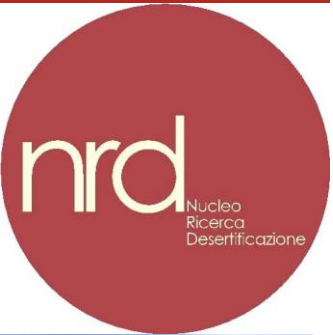




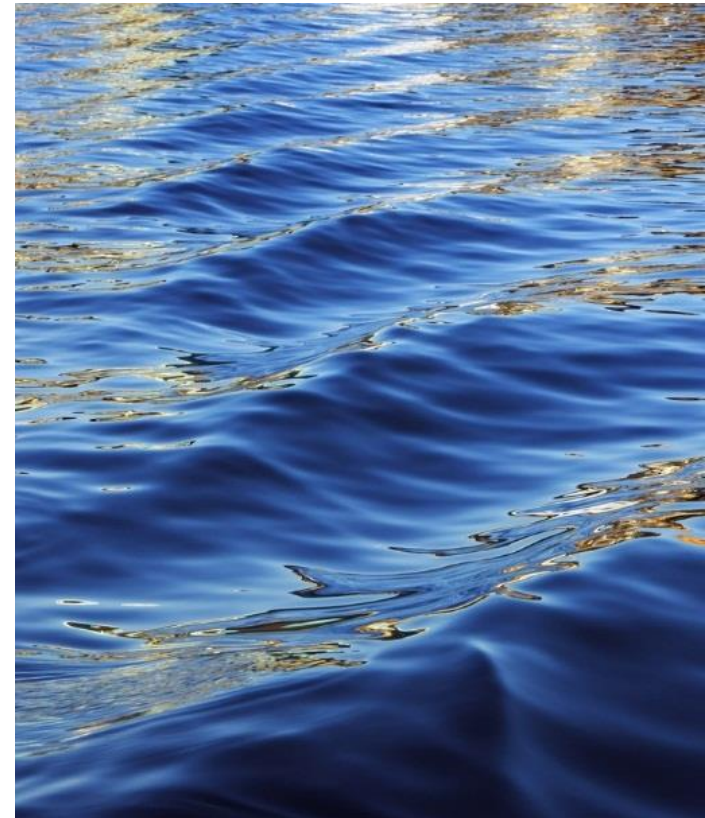
UNIVERSITÀ
DEGLI STUDI
SASSARI



ILHAM-EC

Participatory workshop

Cairo, 29-30 November 2016



Co-funded by the
Erasmus+ Programme
of the European Union





Systems diagramming: when diagrams are louder than words

Giovanna Seddaiu, UNISS



Who am I?

- **Researcher** of Agronomy and Crop Science
- Degree in **Agricultural Sciences** at the University of Sassari, Italy
- PhD in **Agrometeorology** at the University of Sassari, Italy
- Specialization in **Agrohydrology and Bioclimatology**: “Agrometeorology and Crop Environment Interactions” at the Royal Veterinary and Agricultural University of Copenhagen, Denmark

From positivism, empiricism, reductionist,
disciplinary and sectorial research approaches.....





Who am I?

- Degree in **Agricultural Sciences** at the University of Sassari, Italy
- PhD in **Agrometeorology** at the University of Sassari, Italy
- Specialization in **Agrohydrology and Bioclimatology: Agrometeorology and Crop Environment Interactions** at the Royal Veterinary and Agricultural University of Copenhagen, Denmark

.....to constructivism, system thinking,
transdisciplinary and participatory
research approaches





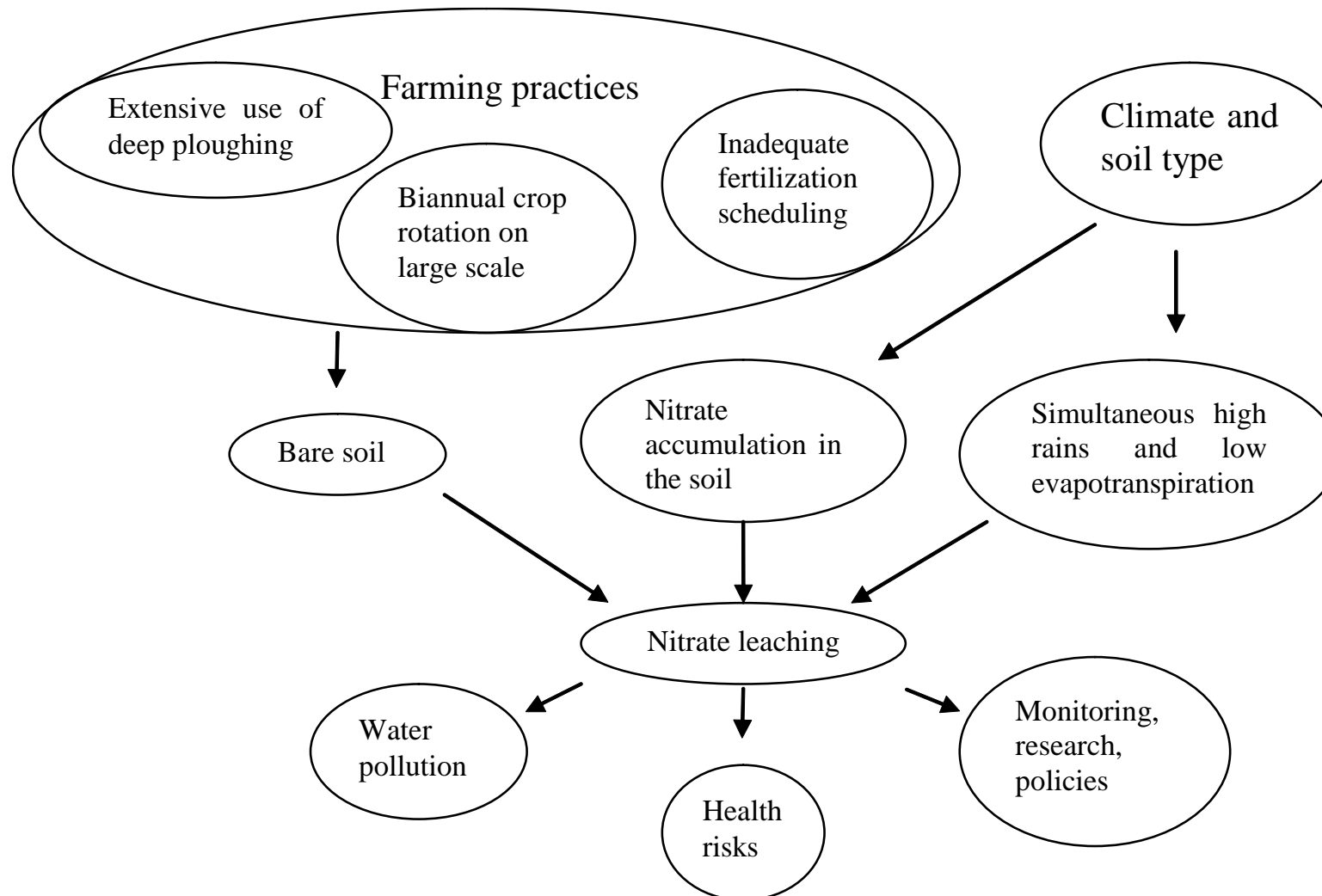
What do we mean for system diagrams?

