RESILIENCE AND ECOLOGICAL CITIZENSHIP IN SOCIO-ECOLOGICAL SYSTEMS

Min-hu Shim

Graduate School, Yonsei University, Seoul, South Korea

Jin-gon Shim

Graduate School, Sogang University, Seoul, South Korea

Yeon-soo(Youn-soo) Shim(Sim)

College of Humanities and Social Sciences, Honam University,

Gwangju, South Korea

Bellomy Donald Cecil

Institute of Humanities & Social Sciences, Honam University,

Gwangju, South Korea

ABSTRACT

As the current discussion of an Anthropocene geological epoch suggests, human planning and intentions have had tremendous effects on the earth's ecosystems. One lesson has been that there must be a positive feedback loop for the proper resiliency in terms of system processes. Just as resilience is needed in the interactions across and within species for an ecosystem to persist over time, it is also a human imperative when faced with crises such as the massive perturbations of the Earth System we now call the Anthropocene. Among the variety of human capacities that the crisis will call upon, perhaps the most crucial is spiritual recovery. Resilience and sustainability of ecosystems will be possible only through spiritual enlightenment building on the open-minded attitude of individuals around the globe.

Key words: Ecological Citizenship, optimal resilience, cultivating spirituality

Resilience and Ecological Citizenship in Socio-Ecological Systems

An ecosystem is a system of living organisms, from the smallest microbes to the largest mammals and the loftiest trees, interacting with one another and with the surrounding non-living environment that affects them and is in its turn reshaped by them. As human beings are a part of nature, they are also part of a series of ecosystems, but since at least the agricultural revolution their interactions with other life forms and the physical environment have often existed on a different plane than the rest of nature. Over the past two thirds of a century that relationship has grown even more tortured and tenuous in the series of overlapping revolutions at all levels of the Earth System that many are now called the Anthropocene (cf. Hamilton, Bonneuil and Gemenne 2015, Purdy 2015, Scranton 2015, Vince 2014). Hence, although any delineation between social and ecological systems is artificial and arbitrary, it makes sense to talk about a series of composite social-ecological systems linking human social systems with the rest of nature. As globalization accelerates, due to the complex connections between natural ecosystems and human systems, the social ecosystem is causing numerous disturbances that will test the resilience of all of its components.

Sustainable Optimal Resilience

Resilience is the ability to absorb disturbances and to change in reaction to them, yet to re-organize in such a way as to retain the same basic structure and ways of functioning. As resilience declines, the magnitude of a shock from which it cannot recover gets smaller and smaller. Applied to a social ecosystem, the definition implies a self-organizing ability to osmose any disturbance by adapting to change and stress in such a way that the original identity of the social ecosystem can still be discerned. Resilience is a highly desirable attribute due to the extent, scale, and duration of the changes any social ecosystem may confront, although occasionally the identities may be changed in such an extreme fashion (for example, in social terms, a dictatorship, or in ecological, a highly saline landscape) that we may wonder whether the resilience was worth it.

The application of resilience to ecosystems can be traced back to a classic paper of C. S. Holling on "Resilience and Stability of Ecological Systems" (1973) that, when it was first published forty-three years ago, helped bring the relationship between ecology and systems theory to a new level of sophistication. Holling pointed out that the understanding of ecology simply in terms of the stability or degree of fluctuation of species populations – of classic equilibrium models – could, especially in the open systems of the real world, often have a negative effect on the long-term persistence of some of the species in an ecosystem. A more useful metric would be their resilience, which would often exist in obverse relationship to their stability (Holling 1973). As Holling's thesis has been summarized in what has become an often-cited ecological definition of resilience, the term refers to "the capacity of a system to absorb and utilize or even benefit from perturbations and changes that attain it, and so to persist without a qualitative change in the system's structure" (Young et al. 2006, 305).[1]

---

[1] The significance of this definition of resilience for ecology and other fields influenced by systems theory is shown in the variety of other sources that cite Holling 1973 for this definition, including Paton Kelly and Doherty 2006, 191; Marshall and McGrath 2007,

