# Navigating the dynamics: Resilient farms through adaptive management

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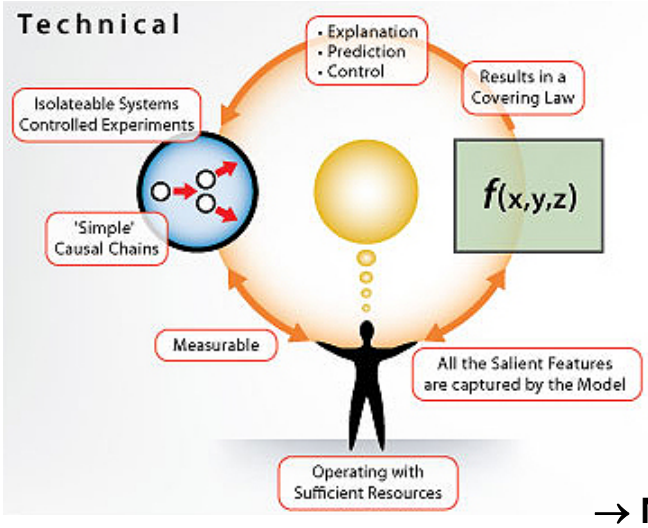
## Technical systems vs. CAS (1)



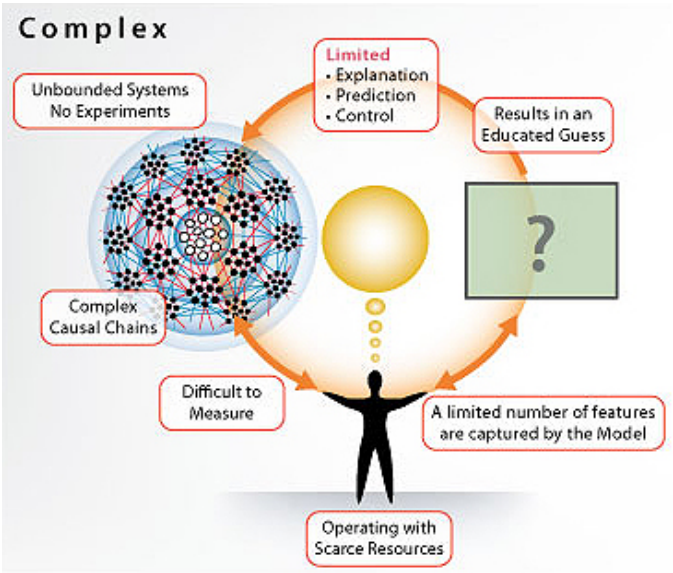

**Characteristics of techn. problems:**

- Clear boundaries
- Stable/predictable patterns
- Limited set of alternative solutions
- Homogeneous stakeholders
- Single optimal solution
- Optimal solution can be tested

→ **Newtonian, mechanical world-view**

Source of graphic: http://www.idiagram.com/CP/kindsofproblems.jpg

# Technical systems vs. CAS (2)



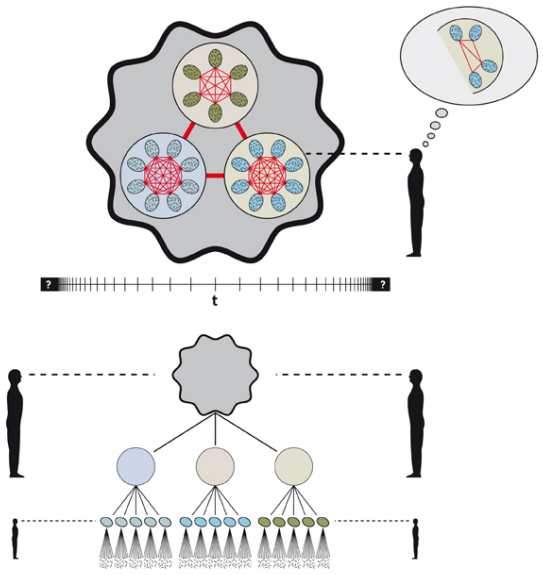

## Characteristics of complex problems:

- No definite boundaries
- Evolving/unpredictable patterns
- No bounded set of alternative solutions
- Multiple stakeholders with different (conflicting) viewpoints
- No single optimal solution
- Solutions cannot be tested objectively