- A system diagram is a visual model of a **system**, its **components**, and their **interactions**. It can capture all the essential information of a system functions and properties
- A good diagram can capture a huge amount of information in a very small space. This makes diagrams a **dense way to represent information**.
- Diagrams can also **represent non-linear information**, such as the multi-dimensional relationships between systems. Text is *linear*, which prevents it from representing non-linear information efficiently.
- Diagrams are a *richer* form of information capture than simple text





Causes and consequences of presence of nitrates in the groundwater



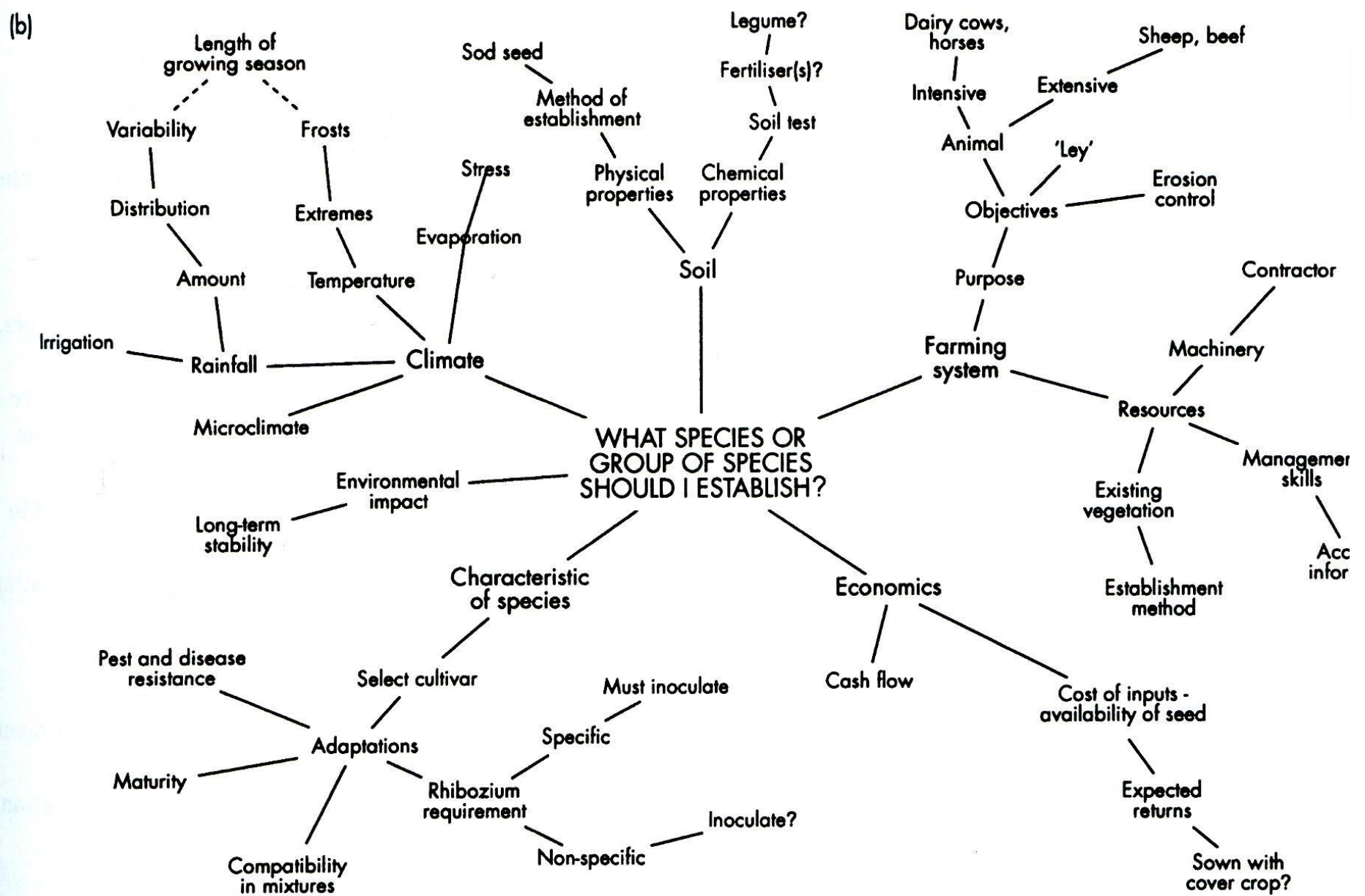


Fig. 3.11 Dendrograms used to explore (a) issues relating to poor legume pasture establishment that resulted in poor pasture productivity, identified in a rapid rural appraisal (see Chapter 9) and (b) factors guiding species choice when establishing new pastures. (Sources: Ison & Ampt, 1992; Brouwer et al., 1994.)



