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16 Dead ends and liveable futures

A framework for sustainable change

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1 Population, affluence, and technology

The lack of organised human effort to change the course of unsustainable development can be characterised 'Our common failure.' In 1987, the Brundtland commission successfully made famous the concept of sustainable development, but unfortunately also legitimised the idea of weak sustainability. Even though people around the world are increasingly exposed to the discourse and initiatives of sustainable development, little—if any—evidence is available today to indicate that human societies would be on the 'right track'. That is, the humankind is not any less environmentally destructive than it was in the 1980s. In fact, the opposite can be considered to be true. All the way back from the Industrial Revolution, the overall amount of production and consumption has risen more rapidly than improvements in efficiency, which signifies that more natural resources are used and more human-induced waste (e.g. climate emissions) are generated than ever in the recorded history of the Earth (Rockström et al., 2009; Barnosky et al., 2012; IPCC, 2014). Further, the expansion of human settlements and excessive mobility on the planet has resulted in an unseen invasion of this single species of ours, and its domination over the rest of nature. This process, which is sometimes also referred to as the Great Acceleration, has come to denote that humankind is now a

main driver of the global environmental change, including the sixth mass extinction wave (Steffen et al., 2015; Ceballos et al., 2015).

The so-called weak sustainability discourse (see e.g. Holland, 1997) and related initiatives have arguably failed because of their disproportionate focus on technological solutions. While technology is mainly a means to control and manipulate the environment for the purposes of its user, it is hailed for its opposite potential within the weak sustainability discourse; i.e. to reduce the human impact on the environment through more efficient products and processes. According to the IPAT formula, the other two main ways to cut the anthropogenic environmental impact is the reduction of human population and affluence (Holdren and Ehrlich, 1974; Chertow, 2000). The most effective way to lower the undesired impact on the planet, which is a precondition to reach sustainability, would be to address all three factors, basically the number of humans, how much they consume and how that is produced. Furthermore, it could be argued that successful drops in the first two factors, as *ex ante* measures, would be more effective than the technological solution, which is an *ex post* means. In other words, the first two target the actual drivers of the sustainability problem (see IPCC, 2014), which as catalysts of change are arguable more effective in comparison to seeking to adjust the effects of unchanged preferences of a rising human population or repair the already triggered damage.

Nevertheless, the weak sustainability theorising and policies habitually reject invitations to question the march of technologically mediated progress. One reason for this dismissal is the lack of sincere commitment to sustainable development. In other words, while many of us might consider that it would be great to reach sustainability, we are not ready to sacrifice those dear things to us, which are in line with unsustainable

forms of development. This concerns, in particular, the devotion to modern comfort and consumption, to profits in business, as well to economic wealth more in general (affluence). The issue of population is perhaps even a trickier one. Policy-makers and academics do not want to touch the issue as a sustainability problem, and decision-making remains private, with the important exception of policies that promote growth in order to keep the socio-demographic base of the economy stable. A reduction in new humans is a threat to consumption, the labour market and to the tax base, and consequently to both the market economy and the modern welfare state. Hence, there is a close resemblance between how affluence and population are treated in the mainstream, Western societal discourse. They are considered as freedoms and rights, which individuals are expected to use responsibly by enacting the 'green' and 'fair' choice, be it a decision to not have offspring or a new IPhone. Simultaneously, they are considered to be in the service of the 'common good', not in terms of sustainable development but in service of sustaining the present economic and social order.

