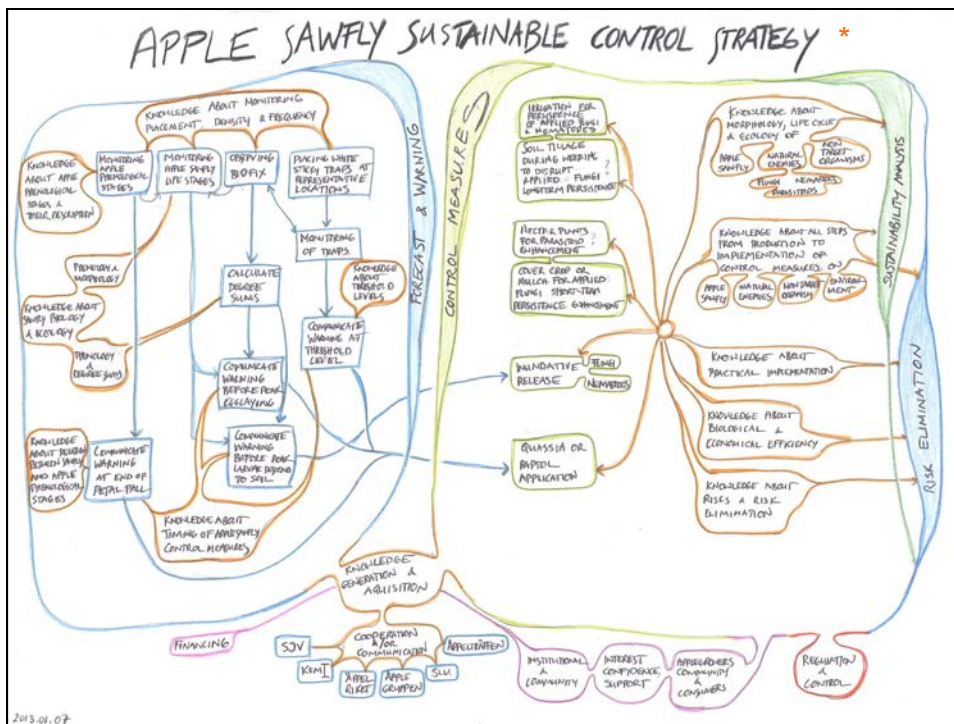
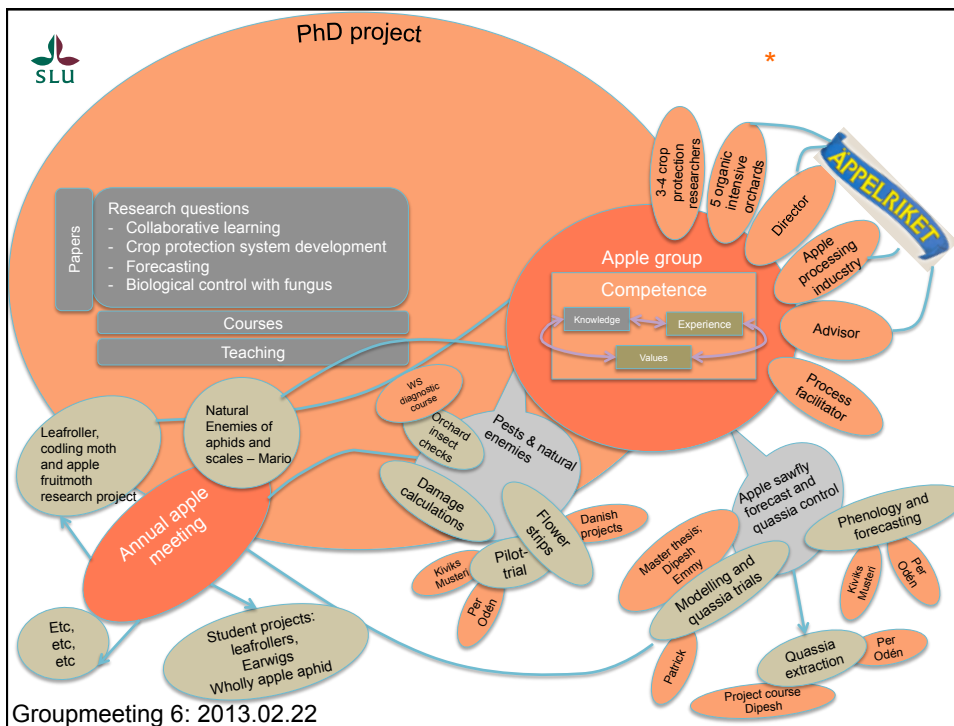
- To acquire knowledge and tools to protect their apple trees


