MOVING FORWARD WITH PLANETARY BOUNDARIES AND DEGROWTH

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The degrowth movement is an emerging response to humanity living beyond its means. By suggesting that the human enterprise is too big by some measure, such that it must downsize, degrowth implicitly suggests a limit on the size of the global economy. Indeed, limits are the essence of degrowth. Yet, degrowth goes beyond ecological economics, sustainability and other expressions of the idea that humans must live within the Earth's means—and therefore that an infinitely growing economy is biophysically impossible—by explicitly incorporating the notion that the economy has already exceeded those limits. The unmistakable warning of the jolting term *degrowth,* which derives from the French word *décroissance,* is not that the economy can and might become too big, but rather that it already is too big and therefore must degrow.

Despite its core focus on limits, the full meaning of degrowth and the objectives of the degrowth movement remain fluid. What limits have been exceeded, and what needs to degrow? The argument in this chapter is that the overriding limits inherent in degrowth are the ecological limits within which human society must operate in order to thrive in successive generations. Other limits may be relevant as well—on the size or scope of enterprises or institutions, on capital accumulation, on incomes and individual and collective monetary wealth, on consumption, on work time. However, from the systems-based perspective on which ecological economics is founded, the paramount normative boundaries that should contain the collective activities of humans are ecological and are tied to the throughput of material and energy in the economy.

This chapter explores the relevance of emerging metrics of ecological limits on the human economy to the degrowth discussion. First, the contours of degrowth are described and its core ideas summarized. The importance of the fundamental notion of limits in degrowth emerges from this analysis. Second, some of the key tensions that persist within the degrowth discussion

are examined. Third, key systems-based indicators of ecological limits, such as planetary boundaries of safe operating space for humanity (Rockström et al, 2009) and metrics of social metabolism, are situated within the degrowth discussion. Ecological integrity and resilience of the human-Earth relationship are fundamental to the ecological limits on which degrowth depends. Last, implications of the fundamental importance of ecological limits on the ongoing development of the degrowth idea and the degrowth movement are considered. In particular, the ecological limits that underlie degrowth are global in scale, and therefore the tendency of the degrowth movement to favor local autonomy and decentralization poses a potential problem. Because the diverse human activities that place pressures on global ecological limits are interrelated, and their effects accumulate and interact in systems that transcend local contexts, degrowth must balance local and global initiatives. Degrowth should embrace a perspective that builds from a systems-based understanding of global ecological pressures and their drivers, acknowledges the diverse cultural and ecological contexts for those pressures and drivers and distributes governance responsibilities from the global to the local level according to these understandings.

[a]What is Degrowth?

Degrowth (or "sustainable degrowth") has been defined as "a downscaling of production and consumption that increases human well-being and enhances ecological conditions and equity on the planet" (Research and Degrowth 2012). The terms contraction, sustainability, anti-productivism, voluntary simplicity and downshifting sound many of the same chords that degrowth does (Latouche 2006). Degrowth has roots both in the quest of ecological economics for a steady state economy that respects ecological limits and in the socio-cultural objections to wealth accumulation and bigness reflected in Schumacher's *Small is Beautiful* and the earlier work of French intellectuals who critiqued "gigantism" (Martinez-Alier et al, 2010).

Although the term *décroissance* can be traced back at least to the 1970s (Martinez-Alier, 2010), the current degrowth movement took root with the publication of special issues on *décroissance* of the French magazine *Silence* in February and March 2002. Its visibility increased with François Schneider's fourteen-month donkey trek through southern France in 2004 and 2005 to raise awareness of the need to downscale the economy. What began as an "explosive word" (Ariès, 2005) intended to shake loose the human imagination from the overwhelmingly dominant idea that the economy must grow for humanity to survive (Latouche, 2004) has evolved into a collaborative discussion and research agenda aimed at developing "a framework for transformation to a lower and sustainable level of production and consumption" (Research and Degrowth, 2012). A plurality of diverse approaches to degrowth is appropriate in light of different challenges in different parts of the world. However, the degrowth community appears to accept that, although rich nations have been and continue to be the leading drivers of dangerous pressures on the global ecosystem, "[d]egrowth must apply to the South as much as to the North if there is to be any chance to stop Southern societies from rushing up the blind alley of growth economics" (Latouche, 2004).

The organization Research and Degrowth, established in 2006, has been maintaining the focus of the degrowth movement by spearheading and overseeing a series of degrowth conferences and maintaining a repository of information about degrowth that has emerged from conferences and other venues. As of October 2012, three main international conferences on degrowth have been held—Paris 2008, Barcelona 2010 and Venice 2012—along with several regional degrowth conferences in Vancouver in 2010 and 2011, Montreal in 2012 and Berlin in 2012.

The reforms associated with degrowth "emphasize redistribution (of work and leisure, natural resources and wealth), social security and gradual decentralization and relocalisation of

the economy, as a way to reduce throughput and manage a stable adaption to a smaller economy" (Kallis, 2011, p876). A key outcome of the Barcelona conference was a more fullsome outline of a core set of degrowth "bullet points" that reflect core degrowth proposals developed during the Paris and Barcelona gatherings (Barcelona Conference, 2010), and those ideas have continued to evolve. The Barcelona bullet points begin with the overarching assertion that "[d]egrowth of the size of the technological and economic system as well as economical, political, social and cultural structural changes are urgently needed." The propositions are organized under the headings Democracy, Education, Social Economy, Natural Resources and Demography. The bullet points emphasize community involvement, decommodification and decommercialization with respect to all of these categories, with a focus is on reorienting the economy toward local autonomy, equitable sharing, low-impact technologies, a more restricted view of private property, food sovereignty and floors and ceilings on income, as well as on monetary reform, trade reform, constraints on advertising and moratoria on harmful technologies. The overarching proposal with regard to natural resources is to reduce and then maintain the throughput of energy and materials within the Earth's life support capacity. The bullet points support full reproductive rights while encouraging reductions in total population and population growth rates. They support as well the right to migrate while encouraging efforts to increase local resilience so as to reduce the incentives for people to seek better lives in new places.

The Barcelona document also recommends a program of research, for example on how to decouple the drivers of innovations that will support a degrowth economy from the profit motive, how to reconsider development categories and relationships between the global North and the global South, whether examples of flourishing non-growing economies exist and how they functioned, what metrics and indicators are appropriate for degrowth, and what the role is of reform of financial and monetary systems in degrowth. Another recent set of degrowth research

questions includes the relationship of ecological crises to economic crises, analysis of the winners and losers associated with commodity frontiers, more rigorous examination of the roots of the growth fetish, more in depth research regarding population and degrowth, and a variety of questions regarding the experience and role of social movements associated with degrowth (Kallis et al, 2012).

[a] Key tensions within degrowth

The foregoing sections reveal the ongoing evolution of the degrowth idea—an evolution that still has not reached a state where degrowth can be considered a clear concept or philosophy (Latouche, 2006; Martinez-Alier et al, 2010). As part of this evolution, some tensions regarding the meaning and implications of degrowth are fostering a healthy debate within the community of academics and activists engaged in the degrowth movement. A key discussion relates to whether and how degrowth is compatible with capitalism and conventional economics. As the word itself makes clear, degrowth is a direct challenge to growth-insistent economics and to economism (Latouche, 2004). However, prominent leaders in degrowth thinking have proposed internalization of environmental costs through Pigovian taxes (Latouche, 2006) or a temporary phase of Green Keynesianism, with public-supported investment in green technologies and infrastructure en route to a low-carbon economy (Martinez-Alier, 2009), within the context of degrowth. These proposals have garnered criticism as being too beholden to conventional economics in light of the perceived inherent incompatibility between degrowth and capitalism (Foster, 2011). This critique supports "a 'co-revolutionary movement' … that will bring together the traditional working-class critique of capital, the critique of imperialism, the critiques of patriarchy and racism, and the critique of ecologically destructive growth (along with their respective mass movements)" (Foster, 2011, p32).

The point of tension between degrowth and captialism highlights the fact that degrowth is inherently transitional, in that the move toward downsizing from the current situation of ecological overshoot must start before the socio-economic system that gave rise to it can be completely transformed. A post-degrowth world might be considered indifferent to growth, or "a-growth" (Latouche, 2004; van den Bergh 2011). However, degrowth cannot avoid subsuming the challenges of transition (Martinez-Alier et al, 2010). It must confront the historical legacy on which the current predicament rests, loaded with a sweeping complex of fossil-fueled anthropogenic material and energy flows, physical and institutional infrastructure, patterns of behavior, investment-backed expectations, and ideological perspectives that as an integrated whole has enormous momentum and inertia. Degrowth must tackle these challenges but also maintain a post-degrowth vision, whether of steady-state ecological economics (Martinez-Alier et al, 2010) or something else. Thus, the call for Green Keynesianism as part of degrowth is qualified with a warning against "persever[ing] in the faith of economic growth" (Martinez-Alier, 2009), and the call for Pigovian taxes and other measures that rigorously and honestly internalize costs is cast as a possible way to trigger the kind of revolution that will spur mass support for degrowth (Latouche, 2006).

Still, these qualifications are reminiscent of the problematic acquiesence of some ecological economists to monetary valuation of ecosystem services—roundly rejected within the degrowth movement (Latouche, 2006). Monetary valuation of ecosystem services is defended as offering a practical way to secure environmental protections in the current economic system (TEEB, 2010), despite cogent warnings that it will be difficult or impossible, as Wes Jackson put it, to control the metaphor (Vermont Design Institute, 2010). Just as Keynes's prediction that growth would be needed only until the "economic problem" was solved (Skidelsky and Skidelsky, 2012) now appears naïve, calls for temporarily relying on the system that caused the

current ecological predicament give rise to understandable concern. At the very least, any transitional aspects of degrowth that rely on the current dominant economic paradigm should be strictly cordoned off from the long-term vision of ecological and social integrity that is at its core—a vision that is best conceived without being constrained by capitalist market economy thinking. And, if it is true that degrowth ultimately is incompatible with capitalism as it now exists, the transitional aspects of degrowth should focus on what the current dominant economic system can do to promote ecological and social integrity on its way out.

Other discussions within the degrowth arena have to do with the appropriate balance in making policy from the local to the global level (discussed further below), the relative roles of individual and collective action, and whether existing institutions of governance should be maintained but reformed or completely disgarded and replaced. In addition, although the appeal for "real democracy" that is not controlled by a wealthy and powerful elite is strong within the degrowth movement, the degrowth community must nonetheless contend with problematic arguments that degrowth will only be possible with some form of benign eco-totalitarianism. One response—probably insufficient to quell this point of tension—has been that degrowth "wagers on a stick-and-carrot combination: regulations designed to force change, plus the ideal of a convivial utopia, will add up to a decolonisation of minds and encourage enough virtuous behaviour to produce a reasonable solution: local ecological democracy" (Latouche, 2006). Because of a strong resistance within the degrowth movement to an insistence on a particular set of principles regarding these and other questions, the degrowth idea continues to evolve in an inclusive manner despite these tensions.[1]

[a]Ecological limits as the core idea of degrowth

Ensuring well-being in an ecologically finite world means providing all present and future members of life's commonwealth "bounded capabilities" to flourish, contingent on Earth's limited

capacity to support life and on fair intragenerational, intergenerational and interspecies sharing of that capacity (Jackson, 2009, pp45-47; Brown and Garver, 2009). The notion of *bounded* capabilities adds important nuance to Sen's notion of human capabilities to be well nourished, to live long lives and to engage meaningfully in society (Sen 2005), by underscoring the need to condition capabilities and freedom on aggregate ecological limits (Jackson 2009). In other words, the goal of enclosing the social and economic spheres within the Earth's ecological limits (Daly 1996) must have primacy against other goals (Garver, 2012).

In his plenary remarks at the Venice degrowth conference in September 2012, François Schneider reaffirmed that this notion of limits with primary importance is a core concept underlying degrowth. At the same time, degrowth economics is ultimately based on energetics, and on challenging the false idea that real wealth can be created by running down ecosystems, and hence increasing entropy, at rates that outrun their solar-powered generation (Martinez-Alier, 2009). Taking these ideas together, it follows that metrics of global ecological limits and of social metabolism—that is, of the throughput and cycling of material and energy in human society—are highly relevant to degrowth. In particular, the comprehensive framework of planetary boundaries of safe operating space for humanity (Rockström et al, 2009), supplemented with measures of social metabolism such as ecological footprint and human appropriation of net primary productivity (HANPP), is highly relevant to degrowth.

In the planetary boundaries framework, normative limits for key planetary variables are established at a "safe" distance from systems thresholds in the global ecosystem, beyond which catastrophic ecological change occurs. According to planetary boundaries researchers, proposed boundaries for atmospheric carbon dioxide concentration, biodiversity loss, and anthropogenic additions of nitrogen and phosphorus to the global ecosystem have already been crossed (Rockström et al, 2009; UNEP, 2009; Carpenter and Bennett, 2011). Similarly, ecological

footprint research indicates that human use of global biocapacity has outpaced the replenishment of biocapacity since the 1970s (Ewing et al, 2010; Pollard et al, 2010).

The planetary boundaries framework's conceptual foundation aligns with degrowth, especially in this overshoot situation, because global ecological boundaries, not insistence on economic growth, constrain the socio-political and economic spheres; "[t]he thresholds in key Earth System processes exist irrespective of peoples' preferences, values or compromises based on political and socioeconomic feasibility" (Rockström et al, 2009, p7). Despite the primacy of planetary boundaries, the "operating space" they enclose allows "humanity . . . the flexibility to choose a myriad of pathways for human well-being and development" (Rockström et al, 2009, p7). This notion of limits opening up vast possibility (Berry 2008) invites creativity in all domains. The potential for the degrowth movement to develop new ways for humans individually and collectively to achieve well-being lies within this creative space.

To develop "novel and adaptive approaches to governance" (Rockström et al, 2009, p28) and other cultural, political, social and economic aspects within the context of degrowth, ecological bounds on the aggregate scale of the economy can be used to frame additional constraints and possibilities focused more directly on the socio-political dimensions of the human sphere. The aggregate environmental impact is a function of the size of the human population, its affluence, and its technology (the well known $I=P \times A \times T$, or *IPAT*, formulation, where *I* is impact, *P* is population, *A* is affluence or consumption and *T* is technology) (Ehrlich and Holdren, 1972). Each of the planetary boundaries can be considered a fixed limit of the *I* variable, with each boundary value of *I* constraining the *P*, *A* and *T* variables; if *P* rises, *A* or *T*, or both, must drop. For example, suppose *I* represents the total carbon emissions that will safely keep the human enterprise in safe operating space, *P* is the human population, *A* is the consumption of material and energy per person, and *T* is the amount of carbon emitted per unit of material and

energy consumed. As population rises, either per capita consumption (*A*) must decrease, the emissions per unit of consumption (*T*) must decrease, or both must decrease for total emissions (*I*) to remain unchanged. If *I* must decrease to return to safe conditions, as is now the case for several boundaries, the degrowth challenge becomes starker. An additional variable, ethics (*E*), may be introduced to this relationship to call attention to the role of ethics in making individual and collective choices regarding the other variables—making the framework $I=f(PATE)$ (Brown and Garver, 2009).[2]

Accounting for material and energy stocks and flows is essential for maintaining the human enterprise within planetary boundaries of safe operating space. HANPP is a useful tool in this regard. Net primary production (NPP), the amount of biomass energy that plants accumulate through photosynthesis in a given time period, is vital to essential ecosystem functions and to human needs. Spatially explicit information on HANPP and the flows of harvested biomass from the points of appropriation to consumption endpoints (Erb et al, 2009b) is important for understanding the drivers and implications for sustainability of agriculture, timber harvest, forest fires, urbanization and other land use change, and other forms of biomass appropriation. These metrics of HANPP can help link social metabolism to pressures on planetary boundaries, which is especially important in the current situation of ecological overshoot. For example, the impact of HANPP on species extinctions and other aspects of biodiversity has been a prominent question in HANPP research (Vitousek et al. 1986; Wright 1990; Haberl et al. 2004a; Haberl et al. 2007; Erb et al. 2009a). Tracking the movement of HANPP and other material and energy sources in the global economy at high resolution, in conjunction with geographically explicit data on the drivers and impacts related to climate change, biodiversity, biogeochemical fluxes and other key systemic processes, will allow for better governance, at an ecosystem-specific scale, of difficult obstacles to sustainable degrowth. Ongoing extension of the analysis of HANPP can help in

particular with challenges related to feeding a rising human population that is consuming more and more meat; deciding the future role of biofuels in the global energy picture; contending with the trend toward increasing metabolic rift in an increasingly globalized economy; and controlling the impacts of intensive biomass production that depends on fertilization, genetically modified organisms, pesticides and irrigation (Erb et al. 2009; Foley et al. 2011; Bringezu et al. 2012).

[a] Reconciling planetary limits with the focus on local autonomy

Several tensions within the degrowth movement were noted above. In regard to how to deal collectively with the aggregated pressures on global ecological limits that derive from geographically and temporally diverse sources, the question of the relationship between localities horizontally with each other and vertically with other levels of political order is particularly cogent. In general, degrowth thinkers and activists tend to be skeptical of the possibility of true democracy at higher levels of political organization, on the grounds that "[d]emocracy can probably only function where the polis is small and firmly anchored to a set of values." (Latouche 2006). Hence the proposition that "[t]he relationships between the polities within the global village could be regulated by a democracy of cultures, in what might be called a pluriversalist vision. This would not be a world government, but merely an instance of minimal arbitration between sovereign polities with highly divergent systems" (Latouche 2006).

The problem is that the dynamics and interregional interdependencies of biogeochemical, geologic, hydrologic, climatic, atmospheric and other processes prevent any sub-global region or locality from being isolated from the rest of the integrated global ecosystem, as a study that detected fingerprinted dioxins from sources in Mexico, the United States and southern Canada in mothers' milk and other receptors in Inuit communities in Nunavut illustrated starkly (Commoner et al. 2000). Moreover, authoritarian rule and inequality in the weight of different voices can exist even at the local level, and retraction of society into largely autonomous but unavoidably

interdependent communities could exacerbate, not alleviate, diviseness and suspicion of the other.

How does a locality protect itself from impacts that arise outside of it, and what ensures that it will be responsible for impacts it causes that transcend its borders? A central challenge for degrowth is to develop legal and policy mechanisms, using tools such as HANPP, for distributing the responsibility to respect global ecological limits down to the local level. This architecture of distribution should also incorporate mechanisms for enabling all humans and other living beings to flourish, built on principles of intragenerational, intergenerational and interspecies fairness (Brown and Garver, 2009; Bosselmann, 2008). The European principle of subsidiarity provides a way to reconcile a preference for establishing policy at the local level with the reality that localities are never immune from impacts that arise from away or able to avoid causing impacts that reach other localities.

The Treaty on European Union (TEU) and the Treaty on the Functioning of the European Union (TFEU) establish subsidiarity as a core principle of governance in the European Union. Subsidiarity favors intervention at the level at which it will be most effective for achieving policy objectives (Saunier and Meganck, DATE). Thus, Article 5(3) of the *TEU* provides that, consistent with the principle of subsidiarity, the EU "shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level." In the United States, the federalization of environmental law that took place starting in the late 1960s can be seen as an adjustment based on subsidiarity, given the ineffectiveness of state laws in regulating environmental problems (Engel, DATE).

The challenge in applying the subsidiarity principle is to account for a broad range of

cultural, ecological and socio-political contexts, and a plurality in the way behavior is made to conform to limits, in fashioning a predictable and consistent global system for implementing limits such as planetary boundaries. Subsidiarity should be implemented in recognition that global governance includes the participation of "a long list of institutions including governments, businesses, nongovernmental organizations (NGOs), universities, research centers, and foundations [operating] inside and outside of government and across national and institutional boundaries" (Saunier and Meganck, p3-4). Although degrowth calls for significant reforms in these institutions, the principle of subsidiarity should nonetheless be useful for allocating governances roles among political orders at different scales.

[a] Conclusion

The current global commitment to economic growth and the goal to raise living standards throughout the world to those in wealthy countries are hard to square with the strong historical correlation of economic growth with ecological degradation and persistent social injustice, and with the daunting challenge of sufficiently decoupling ecological degradation from growth in the future (Speth, 2008; Jackson, 2009). Sustainable development, as defined at the 1992 Earth Summit in Rio, commits to these goals, and the unyielding insistence on economic growth at the root of the sustainable development model was reaffirmed over twenty times in the outcome document of the Rio+20 conference in June 2012. Yet, sustainable development has shown little signs of being capable of triggering the "overarching policies and radical change of behaviour needed at individual and collective scales" (Martinez-Alier et al, 2011) needed to curb the rampant consumerism that drives patterns of social metabolism that are undermining the capacity of the Earth's ecosystems to support human and other life. Degrowth is a forceful critique of and challenge to the growth-insistent sustainable development model (Martinez-Alier et al, 2010;

Kallis, 2011), and a more hopeful approach to long term perpetuation of a mutually enhancing human-Earth relationship.

If the degrowth movement succeeds, the very term degrowth may give way to agnosticism regarding growth. The focus instead will be on maintaining the human enterprise within ecological boundaries, and on enhancing ecological and social integrity. Meanwhile, the term degrowth is a reaction to the perspective that insists on economic growth, and as a result takes on a negative connotation. In one sense, the jarring impact of the term "degrowth" is appropriately aimed at shaking loose the human imagination from the overwhelmingly dominant idea that the economy must grow for humanity to survive. Although good reasons currently exist for degrowth to speak the language of the system that it seeks to undermine (Kallis, 2011), growth in fact causes many things to decline. Thus, in view of the future that the degrowth movement is working toward, degrowth should also be flipped around so as to promote the positive growth of those things that decline as the economy grows: ecological integrity, biodiversity, cultural diversity, compassion, equity, respect for life, human solidarity, simplicity, vegetarianism—and ultimately, the prospect for all beings to live a good life.

[a]Notes

1 The Research and Degrowth website lists areas of inquiry, similar to the main categories in the Barcelona bullet points, and invites people to edit the descriptions of various degrowth proposals. See degrowth.org/dimensions (accessed 31 October 2012).

2 As a multiplicative formula, *IPAT* is tautological—a way to break out impact into its drivers. As *IPATE*, the variables are not multiplied, but rather express variables that combine in complex ways to influence human impact.

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