A few provocative and alarmist statements about the impacts of population growth (e.g. Malthus, 1798/2005, Ehrlich, 1968) have made the population question even more a taboo-like. Even saying the p-word aloud, not to mention questioning the moral and legal aspects of human reproductive rights, will upset many people. For the sake of clarity, it is sensible to note that the amount of population and human aftergrowth are not independent variables of social life, so to speak, but are very contingent on situational, socio-economic factors, such as affluence or class. This is often used as an additional argument for ever more economic growth: more wealth will flatten the population curve, and if we are very lucky, this will happen on a level where the Earth systems still manage to serve us. Further, many humanists and critical thinkers

prefer to consider the social organisation as *the* problem (in particular capitalist structures) rather than populace. This perspective is important and relevant for sustainability studies and policy, even if it problematizes social organisation mainly from an anthropocentric stance, and is primarily motivated by questions of intra-species justice (see Heikkurinen, 2017). The dangers of the population discourse are also good to keep in mind. At one extreme, the call for reducing population can by used to justify brutal top-down population control measures. On a more moderate note, a general focus on population may shift attention away from the particular need to reduce resource use within the over-consuming classes and societies. In a poorly informed debate, the blame for the current global environmental crisis can be misdirected to the developing countries, where population is rapidly growing, but the levels of income and consumption correlate with the environmental harm caused, measured e.g. in CO_2 emissions (Ulvila and Wilén, 2017).

One more relation worth mentioning here is the contingency of population growth and economic growth, and hence also the connection between the population upsurge and the economic system of capitalism, which requires growth to thrive. Given the current economic hegemony of capitalism, as well as market economy in more general, it should not surprise us that the growth of population is seen as unproblematic in many societies. That is, the market economy, or capitalism in a more specific sense, not only needs economic growth to prosper, but also new consumers and labour, which suggests that 'capitalism, with its compulsion for endless growth and expansion, constitutes the hard core of the […] ecological crisis' (Ruuska, 2017, p. 64). In today's societies, worries about food productivity and the environment not keeping up with the growth of population are being ridiculed with partial evidence and expectations in

technological advancement. This kind of techno-optimism is at the heart of weak sustainability, which is definitely not limited to capitalists or other major market actors or proponents. Ever since the scientific revolution and Enlightenment, the supposition is that that humans can – and should – move the Earth and its human beings to an improved state by ever more social evolution and technological intervention. In practice, it is firmly believed that the Earth's ecological systems and physical resources do not set any fundamental boundaries to the human species that could not be overcome by its intellect. This 'modern' understanding of development is the intellectual or axiological cause to ecological imbalances and contradicts sustainability. Still, its position in human minds and policies is so strong that it became part of the Brundtland definition of sustainable development, to which limitations only concern the social organisation and the state of technology.

However, at minimum, it must be accepted that the assumption of technological progress is a risky one. Not even the current state-of-the-art technology has been able to fulfil its promises of 'clean production'. Typically, improvements are only relative to older, more destructive, versions, and use or impact per unit is approached while total production – and the absolute environmental effects of the stock of this human-made capital – is neglected. Still, what are being repeated in a mantra-like fashion are the empirically ungrounded promises of technological salvation in the future. But very problematically, it refers to the time 'still to come' while problems build up and their root causes prevail. Furthermore, the insatiable craving for advancements in technological tools and equipment in itself becomes a force with detrimental environmental effects; there will always be demand for developing and buying an even more 'eco-friendly' product than the best one on the market today. Any final,

sustainable, solution to consumer needs would be a threat to the economy and to the social organisation. This means that it is difficult to see the weak position as a basis for serious attempts to solve problems. The assumption that solutions will be found in future can even be considered to legitimise inaction today. A manifestation of this technologically biased future-orientation is the environmental Kuznets curve, which has little empirical support (Stern et al., 1996; Stern, 2004). It hypothesises that, at first, economic growth leads to environmental degradation, but then at a certain level of economic development, environmental impacts will begin to decrease. What this hypothesis legitimises is destructive economic growth today by setting high hopes on efficiency gains.

What is important to note here is that for techno-utopians there is never enough technology, and this excessive focus on a particular type of means obscures important thoughts and discussions on ends. More technology becomes the means and ends. Things could be slightly different were technologies developed for the purpose of sustainability or with a main aim of decoupling economic and population growth from environmental damage. Rather, the main purpose of technological advancement is to expand the powers of humanity out of egoistic curiosity, to control the surroundings and other earthbound beings, and to exploit nature for the benefit of the dominant and powerful.