Source of graphic: http://www.idiagram.com/CP/kindsofproblems.jpg



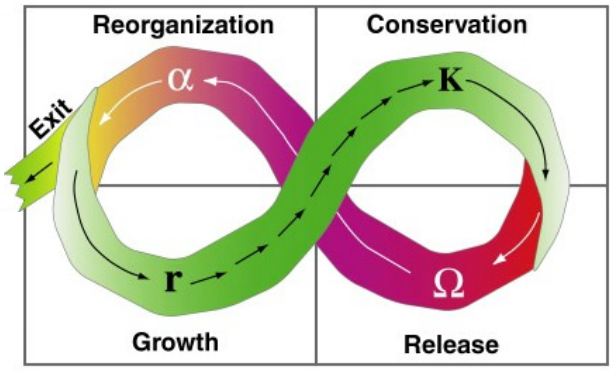
# Key features of CAS



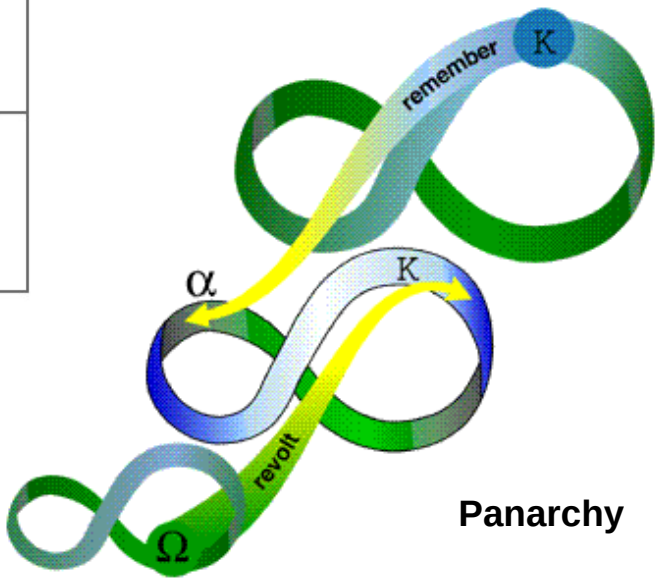

- Composed of many sub-systems that interact
  - But we can only capture a small section in our studies/models
  - Complexity = non-deterministic
- Their interactions change over time
  - "Adaptive", co-evolution, learning
  - Prediction is near impossible
- They involve nested hierarchical systems
  - Scale matters (emergence)

Source of graphic: http://www.idiagram.com/CP/kindsofproblems.jpg

# The nature of change




**Adaptive cycle**

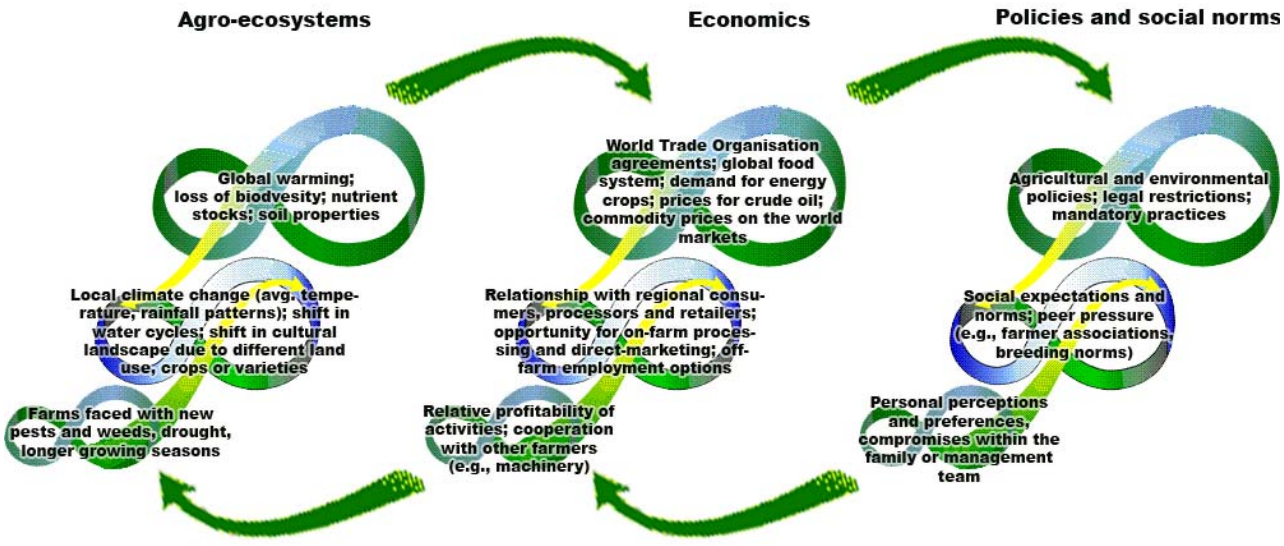



**Panarchy**

Source of graphics: http://www.resalliance.org



# Farming systems as a CAS




CAS is a conceptual framework that allows to integrate domains and spatial scale within an dynamic (adaptive) perspective.

