Finding the Leverage Point in the Sustainability Crisis: Global, National and Regional Australian Responses

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Abstract
From an economic perspective, the sustainability crisis is ultimately characterized by a worsening relationship between the resources required to support the global population and the ability of the earth to supply them. Despite the ever-increasing threat of a calamity, modern society appears unable to alter its course. The very systems which underpin global human endeavor seem to actively prevent meaningful change and the one irrepressible goal to which all societies seem to strive is the very thing that makes such endeavor ultimately life-threatening: that of global growth. Using the Australian experience as an exemplar, this paper explores how the concept of growth infiltrates societal reactions to the crisis at various scales – global, national and regional. Analysis includes historic studies, a critique of current misconceptions around population demographics, comparative evaluation of various interventions in the Australian context and considerations around potential ways to address the crisis.

Keywords: population, carrying capacity, scale, localisation, resources, growth

Introduction

The bounded nature of planet earth is enough to suggest that there is a finite dimension to its resource productivity. There are thus limits to the quantity of people, hence its carrying capacity (Lane, 2010), limits to traded goods and limits to its economic potential. However, the dominant global economic paradigm advocates infinite economic growth at all costs, a seeming impossibility on a finite planet. All facets of society reinforce this drive for growth, from government systems, to educational institutions and the business sector. Population growth and economic growth have generally gone hand-in-hand and this current period of industrialisation has seen sustained expansion of both, punctuated only rarely by brief interludes of economic recession. For instance, in the period 1850 to 2011, Australia's GDP grew 462-fold while its population grew 56-fold (GDP adjusted for inflation) (Hutchinson, 2011).

The obvious contradiction of infinite growth in a finite world can only be explained by a general unwillingness to partake in realistic long-term societal planning. Hardin (1986, p.603) explains that, "[e]conomics, the handmaiden of business, is daily concerned with 'discounting the future,' a mathematical operation that, under high rates of interest, has the effect of making the future beyond a very few years essentially disappear from rational calculation." Catton (1982, p.3) agrees that, "mankind is locked into stealing ravenously from the future," with a system out of alignment not only with principles of societal equity but one that doesn't even obey simple bio-physical imperatives.

Despite decades of warnings from carrying capacity crisis harbingers such as Ehrlich, (1971) Catton (1982) and Hardin (Hardin & Baden, 1977), the global population has continued to increase, economic growth is still the dominant paradigm, non-renewable resources have become increasingly necessary and decreasingly available long-term and the carrying capacity horizon seems to edge ever-closer. Unfortunately co-ordinated action to combat the problem has largely been unsuccessful.

Global responses

Global responses to a potential carrying capacity crisis seem to revolve largely around the hope that demographic transition will finally put an end to global population growth. The theory of demographic transition was initially developed by Notestein (1945, p.39) in 1945. Notestein argued that economic development associated with industrialisation provides incentives and technologies that tend to stabilise population numbers, eventually reaching a plateau. Firstly, the theory states that pre-industrial populations tend to exists in accordance with Malthusian principles, essentially determined by mortality rates imposed by a fluctuating food supply (Caldwell, 1976, p.325). Stage two begins with industrialisation, when modern sanitation and medicine dramatically reduce mortality, leading to a population explosion. However, once the western industrial model becomes entrenched, as Notestein (1945, p.40) points out, a large family becomes a more expensive and, "progressively difficult undertaking." Improvements to contraceptive technologies along with its promotion and ready availability have also hastened this stage of the demographic transition model.

There is little doubt that demographic transition has played a role in the slowing rate of global population growth over the last 40 years (Cohen, 1995, p.50). However, even the United Nations medium range population projection (United Nations, 2011) does not expect the global population to stabilise for at least 90 years before arriving at a population close to 11

billion people. However, Fearnside suggests such modelling is unrealistic. He states (Fearnside, 1986, p.68) that it is unlikely, "that the amount of economic progress realistically possible for many developing counties would be sufficient for the full fertility-reducing effect of the demographic transition to be realised," and that such an effect, "would be too slow-acting to prevent astronomical increases in population densities and intensification of problems following from this increases." Fearnside thus highlights the unreliability of industrialisation and economic growth to deliver timely population stabilisation. Cohen also contends that demographic transition is a poor predictor of when declines in fertility may begin and the speed of which mortality and fertility may occur (Cohen, 1995, p.50).

