



A knowledge approach to sustainability: Seeing through the eyes of farmers

Transitions to Sustainability
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- › **Problem Statement**

Towards a sustainable agriculture in Europe: how to achieve it?

- › **Knowledge Approach**

Knowledge can help the transition from conventional to sustainable agriculture

- › **Knowledge Processes**

What knowledge do humans -as information processing systems- have and use?



Problem Statement

- › Transition towards a sustainable agriculture. Priority for the EU.
- › The sustainability quest is ongoing, but it is complex and multidimensional.
- › The knowledge of farmers is mostly neglected in sustainability debates. (receptiveness/understanding/use of sustainable practices).

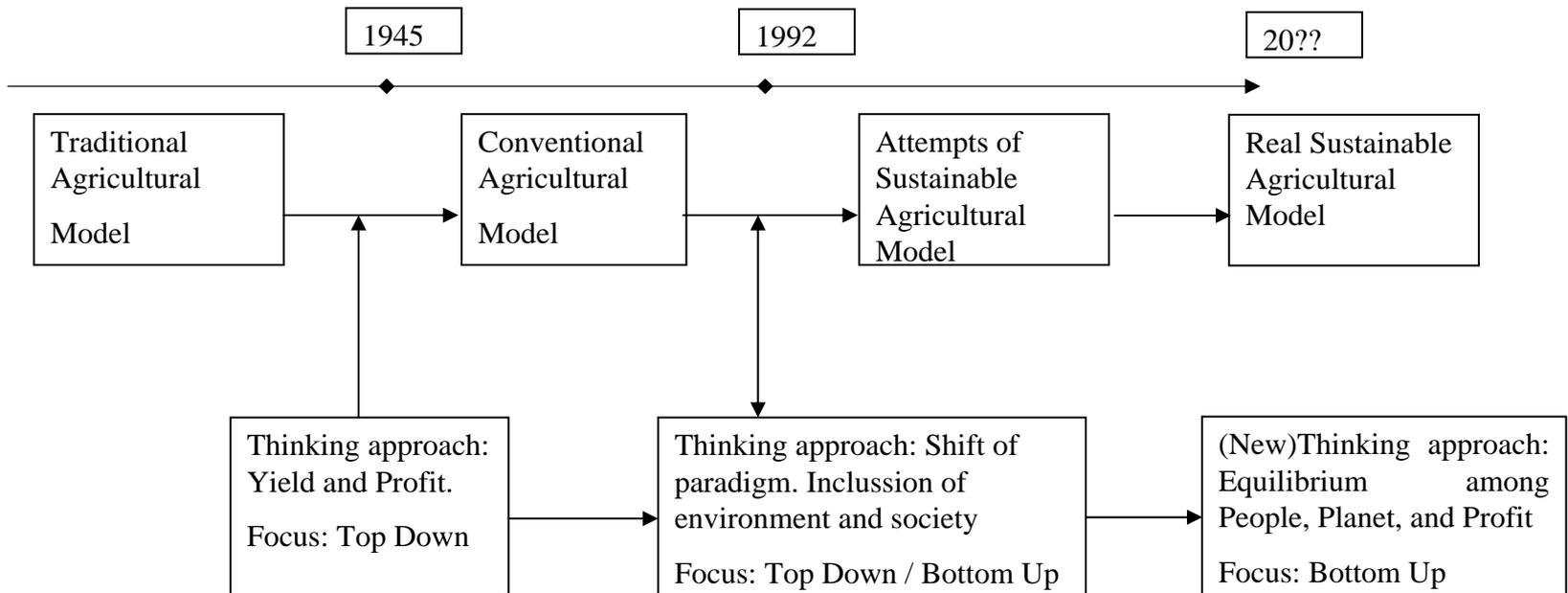
•(How) can sustainable agriculture be enhanced ?

•What knowledge to realize it is necessary?



