Social-Ecological Systems and Adaptive Governance

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Social-ecological co-evolution

Anthropocene – a biosphere shaped by humanity



- Throughout history humanity has shaped nature and nature has shaped the development of human society
 - Social-ecological coevolution now takes place also at the planetary level and at a much more rapid and unpredictable pace than previously in human history

e.g. Steffen et al. 2004. Global Change and the Earth System: A Planet Under Pressure.





Ecosystem support areas

Folke et al. 1997. Ambio

Ecosystem support areas of cities in the Baltic Sea Region

- Cities' actual area about 0.1% of the regions area
- Cities' ecosystem support corresponds to the whole area of the region

 Sustainable use of ecosystem services (incl. food production) from local to global scales requires resilient ecosystems and associated governance systems

Erosion of ecosystem resilience

- increases the likelihood for ecosystem shifts
- impacts on
 livelihood and
 societal
 development

from desired to less desired states in terms of capacity to generate natural resources and ecosystem services

Scheffer et al. 2001. Nature; Folke et al. 2004. AREES

Resilience and Sustainable Development

Building adaptive capacity in a world of transformations

A REPORT FOR THE SWEDISH ENVIRONMENTAL ADVISORY COUNCIL 2002:1

Resilience and Sustainable Development

Science Background Paper commissioned by the Environmental Advisory Council of the Swedish Government in preparation for WSSD

www.resalliance.org

Resilience

- provides capacity to absorb shocks while maintaining function
- provides components for renewal and reorganisation following disturbance
- sustains capacity for adaptation and learning

Holling 1973, Ann.Rev.Ecol.Syst.; 1986, IIASA volume; 2001, Ecosystems Carpenter et al. 2001, Ecosystems Gunderson & Holling 2002. Panarchy

Social-ecological systems

- Loss of ecosystem resilience does not necessarily imply a vulnerable socialecological system
- A 'good governance system' does not necessarily imply a resilient socialecological system

Adaptive co-management of ecosystems and landscapes

Olsson, Folke, Berkes 2004. Adaptive co-management for building social-ecological resilience *Environmental Management* 34:75-90 Armitage, Berkes, Doubleday (eds.). *Adaptive Co-Management: Collaboration, Learning and Multi-Level Governance.* Forthcoming University of British Columbia Press

Building capacity to adapt to change Lake Racken Catchment Management

Crises

- Acidification
- Fish disease
- Overexploitation

Responses

- Generation of ecological knowledge, monitoring and management practices from the species to the watershed level
- Local self-organization from liming group to fisheries association
- Shared management, exchange of experience between local steward associations and collaboration with municipality, county and other organizational and institutional levels

Adaptability and Transformability

- ADAPTABILITY is the capacity of people in a social-ecological system to manage resilience through collective action
- TRANSFORMABILITY is the capacity of people in a social-ecological system to create a fundamentally new SES when ecological, political, social or economic conditions make the existing SES untenable

Kristianstads Vattenrike – A Social-Ecological *Transformation*

Olsson, Folke, Hahn. 2004. Ecology and Society

Phases of the transformation

- 1. Preparing the system for change
- 2. Navigating the transition
- 3. Building resilience of the new direction

Transformation of the social-ecological system

Olsson, Folke, Hahn. 2004. Ecology and Society

Strategies for building resilience of the new direction

- Developing motivation and values for ecosystem management
 - Envisioning the future together with actors
 - Providing arenas for trust building among actors, etc
- Directing the local context through adaptive comanagement
 - Synthesizing and mobilizing knowledge for ecosystem management
 - Initiating projects and selecting problems that can be turned into possibilities, etc
- Navigating the larger environment
 - Influencing decision makers to maintain governance structures that allow for adaptive co-management
 - Providing a buffer for external drivers etc.

Governance networks in Kristianstads Vattenrike

-UNESCO -Germany, Rugen -Spain

-Swedish Environmental Protection Agency -Lake Hornborgasjön

-County administration (nature conservation, legal) -Reg. Road Administration

- Municipality of Kristianstad (many administrations; techn., unempl, ecomuseum)

Landowners, organisations, companies......