Resilience and Ecological Citizenship in Socio-Ecological Systems

Globalization added urgency to the dialogue about resiliency by broadening the ecosystems at stake to the entire earth system and by adding socio-economic concerns about sustainable development, a convergence that became obvious in the United Nations report *Resilient People, Resilient Planet* (UN Secretary-General's High-Level Panel on Global Sustainability 2012) prepared for the Rio +20 conference on sustainable development held in Rio de Janeiro in 2012. Globalization interlocked the human and the natural spheres in ways that rapidly became more complex and pervasive (Young et al. 2006, 308). Globalization complicated the relationships between human society and natural ecological systems by increasing both the scope and scale of disturbances as well as the strengths of the connections throughout the social ecosystem. These changes, which have not been the product of planned changes, have a tendency to increase the vulnerability of the social ecosystem by reducing its overall robustness and resilience (Young et al. 2006, 309). Because the social ecosystem is a hierarchical entity consisting of various sub-systems, with established institutional relations visible at each of the levels (Young 2002), the changes triggered by globalization necessarily echo throughout its interconnected biophysical elements in terms of their resilience, vulnerability, and adaptability (Young et al. 2006, 311).

The global nature of these interactions has significant corollaries for the concept of citizenship by merging the responsibilities of global citizens and ecological citizens. Unlike environmental citizenship, which tends to focus on obligations at the public and national levels, ecological citizenship is a concept that now must emphasize the responsibility of citizens of the world within global society to exercise their rights and obligations on behalf of the single ecosystem called Earth. Ecological citizenship is called upon to discuss cooperation and international obligations in place and time across generations, and to inculcate the feelings of care and compassion that can reduce consumption, and thus ecological footprints, in the interests both of others on the earth today and their descendants living there in the future.

Promoting Spirituality in Living Systems

The issue can be thought of as fundamentally religious in nature. The persistence of religion despite the many sins committed in its name cannot be explained by the need to keep society together or to preserve morality, because these needs do not create institutions (Boyer 2002, 27). The pioneer anthropologist E. B. Tylor defined religion as, in its essential nature, "the belief in spiritual beings" (Tylor 1871:I, 424). But what does "spiritual" actually connote? According to contemporary spirituality theorists, spirituality is said to develop inner peace and form a foundation for happiness through meditation and similar practices that practitioners employ to cultivate their inner life and character (Wilkinson 2007). Outside the boundaries usually assigned to religion and spirituality,

---

52; van der Leeuw 2007, 214; Bentley 2009, 3; Helfert and Duncan 2010, 230; Bentley 2011, 249; and Cusicanqui 2016, 13. It is therefore surprising to discover that the quoted definition is in fact not used in Holling 1973. However, the phrasing can be said to meet Holling's interpretation of "resilience," as it has certainly demonstrated its persistence.

global citizenship can be fostered through the expansion of spiritualty in individuals' lives.

Living systems can be thought of as comprising four major components: matter, energy, information, and consciousness. A human being has body, soul, and spirit. Body is the external physical layer of matter. Matter, though, can be changed into energy. "Soul" can be thought of as the form that the energy takes as mind, will, and emotions. Energy can also be turned into information received by mind. Information can in turn be transformed into consciousness conceived as spirit. Spirit is the inner core of being sensitive to the belief in a spiritual being's innate conscience. The human body has permeated mental power or conscious force.

As we have learned from the discussion of the embodied consciousness in Maurice Merleau-Ponty (1968), the human body is "'thinking." We find the figure of the "thinking body" everywhere. When you eat a delicious meal, ride a bike, swim, or lose yourself in playing a musical instrument, you are not reflecting but acting through your consciousness. The body moves in accordance with the requirements of any given situation. As Merleau-Ponty understood, this dissolution of Cartesian dualism has profound implications for the related boundaries between the individual and the surrounding nature. As he wrote in March 1961, less than two months before his death, "Nature as the other side of humanity (as flesh, nowise as 'matter'" (Merleau-Ponty 1968, 274). We need to cultivate the desirable embodied consciousness to see the world of the Anthropocene in its complete reality of creation and destruction, and to react to it with the necessary level of engagement. Both natural and human affairs continue to dissolve and fuse in their co-evolution.

