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More is more: Scaling political ecology within limits to growth

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ABSTRACT

This piece responds to the article Is less more… or is more less? Scaling the political ecology of the future, where Paul Robbins (2019) discusses degrowth and modernism as two competing political imaginaries with regard to the growth-technology-environment nexus. Arguing from the perspective of ecological economics, I engage with the literature on political ecology to discuss the notions of limits to growth, Malthusianism, austerity and scarcity, as well as the role of technology as both environmental problem and solution. The paper exposes key divergences between different traditions in political ecology with regard to technological and economic scale. First, against the argument that limits to growth is a mere social construct, I call attention to research on ecological thresholds and to the perils of epistemic relativisms in a post-truth era. Second, against the idea that limits represent an elitist discourse, I call attention to long-standing traditions in emancipatory politics that defend limits in the name of justice. Third, against the thesis that more is less, I refer to mounting empirical evidence indicating that more is more (growth brings more environmental destruction, not less). I contend that political ecology can have much to gain from engaging with the political utopia of degrowth, but far less so from the technological utopia of modernism, which –I argue– reinforces status quo and offers false solutions to the environmental challenges of our time. Emancipation, I claim, is not about bringing more to more, but about bringing enough to everyone.

> *In the development of productive forces there comes a stage when productive forces and means of intercourse are brought into being, which, under the existing relationships, only cause mischief, and are no longer productive but destructive forces (machinery and money).* Marx & Engels, 1965 [1846], p. 92

1. Introduction

The above passage by Marx and Engels on the dual character of technology evoques a set of important questions for political ecology. Are growth and the industrial technologies it enables the cause of environmental breakdown, its remedy, or both? Is there a scale beyond which technologies turn to be essentially destructive? Do different institutional setups determine the sign of the impacts that given technologies have on people and the environment?

In his piece *Is less more … or is more less? Scaling the political ecologies of the future*, Robbins (2019) sets out to address related questions by engaging with degrowth and socialist modernism as two competing political imaginaries with regard to the growth-technology-environment nexus. Robbins makes a friendly review of these literatures, discusses their mutual criticism, and weighs the degree to which the work and conclusions of political ecologists are congruent with either perspective. He claims that political ecology should remain ambivalent to both and suggests that, despite having inverse views on economic scale, degrowth and modernism may not be beyond compromise and may indeed require one another.

In this article, I applaud Robbins' initiative to put into dialogue conflicting traditions in political ecology, but I contest his positions with regard to limits to growth and the environmental virtues of industrial technology. Arguing from a tradition in political ecology with links to ecological economics and degrowth, I discuss the notions of limits, scarcity, and austerity, as well as the role of industrial technology as both the problem and potential solution to climate and environmental

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breakdown.

The paper exposes key divergences between different traditions in political ecology with regard to technological and economic scale. Against the argument that limits to growth is a mere social construct, I call attention to empirical research on ecological thresholds and mounting evidence on the links between growth and environment breakdown. Against the argument that limits represents an elitist discourse that plays against emancipatory process, I call attention to long standing traditions in emancipatory politics that defend limits in the name of justice.

I conclude suggesting that political ecology can have much to gain from engaging with the political utopia of degrowth, but far less so from the technological utopia of modernism, which –I argue– reinforces *status quo*, offering false solutions to the environmental challenges of our time.

2. Political ecology and limits to growth revisited

The notion of limits to growth does not sit well in much of the literature on political ecology (Robbins, 2019). Political ecology, which developed partly as a response to 1970s Malthusianism, has effectively exposed the racist, classist and patriarchal underpinnings of reactionary discourses on environmental degradation and overpopulation, as well as the misuse of limits to shift responsibilities to the poor or marginalized (Benjaminsen, Reinert, Sjaastad, & Sara, 2015; Hartmann, 1995; Mehta, 2013; Peluso & Carroll, 1994). This literature has also put into question deterministic dooms of imminent collapse, arguing that limits are politically constructed, and ultimately shaped by institutions and technology (Robbins, 2019; Turner, 1993).

This literature has made critically important contributions to the debate on limits, but I argue that at least two key elements should be added to the overall picture. First, the fact that limits are flexible does not makes them less relevant for political ecology. It is true that ecological overshoot leads more often to gradual change than sudden collapse. True as well, capitalism's capacity to shift the costs of growth across space and time (Kapp, 1978) endows it with a formidable resilience, which invites to think that accumulation may coexist for a long time with environmental decline. However, neither the misuse of limits nor their malleability by technology (normally by shifting costs to the future) give reasonable basis for their denial or banalization.