Knowledge Approach

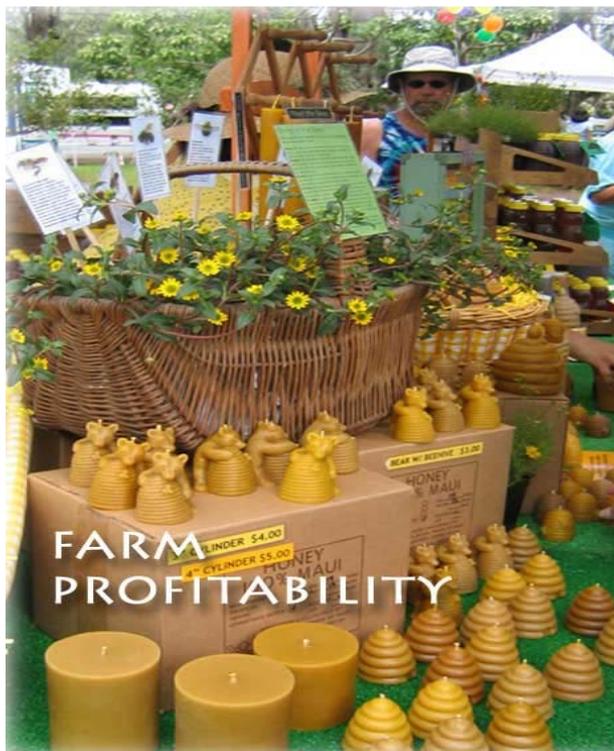
Knowledge Transition within Agriculture in EU





Knowledge Approach

Triple Bottom Line Approach (3P's): People, Planet, Profit





Knowledge Approach

The bottom up approach rises (new) challenges, using knowledge of the farmers:

- › How does a farmer see the transition to sustainability?
- › What does he know (in terms of sustainability concepts)?
- › How does he structure and reason with his knowledge?



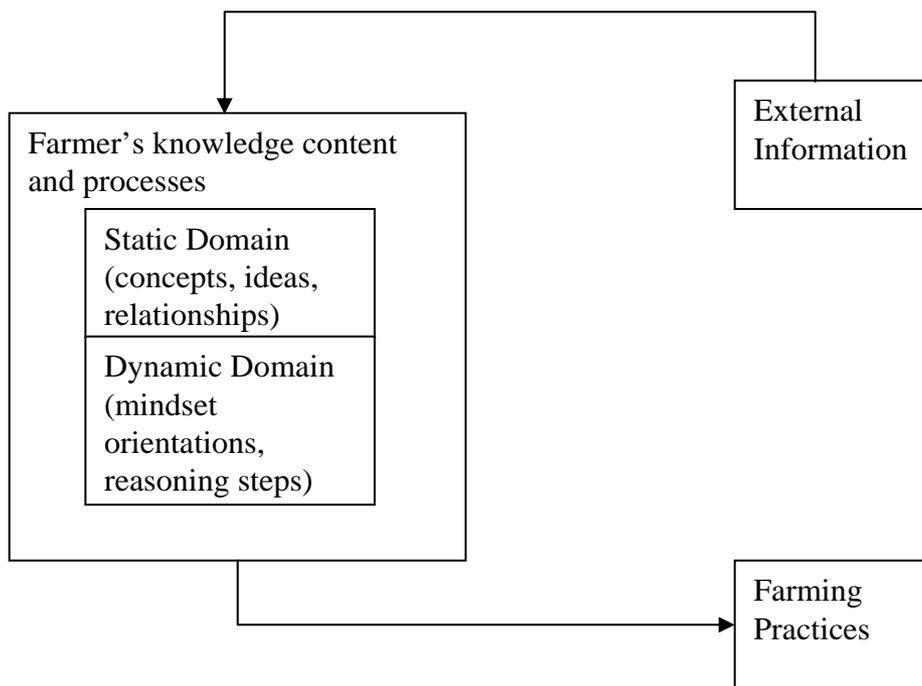
Knowledge Processes

We act on basis of what we know

- › It is possible to study the knowledge content and processes that people, such as farmers, use.
- › These (knowledge or cognitive) processes are carried out by individuals as information processing systems.
- › Cognitive content and processes can be modeled.