What are system diagrams for?

- a powerful aid to thinking, learning and acting
- representing information and ideas about complex situations
- allowing to appreciate the complexity while seeing the individual components and the connections
- summarising how ideas or processes are connected much more efficiently than in words
- showing multiple relationships between 'things' in a non-linear fashion
- identifying and working with systems of interest
- planning and implementing changes to a situation
- helping in decision making
- helping with quantitative model building
- International language

.....but without practising your thinking using diagrams you may not learn how powerful such tools can be



Why system diagrams are so powerful for learning?

- The main power in diagrams comes from a **group** using them to actively develop everyone thinking and possibly shared understanding
- Diagrams are, like words, **intensely personal ways** of sharing information and seeing someone else's ideas in diagrammatic form can give a new view of what they are trying to communicate
- Diagrams can also suggest **new and unexpected relationships** between ideas about a situation and new and unexpected ways of moving forward in a situation

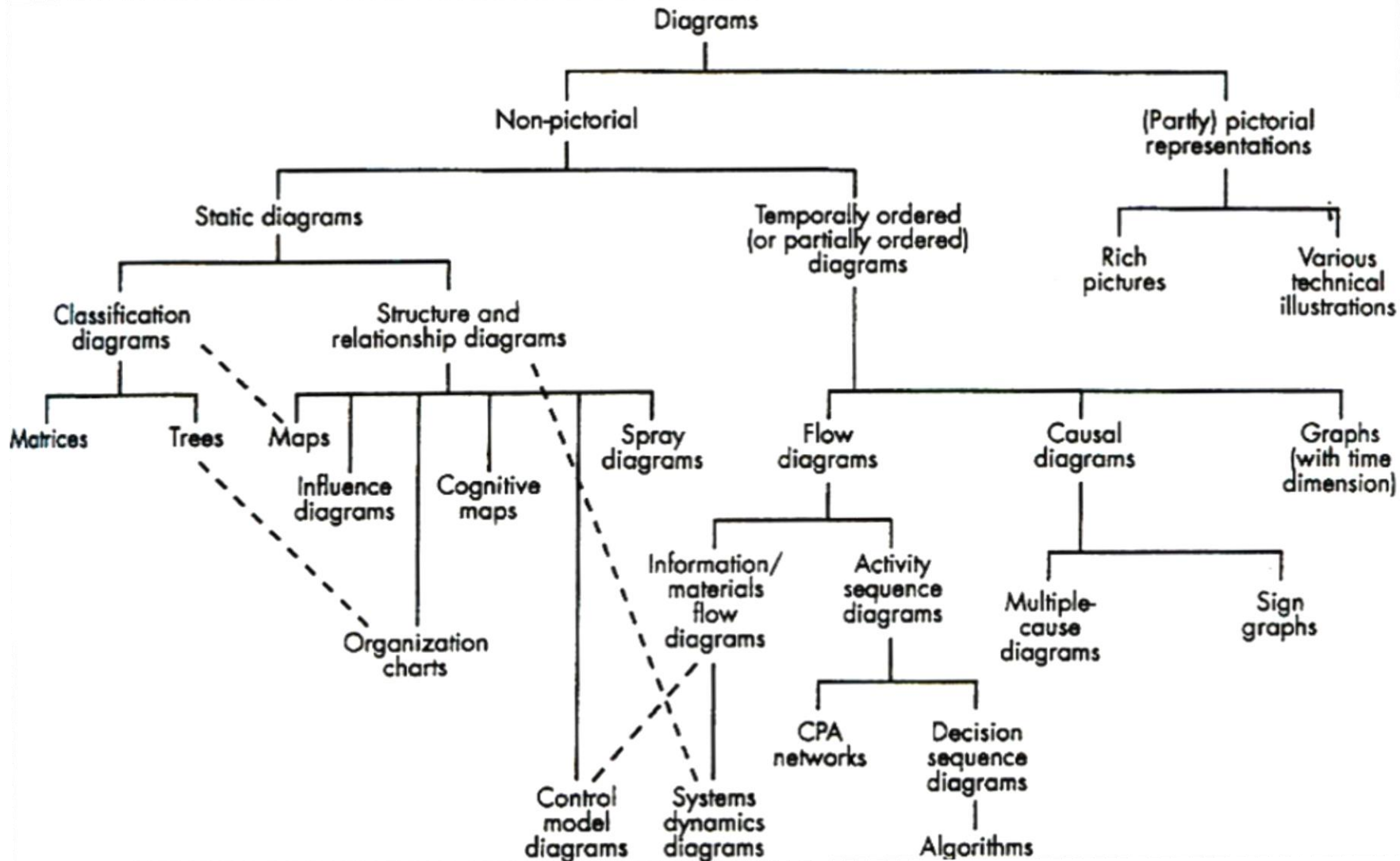




Types of diagrams



A diagram about diagrams





System diagrams for teaching purposes

- taking notes during lessons and learn in the meanwhile
- learning having fun
- helping to gain insights during a systemic analysis (e.g., analysis of case studies on agricultural and agri-environmental issues)
- facilitating students to become “system thinkers”
- facilitating the group work and enrich the joint reflection and thinking
- learning how to deal with complex situations
- learning to appreciate that multiple perspectives are more effective than a single one when addressing complex situations