# Implications for farm management

- There are **many domains** to keep under observation which interact and change:
  - ✓ Family (life cycle, changing preferences and needs)
  - ✓ Economics (investments, price developments of inputs, products)
  - ✓ Policies and society's expectations (animal welfare, environmental protection, quality standards, transparency)
  - ✓ Technical and technological developments
- Past trends have only limited value to **'predict' the future**:
  - ✓ Surprises are unavoidable (e.g., BSE crisis, price spikes)
  - ✓ Timing, source and duration of crises cannot be anticipated
- For **a farm** to last (i.e., be sustainable), it **must**:
  - ✓ Be able to cope with surprises (shock resilience)
  - ✓ Be able to adapt to stresses (transformative resilience)
  - ✓ Focus on flexibility rather than on optimisation/maximisation of one attribute



# Strategies to build resilience (1)

Four cluster of factors (Folke et al. 2003) / workshop results

## 1. Learn to live with change and uncertainty

### Abandon stability, expect the unexpected, learn from crisis

Keep farm flexible and understand strategy as emerging, unfolding:

- ✓ Limit **debt** level,
- ✓ Careful with large, long-term **investments** (esp. animal housing), avoid dependency (long-term contracts)
- ✓ Spread risk: invest with other farmers (**cooperate**), "**modularise**" investments (ability to opt-out or redirect)
- ✓ Use a "bricolage" approach: resource **recombination** (implies redundancy)

# Strategies to build resilience (2)

## 2. Nurture diversity

Seeds for new opportunities, increases options for coping:

- ✓ **Diversity** of crops grown, of animal types/breed/products
- ✓ Diversity of **enterprises** (on- and off-farm, incl. services, energy production, etc.)
- ✓ Diversity of **information**, of partners/social networks, of relationship types (formal and informal)
- ✓ Need on-going **experimentation** to open new potential avenues
- Challenge: coordination to avoid conflict (esp. peak **labour** time) and to avoid overload (quality of life)



# Strategies to build resilience (3)

## 3. Combine different types of knowledge and learning

Scientific + traditional knowledge, create collective learning environ.

- ✓ Bridge (disciplinary) scientific information and complexity of real-life world, **integrate** experiential knowledge
- ✓ **Experiment** to learn how the system works (e.g., which wholesalers to trust, what consumers prefer, how breeds differ)
- ✓ Include a variety of **information sources** (farming and wider society: trends, consumers, services for urban population), diversity of opinions
- Biggest challenge for farmers: Learning **social competencies** for collective action (learn by trial-and-error: conflict management, unambiguous communication, trust building). With cooperation partners and within the family!

# Strategies to build resilience (4)

## 4. Create opportunities for self-organisation and cross-scale links

Ability of community for social and political organisation rather than relying on external intervention

- ✓ Strive towards **autonomy** on-farm: bricolage, nutrient cycles, family labour, energy (wood, solar)
- ✓ **Engagement** in community institutions (fire brigade, church, hunters, neighbourly help, etc.): builds **trust** and community cohesion (and identify potential business partners), practice skills for collective action and leadership
- ✓ Engagement in farmer **networks**: build cross-scale linkages
- Challenge: takes **time**! (esp. difficult for part-time farmers)



# Conclusion

- CAS and resilience thinking is a fundamentally different **framework** from mechanistic understanding of systems
- Emphasises **dynamics** (rather than search for 'optimal' organisation): on-going reconfiguration of resources and activities by family members
- Resilience thinking allows the integration of social, economic and ecological domains, thus supports **interdisciplinary** approaches
- If farmers do manage for resilience, might help **explain limited impact** of policy measures and recommendations of disciplinary research (focus on one domain; mostly based on (narrow) assumption of farmers as economically rational)
- Need to better understand **impact of recommendations** on farm resilience and on complex interdependencies on-farm

# Thank you!

I am looking forward
to your questions!