- -tourism
- -nature conservation
- -agriculture

Social features of ecosystem management in KV

Stewards of Kristianstads Vattenrike

- Not top down or bottom up, but collaborative and flexible, cross-level governance
- Leadership and stewards, vision, trust, dialogue, sense making, informal institutions, conflict resolution, organizational flexibility (front loop, back loop)
- Social networks (shadow networks) for collaboration and support from local to international levels
- Bridging organizations

Adaptive governance of socialecological systems

Framework for analyzing

- social dimension of adaptive co-management of ecosystems and landscapes
- social networks and the interactions between individuals, organizations, agencies, and institutions at multiple organizational levels
- social features and sources of significance in responding to crisis, shaping change and building resilience for reorganization and renewal of socialecological systems

Folke, Hahn, Olsson, Norberg. 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources* 30:441-473

Conclusions

- Resilience is required to absorb change
- Transformability is required to move into a more desired social-ecological trajectory
- Adaptability among actors is required to reinforce, reorganize and sustain desired social-ecological states in the face of change

Ecology and Society A journal of integrative science for resilience and sustainability Formerly Conservation Ecology

www.ecologyandsociety.org

Special features Anthropology and ecology Traditional ecological knowledge in social-ecological systems Strengthening adaptive capacity (MA issue) Restoration of riverine landscapes **Cross-level** institutions Resilience, networks, governance Scenarious (MA issue) Agent-based modeling of social-ecological systems

Navigating volume

Navigating Social-Ecological Systems

Building Resilience for Complexity and Change

edited by Fikret Berkes Johan Colding & Carl Folke

- learning to live with change and uncertainty
- nurturing diversity for reorganization and renewal
- combining different types of knowledge for learning
- creating opportunity for self-organization towards social-ecological sustainability

Adaptive Governance of Social-Ecological Systems

- Build knowledge and understanding of ecosystem dynamics
- Develop management that interpret, learn and respond to environmental feedback
- Support the emergence of flexible organizations, institutions and multilevel governance systems that enable management for ecosystem services and sustainable livelihoods
- Prepare the governace system to deal with change, surprise and external drivers

Folke, Hahn, Olsson, Norberg. 2005. Adaptive governance of social-ecological systems. ARER

Preparing the system for change

- Bottom-up initiative -'stewards of the land', local selforganization
- Generating ecological knowledge of the landscape/ catchment (science, experience, practice, innovation)
- Forming collaboration networks and support networks (local, regional, national and also international)
- Developing a comprehensive framework with visions and goals for a new management approach
- Perceived crisis opened up a trajectory to reduce resilience of the undesired state of the landscape (break down structures that constrain adaptability)

Using a window-of-opportunity

- Shift in political power and people at the municipality level
- Local politicians impressed by the selforganization, broad vision presented with potential for regional development
- Ecomuseum Kristianstads Vattenrike (EKV) was created – a 'bridging organization' – within the existing institutions, with the role to initiate and coordinate projects

Conclusions

- Not top down or bottom up, but collaborative and flexible, cross-level governance
- Within existing legal and institutional framework
- Stakeholder mobilization before new conflicts
- Bridging organizations
- Leadership and stewards, trust, dialogue, informal institutions
- Social networks for collaboration and support

Överraskningar och irreversibla förändringar

Shadow networks

- Characterized by political independence and out of the fray of regulation and implementation.
- Places to develop alternative policies, dare to learn from each other, and think creatively about how to resolve resource problems.
- In Kristianstads Vattenrike and the Everglades, innovations were developed in shadow networks during a preparation phase and carried through a navigating phase.

Leadership functions

- Re-conceptualize issues
- Generate and integrate a diversity of ideas, viewpoints and solutions
- Communicate and engage with key individuals in different sectors
- Move across levels of governance and politics (span scales)
- Promote and steward experimentation at smaller scales
- Recognize (or create) windows of opportunity
- Promote novelty by combining different networks, experiences and social memories