System diagrams for teaching purposes

- taking notes during lessons and learn in the meanwhile
- learning having fun
- helping to gain insights during a systemic analysis (e.g., analysis of case studies on agricultural and agri-environmental issues)
- facilitating students to become “system thinkers”
- facilitating the group work and enrich the joint reflection and thinking
- learning how to deal with complex situations
- learning to appreciate that multiple perspectives are more effective than a single one when addressing complex situations





Case study analysis on grassland-based farming systems with students





System diagrams for teaching purposes

- taking notes during lessons and learn in the meanwhile
- learning having fun
- helping to gain insights during a systemic analysis (e.g., analysis of case studies on agricultural and agri-environmental issues)
- **facilitating students to become “system thinkers”**
- facilitating the group work and enrich the joint reflection and thinking
- learning how to deal with complex situations
- learning to appreciate that multiple perspectives are more effective than a single one when addressing complex situations





Why Teach Systems Thinking?

- Systems thinking is particularly well-suited to teaching about the complex challenges (e.g. climate change)
- Systems thinking offers a means to combine natural systems with human, political, cultural or economic systems
- Complex problems are multidimensional. Both the problem and the solutions cut across multiple disciplines and approaches
- Students tend to prefer simplified, black and white explanations which may be only partially accurate. A systems approach can introduce complexity in an elegant, conceptual and “funny” way that students can appreciate
- Encouraging students to think from a systems point of view can encourage creative problem solving outside the usual discipline-based pathways





System diagrams for teaching purposes

- taking notes during lessons and learn in the meanwhile
- learning having fun
- helping to gain insights during a systemic analysis (e.g., analysis of case studies on agricultural and agri-environmental issues)
- facilitating students to become “system thinkers”
- facilitating the group work and enrich the joint reflection and thinking
- learning to appreciate that multiple perspectives are more effective than a single one when addressing complex situations
- learning how to deal with complex situations



