Viability of the Sustainable Development Ecosystem

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1. INTRODUCTION

Sustainable Development (SD) concerns bearable and sufficient economic and social progress and growth—initiatives and strategies designed to enhance the quality of life of a community's citizens or, at the minimum, stabilizing or securing the current state whilst not overtaxing the environment. SD is founded on key principles of sustainability as well as assumptions about society, economics, and the environment—basically about our nature, existence, and "how things work". As commonly understood, Sustainable Development is development that meets today's demands without compromising the survival of tomorrow (Kates et al., 2016). Thus, Sustainable Development should also be concerned about environmental protection and regeneration, reducing degradation and depletion, finding sustainable alternatives, and restoring what has been spoilt or overexploited. As lofty and "macro" as all this may sound, SD may also be applied at the "micro" level, at the organisational, departmental, or even team level.

At a global level, SD may attempt to address issues of equality, fair distribution, and access, such as championed by the United Nations Global Compact and its 17 sustainable development goals. A prime example is education: a community whose citizens have little chance of becoming educated has slight chance of long-term viability[1] beyond bare subsistence. Individuals lacking skills and knowledge cannot, generally, better their personal circumstances nor can they contribute productively to community welfare.[2] But whilst the ideals and aspirations of SD are laudable, if not presumed necessary, are they really possible?

This article pursues the question: *how viable is Sustainable Development?* The question might be framed alternatively as, "Is Sustainable Development sustainable?" To interrogate and explicate this question, the authors present an ecosystem model of Sustainable Development, with "ecosystem" defined for this purpose as the complex of interdependent animate and inanimate constituents of a given, or "bounded" community and their interaction, which, over time, reveals established patterns (Hays, 2010a; Hays, 2010b). By interdependence we mean continuing relationships of influence amongst elements that might be understood as cycles of cause and effect (or stimulus and response). This applies to the elements within the system (the bounded part) as well as with its external environment.

Organisations and institutions may be thought of as ecosystems as well, bounded entities inextricably tied to various stakeholders, vying for resources, and in malleable and evolving relationships with their environment.[3] To understand an organization as ecosystem is to fathom its richness, complexity, and dynamism—the see it and its relationships as a complete and functioning system. Conceived thusly, an organization is both separate from its environment (bounded), yet inseparable from its larger system and web of relationships (interconnected).

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An ecosystem is inextricably tied to its environment, implying a dependency and continuous exchange. Under normal circumstances, all of these mutual influences promote a dynamic balance in the ecosystem. Things stay pretty much as they are unless disrupted by some unexpected, uncommon, or extreme event (Hays, 2013). In fact, and as we will show in portrayal of the SD ecosystem, knowing the elements in the system and the character of their relationships helps us make sense of the system's dynamic behaviour, and is what allows us to predict the system's behaviour under various circumstances. Such is the power of the map: an intervention at a particular point is going to have reasonably predictable outcomes.

We usually think of ecosystems as being impacted by external events, such as a community might be affected by a devastating forest fire. It is also the case, however, that ecosystems may have within them—perhaps unwitting or undetected—the seed, or *potential,* for spontaneous transformation triggered by some random stimulus. This emergent property might be destructive or may confer some attribute that will ensure the system's survival, an adaptive quality or resilience suited to shifts in the environment, for example, a threat or opportunity it presents (Walker et al., 2004).

Building on these ideas of Complex Adaptive Systems and the authors' respective and ongoing collaborative research spanning several years into various aspects of sustainability[4], the authors have developed and present here for the first time a dynamic model of SD as an ecosystem, identifying the key features or variables in the system and their interrelationships. Whilst the approach is novel so far as we know with respect to SD, it is defensible in this case for at least two reasons: such models have been proven to be very instructive in other complex domains[5], and SD generally focuses its attention at the community or regional level—ecosystems[6]. Positive results may be predicted from systemic interventions because understanding of the features and relationships within the ecosystem allows efforts to be applied to the points of greatest leverage, as has been pointed out in numerous studies[7].

One hypothesis arising from this fact is that SD initiatives that address their interventions on the target community or region *as a complex adaptive ecosystem*[8] will be more successful in the long run than initiatives that focus on a particular problem or issue, such as water security or vaccination programs. The same holds true for organisations and institutions, as has been researched with respect to organizational change and development.[9] This is due, in part, to leverage and synergy amongst efforts made possible through *true-to-life* system mapping and deep understanding of behaviour causality, complemented by deliberately disregarding interventions, that well-intentioned providers might be misled to, based on a more superficial and reactive understanding of symptoms and assumed problem causes (Hays, under review).

The case of a sustainable communities project underway in rural Kenya is briefly described in the article as an example of an ecosystems approach to SD. The case qualifies as an ecosystems approach as it involves a multipronged set of interrelated sustainable initiatives addressing a given community as a Complex Adaptive System. Initiative streams cover: power (particularly directed toward lighting and refrigeration); water security; sanitation, hygiene, and medical care; education and skills-building; agriculture and livestock; industry and commerce; and includes a *train-the-trainer* concept that will enable the progress made and lessons learned from the program to extend to neighbouring communities.

The sustainable communities project is also an example of circular economy (Geissdoerfer et al., 2017; Sauvè, 2016) as resource acquisition, production, use, and reuse are contained and exploited, and profit reinvested into and benefitting the sustainable system and its citizens rather than being funneled into the amassing hands of a few or siphoned off to elements outside of the bounded system. Whilst it is too early to claim success, sustainable communities has the hallmarks of a SD program that might succeed—genuinely make a difference at the local and, quite possibly, regional level.

An important feature of the sustainable communities program is its conscious adoption of and adherence to proven principles of sustainability[10] that can be designed into systemic SD solutions. These