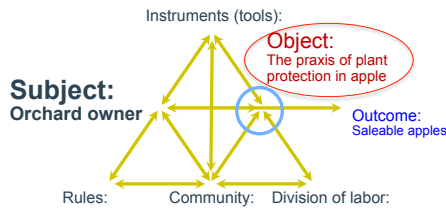
Researchers expectations:

- To acquire knowledge on how a more sustainable crop protection strategies should look like.
- To acquire knowledge on how to develop these in a collaborative way.



Photo: Birgitta Rämert



Subject:
Orchard owner


Instruments (tools):

Object:
The praxis of plant protection in apple

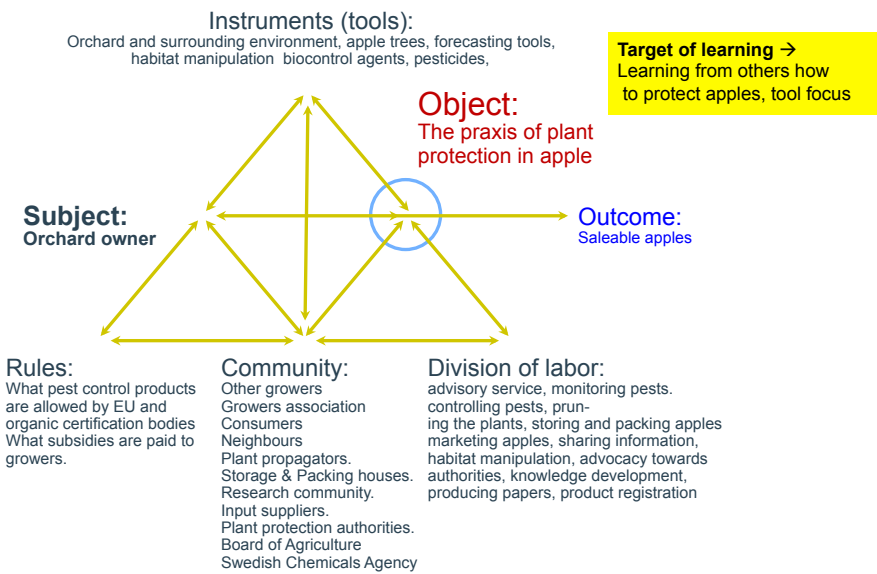
Outcome:
Saleable apples

Rules: **Community:** **Division of labor:**

Exploring the use of activity theory and expansive learning



Unit of analysis: activity system



Instruments (tools):
Orchard and surrounding environment, apple trees, forecasting tools, habitat manipulation, biocontrol agents, pesticides.