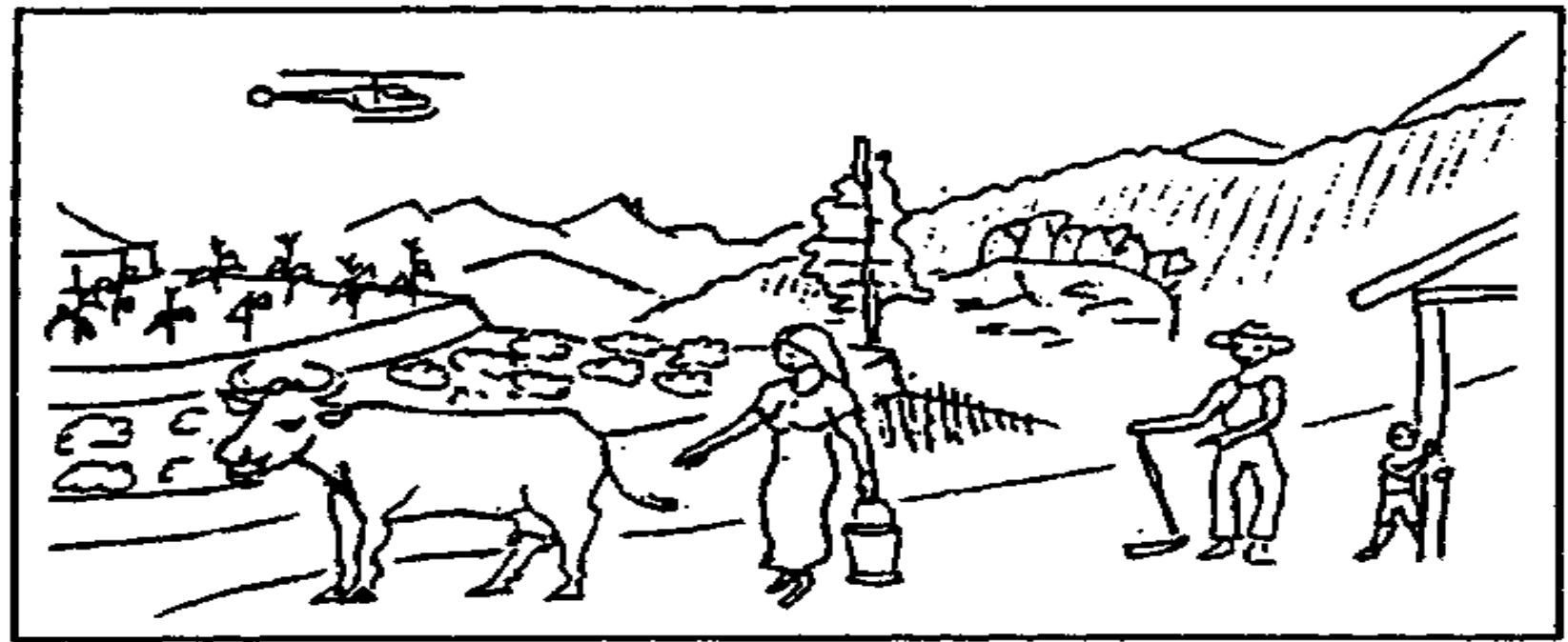


Rich pictures about a case study on an Australian agro-pastoral system



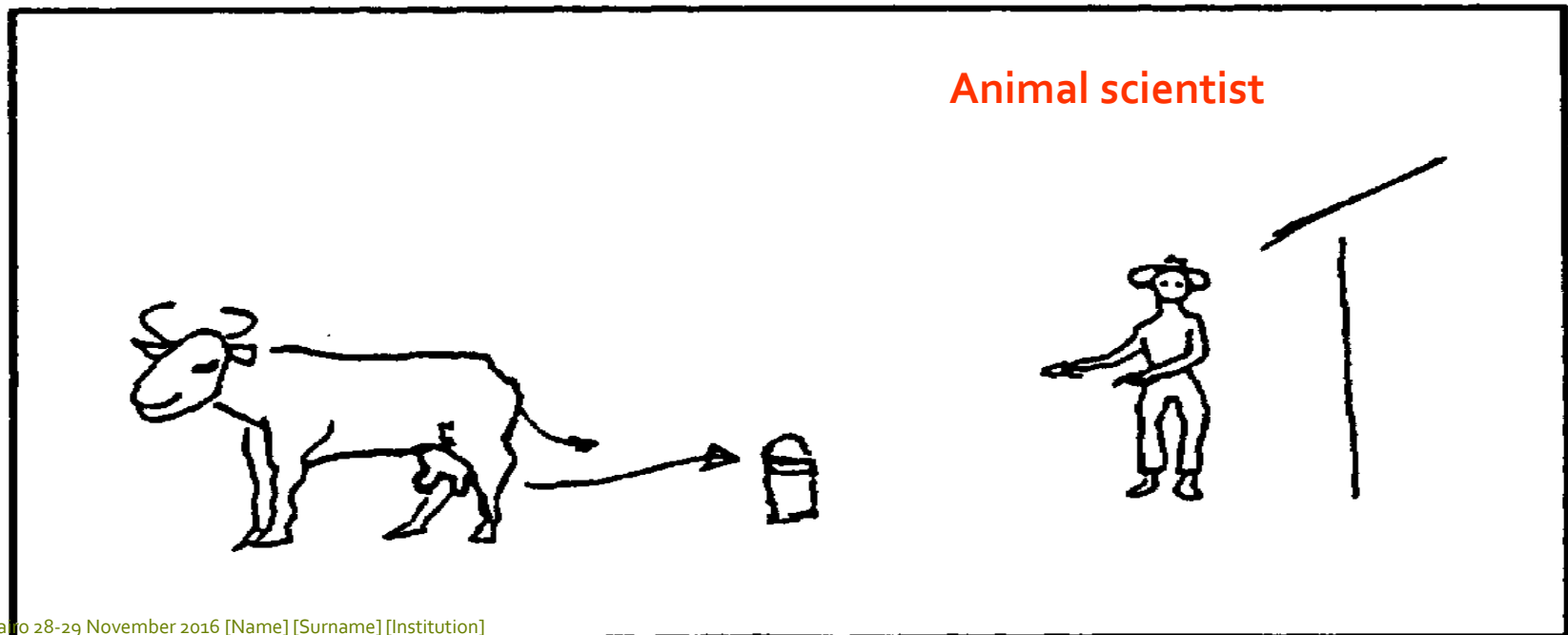
Pearson & Ison, 1997

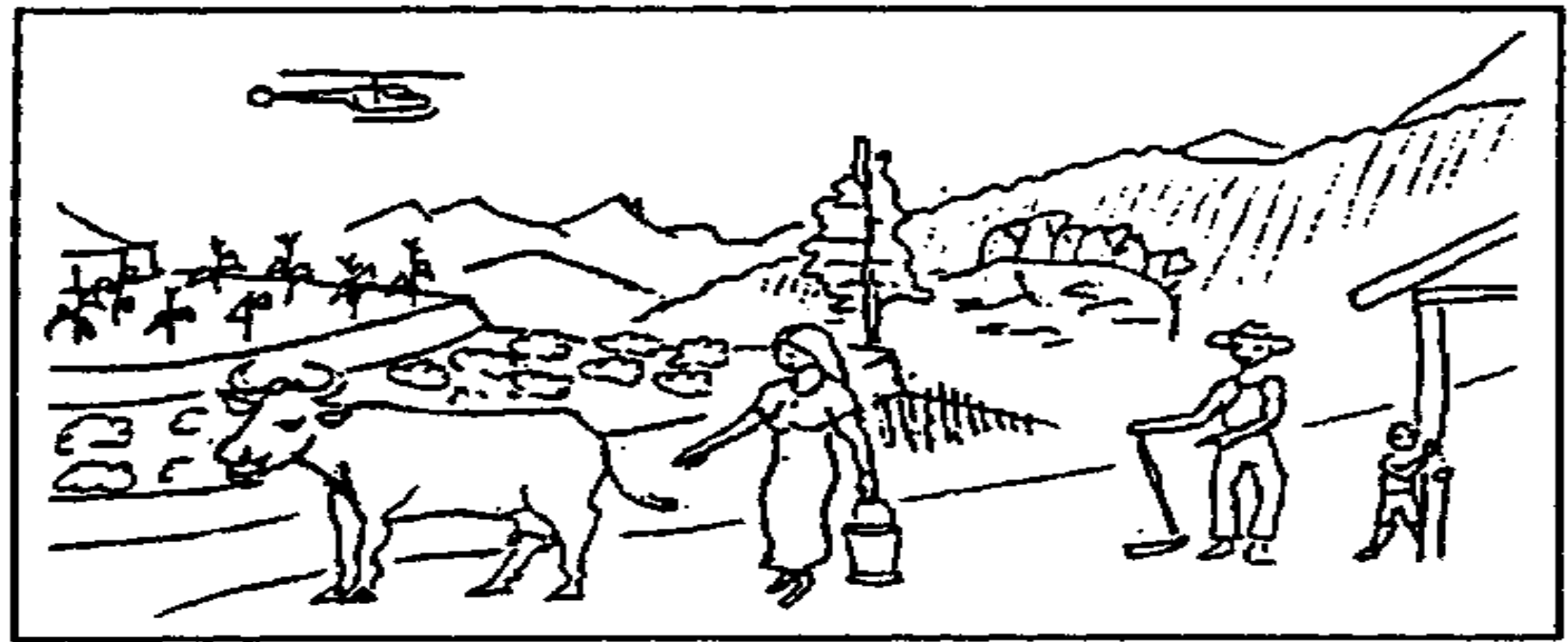




PERCEPTION OF THE SYSTEM

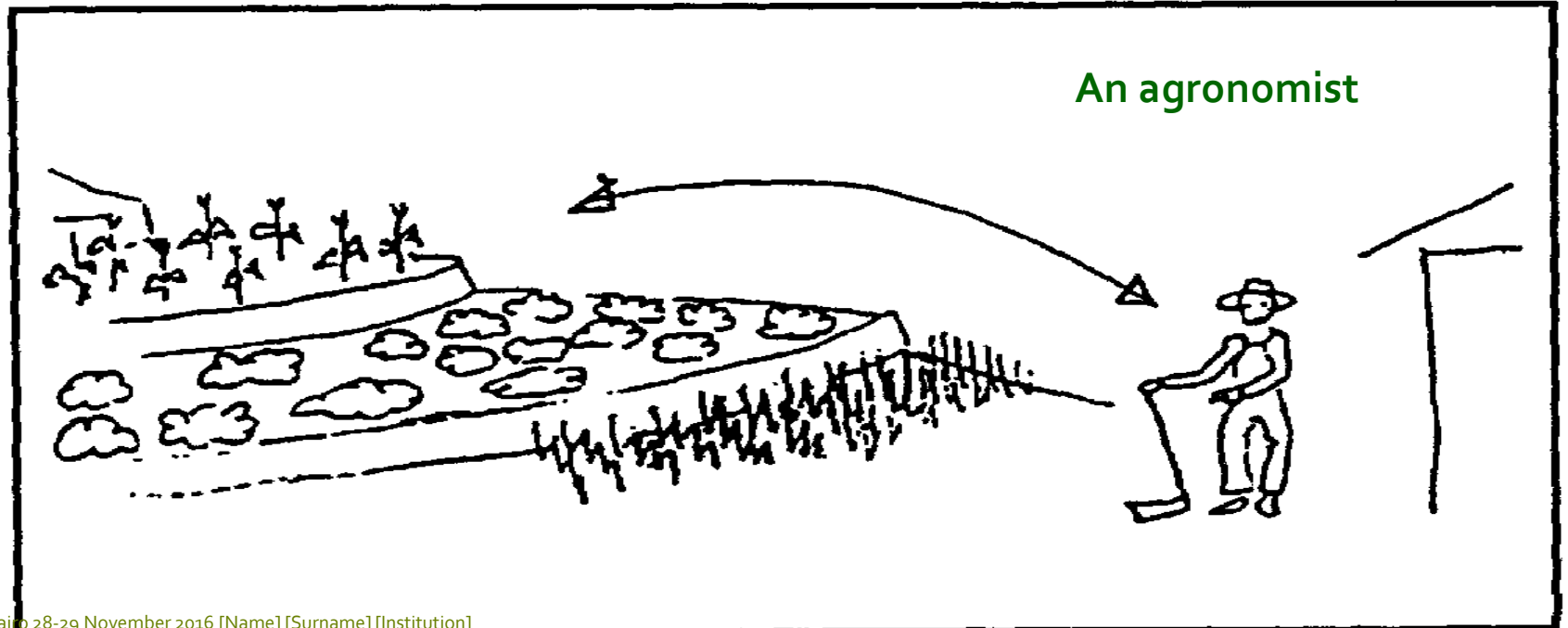
Pearson & Ison, 1997