It is unknown whether the earth will be able to support this amount of people even if our current mode of industrial production was sustainable. Unfortunately however, given the finite nature of our industrial resources, the current societal model may not even last another 90 years so the likelihood of demographic transition, on its own, rescuing society from carrying capacity crisis seems reasonably slim.

National responses

The fact that Australia is one of the few nations bounded by sea, means that at least symbolically, it seems well suited to measurements of self-sufficiency such as carrying capacity analysis (Lane, Dawes, & Grace, 2015). Several attempts have been made to estimate Australia's carrying capacity, the most detailed of which have appeared in various government reports on the population issue.

In 1975, the federal government released a demographic analysis of Australia titled Population and Australia (Australian Government, 1975). While it states that it was not aiming to determine a national carrying capacity, (Australian Government, 1975, p.xxxvii) it nevertheless included a number of previous scholarly attempts ranging from 10 million to 480 million (Australian Government, 1975, p.180-191). In the decades leading up to the 1970s, the predominant national sentiment was one of population expansion, reflected in policy incentives such as increased immigration, limitations to abortion and restriction on the distribution and promotion of contraceptives (Cohen, 1995, p.224). Another initiative originally introduced in 1912 was a £5 baby bonus offered to all new mothers of European descent in an attempt to promote the white Australia policy (Day, 2009, p.258). By 1970, there was some debate about the merit of such population growth, but it continued nonetheless and then between 2002 and 2014, the baby bonus incentive was reintroduced for Australian parents with payments worth up to $5000 per child (Australian Government, 2011a).

In 1994, Barry Jones led a subsequent federal government report of the population issue titled Australia's Population Carrying Capacity (Jones & House of Reps Standing Committee for Long Term Strategies, 1994). While no thorough biophysical analysis was conducted, the aims of the report were ahead of their time in aspiring to explore ecological constraints to growth. McNicoll (1996, p.168) describes the outcomes of this enquiry into Australia's carrying capacity as a debate between two main groups: the ecologists advocating a maximum of 20 to 25 million people and the economists and demographers who suggested that Australia's capacity fell somewhere between 50 and 60 million. The report stressed the importance of the establishment of well-annunciated federal population policy although McNicoll (1996, p.168) correctly predicted that this was unlikely to happen.

Rather than heeding the advice of earlier reports, the most recent Australian government report on population is more of a retrograde step than advancement of the population conundrum. In 2011, the federal environment minister, Tony Burke, released the government's strategy for a sustainable population, Sustainable Australia - Sustainable Communities (Australian Government, 2011c). Prior to the report's release, minister Burke seemed to court the possibility of incorporating population limits into government policy, stating that, "we have to also take into account, do some sections of Australia have what - with my agriculture hat on - gets referred to as a carrying capacity?" (Sales, 2010). However, once the document was released any aim towards carrying capacity targets was rejected, and instead, the introduction of socio-environmental monitoring was endorsed. In so doing, the government seems to discount the possibility that as a society, we are pushing up against biophysical limits that potentially threaten modern society and that population levels are the multiplier in this challenging equation.

Rather than setting population targets, the government's population strategy purports to aim for a more sustainable Australia by managing impacts on the current population, monitoring migration and projecting population trends (Australian Government, 2011c, p.25) but these measures lack any meaningful traction without the process of identifying population limits. For instance, how is sustainability measured, if not against a certain level of certain activities performed by a certain number of people over a certain amount of time? How do we know that past population trends will continue on similar paths if barriers to future growth are not identified?

Despite the title of Burke's report, neither sustainable communities nor a sustainable nation can actually be ascertained, let alone achieved, without acknowledging firstly that limits to growth do exist and secondly that there is an inherent hierarchy contained within these limits. The hierarchy adopted by the Report (Australian Government, 2011c, p.7) gives equal weighting to economic, societal and environmental interests. This approach fundamentally illustrates the disconnect between the laws of nature and unrealistic expectations for unlimited, continued growth, be it economic or societal. An alternative model was included in the 1996 National State of the Environment Report (State of the Environment Advisory Council, 1996, p.10-12) and has been recommended to the Sunshine Coast Regional Council by its Sustainability Advisory Panel in 2009 (Sunshine Coast Regional Council, 2009). This committee provide a more realistic representation of these interests with the economy encapsulated by society, which in turn, is enclosed by the environmental sphere. This perspective recognizes that there are limits inherent in our way of life and that aspects of the economy are limited by society, be it cultural norms, ethical responsibilities or population dynamics. Additionally, society and each of its component parts including the economy are all limited by their biophysical context.

Regional Responses

The acknowledgement of societal thresholds is reflected in the Sunshine Coast Sustainability Advisory Panel's recommendation for subsequent constraints mapping, an aspect mirrored by other local councils such as Port Macquarie-Hastings (Hopkins, Leopold, & Phillips, 2009) but omitted from the federal government's approach. Instead, the government's report proposes the development of sustainability indicators in a strategy that potentially places government merely in the role of passive observer rather active planner. A more responsible planning position would attempt to build the resilience of a society within its biophysical context by utilising models that estimate biophysical constraints to growth, such as the

Carrying Capacity Dashboard, designed for the Australian context in three geographic scales: national, state and regional (Lane, Dawes, & Grace, 2014). If such a carrying capacity-orientated approach to land use planning were to be adopted, it would be possible to anticipate potential future systemic impacts such as finite fuel depletion and increasing harsh weather events in order to determine safe tolerance limits in human activity (Lane & Dawes, 2013).

In order to make accurate detailed carrying capacity estimates at a regional scale it would be important to determine the potential productivity of each piece of land by conducting land suitability assessments. While some progress has been made in this endeavour in Australia, the scale of land suitability assessments differs from state to state and between regions within each state. The appropriate scale for the usage of land suitability mapping in the process of carrying capacity assessments would be dependent on the scale at which assessment is sought. For instance, Noble (1992, p.9) states that scales of 1:5000 or 1:10,000 are most suitable for planning at the farm scale while 1:25,000 is best for catchment planning and 1:50,000 or 1:100,000 scales are most appropriate for district and regional planning. Van Gool et al. (Van Gool, Moore, & Tille, 2005, p.5) concur that assessments at scales between 1:10,000 and 1:50,000 are best for strategic planning of intensive land-use developments including urban development, farming enterprises and forestry production. However, much of Australia's landscape analysis has been conducted at scales of 1:100,000 or 1:250,000 (Australian Government, 2011b, p.74-83; Imhof, Rampant, & Bluml, 2000) so there is still much work to be done in this regard before the scale of land suitability mapping might be publicly available for small-scale carrying capacity assessments.

The responsibility for assessment and storage of land suitability mapping in Australia has largely been a state-based concern although according to van Gool et al. (van Gool, Maschmedt and McKenzie in McKenzie, Grundy, Webster, & Ringrose-Voase, 2008, p.431), in recent years the role of natural resources management has increasingly become decentralised, stimulating demand for land evaluation at the local and regional level. Imhof et al. (2000, p.6) agree that regional assessment has recently gained prominence in the minds of key stakeholders, including government agencies, industry groups, and catchment management authorities; and McKenzie et al. (2008, p.485) also argue that interest is growing, mostly as a result of farmers recognising the value of such information to their farm management practices. While such small-scale approaches to landscape suitability assessment will be essential to future carrying capacity assessments at a similar scale, it seems that the highest current priority should be towards rationalising the assessment system to facilitate cross referencing and integration of the existing state-based information. Van Gool et al. (2005, p.3) thus suggests that all available land resource surveys should be re-interpreted and correlated under a unified national system which he suggests should be administered by the Australian Soil Resource Information System (ASRIS). While ASRIS has successfully brought together a diverse array of state-managed soil information, to date it has not provided a system for re-interpreting this data as land suitability assessments (McKenzie, Jacquier, Maschmedt, Griffin, & Brough, 2012, p.7).

Conclusion

Deleterious environmental impacts from human activity are only likely to exaggerate any threats to populations' food and water supplies with land clearing and degradation, biodiversity loss and climate change all potentially effecting future agricultural yields (Pandey, 2011). While population deceleration by natural means such as demographic

transition can play a role in slowing momentum towards a carrying capacity crisis, it seems unlikely it will impart enough influence in sufficient time, so more direct responses will need to occur at global, national and regional scales. Carrying capacity assessment processes are thus vital components on a path towards sustainable land usage as they indicate the size of population supportable on any particular landscape, given the population's production and consumption processes and choices. While some models such as the Carrying Capacity Dashboard (Lane, 2012) already exist, in order for more detailed and nuanced carrying capacity estimates to occur in Australia, more thorough land suitability mapping, particularly at the smaller regional scales will be necessary in the future.

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