Target of learning →
Learning from others how to protect apples, tool focus

Object:
The praxis of plant protection in apple

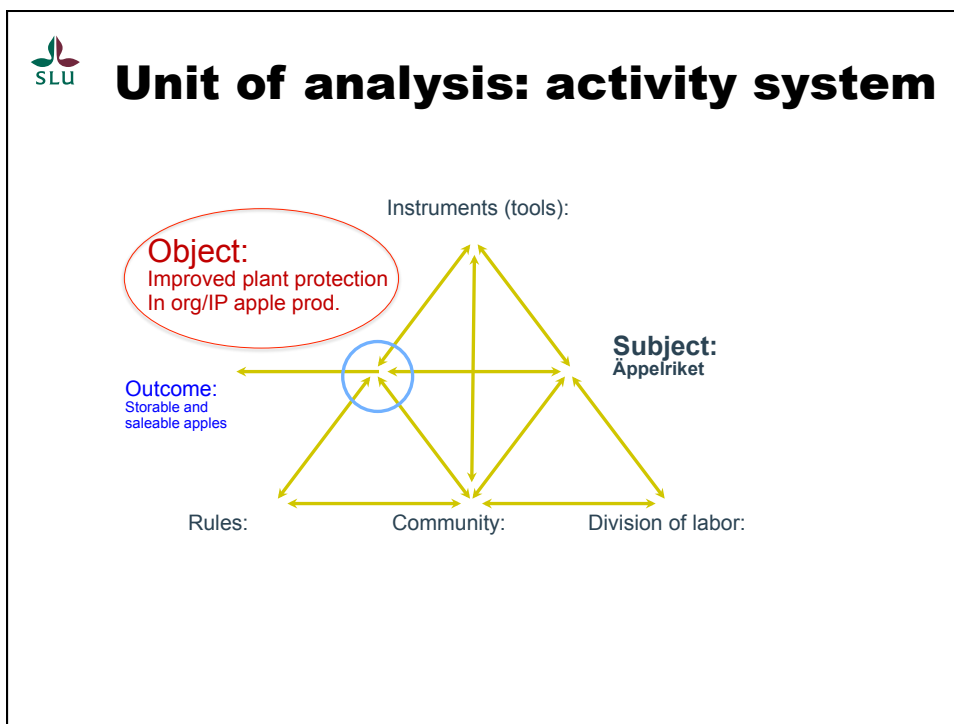
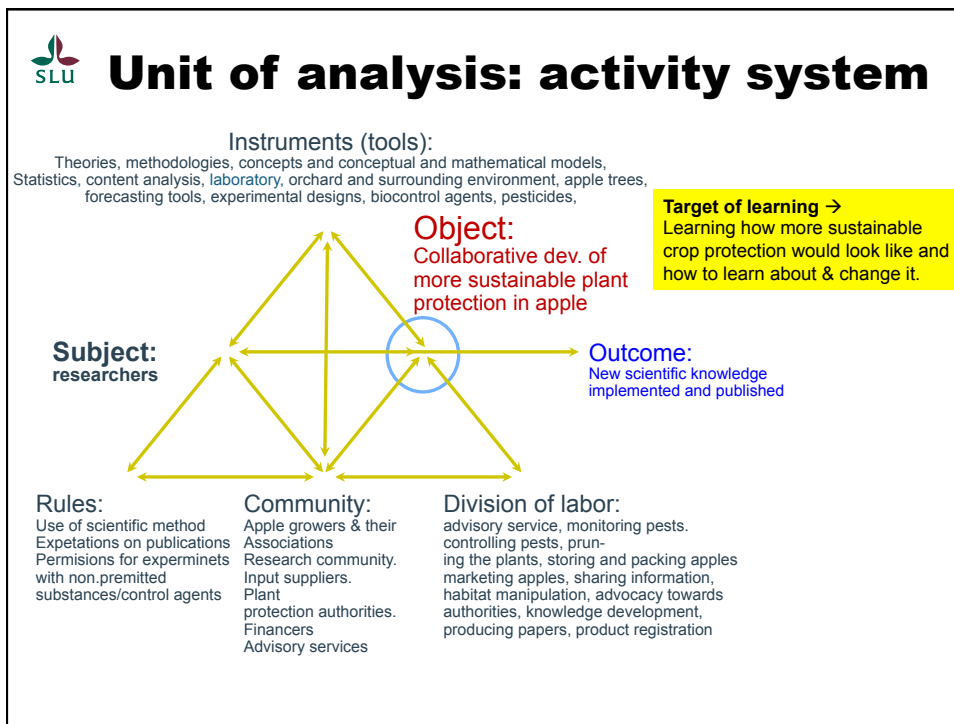
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Orchard owner

