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A role for diversity in achieving sustainability through ecological, social and economic domains

Dr Edmond Byrne
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"Anyone that does not want a splash of daisies and clover across their lawn, with frequent visits from the wonderful bees and insects that choose to feed from these, is insane. I curse those with immaculate, carpet-esque lawns, devoid of life"

Tom Young (2013)*

*Beyond the Riverbank blog; 'Mini Garden Survey: Perfect lawns are for prats!', 4 July 2013
http://tomyoung89.blogspot.co.uk/2013/07/mini-garden-survey-perfect-lawns-are.html
Modern conceptions of progress, based on the dominant Cartesian reductionist paradigm, are associated with a linear drive towards ever greater ascendency, order, organisation, homogeneity, hegemony, performance, efficiency and control. ...and towards extinguishing disorder, inchoateness, uncertainty, redundancy and risk.

By this dualistic framework, diversity is conceived as a threat to system organisation and efficiency.

Contemporary conceptions of sustainability & sustainable development, framed within this paradigm, align with such ideas of ‘progress’. Sustainability itself is seen as an unending process characterised by greater efficiency* and control, realizable for example through technological prowess, more organisational structure, utilization of ‘smart’ systems & ‘big data’ and risk extinction. Such increased ascendancy can, it is envisaged, even build system resilience. *Jevons' paradox is conveniently overlooked.
A conflicting picture emerges from a complex systems perspective however. It’s been shown quantitatively\(^1\) that sustainable ecosystems maintain a dynamic balance between opposing but necessary tendencies of ascendency/efficiency and diversity/redundancy (complimentary dualism).\(^2\)

\[^1\text{Ulanowicz, 2009}\]
\[^2\text{Goerner et al., 2009}\]

While antagonistic at a local level, there is mutual dependence at higher levels\(^3\):

“A requisite for the increase in effective orderly performance (ascendency) is the existence of flexibility (reserve) within the system. Conversely, systems that are highly constrained and at peak performance (in the second law sense of the word) dissipate external gradients at ever higher gross rates.”

\[^3\text{Ulanowicz et al, 2009}\]
Modern (linear) conception of progress (towards extremum) [1] versus a natural requirement for progress which involves continuity among complex (eco-/bio-/socio-/economic) systems.

Progress: Sustain and Evolve

This model has been applied and adopted in relation to sustainability across techno-economic and social domains [2,4].

‘Four necessary but individually insufficient dynamic properties of sustainability’ [Stirling, 2011]

Goerner et al., 2009
Stirling, 2011
Some examples:

Intensive industrial/monocrop agriculture versus Diffuse microgeneration and distribution of electricity

Globally centralised lean manufacturing versus localised and artisan production

Hegemonic globalisation versus local economic subsidiarity

‘Survival of the fittest’ individualism versus interconnected social solidarity and cohesion

To Conclude..

A vision of progress which seeks to extinguish uncertainty to gain ultimate control is as delusional as it is potentially dangerous. It is directly analogous to seeking to violate the 2nd law of thermodynamics by conceiving an isentropic universe or a 100% efficient machine; an impossible and unsustainable mirage! Instead sustainability can only be achieved through recognising progress as a contingent balance between ascendency and redundancy, between homogeneity and diversity.
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http://notesofnature.blogspot.ie/2013/06/in-garden-whats-in-my-lawn.html