Growing the Eco: A Bio-Capacity Economic Growth Model

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The Environment is our shared public realm, providing degrees of comfort and continuing prosperity, or decline, for all living things. The health of the Environment and all living things relies increasingly on humanity's obligation (a point of view often ironically challenged by the same people criticizing an absence of responsibility by humans on other matters). The obligation is driven by our ideas, systems, and the interaction between, on the one hand, the Environment's resources and fecundity, and, on the other, our personal hierarchy of needs as reflected in "must-haves", wants, aspirations, and the associated reshaping of built and natural environments as interpreted through economic strategies.

The prevailing economic model has relied on a growing eco/carbon footprint. A beneficiary of this approach has been a rising HDI (the United Nations' **Human Development Index** measuring primary education levels, mortality, post-secondary achievement, etc.), as a country's global per-capita footprint increases.

Table 1 – HDI and ecological footprint of selected countries (2003 data)

Country	HDI	Ecological demand per capita	
		Ecological footprint (gha/cap)	Footprint to global biocapacity ratio [a]
Norway [b]	0.96	5.9	3.2
UAE [c]	0.85	11.9	6.5
Panama	0.80	1.9	1.0
India	0.60	0.8	0.4
Bangladesh [c]	0.52	0.5	0.3
Niger [b]	0.28	1.1	0.6

[a] This ratio shows how much larger the per capita demand on resources is as compared to the per capita biocapacity available worldwide. It represents the number of planet Earths that would be required to support the current population at that country's level of consumption (assuming no biological productivity is reserved for the use of for wild species.).
[b] Highest and lowest HDI score of reported countries.
[c] Highest and lowest ecological footprint per capita of reported countries.

[i]

Alongside this growth however, with its reliance on ***sources*** of raw materials, natural services, and human engineered products, and ***sinks***, in which associated wastes are deposited ranging from atmospheric and oceanic pollutants to roadside garbage, has been a decline in the global bio-capacity of eco system services including soils, potable water, clean air, pollinators, etc. (As shown below Canada's bio-capacity contribution, relative to our eco footprint, is quite favourable but only because, despite

having one of the world's largest per-capita footprints, our population is small relative to a large land mass.)

Nor, despite economic growth and HDI increase, has there necessarily been an improvement in the general global civic character of life (judicial integrity, electoral transparency, governance legitimacy, etc.). At best we might say the civic moves sideways – some places benefit in expanded democratic and/or judicial openness while others retain a one party, protection racket-like system, fraught with extra-legal and corrupt practices.

Table 1: **ECOLOGICAL DEMAND AND SUPPLY IN SELECTED COUNTRIES**, 2003

	Total Ecological Footprint (million 2003 gha)	Per capita Ecological Footprint (gha/person)	Biocapacity (gha/ person)	Ecological reserve/deficit (-) (gha/person)
World	*14 073*	*2.2*	*1.8*	*-0.4*
United States of America	2 819	9.6	4.7	-4.8
China	2 152	1.6	0.8	-0.9
India	802	0.8	0.4	-0.4
Russian Federation	631	4.4	6.9	2.5
Japan	556	4.4	0.7	-3.6
Brazil	383	2.1	9.9	7.8
Germany	375	4.5	1.7	-2.8
France	339	5.6	3.0	-2.6
United Kingdom	333	5.6	1.6	-4.0
Mexico	265	2.6	1.7	-0.9
Canada	240	7.6	14.5	6.9
Italy	239	4.2	1.0	-3.1

Notes: Totals may not add up due to rounding. For an explanation of global hectares (gha) see page 38.

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Finally, even advances on the environmental front can suffer from three often complementary challenges.

The rebound character of our vaunted improvements in efficiency and regulatory over-sight, can lead to cumulative increases in the absolute quantity of emissions along with an expanded use of limited resources. Resource depletion or sink expansion is at least partly attributable to the way improved water or energy efficiency causes financial savings to be invested in additional consumption with damaging environmental consequences, as well as in increased resource use (as per the Jevons effect). Bigger homes with more rooms for instance may be serviced by greater efficiency in heating, cooling and lighting, but with an escalating absolute use of electricity, products etc. resulting in an increased cumulative production of "reduced- per- operation" CO^2. Likewise as digital communication tools become more energy efficient and smaller their numbers multiply as replacement time speeds up, thus requiring more rare earth minerals, and an absolute increase in "reduced-per-operation" carbon releases.

Secondly the unintended consequences of a salutary measure such as a dedicated greenbelt for farming may create the externality of increased soil erosion and greater run-off of pesticides into freshwater bodies, due to a belief that such activity is now tolerated, and perhaps even encouraged, in the interest of a robust agricultural sector. Elsewhere the Japanese, hoping to reduce electricity demand after the tsunami with its destructive effects on nuclear energy, raised the threshold of tolerated heat levels in

buildings before the air conditioning kicked in, but it led many office workers to use highly inefficient desk top fans, and actually increased energy demand.

Finally, sustainability's metrics can promote or appear to encourage negative outcomes. Poverty, war and catastrophe are three examples with a positive recording on the side of improved metrics. The number of consumers is reduced and the ability of people to consume more declines. Decreased ocean fishing such as occurred during World War II because of the presence of German U-boats, or the decline in fishing resulting from British Petroleum's Deepwater Horizon Gulf oil spill in 2010 were additional unwelcome social and economic impacts with a positive recording on the side of sustainability. Likewise in Canada the federal government has pointed to a decrease in carbon emissions as a positive outcome, but it is one resulting from the loss of manufacturing production and jobs in Ontario with consequent social calamity for many families.