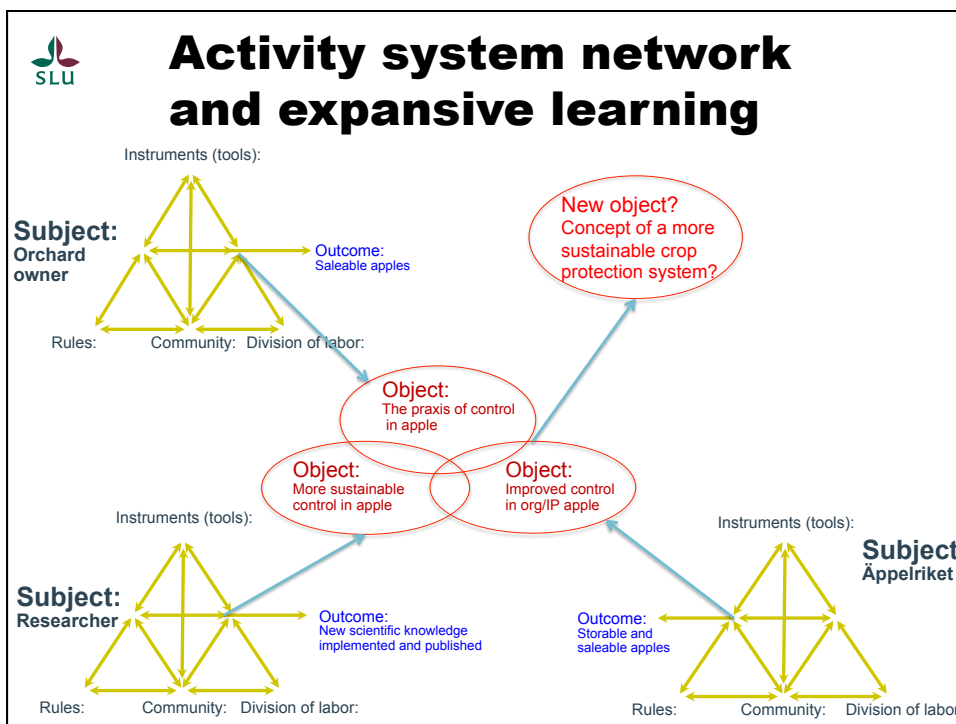
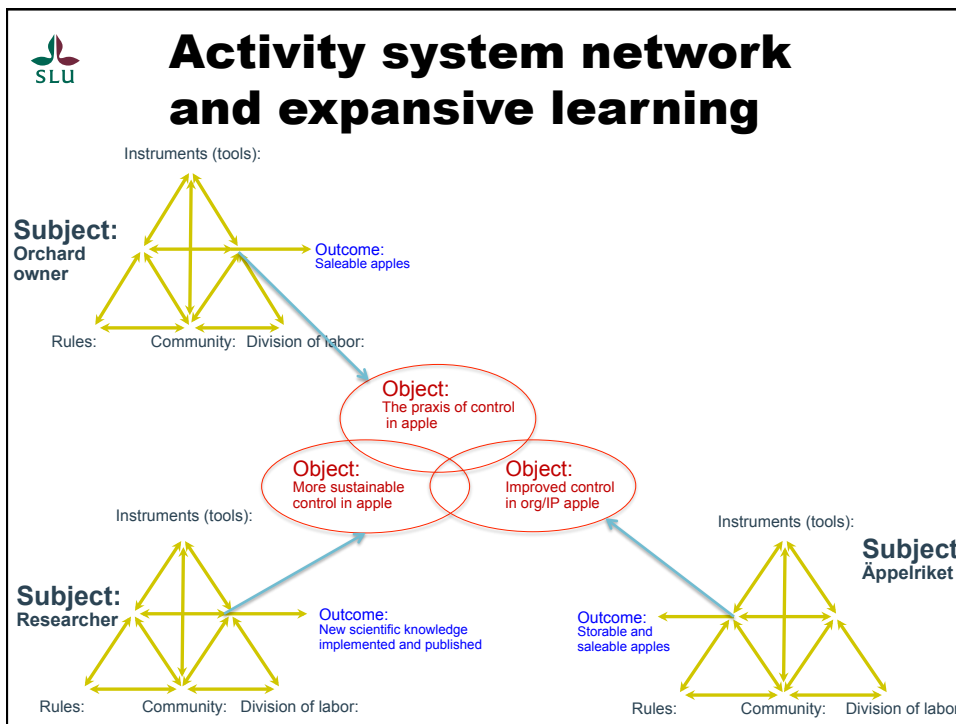
Outcome:
Saleable apples

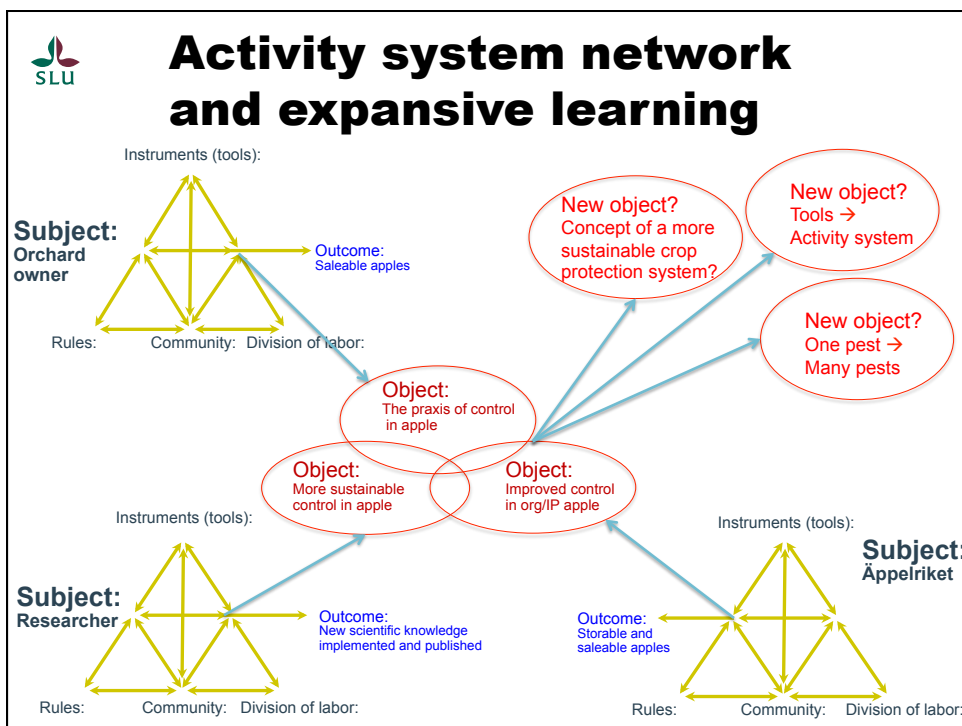
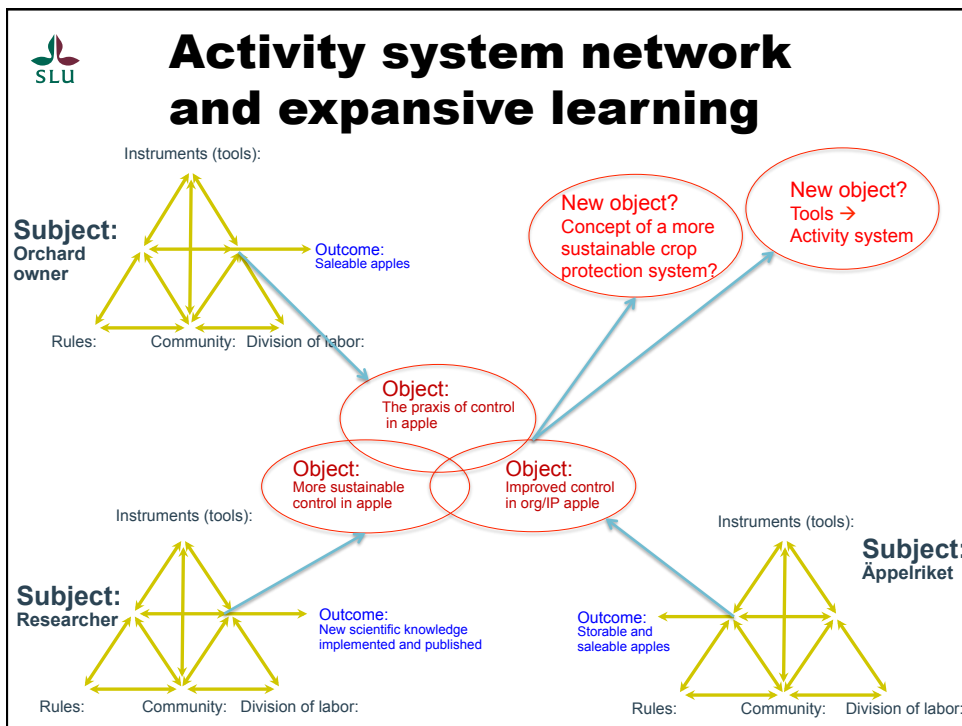
Rules:
What pest control products are allowed by EU and organic certification bodies
What subsidies are paid to growers.

Community:
Other growers
Growers association
Consumers
Neighbours
Plant propagators.
Storage & Packing houses.
Research community.
Input suppliers.
Plant protection authorities.
Board of Agriculture
Swedish Chemicals Agency

Division of labor:
advisory service, monitoring pests.
controlling pests, pruning the plants, storing and packing apples
marketing apples, sharing information, habitat manipulation, advocacy towards authorities, knowledge development, producing papers, product registration









Ongoing and plans

- **Historical developmental cycle analysis** with focus on critical events when the object has been transformed.
 - Development in the (1) concept of sustainability, (2) organic agriculture (pest management), (3) IP(M) and (4) the pest control system in Sweden.
 - **Contradictions;**
 - Disturbance in normal course of events in work process
 - Communication problems (ruptures)
 - Dilemmas
 - Innovations
- **Sustainability analysis**
 - Historical development of concept of sustainability, organic agriculture, IP
 - Groups own criteria related to established criteria
 - Evaluating proposed solutions with proposed criteria.
- **Collaborative model building: pest control system**
 - Historical development of the crop protection system in Sweden.
 - Activity system elements → conceptual activity model



Ongoing and plans

- **Learning analysis**
 - **Expansive learning:** has the object changed? With the help of which transformative agency? How did model building influence?
 - **Learning through remediation of activity system elements:** have the elements of the activity system been re-arranged?
 - Learning **new roles** in participatory research – externalization and internalization processes.
- **Transformative agency**
 - Resisting
 - Criticizing
 - Explicating
 - Envisioning
 - Committing
 - Taking action



Learnings about learning and change

- Most of the analysis is still to come, however...
- Different paths depending on starting point.
 - Collaborative exploration of problem
 - Partial predefined solutions to be tested
- Start: deeper analysis of the problem situation → possible solutions, systemic approach.
- Respect practitioners purpose of participation → always relate abstract concept to practices
- Trust, confidence and learning new roles takes time ... & defines what is said and done.
- Include important actors → facilitate the implementation of what is learned. *