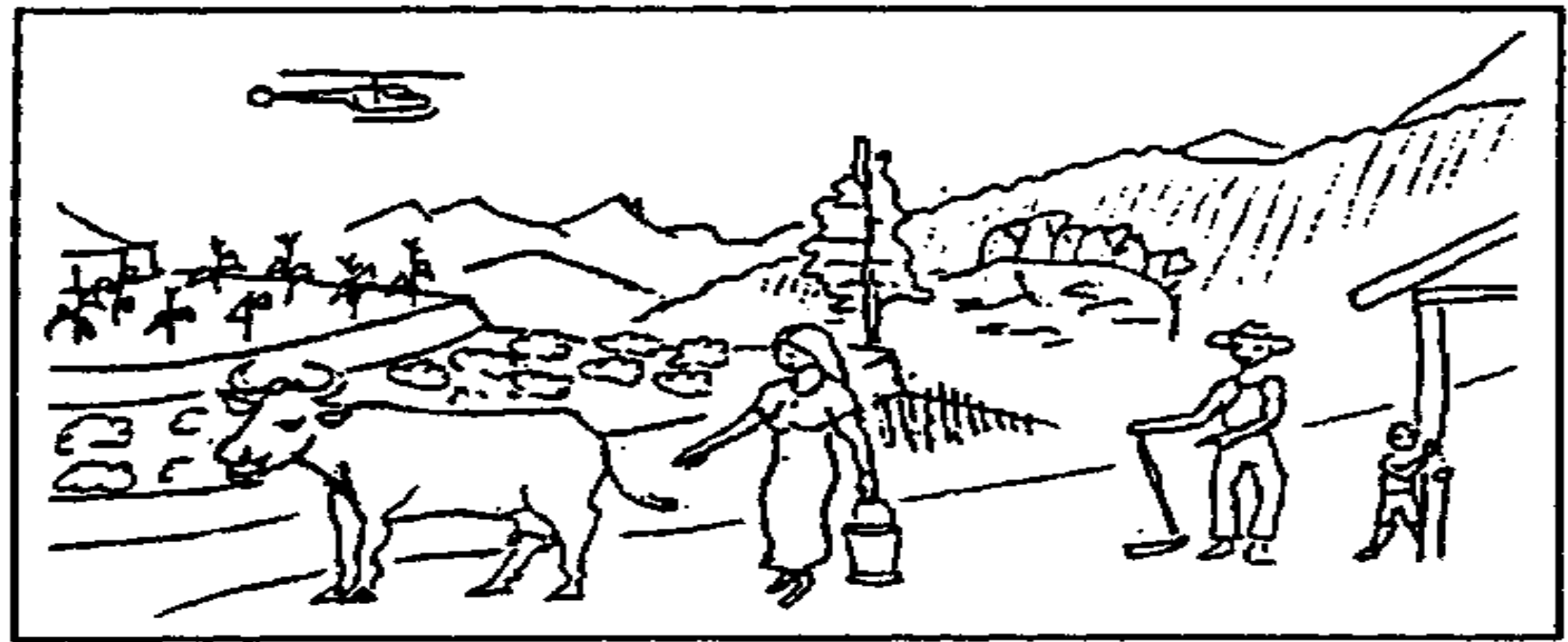


PERCEPTION OF THE SYSTEM

Pearson & Ison, 1997

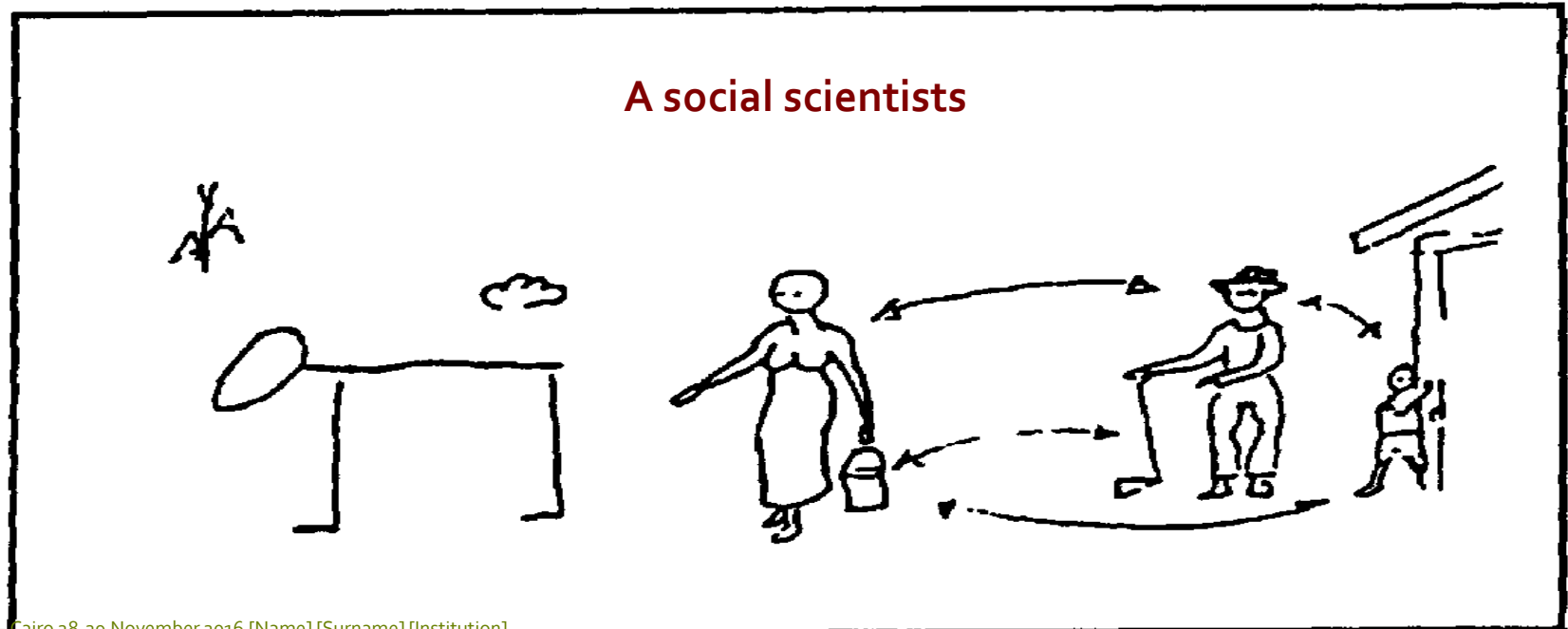


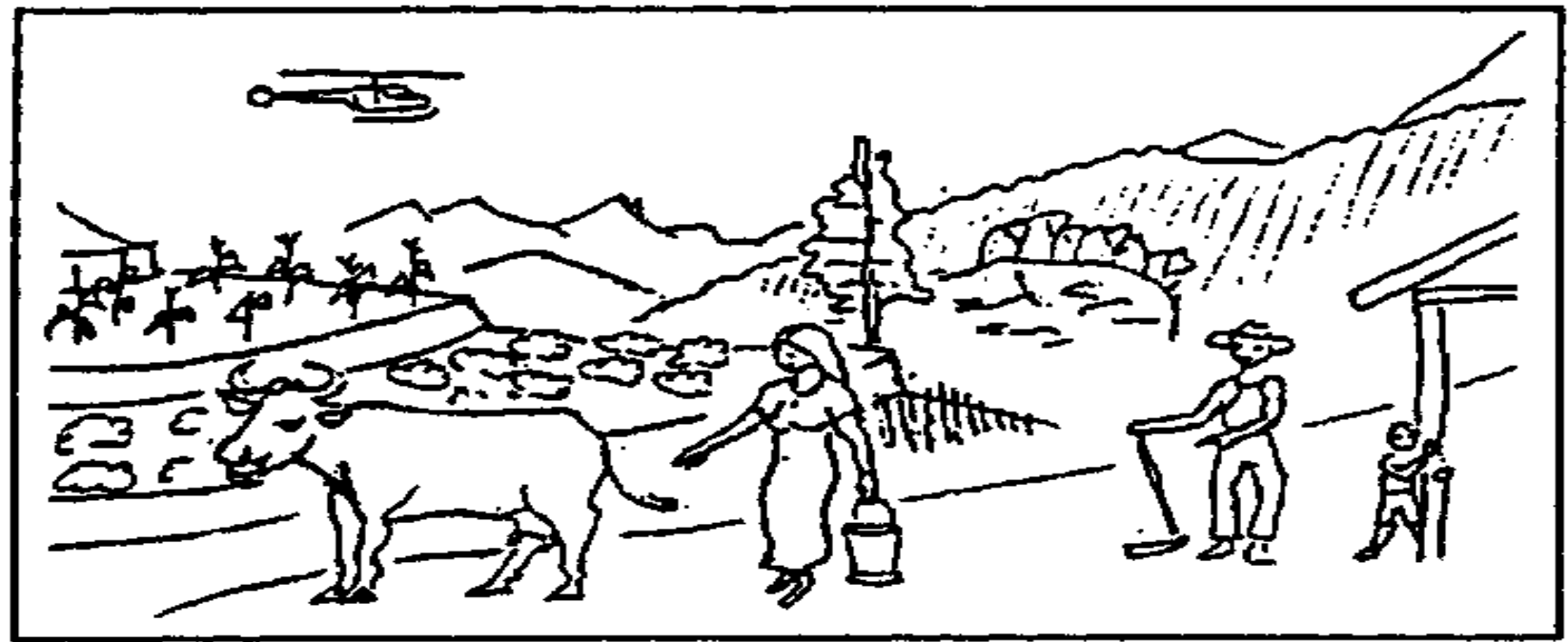
An agronomist



Pearson & Ison, 1997

PERCEPTION OF THE SYSTEM

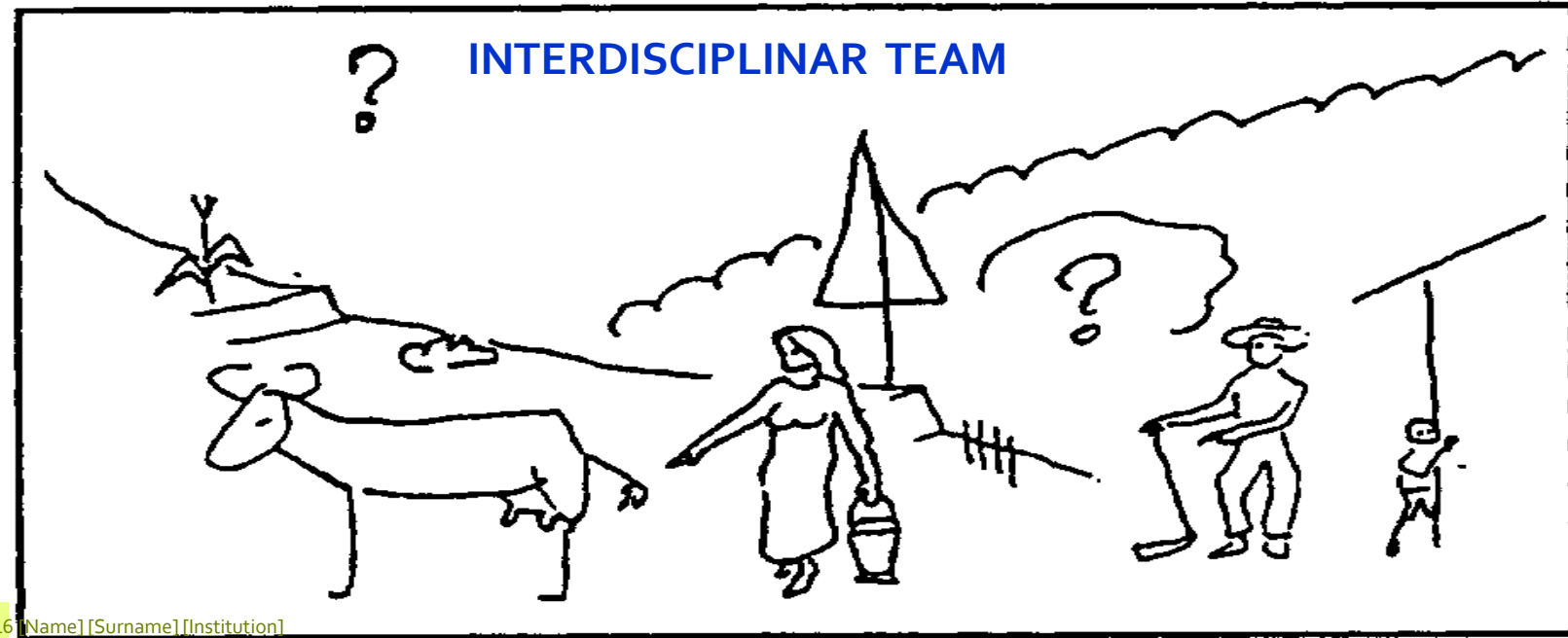




Pearson & Ison, 1997

PERCEPTION OF THE SYSTEM







References/On line sources

- Pearson CJ Ison RL. (1997) Agronomy of grassland systems. 2nd Edition. Cambridge Univ. Press
- Checkland, P. (1981) Systems Thinking, Systems Practice, London, Wiley
- Peter Checkland, Jim Scholes (1990) Soft Systems Methodology in Action. (Wiley)
- Peter Checkland, John Poulter (2006) Learning for Action. (Wiley)
- Derek Cabrera (2015) Systems Thinking Made Simple: New Hope for Solving Wicked Problems. (Odyssean)
- <http://www.open.edu/openlearn/science-maths-technology/computing-and-ict/systems-computer/systems-diagramming/content-section-0>
- <http://systems.open.ac.uk/materials/T552/>