Knowledge Processes

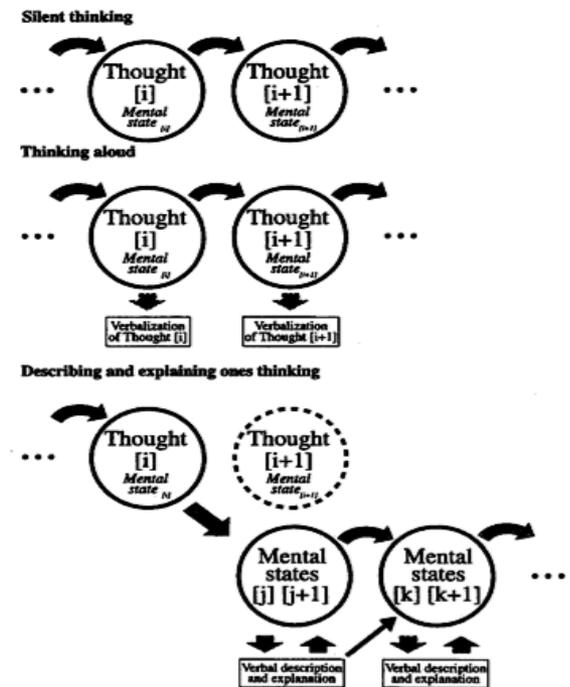




Knowledge Processes (reasoning steps)

How to elicit dynamic knowledge?

- › Protocol analysis allows eliciting the reasoning steps in the mind of an individual while performing a task.
- › Farmers verbalize their thoughts as they solve work-related problems.





Knowledge Processes (reasoning steps)

Operational definition

- › A systemic approach is needed when studying sustainability.
- › Systemic thinking equivalent to sustainable mindset.

Less sustainable oriented mindset	More sustainable oriented mindset
Focus only in specific units of the system	Focus on the Big Picture of the system (holism)
Focus on “ straight ” chains in the system	Focus on interconnections within the system
(Lack of) focus on different interactions	Focus on feedback loops among units
Working on isolation or on a hierarchical manner.	Cooperation
Short time perspective (here and now)	Long time perspective (there and then)



Knowledge Processes

> Example:

In the last years, **a product** that helps **to enhance** the **soil quality** has been **developed** and studied, its name is Biochar. It is made by converting agricultural waste into a char-like material that holds carbon and **makes soils more fertile, discourages deforestation, and preserves cropland diversity**. Biochar makes soil better at retaining water, reduces the amount of fertilizer needed. **However**, it has been **mostly used in small, localized areas of South America and Africa**. It **may increase** the **pH** of the soil. In addition, **strategies to spread** biochar on a large scale are still in **need to be developed**.

1) Shall you take into account future generations in the way you manage your farm?

2) Shall you accept to add Biochar to your soil?



Knowledge Processes

> Expected Outcome

Midset profile based on the protocol given by an interviewee.

	Level 1 (less sustainable)	Level 2	Level 3	Level 4 (more sustainable)
Big Picture/ Holism				V
Time Horizon			V	
Interconnections			V	
Feedback			V	
Cooperation				V



Recap

- › **Conventional Agriculture's main goal: increase yield and profit.**
- › **The current agricultural model requires revision towards sustainability.**
- › **A Knowledge approach can enhance the transition to sustainability.**



Current research

- › Knowledge elicitation about (sustainable) agriculture from 80 farmers.
- › Structuring knowledge through cognitive mapping.
- › Reasoning patterns elicitation through protocol analysis.
- › Farmer's views on sustainable agriculture.



Thank you!

Your comments are welcome.

