Bottlenecks to Sustainability in Asia: FLUXNET Perspectives

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As this new century unfolds, two developments have major impacts on regional and global sustainability: (1) the rise of global capitalism and (2) the creation of sustainable communities based on biosphere consciousness.[1] Both have to do with 'networks' and involve 'complex systems.' Global capitalism, with the goal to maximize the wealth and power of its chosen few, is concerned with networks of financial and informational flows. Biosphere consciousness, on the other hand, is concerned with ecological networks of energy and material flows (which are what FLUXNET community strives to monitor) with the goal to maximize the sustainability of the web of life.[2]

Vast and unprecedented changes to our planet by humans have ushered in a new geological time interval – the *Anthropocene* epoch. Fatefully, we now face the bittersweet vision of approaching global empathy in a highly energy-intensive, complex social-ecological systems, riding on the back of an escalating entropic juggernaut that threatens regional and global sustainability.[1] Resolving this "empathy/entropy paradox" (i.e., increasing biosphere consciousness while decreasing entropy) is the critical test of sustainability – the possibility and the destiny that human and nature will prosper together on Earth.[3] We are challenged to rethink and reposition ourselves with the most important question: *How can we mobilize nation and people toward sustainability?*

Biosphere consciousness based on ecosystem science, service and stewardship is the core mission of the AsiaFlux[4] - the Asian pillar of FLUXNET (i.e., global network of tower-based ecosystems monitoring). It requires systems thinking that compels a dramatic paradigm shift from objects to relationships (which are responsible for unexpected emergent and self-organizing behaviors in social-ecological systems). Sustainability is transforming science as well as scientists and their roles in society. Science underlying the complex social-ecological systems should focus not only on the concepts of mass, energy, and forces, but also on those of feedback, information, communication, and purpose. These days, however, most people (including scientists) live a life of indifference, status quo, and a lack of vision.

In the present complex social-ecological systems, purpose is one of the most important pillars, which gives birth to vision - the key to fulfilling the systems' mission. Sustainable future will require purpose-driven transformation of society at all scales, guided by the best foresight with insight based on hindsight that science could provide. The bottlenecks to sustainability then may be condensed into the lack of three basics: (1) clear vision and its engineering (i.e., visioneering)[3], (2) resilience and capacity building to perform the transformations needed, and (3) understanding

of the complex social-ecological systems (in which large networks of components give rise to complex collective behavior, sophisticated information processing, and adaptation via learning)[5].

For peoples and nations in Asia, perhaps the fundamental bottleneck to sustainability would be the abandonment of the spirit of "溫故知新" (meaning "*keep cherishing old wisdom and knowledge while continually learning new to serve others*"). Certainly, visioneering, resilience-based systems thinking, and better understanding of complex systems would provide the Asian communities with a logical framework toward fulfilling sustainability.[3] However, without embracing and living out the spirit of "溫故知新, true understanding of the relationships and ontic purposes, envisioning a culturally rich web of life, and eventually dancing with the systems would hardly come to reality.

References

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