Since the dismantling of medieval society, faith in human reason has informed the creation of modern civilized society in all areas, yet throughout world history, humans have repeatedly displayed the limits of reason. Living systems, whether in the guise of European history, amoebas, bodies, auditoriums, mountains, cities, or anything in between, create boundaries in order to establish their identity. However, in this process, all things (not just living things) must use their matter-energy and information in such a way as to increase the level of entropy within their systems according to the second law of thermodynamics. The second law of thermodynamics states that in every natural thermodynamic process the sum of the entropies of all participating bodies is increased. And all things must die due to the increase in entropy, if there are no other variables. Therefore, we need more variables: to interconnect with other systems and environments for acquiring energy and information and decreasing entropy. That is, within their systems, they continue to get the energy for the dissipation of entropy maximization.

Also, living systems are cognitive systems, and living as a process is a process of cognition (Maturana and Varela 1980, 13). Living systems involve autopoiesis and cognition as well to open and shut epistemological framework in order to establish identity from the environment. In living systems, any autopoietic cell actively relates to its environment, and its sensory responses trigger motor behavior governed by autopoiesis as a self-referential system ("Sensorimotor subjectivity" in Thompson 2007, 243ff). Human beings as a living system seek to establish epistemological identity. Also even in a closed state, identity is constantly evolving. If humans have closed minds to

block information from the outside, they evolve into closed, dogmatic, superstitious, and fearful individuals. If they combine with one another, they can generate a common myth – even ideology – to strengthen their collective identity through the closure of other environments. This natural tendency within humans is perhaps the greatest threat to the social ecosystem.

Cultivating Open Mindedness

The human brain naturally hates ambiguity. Basically, the brain operates as a nonlinear complex system that has a "search and destroy" relationship with ambiguity, which is why evidence contradictory to people's current beliefs tends to make them uncomfortable (DiSalvo 2011). The closed mind leads to intolerance or impatience in the face of a cognitive mismatch. The open minded person, on the other hand, comes to believe that others should also be free to express their views, and recognizes the possible and potential value of their knowledge. The open mind can negotiate a political agreement. It refers to an agreement through specific psychological technologies rather than reliance on the era's hegemonic ideology and mindset (Hunt and Miller 1968).

A human consciousness operating with an open mind can also develop a self-reflection mechanism that contributes in a practical way to his spiritual growth. Through strengthening their own feelings and trying to take care of others around them, humans can cultivate an attitude of raising other people's interests to the level of their own interests, or even above them. All religions emphasize love, compassion and forgiveness. Those who do not believe in a religion also appreciate the value of such basic human virtues. Humans also can learn to distinguish between negative pride and conceit on the one hand, and on the other positive self-esteem and confidence, by training their minds toward spirituality.

Generally, closed minds are closely associated with dogmatism and ideology in authoritarian systems (Inzlicht et al. 2009). The factors that people can solve problems more easily and more quickly integrate new ideas with open minds, not information. So when open minded persons are faced with difficult challenges, they willing to accept and overcome then with an open mind. People with closed minds, on the other hand, tend show aggressive attitude or atrophy in the same situation (cf. Cohen-Cole 2014).

Open minds are a prerequisite for human beings to develop the resilience needed to overcome the vulnerability of both social systems and ecosystems, and to improve the adaptability of the social ecosystem developing through their co-evolution. Open mindedness can be achieved through a spiritual recovery in the embodied consciousness that controls both through reason and emotion. Therefore the ecological citizenship required in the Anthropocene era should aim to recover and eventually cultivate spirituality.

References

Bentley, Timothy. 2009. *Planning for Coastal Resilience: Best Practices for Calamitous Times*. Washington DC: Island Press.

———. 2011. "Resiliency to Disasters." In *Making Healthy Places: Designing and Building for Health, Well-Being, and Sustainability*, edited by Andrew L. Dannenberg, Howard Frumkin, and Richard J. Jackson, 244-258. Washington DC: Island Press.

Boyer, Pascal. 2002. *Religion Explained: The Evolutionary Origins of Religious Thought*. New York: Basic Books.

Cohen-Cole, Jamie. 2014. *The Open Mind: Cold War Politics and the Sciences of Human Nature*. Chicago: University of Chicago Press.

Cusicanqui, Tomas. 2016. "Assessing the Adaptive Capacity of Sweden's Environmental Objectives." M.Sc. thesis, Linköping University, Linköping, Sweden.

DiSalvo, David. 2011. *What Makes Your Brain Happy and Why You Should Do the Opposite*. Amherst NY: Prometheus Books.