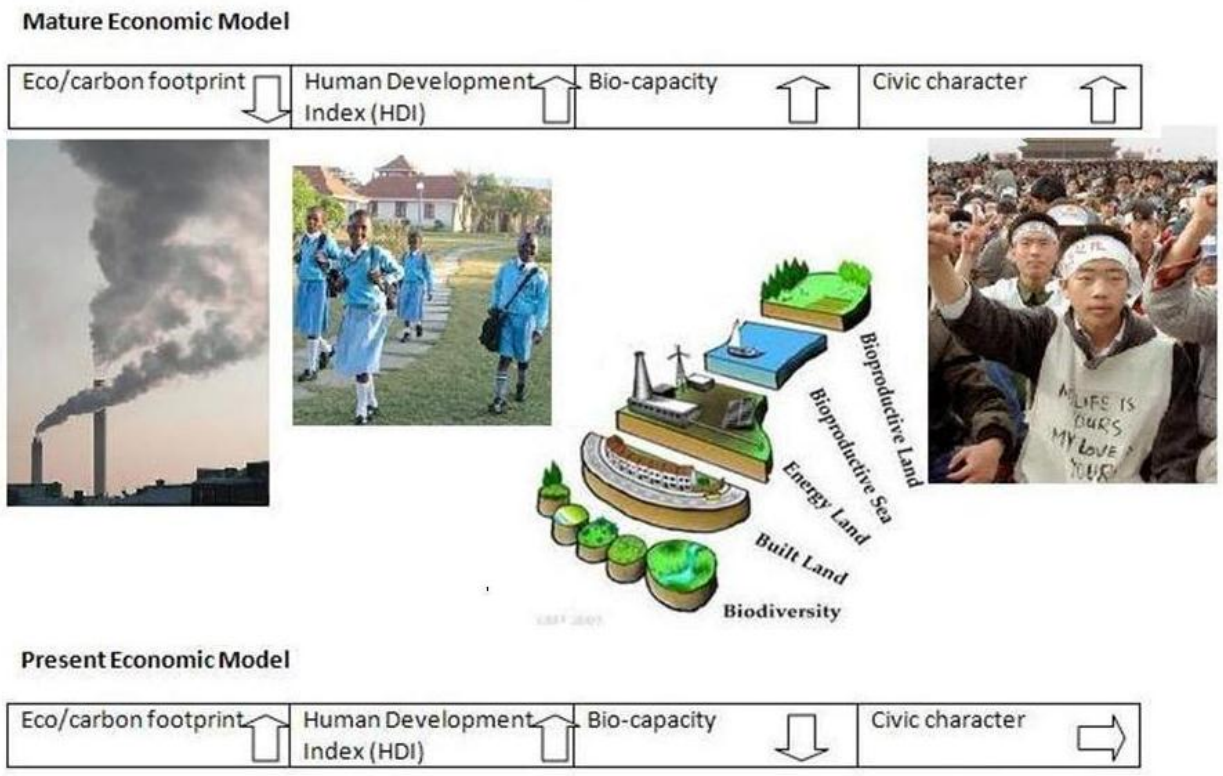
A new or more mature economic model of net positive eco development (visible or emerging in some cases, contested with and occasionally opposed in others) is one in which strategies move away from a dependence on eco/carbon footprint growth to ones based on bio-capacity enhancement. In other words an economy of eco/carbon footprint growth in which bio-capacity is at its service, needs to be overlaid by one in which bio-capacity growth is serviced by a necessary but declining eco/carbon footprint. Such bio-capacity growth however requires two other performance based aspects to be truly successful – continued expansion of HDI (consistent with its progress in the prevailing economic model), and improvement in the civic character of life (brought on hopefully by a more resilient, intentional regard for quality of place and life).

Such a mature economy of net positive eco development has four main features.

1. Positively it addresses those opportunities in both the built and natural environment to grow bio-capacity -> eco system productivity, greener infrastructure, bio-diversity.
2. Transitioning from the neutral to the more positive are increasing incentives for those activities, products and services which reduce the eco/carbon footprint as they potentially contribute to bio-capacity maintenance or enhancement -> lifetime neighbourhoods; pedestrian quality of a place; urban revitalization; the taste and distinction of local foods; experiences rather than products as determinants of a good life.
3. More negatively in the short term, but positive in the long term, are those tolerated activities, products and services which, while adding to the eco/carbon footprint, do so by their service to the life cycle goal of maintaining and enhancing bio-capacity -> intensive and concentrated development such as higher density urban living; hard, (but permeable where appropriate), surfaced and wired infrastructure integrating sidewalks, narrow streets, and underground utilities; public transit and personal mobility means such as bicycling; hybrid solutions mixing greener approaches with backup centralized systems.
4. Broadening participation beyond first tier practitioners such as engineers, architects, scientists and planners, to the necessary second tier of technicians, trades, and maintainers who are the life cycle guarantors of any implemented project or practice, as well including the public who often respond to change, when not engaged, by opposition.

Currently we are caught between these two economic growth ideas and practices, but any transition may be less traumatic than imagined. For one thing the mature economic model retains the idea of growth, of marketplaces, and of existing smarter infrastructure within an improving quality of life. It also builds on the several century movement of peoples from rural to urban areas, a process now being completed in the developing world. Finally it matches new technical innovation with a public desire for a healthier, more pleasant world (a feature of all increasingly affluent societies).

Though the above new model needs to be implemented, it will, as stated above, overlay rather than replace the old one. This is because remnants of the old survive even after their supplanting, (much as airplanes didn't eliminate railways or television render radio obsolete). The challenge of accommodating the physical and emotional aspects of the old model within a more mature one is ours.



[i] 471, Moran, Wackernagel, Kitzes, Goldfinger, Boutaud, **Measuring sustainable development – Nation by nation**, Ecological Economics, 2007

[ii] 3, **Living Planet Report**, World Wildlife Fund et al, 2006