2 Market, state, and civil society

The future-oriented belief in technology has its roots in anthropocentrism and human supremacist ideals, where the human is considered to stand as the crown of creation. This can be generalized to various human roles and arenas, whether it concerns human production, consumption, regulation, or just ordinary civic life. The human use of artificial instruments and massive amounts of stored energy also defines the powers relative to other forms of life. In theological terms, many Western humans have positioned themselves somewhere between the gods and other worldly creatures. As a progressive development over half a millennia, the Earth has recently witnessed the human drive to even challenge the gods by means of genetic technology, geoengineering and thoughts about expansion to other planets. But why should the humankind not test its limits? After all, god is dead, as Nietzsche announced in the 19th century. One feasible reason is of course concern and care for the non-human world, but under the prevalent anthropocentric premises nature is subordinated as resources of potential use in human systems of production and consumption. There is little concern over biodiversity, a lost species or a ruined ecosystem beyond their lost utility.

Climate change has, however, become a concern in mainstream circles, but the prevalent weak sustainability understanding of the problem does not challenge the two main causes of the on-going ecologic destruction, namely economic growth and population growth (see Meadows, Meadows, Randers, and Behrens, 1972; IPCC, 2014). Rather, proponents of the liberal market economy, both from the business and policy sectors, have problems to admit that their model has not been able to deliver sustainability outcomes. Apart from the expanding overshoot, demand is met and wealth created, but needs are still unsatisfied and inequalities soar. Proponents of a stronger welfare state and socialist utopias are equally visionless when it comes to

sustainability. Public governance and involvement in the local, national and global levels has been not only toothless but also utterly reluctant to address economic and population growth – or any major change in the business as usual. Here, the failures to go from science to action in global climate policy are an excellent and tragic example. The advocates of strong international frameworks or centralised control might argue in their defence that this is due to the increased private sector involvement in the democratic process, but the increasing role of the markets has been supported by politics, and would it be much different if people were really to democratically decide the direction of development? Would we then see laws and regulations that would actually curb over-consumption of goods and services or tackle the painful issue of human over-production? Probably we would not. Nevertheless, at some point, humans may begin to realise that their local choices and decisions are linked to global common problems, and a need for new regulatory and governance institutions to solve the environmental problems might emerge.

In terms of the present political climate, the state of the affairs is rather troublesome. Whether the call is for more market transactions or more state jurisdiction the causes of unsustainability are rarely addressed. Within the third sector and some of its more radical environmental organisations the weak definition of sustainability is challenged, but while the civil society actors might be more diverse in their objectives they are often accepting the rules of the game due to their dependency of economic investments, and hence economic growth.

So what we are trying to say here is: from a strong sustainability point of view, it is not so much about who holds the power in a society if the power holders' assumptions about sustainability are weak. The market, the state, and the civil society

currently all produce inherently ecologically unsustainable outcomes, which suggests that the focus of the scholarly inquiry and activism should not be limited to speculating between diverse governance alternatives or the organisation models for human activities but must address the ends of these means in order to have even a chance for effective, sustainable change. This includes scrutinising the human condition in a critical light and questioning our own intentions, as well as reconsidering the human place in the world.

3 Efficiency, effectiveness and sufficiency

Strong sustainability as an alternative to weak sustainability offers a radically different way to think about the human species and its relationship with the rest of the world. It might succeed in something very important by swapping the assumption about substitutability to non-substitutability. Tightly interwoven to this 'swap' is an ontological and axiological transformation, a shift to considering the entities and processes of nature as not only objects whose existence and value depends on humans but also considering beings capable of realising their complex genesis without human intervention (Heikkurinen et al., 2016; Heikkurinen, 2016). Such a move is consistent with human prosperity, but with focus on wellbeing, not on wealth.

Rather than assuming, or even aiming at, that humans can substitute all things in nature, in an eternal quest for increasing wealth (i.e. human-made capital), strong sustainability proposes that humans can only complement the entities and processes of nature. The framework that this chapter begins to outline rejects the substitutability premise in its totality. Humans either complement or destroy entities or processes of

nature. This position, however, does not signify that nature should or could not be utilised for any human purposes. Some nature must even be fought, like viruses, and some of its utilisation is vital for human existence. Without humans turning parts of nature into resources and further to waste, the basic needs of food, water, and shelter could not be met. And this certainly must be done in an efficient manner to save matter/energy resources, as focused in the weak sustainability thinking. Efficiency as a strategy for sustainable change, however, is inadequate. Its focus on relative improvements, using fewer resources per unit, does not tackle the overall amount of production and consumption, which is the foremost problem in sustainability. Therefore, sustainability efforts must also target the scale and direction of human activities. Not only must environmental impact be within the planetary boundaries. Society must also be effective by distributing its moderately sourced and efficiently utilised resources in a manner that meets the essential needs of its members (not limited to humans). As a third component in this overarching strategy, we call for sufficiency. The quest for sustainable change then becomes not only a question of how to produce and consume relatively better (efficient), but also the right things with a just distribution and within Earth's capacity (effective), and in a scale that is relevant for wellbeing (sufficient). In principle, nature should not be used for human purposes beyond what is ecologically possible and in terms of wellbeing sufficient, actually needed. This signifies that human life quality should be defined beyond individual preferences and in respect for all earthbound life, as was outlined in chapter 1. It goes without saying that the modern human is far from having a comprehension of what is truly needed to survive and peacefully coexists with the rest of nature, or at least far from making such comprehension operational in everyday life. While such a bridge between knowing and

acting must be built by values as well as by regulation we see that new sustainable knowledge must not only embrace wellbeing and needs instead of wealth and demand (see chapter 1). Another vital starting point in reaching sustainable societies is to acknowledge these different roles of efficiency, effectiveness and sufficiency.

Weak sustainability calls for increased efficiency in its quest for wealth, produced in a relatively 'green' way, and, to a much lesser extent, for a more effective distribution, in order to meet essential needs. It is, however, not even silent on the need to increase also sufficiency; its continued call for growth contradicts the idea of sufficiency, and hence it can be deemed a cul-de-sac, a dead end in the pursuit of sustainability. Strong sustainability, again, might offer some considerations for liveable futures. Perhaps the difficult move is the one from assuming strong sustainability to acting in the same lines. Assuming weak sustainability is still rather convenient for an individual or an organisation, as one does not have to challenge the prevailing cultural values, norms, and practices, but he/she/it can continue business as more-or-less-usual. The enactment of strong sustainability, on the contrary, requires a fundamental opposition to the way human activities are concurrently organised but also to dominant values, priorities and privileges.

In the rest of the chapter, based on the contributing authors to this book, we will seek to outline a framework for sustainable change that is line with the premise of strong sustainability, and tease out the complementarities between the chapters.

4 Individuals, organisations, nations, and the globe

The roots of unsustainability run deep in human history, as Ketola, Räsänen, Syrjämaa noted in chapter 2, and therefore, a deep reflection of values is needed. This includes renouncing conventional anthropocentrism, where the entities and processes of nature are considered to merely exist to serve the human purpose, as 'capital'. In a strongly sustainable society, the existence and value of beings should not be a human judgement solely based on instrumentality. That society should be based on coexistence and not on subordination. This kind of ontological and axiological non-anthropocentrism offers a philosophical base for beginning to imagine a frame for strongly sustainable change.

Owing to the undisputed connection between economic activity and ecological harm, the role of economic theory has great significance for sustainability. In chapter 3, Eskelinen and Wilén showed key problem areas of the dominant theory of neoclassical economics, and conclude that a new economic ontology, which recognises biospherical limits, is needed. In practice, Earth's limited resources should be used to meet real needs with respect for justice and integrity rather than with the aim to meet demand and increase their exchange value in the marketplace. Such change must involve reform in institutions and law, and one promising way is suggested by Thiel and Hallgren in chapter 4. The authors leave anthropocentric ontology and axiology behind by considering non-human nature as a right bearing subject rather than a property object. This kind of institutionalized respect towards nature has its antecedents already in many indigenous cultures and pre-modern communities so it certainly is something conceivable. Frigo, in chapter 5, argued for the necessity of a similar ecocentric turn with the example of how humans perceive and use energy. Strongly sustainable societies need such flexible but indicative moral compasses to guide humans towards sustainable relationships with nature. In addition to the desperately needed ethical

direction and supportive legal structures, further new governance mechanisms and policy measures are needed to support a transition to strongly sustainable societies. Al-Saidi and Buriti (chapter 6) presented best practices of multi-stakeholder, cooperative projects to restore the natural environment, and demonstrate that a variety of policy tools and techniques should be utilised for effective sustainable change. The instruments and processes of the private, public and third sectors should all be geared towards reducing consumption and production.

In this kind of integrative thinking about sustainable change, diverse viewpoints of different stakeholders are taken into account. A good example of such an inclusive approach to theorising is shown by Heikkinen, Mäkelä, Kujala, Nieminen, Jokinen and Rekola in chapter 7. To address the problems of over-consumption and over-production, which characterise the Anthropocene epoch, the authors expand the capability approach to also encompass non-human stakeholders. Consequently, a new understanding of democracy should not only expand to include the interests of future human generations but also include the non-human 'demos'. From an ecocentric perspective, all beings of the ecology should have their integrity and capabilities supported. Currently, however, there are many mundane practices that certainly do not support any independent value of other species. One of the most obvious examples is the large-scale domestication of animals, where ethical and environmental considerations are often put aside. In their study, Cole and McCoskey (chapter 8) reported on the environmental devastation resulting from animal husbandry and observe that the growth of meat consumption is closely linked with growth in income and urbanisation. Economic growth and urbanisation are surely also connected to environmental damage in general, as the IPAT formula advises us. To put it bluntly: the more people and affluence there is on a

particular region, the greater the negative environmental impact is. But what is noteworthy here is how the market mechanism is incapable by itself to revert these developments. Thus, ethics and legislative measures are also needed to curb both the consumption and production of meat (chapter 8), especially in the wealthiest parts of the world.

To pinpoint the limits of the current market to ignite strongly sustainable change does not exclude a role for private actors. Almost the contrary would be true. Business organisations and consumers have a crucial task in supporting the transformation of unsustainable societies. In chapter 9, Stål outlined the potential, in particular, in entrepreneurship that does reduce the idea of value to market demand. To scale up such a novel approach to business, a dialogue between natural scientists and business practitioners, as well as supportive legal structures, are needed. A complementing study by Quarshie, Salmi, Scott-Kennel, and Kähkönen (chapter 10) shows that innovative business organisations can develop ways to address value beyond market demand, and even address the complex issues of biodiversity in their strategy. Nevertheless, the success of such business initiatives must be evaluated against their ability to reduce the overall impact from consumption and production. After all, that is what matters for strongly sustainable change.

Lehtonen, in chapter 11, examined this call for degrowth in relation to investment decisions. The results show that the most realistic investment strategies are the elimination of the worst polluters and resource gluttons, augmentation of good growth, and the transformation of business. Investment in the second category could support business initiatives such as the examples above, but obviously also those initiatives that meet wellbeing and not wealth, needs and not demand. The third

category, which combines the first two, holds perhaps the largest revolutionary power. Moreover, the investment decision of refraining from economic activity should not be forgotten as a viable option for those willing to make a degrowth impact. The challenge with the no-investment plan is, of course, that if one has capital in a financial institution, someone will be using it for investment activity. This institutional lock-in must be challenged by related institutional change, e.g. aiming at either a reduced role for money in society (even demonetisation) or a more just distribution of the same.

In chapter 12, Wilén and Taipale discoursed about 'institutional consumption', which thus has resemblance to the investment side of activity. They show that even the strongly sustainably minded people, be they investors or consumers, have difficulties to imagine alternatives outside their role as an economic agent. This economisation of everyday life is stripping the political agency away from people by turning them, first and foremost, into consumers, managers, producers, and investors. The alternative would be to support the emergence of identities of citizenship and sense of belonging with the community of nature. Such a path can be better understood through approaches such as the one by Helne (chapter 13) who outlined a framework for holistic wellbeing, to complement the dominant economistic interpretations. A strongly sustainable society needs ecological embeddedness of wellbeing and a balanced view of its dimensions, which Helne lists as having, doing, loving, and being.

To finally approach strongly sustainable societies in practice, permaculture and ecovillages can be used as examples, and both Vlasov and Vincze (chapter 14) and LeVasseur and Warren (chapter 15) show that there is much to be learned from these experiments of communal activity. Vlasov and Vincze, for example, proposed that permaculture offers a novel way to look at the knowledge behind innovations. In a

permaculture context, the authors find an alternative to universal knowledge of global markets, science and technology that is more place-based, and with semblance to many indigenous cultures and grassroots action for strong sustainability. LeVasseur and Warren point at the importance of motivation and (eco- and social-centric) values, democratic decision-making, and inclusive social practices, and innovative forms of economic exchange. Without romanticising the past or indigenous lifestyles, whether we like it or not, some of the eco-communities are already within ecological boundaries, in contrast to the modern industrial world.

What can be observed from this review of recent social science studies assuming strong sustainability is that a major reorientation is compulsory in the contemporary economy, state apparatus and civil society, including the academic industry. Much of the present-day philosophy, economics, sociology and psychology are failing the Earth and its beings by producing ideas that are limited to serve the interest of the human species. One reason but no excuse is that this knowledge and understanding has its roots in times when Earth appeared infinite. It is now both inaccurate and dangerous. In this book, transdisciplinary scholars from many areas are now challenging this inherently narrow and unsophisticated view of anthropocentric ontology, epistemology, and axiology. The contributions are heavily biased towards the rich and environmentally most problematic parts of the globe. When change is most acute in those regions, answers and solutions has to be sought for also in regions that we still tend to label underdeveloped. Further, as it has become apparent, the idea of strong sustainability is not limited to the ecological economics but is being applied and developed in diverse fields of research. Consequently, the push towards strong sustainability is not limited to private actors, like consumers and entrepreneurs, or to public agents of change, like the

nation state and the United Nations, or not even to leaders in the civil society. To move away from the world of weak sustainability to a strongly sustainable Earth, which is not too hot or full for peaceful coexistence, the mobilisation of human actors on multiple levels is indeed worthwhile.

4 Conclusion

Based on the chapters of the this book, it can be concluded that sustainable change comes in many forms and can take place in and between the public, private and third sectors of a society, as well as on different levels from the individual to the global. While responsibility is everywhere, it is however not equal but relative to powers and resources, and to the role each actor has had in the destructive practices up to today. Nor does this denote that sustainability can be reached with any kind of initiatives, with vague connections to environmental, social and/or economic causes. Quite the contrary is true. As the source of the human environmental impact come from the amount of population, the amount of affluence, and the technology in use, sustainable change must address the contemporary, pressing problems of too many people, too much wealth, and too poor tools. Moreover, the distribution of the gained benefits has to become more equitable, and more geared towards wellbeing and needs. In the weak sustainability theorising, the main focus of the change initiatives is on technology, assuming that efficiency gains could counter the impact from the levels of population and affluence. So far, however, the humankind has not been able to develop such tools and techniques. Rather, technologies have served the powerful human elite in its efforts to further drive