Dobson, A. 2003. *Citizenship and the Environment*. Oxford: Oxford University Press.

https://en.wikipedia.org/wiki/Autopoiesis (Search 2015.10.30.).

https://en.wikipedia.org/wiki/Open-mindedness (Search 2015.10.30.).

http://www.slideshare.net/aguilajk/misperception-of-feedbacks-another-source-of-vulnerability-in-socialecological-systems?next_slideshow=1 (Search 2016.6.10.).

Hamilton, Clive, Christophe Bonneuil and Francois Gemenne, eds. 2015. *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch*. Abingdon UK: Routledge.

Helfert, Markus and Howard Duncan. 2010. "Aspects on Information Systems Curriculum: A Study Program in Business Information." In *The Transfer and Diffusion of Information Technology for Organizational Resilience*, edited by Brian Donnellan, Tor J. Larsen, Linda Levine, and Janice L. DeGross, 229-237. Boston: Springer.

Holling, C. S. 1973. "Resilience and Stability of Ecological Systems." *Annual Review of Ecology and Systematics* 4: 1-23.

Hunt, Martin F., Jr. and Gerald R. Miller. 1968. "Open- and Closed-Mindedness, Belief-Discrepant Communication Behavior, and Tolerance for Cognitive Inconsistency." *Journal of Personality and Social Psychology* 8 (1): 35-37.

Inzlicht, Michael, Ian McGregor, Jacob B. Hirsh, and Kyle Nash. "Neural Markers of Religious Conviction." *Psychological Science* 20 (3): 385-392.

Marshall, Victoria and Brian McGrath. 2007. "Operationalizing Patch Dynamics." *Landscape Architecture: Site-Non-Site* 77 (2): 52-59.

Maturana, Humberto R. and Francisco J. Varela. 1980. *Autopoiesis and Cognition: The Realization of the Living*. Dordrecht: Reidel.

Merleau-Ponty, Maurice. 1968. *The Visible and the Invisible*, Claude Lefort, ed., Alphonso Lingis, trans. Evanston IL: Northwestern University Press.

Resilience and Ecological Citizenship in Socio-Ecological Systems

Paton, Douglas, Gail Kelly, and Michael Doherty. 2006. "Exploring the Complexity of Social and Ecological Resilience to Hazards." In *Disaster Resilience: An Integrated Approach*, edited by Douglas Paton and David Moore Johnson, 190-212. Springfield IL: Charles C. Thomas.

Purdy, Jedidiah. 2015. *After Nature: A Politics for the Anthropocene*. Cambridge MA: Harvard University Press.

Scranton, Roy. 2015. *Learning to Die in the Anthropocene: Reflections on the End of a Civilization*. San Francisco: City Light Books.

Thompson, Evan. 2007. *Mind in Life: Biology, Phenomenology, and the Sciences of Mind*. Cambridge: Harvard University Press.

Tylor, E. B. 1871. *Primitive Culture: Researches into the Development of Mythology, Philosophy, Religion, Art, and Custom*. London: John Murray.

United Nations Secretary-General's High Level Panel on Global Sustainability. 2012. *Resilient People, Resilient Planet: A Future Worth Choosing*. New York: United Nations.

Van der Leeuw, Sander E. 2007. "Information Processing and Its Role in the Rise of the European World System." In *Sustainability or Collapse? An Integrated History and Future of People on Earth*, edited by Robert Costanza, Lisa J. Graumlich and Will Steffen, 213-242. Cambridge MA: MIT Press.

Vince, Gaia. 2014. *Adventures in the Anthropocene: A Journey to the Heart of the Planet We Made.* Minneapolis: Milkweed Editions.

Wilkinson, Tony. 2007. *The Lost Art of Being Happy: Spirituality for Sceptics*. Forres, Scotland: Findhorn Press.

Young, Oran R. 2002. *The Institutional Dimensions of Environmental Change: Fit, Interplay, and Scale*. Cambridge MA: MIT Press.

Young, Oran R., Frans Berkhout, Gilberto C. Gallopin, Marco A. Janssen, Elinor Ostrom, and Sander van de Leeuw. 2006. "The Globalization of Socio-Ecological Systems: An Agenda for Scientific Research. *Global Environmental Change* 16 (3): 304-316.