

Resilience Is More Than an Elastic Jump

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Resilience is defined in a dictionary as 1) The ability to return to the original form or position after being bent, compressed or stretched; elasticity, and 2) ability to recover readily from illness, depression, adversity, or the like; buoyancy (3) (College Dictionary 1975). But resilience is also applied in many holistic relations such as ecosystems and social science.

Ecosystem resilience describes the capacity of an ecosystem to cope with disturbances, such as storms, fire and pollution, without shifting into a qualitatively different state. A resilient ecosystem has the capacity to withstand these shocks and surprises and, if damaged, rebuild itself. An example can be a lake exposed to increased nutrient concentration. A resilient ecosystem can manage with the increased nutrients without a significant change in the diversity of animals and plants. However, an ecosystem that is not resilient will appear unaffected by until a critical threshold is passed and the water shifts abruptly from clear to turbid. Submerged plants suddenly disappear and animal and plant diversity is reduced – an undesired state from both a biological and economic point of view. In this case, substantially lower nutrient levels than those at which the collapse of the vegetation occurred are required to restore the system. The economic and social intervention involved in a restoration is complex and expensive, and sometimes even impossible. An ecosystem with low resilience can often seem to be unaffected and continue to generate resources and ecosystem services until a disturbance causes it to exceed a critical threshold. Even a minor disturbance can cause a shift to a less desirable state that is difficult, expensive, or even impossible to reverse (Ministry of Environment).

Ecosystems seem to be particularly resilient if there are many species performing the same essential function (such as photosynthesis or decomposition) and if species within such “functional groups” respond in different ways to disturbances. Then, species can replace or compensate for each other in times of disturbance. When humans reduce biodiversity or favour monocultures, ecosystems tend to become vulnerable (Ministry of Environment).

Social resilience is the ability of human communities to withstand and recover from stresses, such as environmental change or social, economic or political upheaval. Human well-being and development depend on ecosystem goods such as food, timber and medicines, and services such as water and air purification, carbon storage, pollination, soil formation, and the provision of aesthetic and cultural benefits. The challenge is to sustain the resilience of ecosystems – their capacity to cope with disturbances and maintain an adequate supply of goods and services. This is especially important in the face of global environmental change which may cause more frequent and intense disturbances (Ministry of Environment).

A diversified decision-making structure is critical to building resilience in social-ecological systems. This implies that ecosystem management is shared by sub-units of various sizes and scales, from international governments to local villages. It allows for testing of rules and policies over the short, medium and long term as well as at local, national and international levels. It enables social institutions to better match ecological processes (Ministry of Environment).

In their paper, Tanner et al. (2009) examines how to manage climate-related impacts in an urban context

by promoting planned and autonomous adaptation in order to improve resilience in a changing climate. They investigate the linkages between the characteristics of pro-poor good urban governance, climate adaptation and resilience, and poverty and sustainable development concerns. Their paper develops an analytical framework by combining governance literature with rapid climate resilience assessments conducted in ten Asian Cities. Based on this empirical data, they argue that a number of key characteristics can be identified to assess and build urban resilience to climate change in a way that reduces the vulnerability of the citizens most at risk from climate shocks and stresses. These characteristics form the basis of a climate resilient urban governance assessment framework, and include (1) decentralization and autonomy, (2) accountability and transparency, (3) responsiveness and flexibility, (4) participation and inclusion and (5) experience and support. This framework can help to assist in the planning, design and implementation of urban climate change resilience-building programmes in the future (Tanner 2009).

The concept of resilience is hotly contested, but it is interpreted in many studies as referring to the ability to persist and the ability to adapt in the face of climate shocks and stresses. In the context of the vulnerabilities and impacts on human and ecological systems, strengthening resilience therefore constitutes those natural and planned adaptation strategies, which reduce the vulnerability of those most at risk to increased climate hazards.

Resilience in such combined social-ecological systems concerns (Ministry of Environment):

- How much shock the coupled human and natural system can absorb and still remain within a desirable state.
- The degree to which the system is capable of self organization.
- The degree to which the system can build capacity for learning and adaptation.

Recent research indicates that societies will have to increase the resilience of our social-ecological systems considerably if we are to cope with future climate change and other components of global change. According to new findings, “catastrophes” caused by, for example storms, fire and flooding have become more common. This is a result of a combination of

human-altered disturbance patterns in nature, and reduced social and ecological resilience. Coral reefs, mangrove forests and other coastal wetlands protect human settlements from coastal storms. Forests and wetlands work as “sponges” that absorb floodwaters. Unfortunately, societies have eroded resilience in many natural systems to the extent that their ability to protect from disturbance has diminished.

As described, socio-ecological resilience reflects the management of uncertainty that comes with the changing climate. It is impossible to predict specifically how the weather patterns and climate conditions will change on a local or regional scale. Therefore it is important to assess how social structure and decisions taken, affect the socio-ecological resilience, and with it our ability (and the ecosystems ability) to cope with a changing environment. With this in mind, the TES editors welcome articles which deal with the concept of resilience.

References:

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