Second, the case for downscaling the economy to avoid environmental breakdown is by no means constrained to reactionary notions of limits. There is also a tradition in political ecology, influenced by ecological economics and degrowth, that defends limits to growth along with strong notions of social justice. A central tenet in these literatures is that economic growth cannot continue *ad infimum* in a finite planet (Gorz, 1980; Kallis, 2018; Latouche, 2009). Beyond a certain scale, the economy enters in conflict with ecological life-support systems (Daly, 1996), the socio-environmental costs of growth accelerate (Gorz, 1980; Illich, 1973; Kapp, 1978; Mishan, 1967), and environmental conflicts multiply (Martinez-Alier, 2014).

The case for limits to growth in these intellectual traditions rests on a thermodynamic vision of the economy, first theorized by Georgescu-Roegen (1971) and later popularized through the field of ecological economics (Daly, 1996; Martínez-Alier and Schlüpmann, 1987). This vision portrays the economy as a subsystem of the biosphere, where the economy depends on ecosystems as both source of resources and as sink of waste. Industrial metabolism transforms energy and materials into goods and services, in a process that irreversibly converts (low entropy) stocks of resources into (high entropy) waste.

The earth is a closed system for materials (except for the negligible event of meteorites) and solar energy enters at a fixed rate, so physical stocks of resources are finite. Recycling is a partial solution but has a high energy cost and entropy prevents complete recycling. Renewable technologies are part of the solution too, but deploying them at the scale required to replace fossil fuels, and expanding them in pace with continued economic growth, would require massive amounts of finite materials, including rare minerals (Vidal, Goffé, & Arndt, 2013). Hence, the theory goes, the economy cannot grow perpetually: the scale of the economic sub-system is limited by the size of the host ecosystem (Daly, 1996; Latouche, 2009).

Growth can continue for some time (possibly for long) beyond an ecologically sustainable scale, but at the expense of shifting costs to rural populations, future generations, and other species (Kapp, 1978; Martínez-Alier et al., 2010). The Environmental Justice Atlas (www.ejatlas.org) documents more than three thousand environmental conflicts around the world. The origin of these conflicts lies in that the industrial economy is not circular, but entropic. It demands increasing amounts of resources, most of which are irreversibly dissipated and cannot be used again. This pushes extraction frontiers into new territories, encroaching into the livelihoods of communities and into habitats of other species. Hence, so many environmental conflicts in extraction at the commodity frontiers, in transport, and in waste disposal (Martinez-Alier, 2014).

3. Limits to (de)constructionism: when relativism serves business power

Political ecologists commonly argue that limits are socially constructed (Robbins, 2019). Despite of the element of truth this argument contains, I argue that this perspective is both scientifically limited and politically counterproductive.

First, ecological limits are more than mere social constructs. To make no mistake, ecological thresholds should not be conflated with guides to manage environmental risk. Such guides, expressed in notions like 'safe minimum standards' (Ciriacy-Wantrup, 1968) or 'safe operating space' (Rockström et al., 2009), are by definition shaped by values, like society's risk aversion. By contrast, ecological thresholds describe physical realities, observable as non-linear ecosystem responses (i.e. abrupt change or collapse) when limits are crossed due to disturbance or cumulative pressure (Scheffer, Carpenter, Foley, Folke, & Walker, 2001). Thresholds have been empirically demonstrated across local and regional scales, from the eutrophication of lakes to the collapse of fisheries and other resource systems (Andersen, Carstensen, Hernandez-Garcia, & Duarte, 2009; Muradian, 2001; Walker & Meyers, 2004). Research also suggests that limits were a factor behind the collapse of some ancient civilizations (Mieth & Bork, 2003; Webster, 2002). To assume that limits lose all relevance at the global scale would be naïve.

Second, if deconstructions are to remain useful for the purposes of political ecology, they must be situated in relation to dominant epistemological and political views (Neimark et al., 2019). Robbins himself notes that: 'as normative researchers, political ecologists pursue these [constructionist] claims because they believe that these [categories], in the current socio-political context, are doing pernicious work or helping to secure the power of an elite community' (Robbins, 2012, p. 124). The irony is that in today's post-truth era, banalizing research on ecological limits as mere narratives or social constructs pays service (albeit unintendedly) to the same elites and business powers against which such claims where initially conceived.

Half a century ago, constructionist claims played an important role in critical scholarship, showing how analytical categories we take for granted as universal truths did not exist in other times and places, and exposing how these categories were exploited by elites to exercise power (e.g. Foucault, 1971). Authors like Wittgenstein, Benveniste and Lacan exposed the articulations between language and the way we understand reality, putting into question dominant forms of realism that magnified the absolute and universal character of scientific truths. In this line of reasoning, intellectuals associated with postmodern[1] and

[1] While these authors are typically seen as the main representatives of postmodern thinking it should be noted that the authors themselves rarely labelled themselves as such.

post-structuralist thinking, like Barthes, Derrida, Kristeva, Foucault, Deleuze, Baudrillard, Jameson, and Lyotard challenged established beliefs surrounding scientific panaceas and the dogmas of modernity. In doing so they contributed to erode beliefs in certainties, allegedly emanating from reason, that shielded the exercise of power by endowing it with the unquestionable authority of scientific truth.

The deconstructionist machinery set in motion by these authors, however, soon proved double edged. Naïve realism –the original target of this criticism– fell in disgrace and social constructionism gradually became the mainstream in cultural studies. Eventually, and with some support of the media, vulgarized variants of this criticism contributed to expand a generalized climate of moral relativism, skepticism and cynicism that, in words by Lévy (1987: 20), installed us in an obsessively modest way of thinking that makes of uncertainty its last word, and which 'extreme relativism has resulted in a generalized idiocy' (cited in Naredo, 2015). In another critical account Sahlins (2002: 49) notes that 'one of the more poignant aspects of the current postmodernist mood is the way it seems to lobotomize some of our best graduate students, to stifle their creativity for fear of making some interesting structural connection […] or a comparative generalization. The only safe essentialism left to them is that there is no order to culture'.

Critics suggest that epistemic relativisms that reduce interpretations of reality to mere 'narratives', 'discourses' and 'social constructs' have been instrumental for today's generalized skepticism and cynicism (Boghossian, 2007; Sokal & Bricmont, 1999; Zerzan, 1994). Naredo (2015) further notes that this epistemic climate, initially conceived as a healthy critique to established ideas, later came to be exploited by the *status quo* to mask the dark sides of progress –such as environmental destruction from economic growth–, behind a nebulous of uncertainty. Decades of scholarship devoted to deconstruct 'truth' paved the way for a golden era of relativism. Post-truth, a concept used to describe the disappearance of shared objective standards for truth and the undifferentiated blurring of facts, values, knowledge, opinion, and belief that characterizes today's intellectual climate (Biesecker, 2018), may be looked at as the ultimate Frankenstein of this epistemological drift. According to Frankfurt (2005: 16), –who foresaw the post-truth coming long ago: 'The contemporary proliferation of bullshit has deeper sources in various forms of skepticism which deny that we can have any reliable access to an objective reality'.

Today this intellectual climate is successfully exploited by business power that, in the name of progress and growth, manufacture doubt and uncertainty to prevent the precautionary principle and undermine environmental regulations (Harremoës et al., 2013; Michaels & Jones, 2005; Oreskes & Conway, 2010). In an era of ecological breakdown and post-truth, caricaturizing limits as fanaticism (Bruckner, 2013; Phillips, 2015) or banalizing their relevance as mere 'constructs' or 'discourses', serves the denialism of corporate power and the new authoritarianism. To Latour's assertion that 'context stinks' (2005: 148, citing Koolhaas), in today's post truth era time may be ripe to add that '(de)constructionism stinks' too.

4. Limits beyond Malthus: on scarcity, austerity, and emancipatory politics

Robbins (2019) relates degrowth to a Malthusian narrative of scarcity and austerity, allegedly allied with elite power. Emancipation, he argues, should bring more to more people, not less. I argue that this claim is misleading, and that a default association of limits to reactionary narratives of austerity is fallacious.

First, the case for limits should not be equated to Malthusianism (Kallis, 2019). Degrowth has declared sympathy for the anarchist feminists of the early 20th Century. This movement, which struggled for women's right to decide on procreation, and against the capitalist exploitation of female bodies to produce soldiers and cheap labor force, labelled itself as neo-Malthusian (Martinez Alier, 2015). Given its political orientation, however, the choice of this self-labelling seems misleading. Malthus' concerns were not motivated by ecology or feminism, but by the fear of the upper class to lose their privileges. Furthermore, against what is generally assumed, Malthus advocated growth, not limits (Dale, 2012). As discussed extensively in a recent account on the matter, in the name of growth, Malthus rejected redistribution of wealth, defending class society against revolutionaries (Kallis, 2019). Degrowth is not sympathetic to Malthus neither to top down population control (D'Alisa, Demaria, & Kallis, 2015).

Second, recognition of limits does not necessarily situate growth objectors in a premise of scarcity. Positions on scarcity and abundance are in fact contested in the degrowth literature. Early ecological economists like Ballod-Atlanticus (1915) envisioned sustainable futures that were not premised in the abolition of scarcity (Martinez Alier, 1992), a line of thinking that finds continuity in the entropic vision of the economy of Georgescu-Roegen (1971) and Daly (1996). Other growth objectors, however, conceive scarcity primarily as a product of capitalist enclosure and commodification, making the case that abundance can be restored by sharing wealth and by expanding public goods and the commons (D'Alisa et al., 2015; Hickel, 2019). Frugal and egalitarian small-scale societies in which degrowth takes inspiration are characterized by a cosmology of abundance, not scarcity (Bird-David et al., 1992; Lewis, 2008). Research has portrayed these societies as affluent, noting that they enjoyed good ratios of leisure to working hours, sometimes better than those of industrial societies (Sahlins, 1972). Based on this research, degrowth advocates have made a case for 'frugal abundance', where scarcity could be overcome by means of institutionalized simplicity (Alexander, 2017; Kallis, 2018; Latouche 1993, 2014).

Third, the above points beg a discussion on the question of austerity. In contemporary debates, the word austerity inevitably evokes economic policies of fiscal discipline applied in Europe in response to the Great Recession of the late 2000s and early 2010s. However, such austerity, basically an attempt to resume the engines of growth by slashing social spending, has been the subject of harsh criticism from the degrowth literature (D'Alisa et al., 2015; Hickel, 2019; Kallis, 2018). Furthermore, history shows that the meaning of 'austerity' is by no means restricted to this economic ideology, neither to the sense of sacrifice or self-denial implied by Robbins (2019).

The corruption of the term 'austerity' is not new. Already in the 1970s Illich (1973) lamented that the term has been degraded and acquired a bitter taste, noting that for Aristotle and Aquinas austerity was a virtue and a foundation of friendship and joy. Furthermore, we tend to forget that austerity has also been part of the vocabulary of the left (Mingardy, 2015). The flag of austerity was waved with pride by the Secretary of the Italian Communist Party Enrico Berlinguer, who believed that "austerity" brought by the 1973 oil crisis would force us to "shelve the delusion that we can preserve a development model based on a fabricated expansion of individual consumption, which is a source of waste, parasitism, privilege, resource depletion, and financial disarray" (from a speech of 1977, cited in Mingardy, 2015). Austerity and simple ways of living are also advocated by former guerrilla partisan and later socialist President of Uruguay José Mujica (who nonetheless tells in an interview that he gave up the term for 'sobriety', after 'austerity' was demeaned by politicians in Europe in the aftermath of the Great Recession).[2]

5. Technological miracles and the myth of green growth

Work in political ecology reviewed by Robbins (2019) criticizes degrowth as 'green romance', pervaded by a tacit distrust in industrial large-scale technologies. In reality, degrowth perspectives on technology are more diverse that the one described by Robbins. They span an

[2] Interview from 19.5.2014. https://www.lasexta.com/temas/jose_mujica_en_salvados-1 (retrieved 11.8.2019).

ample spectrum of litterature that ranges from radical critique (e.g. Ellul, 1964; Illich, 1973; Kaczynski, 2010; Zerzan, 1994) to technological enthusiasm (reviewed in Kerschner, Wächter, Nierling, & Ehlers, 2015). Yet, when accused of romantics, growth objectors should not take a defensive stance (thereby letting their opponents define the terrain of the struggle), but fully endorse the accusation. Romanticism should not be understood here in the sense of an idealized view of reality, neither as the literary and artistic movement of the early 19th Century described in dictionaries and Encyclopedias. Instead, it should be understood in its deeper sense as a *worldview*; a cultural protest against Western capitalist civilization in the name of certain pre-capitalist and even pre-modern values (Löwy & Sayre, 1992). Revolutionary romanticism is to be understood as a movement of resistance against total mechanization, the dissolution of communitarian ties, and the colonizing expansion of markets and money into new social and environmental domains (Löwy & Blechman, 2004,). Such romanticism is part and parcel of green egalitarian thinking and growth objectors should take pride of being part of this political legacy.

Discussing the growth-technology-environment nexus, Robbins takes side (in a tacit but obvious way) with the modernist vision of environmental improvement through technological progress and green growth. The contours of this vision are best epitomized in the *Ecomodernist manifesto* (Asafu-Adjaye et al., 2015), to which Robbins declares sympathy (Robbins & Moore, 2015). As noted by Kallis and Bliss (2019) ecomodernism presents a strange set of ideas that combines deconstructionist arguments familiar to political ecologists with a modernization core from mainstream liberal economics. The manifesto rejects limits and celebrates modern industrial technologies, claiming they have far smaller environmental impact than technologies of the past. The manifesto also advocates urbanization, centralized production, industrialization, agricultural intensification, and nuclear power as means to protect the environment.

Arguing along these lines, Robbins uses examples of genetically modified organisms and automated industrial farming to alert against environmentalist dismissals of technologies at scale (Robbins, 2019).[3] Critics of genetically modified Bt cotton attribute increased rates of suicides among Indian peasants to spirals of indebtedness, allegedly emerging after this technology was adopted to reduce the use of pesticides (see Thomas & De Tavernier, 2017). These claims, he argues, lack robust grounding: indebtedness by peasants owes more complex economic and socio-political dynamics. Robbins' analysis provides good food for thought but omits important parts of the picture. It omits that, against the promises of Monsanto, pesticide use in Bt cotton crops has increased dramatically after plagues of the pink bollworm developed high levels of resistance 'leading towards unsustainable cotton ecosystems and environment', as an Indian GM proponent has come to acknowledge (Kranthi, 2016, p. 4). It does not mention either that Burkina Faso decided to phase Bt cotton out completely, after adoption of this technology decreased product quality and proved uneconomical (Dowd-Uribe & Schnurr, 2016).

Robbins' *perpetum mobile*-like description of a large-scale robotized farm with minimal environmental impacts also needs closer inspection. High-tech industrial farms, Robbins claims, perform better than traditional small-scale farming as they produce more efficiently, while reducing environmental impacts. A life cycle analysis of industrial farming, however, reveals much larger ecological footprints than those described in his account (see e.g. Thornton, 2010). Furthermore, like the authors of the Ecomodernist manifesto, Robbins confuses here efficiency with scale (Kallis, 2015). Industrial farms may use less resources and pollute less per unit of product, but they produce more, use more resources, and create more pollution overall (Kuppusamy et al., 2018; Rivera-Ferre et al., 2016). Industrialization of farming has increased resource use and pollution in absolute terms, which should not be confused with decreases of environmental impact per unit of product. In other words, intensification and industrialization of farming leads to *more* efficiency and *less* sustainability (Rodríguez-Ortega, Bernués, Olaizola, & Brown, 2017). More is not less, as modernists claim. More is simply more.

Let us now upscale the discussion from farms and crops up to the larger economy. The ecomodernist vision of ecological salvation through technological progress ultimately boils down to the idea of 'green growth', the dominant policy response to climate change and ecological breakdown advocated by the European Union, United Nations, OCDE, and the World Bank, among others. Like mainstream market economists, modernists claim that growth is not the problem, but the solution to the environmental crises (Gómez-Baggethun & Naredo, 2015). They contend that continued growth is compatible with sustainability because technological progress and substitution of natural resources will lead us to a 'dematerialized' and 'decarbonized' economy, where growth is *decoupled* from resources and pollution.

The thesis of green growth is appealing but has a fundamental problem: it lacks empirical grounding. Recent reviews of scientific evidence around the hypothesis of decoupling have consistently reached the same conclusion: not only is there no empirical evidence supporting a decoupling of economic growth from environmental pressures on anywhere near the scale needed to deal with environmental breakdown, but also such decoupling appears highly unlikely to happen in the future (Hickel & Kallis, 2019; Parrique et al., 2019). On a planetary scale, economic growth measured as GDP remains highly coupled to resource use. Some countries have dematerialized in relative terms (per unit of GDP), but there are no symptoms of absolute dematerialization (Wiedmann et al., 2015). The hypothesis of 'dematerialization' with GDP growth has come true only in developed countries that have outsourced their industry to developing countries with cheaper labor force and softer environmental regulations (Gómez-Baggethun, 2019; Hickel & Kallis, 2019; Jackson, 2017; Peters, Minx, Weber, & Edenhofer, 2011; Wiedmann et al., 2015).

Political ecology can gain more insight from empirical research on the links between growth and environment pressure than from a pseudo-religious faith on technological progress, that serves as opium for the people by sustaining the belief that production and consumption can continue to expand as usual.

6. Technological utopias and political utopias

Faced with the question of whether his case for green growth entailed a utopian vision to technological achievements, an Oxford economist once gave me an excellent answer: 'Possibly yes, but not more utopian than your vision entails with regard to political achievements'. He was right. With science pointing out that humanity has never been moving faster nor further from sustainability than now, any vision of a pathway to sustainability, either political or technological, embraces an element of utopia.

Jameson (2004) notes that utopias often come in pairs or opposites: work for all vs. end of work, city vs. country, planning vs. organic growth, or –most important for our discussion– Promethean utopia vs. Franciscan utopia. How is the political utopia of degrowth different from the technological utopia of modernism? While both share the vision of a more just and sustainable future, I claim that the former challenges the *status quo* whereas the latter reinforces it. As noted by Kallis and Bliss (2019), ecomodernist ideas align with powerful interests who benefit from arguing that accelerating capitalist modernization will save the environment. In this sense modernism reproduces the same utopia that is at the very heart of the existing political-economic system, namely the

[3] The example of Bt cotton is omitted in this paper but discussed in the keynote speech with same title given at the 2nd Biennial Conference of the Political Ecology Network (POLLEN), "POLLEN 2018: Political Ecology, the Green Economy, and Alternative Sustainabilities", in Oslo, Norway. Available at www.journals.elsevier.com/political-geography/videos-political-geography/paul-robbins-is-less-more-or-is-more-less (retrieved 11.8.2019).

belief that growth can continue *ad infinitum*, as technological progress will gradually resolve the contradictions between ecology and capital.

To fairness, Robbins (2019) does not refer to modernism in its liberal and capitalist guise, but to a 'socialist modernism' with emphasis on collective ownership and egalitarian politics. Yet, there is no obvious reason to expect that the capitalist and socialist variants of the modernist project should bring essentially different environmental outcomes. If it came into being, the socialist variant shall be expected to bring more equitable distribution of wealth, but to the extent that it still relies on an expansionary vision of the economy (and consequently on increased dissipation of resources) there is no reason to think that the effects on climate and the environment would be different from those of capitalist growth.

By favoring redistribution over expansion, the degrowth utopia represents a frontal attack on the core ideology of modern industrial capitalism. Degrowth is utopian in the sense it aims for radical change, but it is not utopian in the sense of pursuing an impossible future. Attacked as utopians, early ecological economists like Popper-Lynkeus, Ballod-Atlanticus, and Otto Neurath wrote detailed accounts (full of statistics and empirical calculations) on how a post-revolutionary and post-capitalist green economy could work (reviewed in Martínez-Alier and Schlüpmann, 1987). Their utopias, unlike those of classical anarchism and Marxism,[4] were not premised in the abolition of scarcity. Instead of resorting to technological miracles, Popper-Lynkeus (1912) grounded his vision on detailed accounts of available resources, with the double objective of calculating the human work required to guarantee basic needs for all[5] and to investigate how consumption of exhaustible resources could be gradually reduced to secure long-term economic viability.

Martinez Alier (1992) refers to these futures as c*oncrete utopias.* They are utopian because they assume radical social change without explaining how it would come about, but they are concrete and plausible utopias, because the authors take an ecological and scientifically informed view of the economy. As Martínez-Alier notes, the eco-socialist projects they envisioned, had a chance of coming into being.

Degrowth continues and keeps alive the spirit of these concrete utopias. These utopias resist the ideological closure of the growth imaginary in which we are confined, keeping alive the capacity to envision and drive radical political change. But these utopias also take seriously what science can tell us about thermodynamics, ecological thresholds, and the links between economic growth and environmental degradation. Against the modernist claim that *more is less*, evidence suggests that *more is more*. Emancipation is not about bringing *more to more people*, as Robbins claims, but about bringing *enough to everyone*.

Declaration of competing interest

No conflicts of interests to be declared.

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Appendix A. Supplementary data

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[4] As noted by Martínez Alier (1992), despite of their quarrels, the anarchist (from Kropotkin's Fields The Conquest of Bread to Murray Bookchin's Post-Scarcity Anarchism) and Marxist tradition (as in Marx's Critique of the Gotha Programme) shared an ultimate vision of great abundance.

[5] This work requirement would be achieved by means of civil (instead of military) conscription, that he had calculated at a 12 year service for men and seven for women, with a thirty-five-hour week (Martínez-Alier 1992). Note the relevance of Popper-Lynkeus proposal for current discussions on basic income variants and their economic viability.

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