exploitation and consumption. From an ecocentric viewpoint, it is unethical to assume that this decoupling of human population and economic growth from environmental harm will happen sometime in the future. Other species are suffering as their habitats are crowded and heated up by humans. But even from an anthropocentric viewpoint, this weak sustainability assumption is ethically dubious, prioritizing present preferences over future ones, and a very risky one, jeopardising the humanity itself. What if the decoupling will not happen after all and irreversible ecological damage will be done? The strong sustainability theorising is an approach of precaution and inclusive ethics. Rather than going 'all-in' with the efficiency strategy, it calls for sufficiency in the amount of people and wealth – but with focus on wellbeing – as well as effectiveness in meeting needs in time and space. Strong sustainability allows an approach of generosity rather than one based on egoism, a focus on life qualities rather than material quantities, and moderation rather than extreme (growth, exploitation, domination). In line with moderation, a strongly sustainable society is one, which keeps it wastes within the assimilative capacities of the planet, and ideally the region, has its harvest rates within regenerative capacities of renewable resources available, and does not deplete non-renewables at the rate at which renewable substitutes are not developed (see Goodland and Daly, 1996). To arrive at this relatively ideal state of affairs, the sustainability process, there is a need to engage in and support those initiatives that increase sufficiency, effectiveness, and efficiency. And this engagement cannot be left to the market, state or civil society alone. There needs to be actions of sufficiency, effectiveness, and efficiency in the public, private and third sectors of a society to reach a sustainable society.

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Table 16.1 Framework for sustainable change

5 Further work

The most important work ahead is action and not studying or writing. For many years change has been possible on the basis of knowledge already available. However, to get the bread on the table, the researcher can also empirically examine relevant initiatives on different levels of society that in particular increase sufficiency in terms of population and affluence. How ethically acceptable they are, and how they can be made acceptable are other important research questions. A more specific suggestion for an investigation of great importance during transition is the rebound effect. It refers to the overall technical, organisational and social development, which increase the efficiency of the economy and give room for more consumption. 'This is usually hailed as progress but it also constitutes a threat to the ecological balance.' (Sanne, 2000, p. 494). In his study, Alcott (2008) showed that in a global economy both efficiency and sufficiency initiatives are bound by the rebound effect, leading to further increases in economic growth (see also Figge, Young, and Barkemeyer, 2014). 'Whereas input–output efficiency constitutes an income effect and can lower prices of material-energy inputs, "lighter lifestyles" of the wealthy constitute an autonomous demand reduction that lowers prices. In both cases new demand emerges, in the case of sufficiency that of new or marginal consumers who take up the "slack" left by the previous consumers' environmentally motivated frugality.' (Alcott, 2008, p. 771). However, '[t]he economist's observation that a lower price leads to higher consumption (and the adherent valuation that this is good) cannot be passively accepted; it must be countered

by a conscious policy of moderation' (Sanne, 2000, p. 487). Nevertheless, the danger of rebound effect does continue to lurk behind all proposed solutions, and alternatives like local economies and new institutions on national or international level that hinder the rebound effect must be sought for.

Quotas and caps are promising alternatives of such kind. They can be constructed on different levels, saying e.g.: 'These are the maximum allowed amounts. Each country, firm and person must find the combination of reductions in population, affluence and energy intensity that most suits them' (Alcott, 2010, p. 553). While such more direct approaches to lowering the environmental impact by means of caps, 'heavily taxing resources or rationing them on a country basis' (ibid, p. 552), combined with quotas to make adjustments more just, are arguably very efficient and effective strategies, how conceivable are they in today's political environment? The restricted landscape of ideas and discourse limited to weak sustainability calls us to experiment with more profound initiatives to ignite strongly sustainable change.

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