
1. Sustainable consumption as a systemic challenge: inter- and transdisciplinary research and research questions

Sylvia Lorek and Philip J. Vergragt

1.1 THE CHALLENGE

Present consumption patterns in developed countries are unsustainable. We consume too many raw materials and use too much energy, create too much hazardous waste and even consume renewables at an unsustainable rate. In addition research has shown that more material consumption does not make us happier; it appears that above a certain level individual well-being is ‘decoupled’ from material throughput and energy use (Abdallah et al. 2009; Jackson 2009). Moreover there are strong indications that unsustainable consumption patterns contribute to greater inequity; and conversely, that inequities contribute to unsustainable consumption patterns (Vergragt 2013; Wilkinson and Pickett 2009).

Developing countries are quickly following the same path of material over consumption and greater inequality. One-quarter of humanity – 1.7 billion people worldwide – now belongs to the ‘global consumer class’, having adopting the diets, transportation systems and lifestyles that were once mostly limited to the ‘global North’. Today, the BRIC countries (Brazil, Russia, India and China) and other developing countries are home to growing numbers of these consumers.

Sustainable consumption is defined at the Oslo Roundtable (1994) as: ‘the use of goods and services that respond to basic needs and bring a better quality of life, while minimizing the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardize the needs of future generations’. It is thus a broad concept with a wide variety of meanings, for instance: consuming differently using less resource-intensive products; moving from material products to immaterial services; energy conservation; sharing the use of products; and using higher-quality products with longer life spans (Lebel and Lorek 2008). More generally it means a cultural shift away from the prevalent consumerist culture towards a culture which values sustainable lifestyles (Brown and Vergragt forthcoming). From an economic perspective, it means that the economy needs to move away from producing too many unsustainable consumer products, towards producing more sustainable services and infrastructures. However the present market economy is dominated by the economic growth paradigm which results in increasingly unsustainable production and consumption patterns (Jackson 2009).

Consumption is part of a larger system of investments, production, trade, consumption and waste; it has material, economic, cultural, institutional and power aspects. Changing consumption thus entails changing the entire system: it encompasses changing the economic system, the infrastructures, the dominant culture and lifestyles, and changing institutions and power relationships (Vergragt et al. 2014).

No full agreement exists among scholars about what constitutes the sustainable consumption research field. A first distinction can be made between research on existing (often unsustainable) consumption patterns and practices, and studies reflecting the aspiration of sustainable consumption. A second distinction is between individual consumption practices and the collective act of consumption, which is associated with the cultural notion of a consumer society and consumerist lifestyles. A third distinction can be made between material aspects, economic aspects and cultural notions. Material aspects are often expressed in life cycle assessments (LCAs) and materials flow analyses. Economic aspects are transactions between buyers and sellers as well as investments and trade. Cultural notions are researched at the individual level (norms and habits, identity) and the collective level (fashion, consumerist lifestyles).

Next to static analyses (such as the LCA of a product), dynamic analyses of change processes exist, such as the frameworks of socio-technical transitions, grassroots innovations and social movements. Change process can be analysed through the lens of power relationships between elements of the incumbent system and actors who want to change the system. Finally, scholars conceptualize production and consumption as a complex system and analyse the complexities of changing such systems. In Vergragt et al. (2014) an overview is presented of research fields comprising sustainable consumption research.

Consumerist culture is not a natural phenomenon. In the United States it was designed before the Second World War by powerful think-tanks, trade unions and government interventions serving big business interests (Botsman and Rogers 2010; Brown and Vergragt forthcoming; Cohen 2004; Ewens 1998; Garon 2012). The prevalent consumerist culture in consumer societies is closely related to the issues of (economic) power, which are so far insufficiently addressed in sustainable consumption research. It is beyond the scope of this chapter to discuss power issues in depth, but in general we can say that power plays a central role in creating structural barriers to sustainable consumption and in delimiting opportunities for intervention. The relationship between power and sustainable consumption also highlights fundamental questions of democracy: how can one assure equality in participation in today's democracies, which are characterized by large asymmetries in resources and access to institutions and decision makers? Power has structural and actor-specific elements as well as material and ideational sources (Fuchs 2013a, 2013b).

Consequently, modes and levels of consumption are hardly touched by politics. The prevalent market economy is ideologically based on 'free choice' and 'consumer sovereignty', and thus governments as well as civil society organizations are hesitant to interfere with individual lifestyle choices. Market-economy systems (as actually structured) need to constantly increase consumption in order to sustain the economy and, especially, full employment. Thus, in the name of sustainable consumption, their interventions are carefully calibrated to address environmental problems while not slowing down the economy. Consequently, the increased emphasis on efficiency and green consumerism has allowed governments to pay lip service to sustainable consumption while still allowing consumer sovereignty, and tacitly or explicitly encouraging continuous (over) consumption (Akenji 2014).

The aims of this chapter are to document the unsustainability of present prevalent consumption patterns in the overdeveloped world, and to explore in more detail how a transition towards a more sustainable consumption system could be achieved, based on

research outcomes. In section 1.2 we present empirical data that illustrate unsustainable consumption and also the problems of ‘green consumerism’. In section 1.3 we illustrate what we mean by ‘systemic change’; we present consumption as part of a complex system; and argue that systemic change encompasses simultaneous changes in culture, production processes, consumption patterns, lifestyles, economics and politics. In section 1.4 we conclude by elaborating which actions could contribute to such systemic change, and what the role of research could be to support such actions.

1.2 EMPIRICAL EVIDENCE ON UNSUSTAINABLE CONSUMPTION

A huge variety of data illustrate that we are not at all approaching a sustainable level of consuming. The Global Footprint Network (2013), for example, annually calculates the day upon which the renewable resources which should last for a year are consumed already (Table 1.1). Since the mid-1980s the ‘Earth Overshoot Day’ appears earlier and earlier. In 2013 the resources were already used after two-thirds of the year. During the remaining months global population no longer consumes the fruits of nature but consumes from the stock, which is thus constantly shrinking.

Other sources offer more detailed facts, for example:

- Extraction of ‘conventional’ crude oil peaked in 2006; most major fields were discovered in the 1960s and production from them is declining at 4–6 per cent per year and ‘new’ oil cannot keep up (IEA 2010).
- Sixty-three of the 89 non-renewable resources that enable high-tech industrial society had become globally scarce by 2008 (Clugson 2012).
- Eighty-two per cent of monitored fish stocks were fully exploited or overexploited by 2008; 32 per cent are overexploited, up from 10 per cent in the 1970s (FAO 2010).
- Thirty per cent of the world’s arable land has become unproductive; soil erosion and degradation continues at 10–40 times the rate of natural replenishment (Pimentel 2006).

Stopping and reversing these developments requires clear targets and timetables, as well as strategic approaches based on our knowledge of how systemic change could be influenced. Rockström et al. (2009) list nine processes for which it is necessary to define planetary boundaries. They illustrate that in three systems (rate of biodiversity

Table 1.1 Development of Earth Overshoot Day

1987	1990	1995	2000	2005	2007	2008	2009	2010	2011	2012	2013
19.12	07.12	21.11	01.11	20.10	26.10	23.09	25.09	21.08	27.09	22.08	20.08

Note: The discontinuity in 2009 is due to changes/improvements of the calculation methods.

Source: Global Footprint Network (2013).

loss, climate change and human interference with the nitrogen cycle) the safe operating boundaries have already been tremendously exceeded (Rockström et al. 2009).

Considering how to reduce the impacts on the environment, the IPAT formula (Ehrlich and Holden 1971; Thøgersen 2014) is still useful: the impact (I) on the environment is determined by population (P), affluence (A) and technology (T). We will briefly address each of the factors.

According to the *World Population Prospects* (UN DESA 2013) Europe's population (the 'P' factor) is projected to decline by 14 per cent until 2050. However, the current world population of 7.2 billion is projected to increase by almost 1 billion people within 12 years, reaching 8.1 billion in 2025, and 9.6 billion in 2050. Most of the population growth will occur in developing regions, which are projected to increase from 5.9 billion in 2013 to 8.2 billion in 2050. Growth is expected to be most rapid in the 49 least-developed countries, which are projected to double in size from around 900 million inhabitants in 2013 to 1.8 billion in 2050. Next to increasing fertility, life expectancy is also projected to increase and so contributes to the raising population number. The twentieth century witnessed the most rapid decline of mortality in human history. For the world as a whole, life expectancy at birth rose from 47 years in 1950–1955 to 69 years in 2005–2010. Over the next 40 years, life expectancy at birth is expected to continue on a similar path. At the global level, it is projected to reach 76 years in 2045–2050 and 82 years in 2095–2100. By the end of the century, people in developed countries could live on average around 89 years, compared to about 81 years in developing regions. As fertility declines and life expectancy rises, the proportion of the population above a certain age rises. This phenomenon, known as population ageing, is occurring throughout the world.

This is of concern because it reduces the 'fair Earth share' of resources per person. In its 2010 report *Transforming Cultures*, the World Watch Institute (2010) calculated a possible sustainable population in relation to Earth's biocapacity (see Table 1.2). This biocapacity would even allow 13.8 billion people 'if they would live on a biocapacity of one global hectare each'. As the World Watch Institute's figures indicate the income level of people – or in Ehrlich and Holden's terms, the affluence (A) factor – plays the even more important role. Both population and affluence have to be targeted to shrink our footprint to a size that fits the available biocapacity. So the challenging task of the developed nations is to shrink the affluence-related impacts, and for developing nations to increase affluence while not exceeding the fair Earth share.

Table 1.2 Sustainable world population at different consumption levels

Consumption level	Per capita income (2005) (GNI, PPP, 2008 dollars)	Biocapacity/person (global hectares)	Sustainable population at this level (billion)
Low-income	1.230	1.0	13.6
Middle-income	5.100	2.2	6.2
High-income	34.690	6.4	2.1
United States	45.580	9.4	1.4
Global average	9.460	2.7	5.0

Source: WorldWatch (2010).

As to the technology factor (T), the dominant paradigm still is that technology will be able to solve ecological problems through technological innovations, in combination with suitable policies. However it is becoming increasingly recognized that technology alone will not be able to solve these problems. Technological innovations have the potential to transform society, like the Internet; and also have the potential of reducing pollution and enhancing resource efficiency, for instance through dematerialization and through energy efficiency and renewable energy. However rebound effects (Herring and Sorrel 2008) on many levels are counteracting these efficiencies: on the individual level, if consumers spend their saved expenses on unsustainable activities; and on the economic level, when efficiencies spur innovations in more new products and services and economic growth (the Jevons paradox) (Alcott 2005).

For more than a decade scientific knowledge has been available on which product groups cause most environmental pollution; quite often due to fast technological development. The highest environmental impact per capita is caused by food, housing and mobility (Gatersleben et al. 2002; Lorek and Spangenberg 2001; Noorman et al. 1999). More recent and concrete data are provided by the European Environmental Agency (EEA 2013). Only a few product groups contribute significantly (between 30 and 50 per cent) to environmental pressures. These product groups are:

- construction works, that is, buildings and infrastructures;
- food products, beverages and alcohol;
- products of agriculture, forestry and fishing;
- electricity, gas, steam and hot water (the majority of which is electricity).

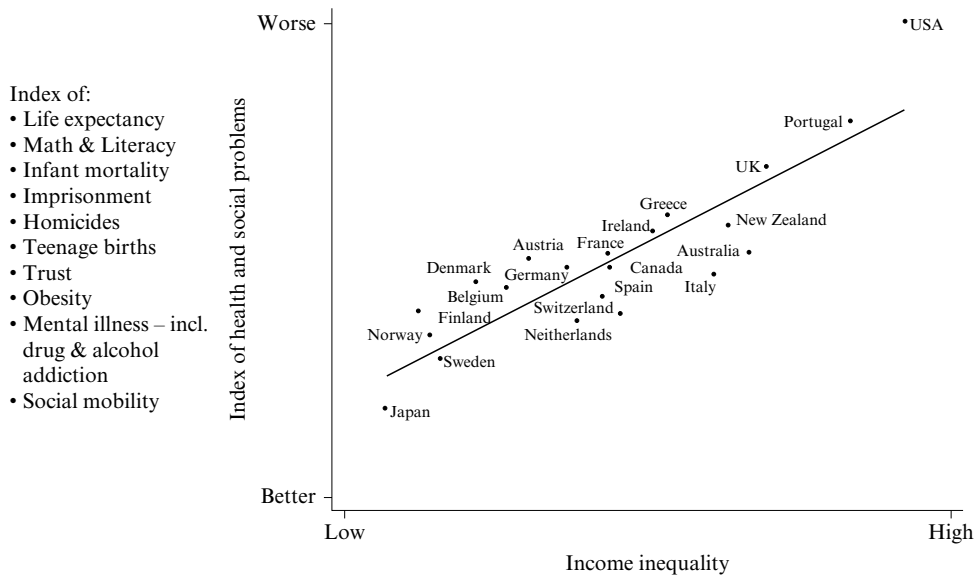
These four together contributed 42 per cent to greenhouse gas emissions, 52 per cent to acidifying emissions, 37 per cent to ground ozone precursors, and 55 per cent to the total material requirements (TMR) embodied in all consumed products in 2005. Interestingly they represent only 17 per cent of total consumption expenditure.

In addition the EEA claims that the production chains for additional seven products accumulate quite significant environmental pressures, though less than the first group of four. These are:

- wholesale and retail services;
- motor vehicles and other transport equipment;
- hotel and restaurant services;
- transport and auxiliary transport services;
- coke and refined petroleum;
- health and social work;
- public administration, defence and social security services.

All 11 key product groups together account for 75–85 per cent of the key environmental pressures caused by expenditure on goods and services.

So, recognizing, that all factors of the IPAT equation are increasing, including the impact on the environment, the question arises of whether the increase in A has at least some measurable benefits beyond just affluence. Research suggests that this is only the case to a very limited extent. There is a wealth of data showing that above a certain (low)



Source: Wilkinson and Pickett (2009).

Figure 1.1 *Health and social problems in relation to income inequality*

income level, increased consumption of material goods does not increase happiness. For instance, in the US, a tripling of annual income since 1957 has made little or no effect on levels of happiness (Myers 1993). Across countries, above a certain level of income, subjective well-being hardly increased (Inglehart and Klingemann 2000).

In addition, since the 1980s inequality has increased in most countries. It has been amply documented that more equal societies perform better on a wide range of social indicators of well-being, including social trust and support for democratic institutions, political participation, educational outcomes, health status, crime and opportunities for social mobility (Wilkinson and Pickett 2009) (Figure 1.1). A society with large income disparities provides the free market system with a perfect setting for exploiting the natural human tendency toward insatiability and positional consumption, and thus perpetuates and inflames the consumerist society. Less inequality will also mean lower material consumption and a smaller environmental burden, while providing greater life satisfaction and a higher standard of living for most people (Vergragt 2013).

1.3 TOWARDS SYSTEMIC CHANGE¹

As a result of the argument above, some scholars insist that next to efficiency we need to consider sufficiency as a leading principle. Sufficiency explores the question: how much is enough? (Princen 2005). Sufficiency needs to be connected to two issues: one is individual and social well-being; and the other is ecological sustainability. Thus a sufficiency lifestyle should on the one hand remain within the ecological footprint that reflects a

fair Earth share; and on the other hand enhance human and social well-being. There are many visions and scenarios for such sustainability lifestyles that reflect sufficiency, for instance the Tellus Institute's Great Transition Scenario (Great Transition Initiative 2013) and the SPREAD project (Sustaining Partnerships to enhance Rural Enterprise and Agribusiness Development) (Kuittinen et al. 2012; Mont et al. 2014). The challenge is not only to develop appealing visions of the future, but especially to develop strategies and policies about how to get there. So far, there is a deficiency in successful strategies and policies.

Based on scientific research, a number of strategies for systemic change have been developed over the last decade or so. The socio-technical transitions framework focuses mainly on technological innovations. The framework in essence stipulates that technological and social innovations are developed in niches, where social actors are able to experiment with the design and the implementation of new technologies, social arrangements and organizational structures (Geels and Schot 2007). Once experiments in niches have developed the innovation into a somewhat stable design, the niche may eventually challenge the mainstream, which is called a socio-technical regime (for example, the internal combustion motor regime). The destabilization of the socio-technical regime may be further enhanced when 'landscape' developments push in the same direction (for instance, the global challenges of climate change). The incumbent regime may eventually be replaced by a more sustainable regime.

A second framework of systemic change is the perspective of grass-roots innovations (Seyfang 2009; Seyfang and Smith 2007), which is also discussed under the heading of 'bounded socio-technical experiments' (BSTEs) (Brown and Vergragt 2008). BSTEs are in essence experiments in alternative technologies and social arrangements in niches; this framework focuses on the social learning processes that take place in those niches. The theory claims that learning occurs when actors with different world views (business, government, civil society and academia) collaborate in concrete projects, for instance on the design of a sustainable transportation system or a sustainable city concept. In such collaboration the actors, guided by their different world views, initially develop incompatible problem definitions (profit making, long-term social benefits, social change, knowledge creation). During the project, and especially in the design stage, actors mutually adjust their problem definitions (but not their world views, which are stable), and develop a joint problem definition that guides their collaboration. This development and stabilization of a common problem definition constitutes higher-order learning, and actors can transfer this learning to their subsequent projects.

Seyfang and Smith have studied 'grassroots innovations' existing in the 'social economy' of community activities and social enterprise, rather than in the market economy (Seyfang 2009, pp. 72–73; Seyfang and Smith 2007). Among their examples are: local currencies, local farmers' markets, non-traditional housing and others. The institutional forms of those initiatives are different from market institutions, including co-operatives, voluntary associations, informal community groups and other social enterprises. They are driven by two motivations – social and environmental needs, and ideology – and emphasize different social, ethical and cultural rules and values. Social and environmental needs could for instance consist of access to affordable and sustainable housing, fresh and sustainable food, sustainable transportation services and so on. Ideology refers to 'alternative ways of doing things, counter to the hegemony of the

regime . . . Some grassroots innovations develop practices based on reordered priorities and alternative values. Examples are for instance the new economics, focusing on the quality of life rather than on economic growth per se' (Seyfang 2009, p. 74).

Another framework of systemic change has been developed under the heading of 'visioning and back casting' (Quist et al. 2011). Back casting can be defined as 'generating a desirable future, and then looking backwards from that future to the present in order to strategize and to plan how it could be achieved' (Vergragt and Quist 2011). It has gradually become more widely applied over the last decade. This is related to the rising popularity of the strongly normative concept of sustainability. Back casting also has a strongly normative nature, and therefore it is especially well equipped to be applied to sustainability issues. Backcasting works through envisioning and analysing sustainable futures and subsequently by developing agendas, strategies and pathways for how to get there. Visioning and back casting have been used for example in the SPREAD project (Corubolo et al. 2012; Kuittinen et al. 2012; Mont et al. 2014).

In the sociological literature the concept of 'new social movements' is relevant (Buechler 1990; Tarrow 2005; Tarrow et al. 2001). The most noticeable feature of new social movements is that they are primarily social and cultural and only secondarily, if at all, political. New social movements concentrate on bringing about social mobilization through cultural innovations, development of new lifestyles and transformation of identities. Some of them also emphasize post-material values in contemporary and post-industrial society, as opposed to conflicts over material resources. These contemporary social movements reject the materialistic orientation of consumerism and question the modern idea that links the pursuit of happiness and success closely to growth, progress and increased productivity, and promote alternative values and understandings in relation to the social world.

Akenji (2014) offers a useful conceptual model of change, the attitudes–facilitators–infrastructure (AFI) framework. It presents three conditions necessary to shift the system towards sustainability: the right attitudes by all stakeholders (shaped by values and knowledge); facilitators to translate attitudes into action (incentives and constraints); and sustainable infrastructure (including systems of provision and the physical infrastructure).

In addition to the above-mentioned approaches to systemic change, there are other useful approaches that are cross-cutting the field of sustainable consumption. One approach is the social practice theory (Halkier 2013; Shove and Walker 2010). Social practice scholarship views consumers of goods and services as practitioners immersed in the affairs of everyday life. Practices are the ways that people constitute the ordinary tasks of working, cooking, washing, preparing food, socializing and relaxing. Moreover most individuals typically regard themselves as practitioners engaged in the business of living, rather than as consumers of scarce commodities. This approach offers a useful new perspective on consumption practices; however it offers few insights into how to change established consumption practices.

Given that the individual is deeply embedded in societal, economic and political structures, governance for change will have to focus on structural changes, which in turn is where governments become important. This does not mean that individual, voluntary approaches should not be appreciated. However groups and movements such as the voluntary simplicity movement (Doherty and Etzioni 2003; Elgin 1993; Maniates 2002),

which has recently gained attention in marketing concepts such as LOVOS (Lifestyle of Voluntary Simplicity) or voluntary downshifting (Hamilton 2010), tend to include small sectors of society only and thus are not sufficient to solve system-wide problems.

Several research approaches have started to explore governance opportunities for the kinds of substantial structural reforms that are needed; that is, that would go beyond the inclusion of external costs in prices or other market-related approaches. These approaches include system innovation research (Tukker 2008), evolutionary economics (Boulding 1991) and critical realism (Archer et al. 1998; Bhaskar 1978; Lorek 2010), for example.

A discussion that touches on sustainable consumption is the growth–degrowth debate, which is on the rise both within economics but also in the social movements around sustainable consumption (Demaria et al. 2013; Schneider et al. 2010; Sekulova et al. 2013). This debate is closely connected to the efficiency–sufficiency debate. Economic growth (measured in gross domestic product, GDP) has since the Second World War been the bedrock of economic theories and government policies. Economic growth is supposed to generate employment for most, as well as technological innovations, infrastructure development, and lifting the poor out of poverty. However, after the Great Recession it became clear that it did not deliver its promises (including a steep rise in inequality); and it had a strong negative impact on the environment (Harris 2013; Røpke 2013; Schneider et al. 2010, 2011).

In this context the notion of decoupling has emerged. Resource decoupling means reducing the rate of resource use per unit of economic activity measured in GDP. A distinction is often made between relative and absolute decoupling (Jackson 2009, Ch. 5). Relative decoupling is achieved when resource use grows less than GDP; it reflects a reduction of energy and materials use and emissions per unit of production. Unfortunately such a reduction is most often offset by further economic growth. Thus absolute decoupling is called for, meaning that resource use decreases in absolute terms in the sense of real dematerialization of societies, which is most often incompatible with economic growth in terms of GDP (O’Neill 2012).

In line with this, the degrowth movement argues that in (over)developed countries the economy should shrink in a planned and orderly way, not through recessions and economic calamities (Alperovitz 2011) or, as Victor (2008) phrased it: ‘slower by design not disaster’. Some modelling has been performed on degrowth, which shows that public investments rather than private consumption, in combination with a shortening of the working week, could possibly achieve a degrowth scenario (Victor 2008, 2010).

Degrowth can be considered to be part of the ‘new economy’ movement, which conceptually has a macroeconomic component (Harris 2013; Røpke 2013) (degrowth of the economy, and different indicators than GDP for human and economic well-being); but also has a grass-roots innovation component, as it concentrates on socio-technical experiments, alternative currencies, experiments such as transition towns and different forms of company ownership such as co-operatives (Jackson and Victor 2013; Miller 2012).

Fuchs and Lorek (2005) make a useful distinction between weak and strong sustainable consumption, based on Neumayer’s distinction of weak and strong sustainability (Neumeyer 2003). They suggest that the current ‘green economy’ or ‘green growth’ agenda is insufficient and potentially counterproductive to the long-term goal of sustainability because of its reliance on weak sustainability stimuli (Lorek and

Spangenberg 2014). Institutional change that promotes strong sustainable consumption is a necessary condition for sustainable development and calls for the greater involvement of government and powerful actors in encouraging public debate.

To better motivate a governance for change, a two-pronged strategy seems necessary: that is, a carrot and stick approach (Lorek 2010). The stick would be strong government regulations including capping unsustainable consumption levels, in combination with a communications strategy explaining why these are necessary (Thøgersen 2014).

The carrot for strong sustainable consumption is to raise the awareness of the fact that a slimming of the economy, that is, reducing its physical throughput, is accompanied by many positive side effects – if we are prepared for it. Well-being in developed countries has for some time already been decoupled from economic growth (Daly et al. 1990; Jackson 2009; Mulder et al. 2006). This needs to be communicated more effectively. Understanding and internalizing alternative measures of well-being (NEF 2009; Stiglitz et al. 2009) can help to overcome growth addiction (Van Griethuysen 2009), not by downplaying losses but by highlighting gains, for example, of time and self-realization (Grober 2012; Reisch 2001). It is important to sensitize people to the relevance of other elements of well-being beyond material consumption. Examples like the US initiative ‘Take Back Your Time’ for reducing working hours and extended holidays are a valid contribution to strong sustainable consumption without explicitly focusing on it (de Graaf 2003; Maniates 2010). Also, the public discourse on happiness can help in considering the limitations on increasing human well-being through material consumption (Hofstetter et al. 2006; Layard 2005).

Successful governance for strong sustainable consumption as well as successful degrowth governance will depend on governments taking responsibility and making tough choices (Lorek and Fuchs 2013). Capping and the protection of resources in the interest of societal sustainability are unavoidable (see also Princen 2010). It is governments’ responsibility to phase out unsustainable consumption options (Church and Lorek 2007) or to carry out ‘choice editing’ as it is called more recently (Maniates 2009; Thaler and Sunstein 2008). As long as national governments understand their role in the governance of sustainable consumption as one of providing opportunities for the exchange of opinions and voluntary commitments that are not controlled, a significant drive will fail to materialize (Berg 2006). In consequence, pressuring governments to take responsibility is a crucial strategy to pursue.

To overcome socio-psychological lock-in – for consumers, policy makers and business decision makers – scenarios can help to imagine and compare the potential implications of choice options. For strong sustainable consumption they remain unrecognized, like the ‘Great Transition’ scenario mentioned earlier (Raskin et al. 2002). This makes the decision process abstract and hinders a broader perception of what the choice really encompasses. It can even result in the paradoxical effect that to some the ongoing degrowth debate strengthens rather than challenges the growth paradigm; for consumers as well as for political decision makers, as Berg and Hukkinen (2011) have shown in their narrative analysis of the Finnish sustainable consumption and production debate. Scenarios need to compare the suggested strong sustainable consumption option with the risks and costs of inaction, economic as well as social (Lorek and Spangenberg 2014; OECD 2008).

1.4 CONCLUSIONS

In this chapter we have argued that present ‘Northern’ lifestyles and consumption patterns have led to unsustainable environmental impacts, and also have led to deep inequalities which are equally unsustainable. Many publications and data sets have shown that these problems will increase due to population growth, urbanization and further increases of affluence due to the emerging of a new global middle class. Deep systemic changes are necessary in our current patterns of housing, transportation and food consumption. Green consumerism, setting the prices right and creating the right incentives for individual consumers are necessary, but will not be enough to address these problems. Such measures amount to what we have mostly called weak sustainable consumption.

Deep systemic changes need leadership and governance, learning from experiments, collaboration between stakeholders, new business models, and new framings and communications. Research can elucidate the conditions for success and failure, as well as help to more successfully communicate the urgency. Research also needs to generate clear and time-bound targets of what has to be reduced, by whom and when, if humanity aspires to stay within ecological limits. Such scenarios should highlight the social costs of inaction and the risks for social security from the local to the global level. Scientifically solid targets have to serve as orientation points for political and societal development.

Most research to date has either addressed the supply side and technological solutions, or has focused on behavioural change of individual consumers. To date, research has hardly begun to investigate a possible and necessary societal transition to new and sustainable production and consumption systems, which includes new economics, and a new post-consumerist culture. Research into these issues is complex and trans disciplinary. It needs to cover the various dimensions (material, technological, economic, cultural, psychological, historical and political) in an integrated way. It should cover domains such as food, housing, transportation and leisure. It should study successful examples and the conditions for success, and failures and causes of failure, and it should conduct comparative studies.

Research should ultimately contribute to developing a theory of social change that would contribute to systemic social change, including a transition to new and sustainable lifestyles and values. Technological change and individual consumption habits and patterns would be part of this research programme, but social change research would be an important and integral part of this endeavour.

NOTE

1. Partially based on Vergragt et al. (2014).

REFERENCES

- Abdallah, S., S. Thompson, J. Michaelson, N. Marks and N. Steuer (2009), *The Happy Planet Index 2.0: Why Good Lives Don't Have to Cost the Earth*, London: NEF (New Economics Foundation).

- Akenji, L. (2014), 'Consumer scapegoatism and limits to green consumerism', *Journal of Cleaner Production*, 63, 16–23.
- Alcott, B. (2005), 'Jevons' paradox', *Ecological Economics*, 54 (1), 9–21.
- Alperovitz, G. (2011), 'The New Economy movement', *Nation*, 13 June, available at <http://www.thenation.com/article/160949/new-economy-movement#> (accessed 24 February 2014).
- Archer, M., R. Bhaskar, A. Collier, T. Lawson and A. Norrie (eds) (1998), *Critical Realism: Essential Readings*, Abingdon: Routledge.
- Berg, A. (2006), 'Innovative governance or outsourcing politics? Discussing European forerunner cases of sustainable consumption and production', *Proceedings: The Ninth Biennial Conference of The International Society for Ecological Economics, Ecological Sustainability and Human Well-being*, New Delhi, India.
- Berg, A. and J.I. Hukkinen (2011), 'The paradox of growth critique: narrative analysis of the Finnish sustainable consumption and production debate', *Ecological Economics*, 72, 151–160.
- Bhaskar, R. (1978), *A Realist Theory of Science*, Brighton: Harvester Press.
- Botsman, R. and R. Rogers (2010), *What's Mine is Yours: The Rise of Collaborative Consumption*, New York: Harper Collins.
- Boulding, K.E. (1991), 'What is evolutionary economics?', *Journal of Evolutionary Economics*, 1, 9–17.
- Brown, H.S. and P.J. Vergragt (2008), 'Bounded socio-technical experiments as agents of systemic change: the case of a zero-energy residential building', *Technological Forecasting and Social Change*, 75, 107–130.
- Brown, H.S. and P.J. Vergragt (forthcoming), 'From consumerism to wellbeing: towards a cultural transition?', *Journal of Cleaner Production*.
- Buechler, S.M. (1990), *Social Movements in Advanced Capitalism*, New York: Oxford University Press.
- Church, C. and S. Lorek (2007), 'Linking policy and practice in sustainable production and consumption: an assessment of the role of NGOs', *International Journal of Innovation and Sustainable Development*, 2 (2), 230–240.
- Clugson, C.O. (2012), *Scarcity: Humanity's Final Chapter?* Port Charlotte, FL: Booklocker.
- Cohen, L. (2004), *Consumer Republic: The Politics of Mass Consumption in Postwar America*, New York: Vintage Books.
- Corubolo, M., F. Jégou, A. Meroni, F. Piredda and Z. Zhang (2012), *Visual Material Presenting Emerging Best Practice and Emerging Visions on Sustainable Lifestyles*, Milan: Politecnico di Milano.
- Daly, H.E., J.B. Cobb Jr and C.W. Cobb (1990), *For the Common Good: Redirecting the Economy Towards Community, the Environment and a Sustainable Future*, London: Green Print.
- De Graaf, J. (ed.) (2003), *Take Back Your Time: Fighting Overwork and Time Poverty in America*, San Francisco, CA: Berrett-Koehler.
- Demaria, F., F. Schneider, F. Sekulova and J. Martinez-Alier (2013), 'What is degrowth? From an activist slogan to a social movement', *Environmental Values*, 22, 191–215.
- Doherty, D. and A. Etzioni (2003), *Voluntary Simplicity: Responding to Consumer Culture*, Lanham, MD: Rowman & Littlefield.
- EEA (European Environmental Agency) (2013), 'Environmental pressures from European consumption and production', EEA Technical report 2/2013, Copenhagen: EEA.
- Ehrlich, P. and J. Holden (1971), 'Impact of population growth', *Science*, 171, 1212–1217.
- Elgin, D. (1993), *Voluntary Simplicity: Toward a Way of Life that is Outwardly Simple, Inwardly Rich*, rev. edn, New York: Harper Paperbacks.
- Ewens, S. (1998), *PR: The Social History of Spin*, New York: Basic Books.
- FAO (Food and Agriculture Organization) (2010), *The State of World Fishery and Aquaculture*, Rome: Food and Agriculture Organization.
- Fuchs, D. (2013a), 'Sustainable consumption', in R. Falkner (ed.), *Handbook of Global Climate and Environmental Policy*, Hoboken, NJ: Wiley-Blackwell, pp. 215–230.
- Fuchs, D. (2013b), 'Theorizing the power of global companies', in J. Mikler (ed.), *Handbook of Global Companies*, Hoboken, NJ: Wiley-Blackwell, pp. 77–95.
- Fuchs, D. and S. Lorek (2005), 'Sustainable consumption governance – a history of promises and failures', *Journal of Consumer Policy*, 28, 261–288.
- Garon, S. (2012), *Beyond Our Means: Why America Spends While the World Saves*, Princeton, NJ: Princeton University Press.
- Gatersleben, B., L. Steg and C. Vlek (2002), 'Measurement and determinants of environmentally significant consumer behavior', *Environment and Behavior*, 34 (3), 335–362.
- Geels, F. and J. Schot (2007), 'Typology of sociotechnical transition pathways', *Research Policy*, 36, 399–417.
- Global Footprint Network (2013), 'Earth overshoot day', available at http://www.footprintnetwork.org/en/index.php/GFN/page/earth_overshoot_day/ (accessed 24 January 2014).
- Great Transition Initiative (2013), available at <http://gtinitiative.org> (accessed 24 February 2014).
- Grober, U. (2012), *Sustainability: A Cultural History*, Totnes: Green Books.
- Halkier, B. (2013), 'Sustainable lifestyles in a new economy: a practice theoretical perspective on change

- behavior campaigns and sustainability issues', in M. Cohen, H. Brown and P. Vergragt (eds), *Innovations in Sustainable Consumption: New Economics, Socio-Technical Transitions, and Social Practices*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar, pp. 209–228.
- Hamilton, C. (2010), 'Consumerism, self-creation and prospects for a new ecological consciousness', *Journal of Cleaner Production*, 18 (6), 571–575.
- Harris, J. (2013), 'The macroeconomics of development without throughput growth', in M. Cohen, H. Brown and P. Vergragt (eds), *Innovations in Sustainable Consumption: New Economics, Socio-Technical Transitions, and Social Practices*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar, pp. 31–47.
- Herring, H. and S. Sorrell (eds) (2008), *Energy Efficiency and Sustainable Consumption: The Rebound Effect*, New York: Palgrave Macmillan.
- Hofstetter, P., M. Madjar and T. Ozawa (2006), 'Happiness and sustainable consumption: psychological and physical rebound effects at work in a tool for sustainable design', *International Journal of Life Cycle Assessment*, 11 (1), 105–115.
- IEA (International Energy Agency) (2010), *World Energy Outlook*, Paris: IEA.
- Inglehart, R. and H.-D. Klingemann (2000), *Genes, Culture, and Happiness*, Boston, MA: MIT Press.
- Jackson, T. (2009), *Prosperity without Growth: Economics for a Finite Planet*, London: Earthscan.
- Jackson, T. and P. Victor (2013), 'Green economy at community scale', Toronto: Metcalf Foundation, available at <http://metcalffoundation.com/wp-content/uploads/2013/10/GreenEconomy.pdf> (accessed 8 January 2014).
- Kuittinen, O., R. Mokka, A. Neuvonen, M. Orjasniemi, M. Ritola and M. Wikholm (2012), *I-Future Diversity of Sustainable Lifestyles*, Helsinki: Demos.
- Layard, R. (2005), *Happiness: Lessons From a New Science*, New York: Penguin Press.
- Lebel, L. and S. Lorek (2008), 'Enabling sustainable production–consumption systems', *Annual Review of Environment and Resources*, 33, 241–275.
- Lorek, S. (2010), *Towards Strong Sustainable Consumption Governance*, Saarbrücken: LAP Publishing.
- Lorek, S. and D. Fuchs (2013), 'Strong sustainable consumption governance – precondition for a degrowth path?', *Journal of Cleaner Production*, 38, 36–43.
- Lorek, S. and J.H. Spangenberg (2001), 'Indicators for environmentally sustainable household consumption', *International Journal of Sustainable Development*, 4 (1), 101–120.
- Lorek, S. and J.H. Spangenberg (2014), 'Sustainable consumption within a sustainable economy – beyond green growth and green economies', *Journal of Cleaner Production*, 63, 33–44.
- Maniates, M. (2002), 'In search of consumptive resistance: the voluntary simplicity movement', in T. Princen, M. Maniates and K. Conca (eds), *Confronting Consumption*, Cambridge, MA: MIT Press, pp. 199–235.
- Maniates, M. (2009), 'Editing out unsustainable behavior', in E. Assadourian, L. Starke and L. Mastny (eds), *State of the World 2010: Transforming Cultures, From Consumerism to Sustainability*, New York: W.W. Norton & Company, pp. 119–126.
- Maniates, M. (2010), 'Cultivating consumer restraint in an ecologically full world: the case of "take back your time"', in L. Lebel, S. Lorek and R. Daniel (eds), *Sustainable Production and Consumption System*, Dordrecht: Springer, pp. 13–37.
- Miller, E. (2012), 'Solidarity economy: key concepts and issues', in E. Kawano (ed.), *Solidarity Economy I: Building Alternatives for People and Planet; Papers and reports from the 2009 US Forum on the Solidarity Economy*, Amherst, MA: Center for Popular Economics, pp. 25–42.
- Mont, O., E. Heiskanen, A. Neuvonen and S. Lähteenoja (2014), 'Sustainable lifestyles 2050: Stakeholder visions, emerging practices and future research', *Journal of Cleaner Production*, 63, 24–32.
- Mulder, K., R. Costanza and R. Erickson (2006), 'The contribution of built, human, social and natural capital to quality of life in intentional and unintentional communities', *Ecological Economics*, 59 (1), 13–23.
- Myers, D.G. (1993), *The Pursuit of Happiness: Who is Happy, and Why?*, New York: Harper Paperbacks.
- NEF (New Economics Foundation) (2009), *National Accounts of Well-being: Bringing Real Wealth onto the Balance Sheet*, London: NEF.
- Neumayer, E. (2003), *Weak Versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms*, 2nd edn, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.
- Noorman, K.J., W. Biesiot and H. Moll (1999), 'Changing lifestyles in transition routes towards sustainable household consumption patterns', *International Journal of Sustainable Development*, 2 (2), 231–244.
- OECD (2008), *The Costs of Inaction on Key Environmental Challenges*, Paris: Organisation for Economic Co-operation and Development.
- O'Neill, D.W. (2012), 'Measuring progress in the degrowth transition to a steady state economy', *Ecological Economics*, 84, 221–231.
- Oslo Roundtable (1994), 'Part 1 – The imperative of sustainable production and consumption', available at <http://www.iisd.ca/consume/oslo004.html> (accessed 7 January 2014).
- Pimentel, D. (2006), 'Soil erosion: a food and environmental threat', *Environment, Development and Sustainability*, 8, 119–137.

- Princen, T. (2005), *The Logic of Sufficiency*, Cambridge, MA: MIT Press.
- Princen, T. (2010), *Treading Softly – Paths to Ecological Order*, Cambridge, MA: MIT Press.
- Quist, J., W. Thissen and P.J. Vergragt (2011), 'The impact and spin-off of participatory backcasting: from vision to niche', *Technological Forecasting and Social Change*, 78 (5), 883–897.
- Raskin, P., T. Banuri, G. Gallopin, P. Gutman, A. Hammond, R. Kates and R. Stewart (2002), *Great Transition, the Promise and Lure of the Times Ahead*, Boston, MA: Stockholm Environment Institute and Tellus Institute.
- Reisch, L.A. (2001), 'Time and wealth: the role of time and temporalities for sustainable patterns of consumption', *Time and Society*, 10 (2–3), 387–405.
- Rockström, J., W. Steffen, K. