



Learning and knowledge production with Change Laboratory for IPM in horticulture

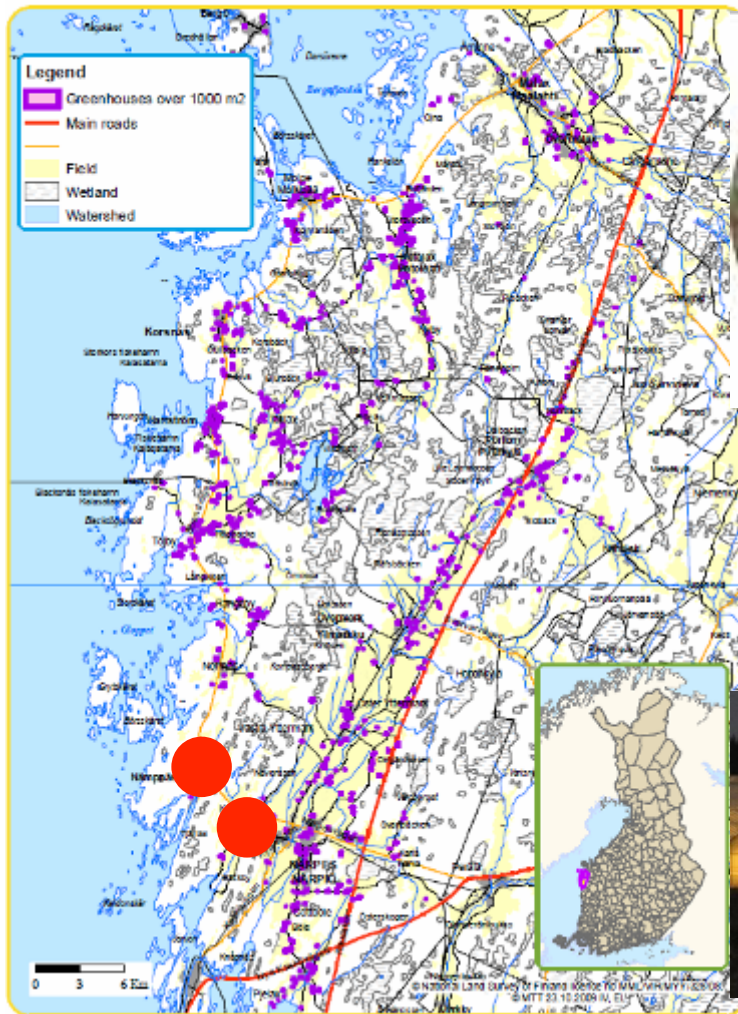
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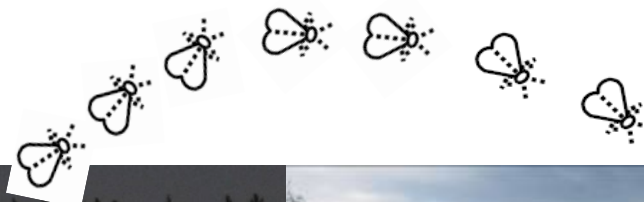
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The system & the problem: greenhouse whitefly as a pest of tomatoes and cucumbers in the Ostrobothnian greenhouse cluster

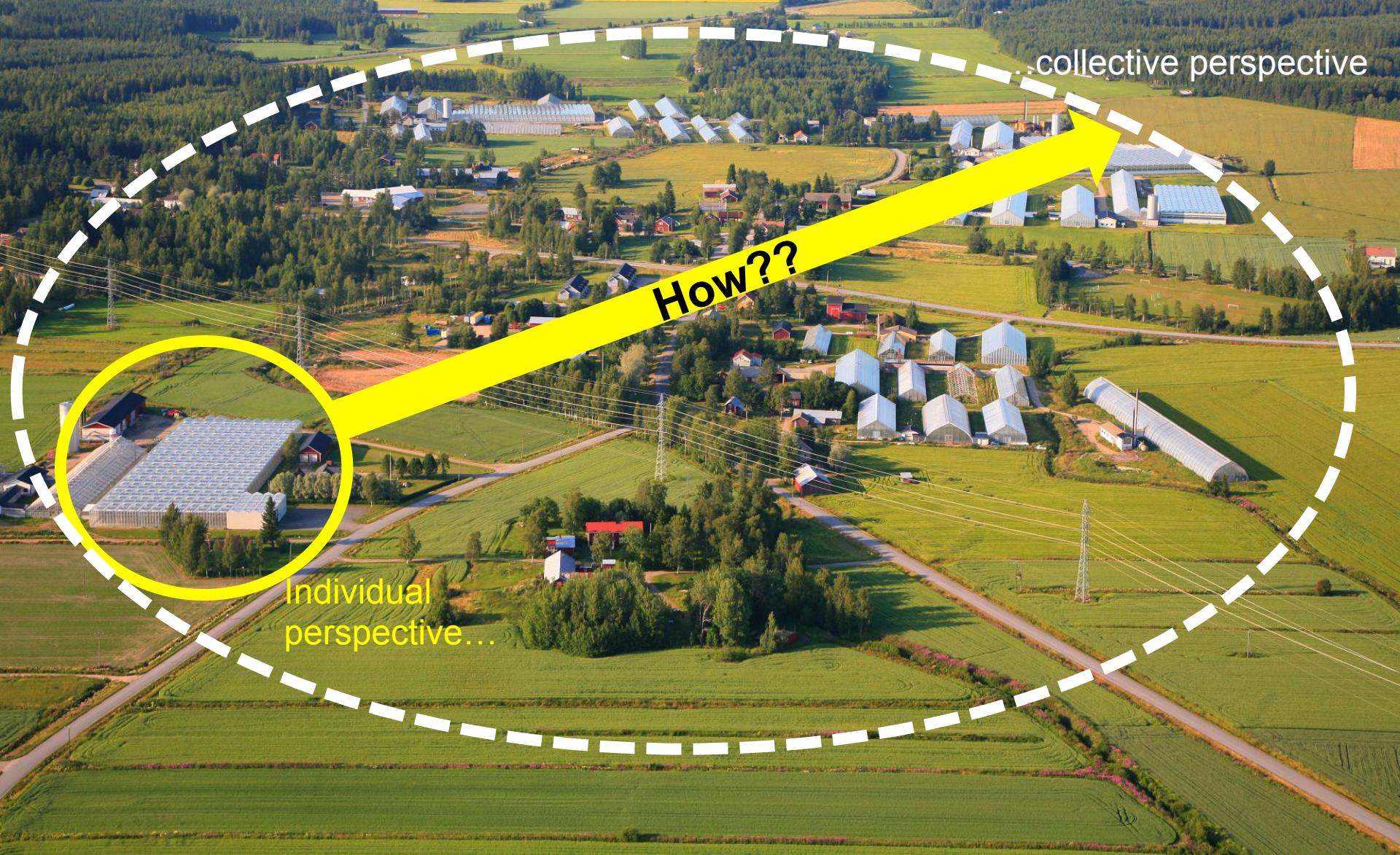
Greenhouses in Southern Ostrobothnia



Greenhouse whitefly
(*Trialeurodes vaporariorum*)



Why did we work on this: as a response to concerns of a local (big) plant propagator on pests spreading in the production cluster. **"It has to be regional!"** – but how?



collective perspective

How??

Individual perspective...

Two ways of looking at the problem

1. Activity theoretical approach: from individual objects to partially shared object of two or more activity systems (e.g. tomato producing firms)

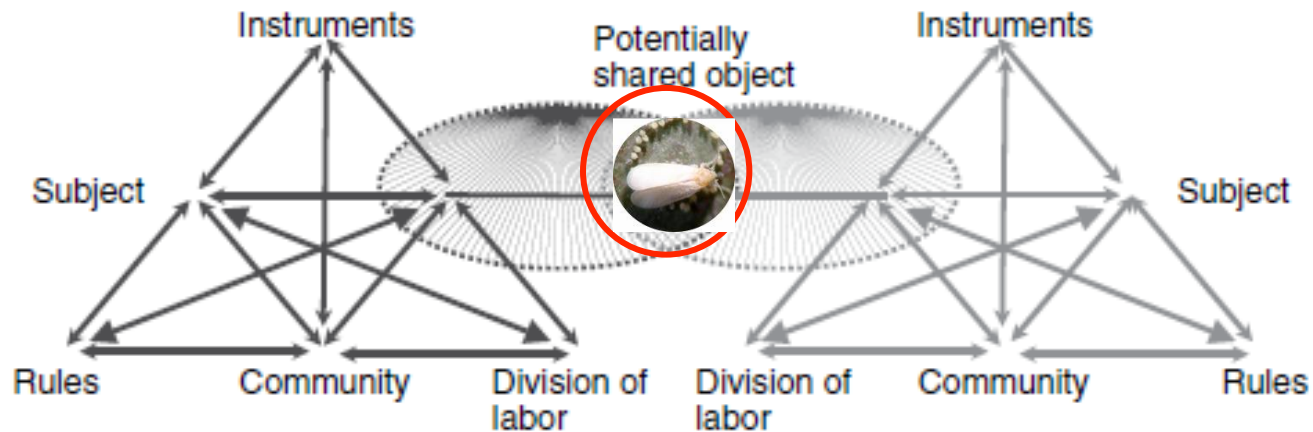


Figure 19.1. Two activity systems and a potentially shared object.

2. From partial optimization of pest management (each firm considers only its own short-term interests) to a systemic approach (firms recognize their interdependence and act accordingly, taking long term benefits of collaboration into account)

Method: Change Laboratory backed by theory of expansive learning and activity theory

Activity theory: philosophical and multidisciplinary framework for studying human activity and developmental processes

- Objectivity (every human activity has an object)
- Hierarchical structure of activity : operation → action → activity. Activity forms the context where actions and operations take place and obtain meaning
- Mediation (humans do not operate directly with the objective world, but their activity is mediated by e.g. tools (concrete or mental))
- Internalization and externalization : all operations and actions are first external, but once they have been internalized, external support is not needed anymore
- Development: how does human activity change and how can change be supported

Learning theory:
Expansive learning

- The target of learning is the object of activity– not just individual actions but the systemic level of the whole activity
- Learning activity that involves seven different learning actions
- Explicit theory of change: developmental cycles of an activity, inner contradictions of activity as drivers of change
- Expansion is both temporal and spatial, it involves responsibility and developmental change of the activity

Method: Change Laboratory

- Systematic support to **expansive learning and transformative agency** in the need state of an activity
- Pedagogical tools originating from activity theory: mediation, double stimulation, developmental experiments, theoretical-genetic generalization (abduction)
- Practitioners themselves, by the support of the facilitators, generate the needed solutions for changing their activity. **The solutions are not known in the beginning of the process.**

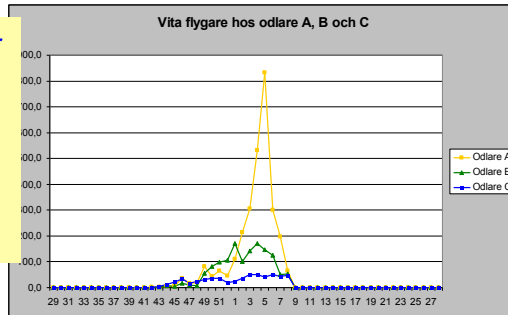


Method and theory behind it developed at Univ. of Helsinki, Center for Research on Activity, Development and Learning (Cradle). Prof. Yrjö Engeström and Dr. Marco Pereira-Querol.

Pedagogical tools to support expansive learning actions and transformative agency

"It costs me 5000 euros extra per year to control whiteflies that are coming from my neighbour."

(interview of a seasonal grower located next to a year-round grower)

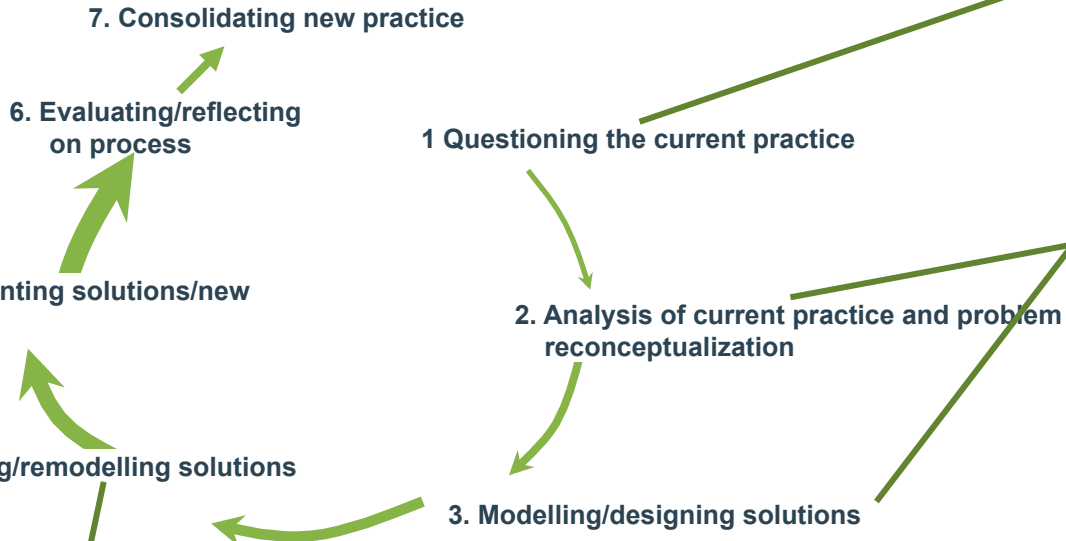


Primary stimulus:
Mirror data to highlight the current problematic practice and stimulate discussion

Double stimulus

Secondary stimuli:
generic or specific abstract models of activity and its logic to stimulate theoretical-genetic thinking (generalization) and to reconceptualize the problem

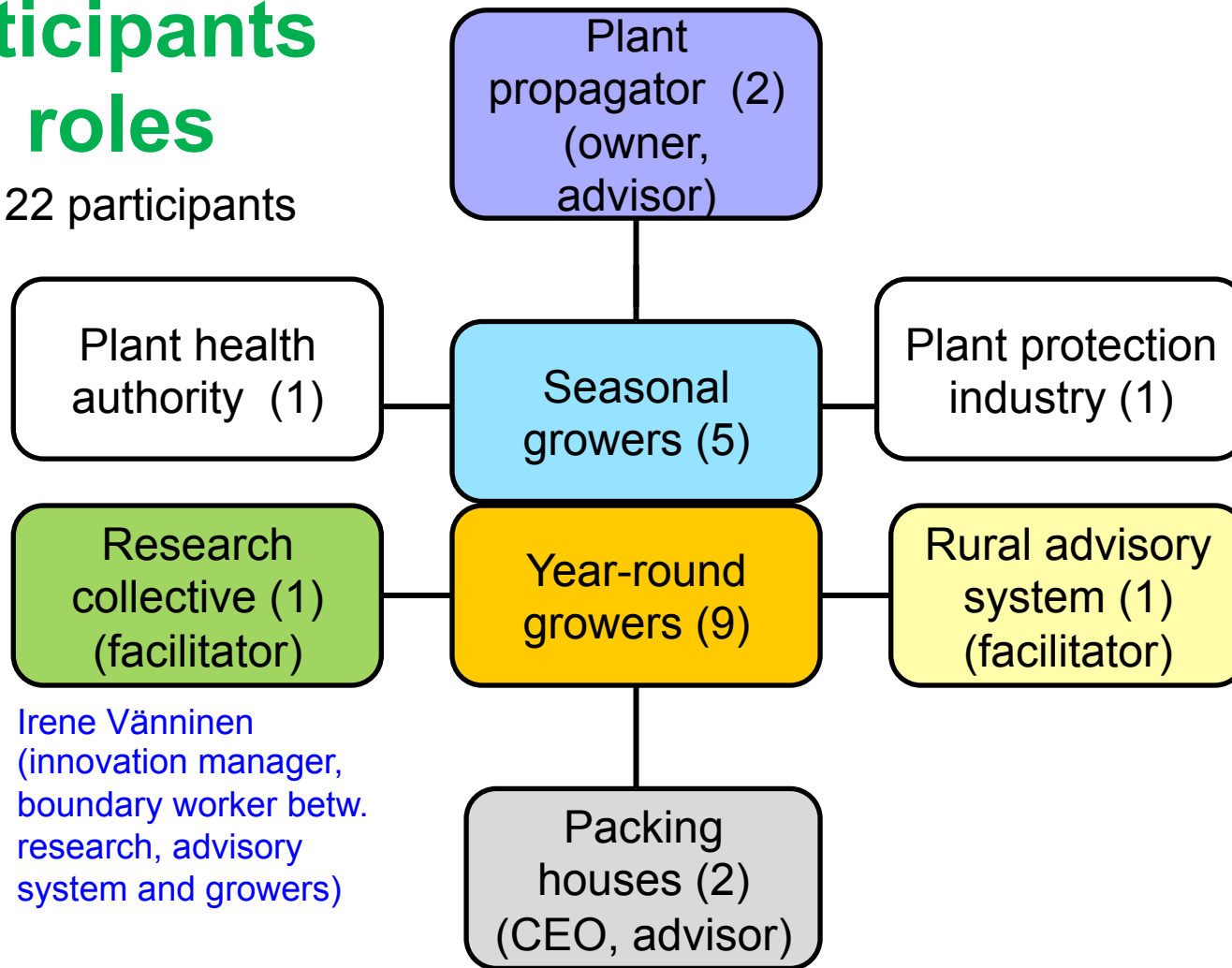
- * Activity system triangle
- * Historical layers of activity (past, present, future)
- * Zone of Proximal Development with learning paths needed to reach desired future states
- * **Systemic model of the problem (effective secondary stimulus)**
- * **Cropping cycles of the two cropping forms and their overlap (support stimulus)**



Strengthening learning:
Through concrete actions of experimentation, the cognitive model of the new activity or its component (s) is strengthened

Participants and roles

Total of 22 participants

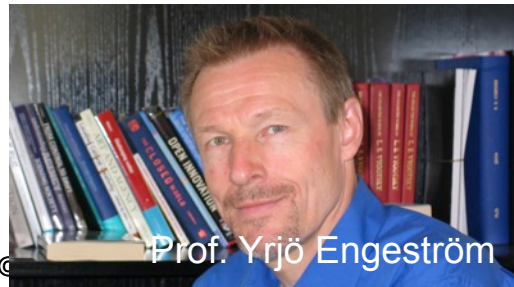


Irene Vänninen
(innovation manager,
boundary worker betw.
research, advisory
system and growers)

Tutors from
Univ. Helsinki,
Center for Res.
On Activity, De-
velopment and
Learning (Cradle):



Dr. Marco Pereira-Querol



Prof. Yrjö Engeström

Key drivers

Key change agents in village A



Irene, innovation manager, facilitator



Jenny, facilitator, boundary worker advisor



Marco, tutor



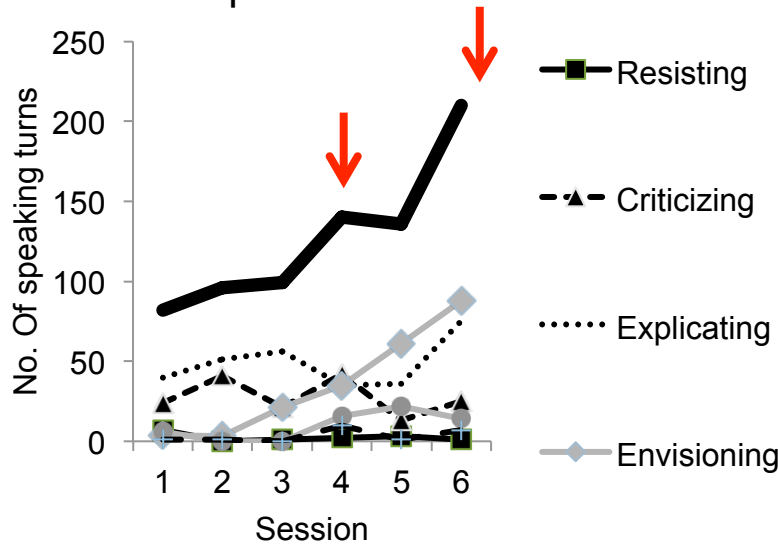
Yrjö, tutor



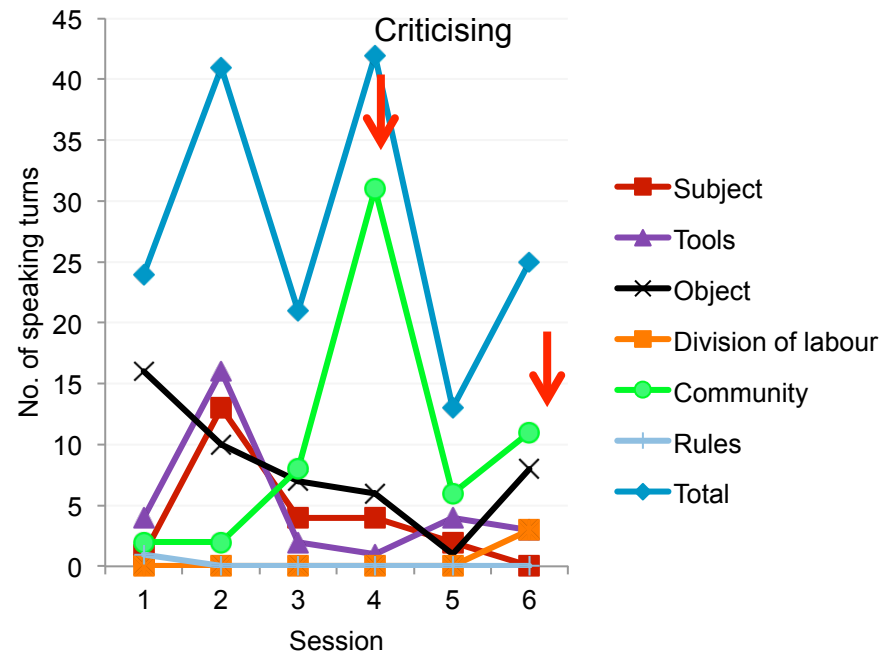
Decisive moments, turning points: revealing the split in the grower community (year-round vs seasonal production forms) and the role of the social system in contributing to the problem

Session 1 Feb 2011 – session 6 Jan 2012

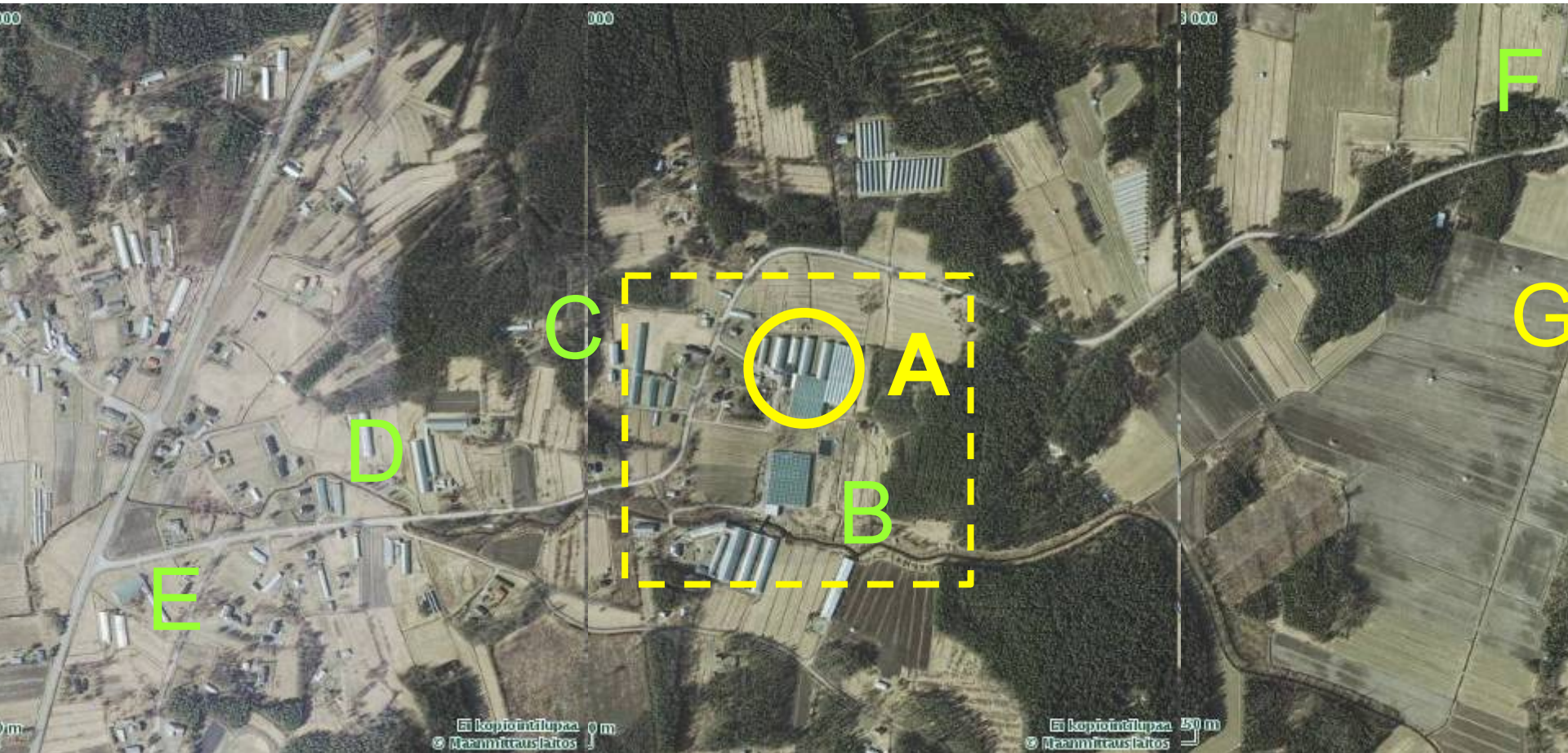
In the plan, 4th session=refining the new model. In actuality, criticizing community and revealing the split in it



Community as the target of criticism



A decisive manifestation of agency at the level of action in village B: closely situated seasonal and year-round producers. Year-round grower improved his wfly control → savings to the seasonal one → reciprocation by offering financial support to collaboration



Closely situated dyads of companies as functional units where the benefits of reciprocal collaboration can be proven → communication of the value of collaboration more widely

Transforming activity with Change Laboratory

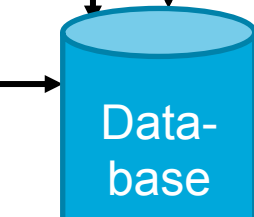
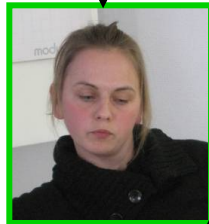
WAS IT USEFUL?

New model of activity was co-produced and implemented:

Nurseries with outsourced or own monitoring



Growers with shared interests

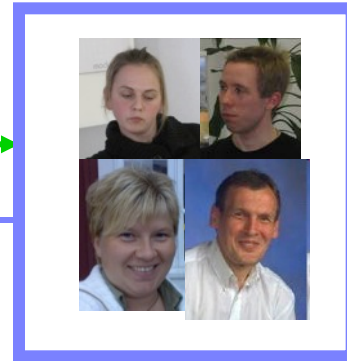


Zooming in & zooming out

Knowledge sharing and collaborative learning based on boundary object (pest density database)

Supporting collectives

Advisor collective



Information & knowledge needs

General & specific information

Research collective



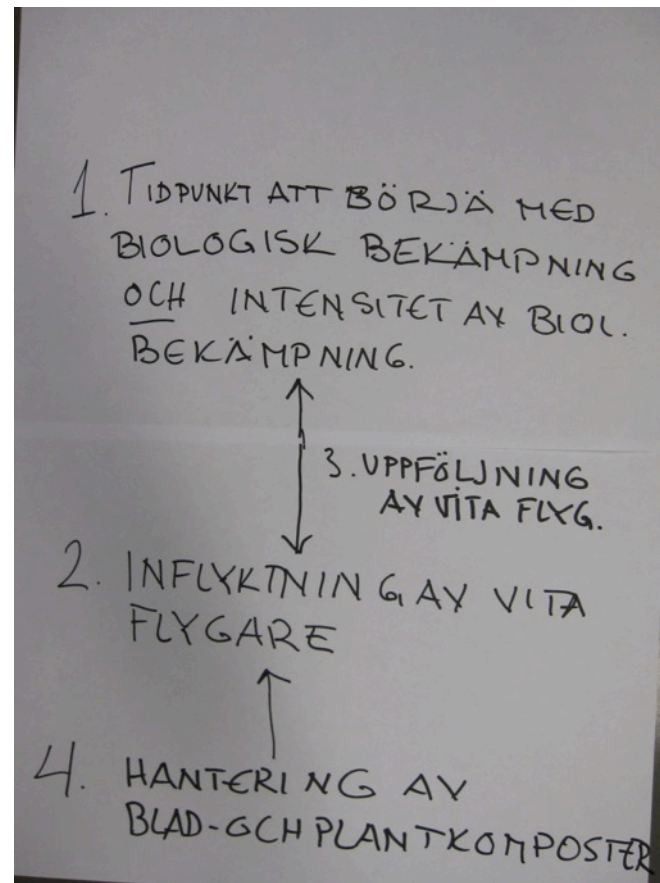
Raw data, hypothesis building

Information & knowledge from raw data, research results

Information searching, knowledge production, sense-making, project generation



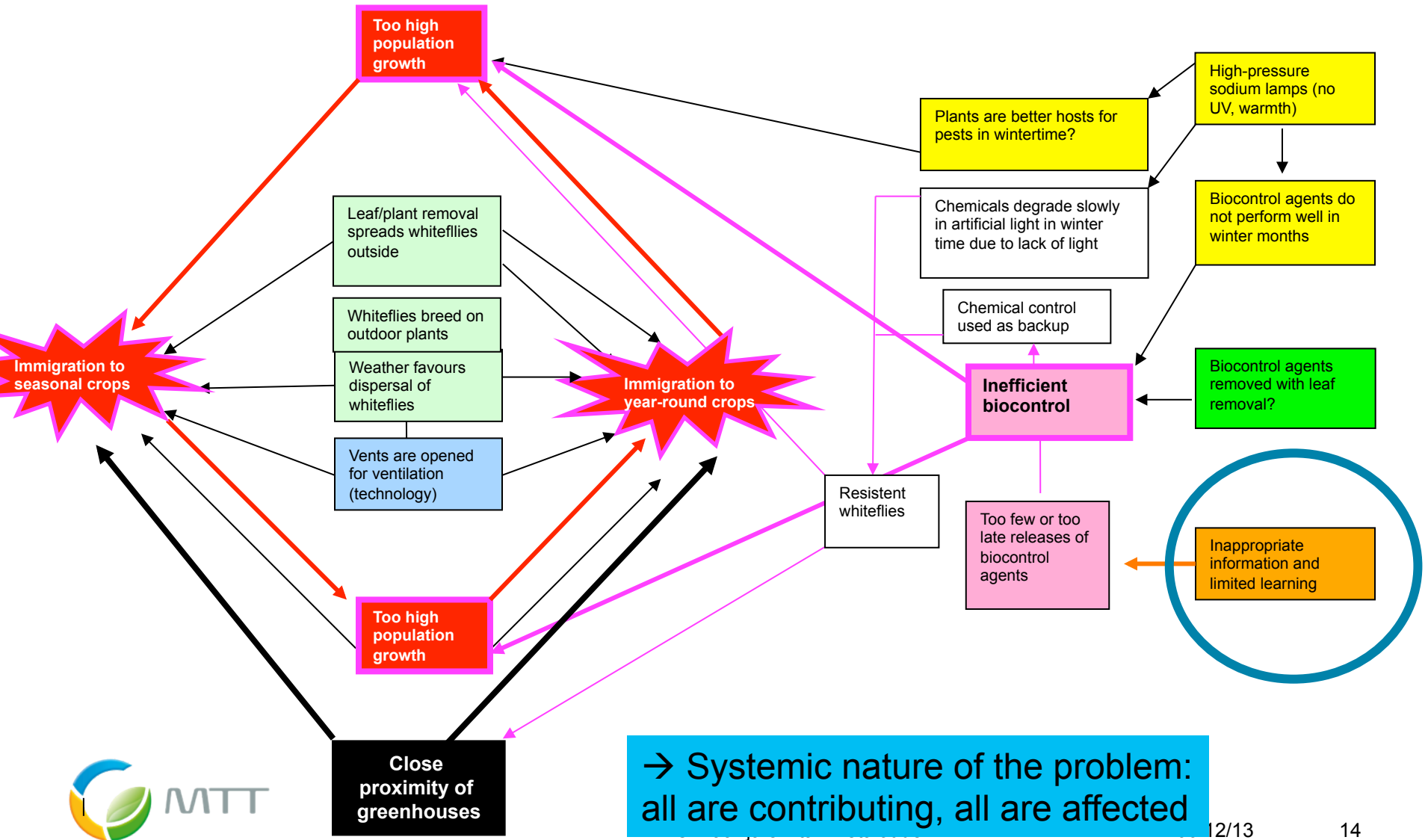
Initial elements of the system-specific model that was co-produced by the 3rd session by discussing mirror data and reinterpreting the whitefly problem



How did the basic idea of co-innovation take place?

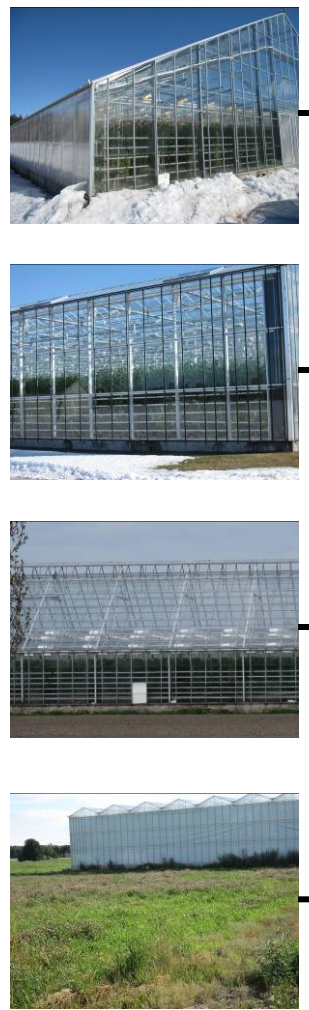
DECONCEPTUALIZATION- RECONCEPTUALIZATION

Deconceptualizing the problem and its components collaboratively using the vicious circle as a cultural general concept.
Reconceptualizing the produced model into a practical solution: a platform for collaborative learning club.

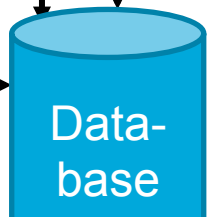


Conceptualizing the new model of activity to evoke further discussion:

Nurseries with outsourced or own monitoring



Growers with shared interests



Boundary object

Knowledge sharing and collaborative learning based on boundary object (pest density database)

Supporting collectives

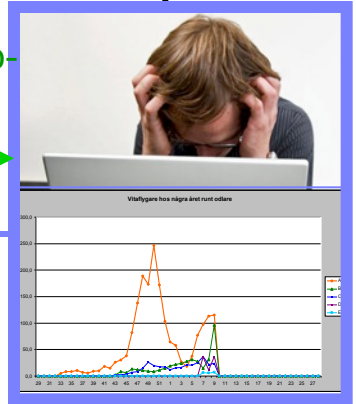
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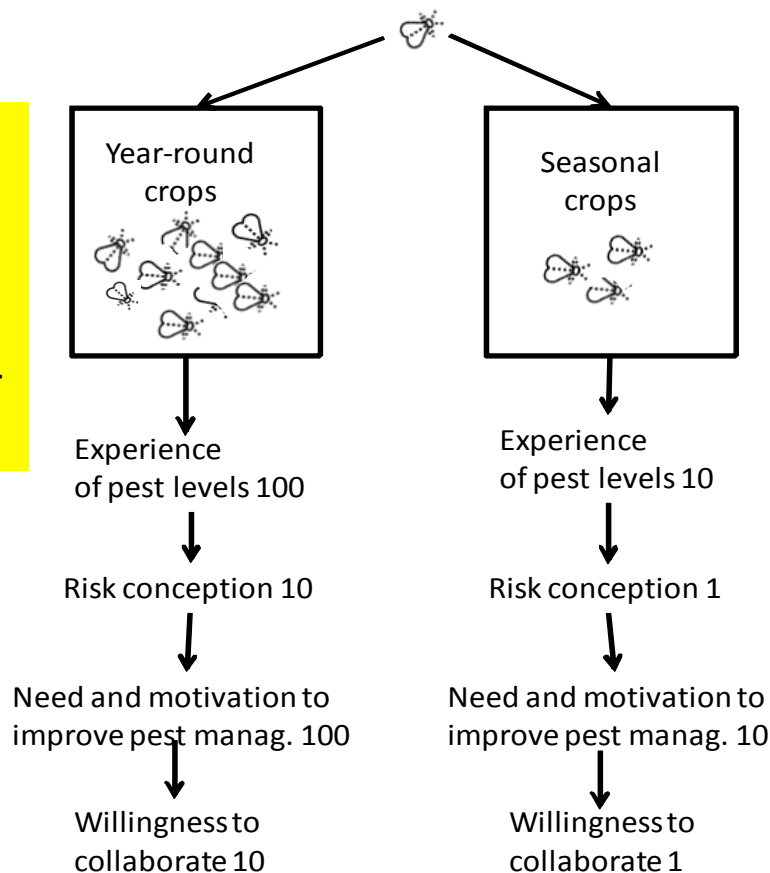
Information searching, knowledge production, sense-making, project generation

06/12/13



Deconceptualization of the interplay of ecological and social domains by analysis of criticizing agentive expressions → understanding split and differences in risk perception between the two production forms and their consequences to collaboration → **recontextualizing** into a new approach of how to better address the needs of seasonal growers in the future

Experienced differences in pest levels over time (importance of context for IPM possibilities: interplay of social and ecological domains)





Visiting growers in village B

WHAT DID I LEARN?

I learned to:



- Value grower knowledge much more
- Value dialogue where one must free herself from the usual expert role and learn on-the-go with and from the growers
- See my role as a researcher with new eyes – my own role is now better defined
- Use a more interactive way in giving talks and organizing events for disseminating research results: workshop-type events where results are discussed and consequences are contemplated with knowledge users who in so doing become also knowledge producers
- Combine theory and practice
- Rely on the collective wisdom of people



Strong and weak points of the approach

- Based on sound theory, concept of change and pedagogical concepts
- Deconceptualization-reconceptualization is built in the process = supports co-innovation
- Guided process, but flexible enough to accommodate surprises and serendipity
- Produced knowledge immediately useful for participants (grower feedback)
- Theoretically laden – need tutor to learn process
- In its full form quite laborious – transcribed sessions, analysis of learning actions and transformative agency
- Working out the inner secondary contradictions between elements is a subjective process, no clear helper tool available

What would I do otherwise?

- I would collect better mirror data – more talking with people, more interviews, more observations of activity of practitioners
- I would transcribe sessions immediately – so much information would be available for planning the next session
- I would learn and incorporate in the process formal techniques of e.g. problem structuring, root cause/problem analysis, current reality tree, Ishikawa-diagram – all help to organize messy data and make sense of it – they also help make better models

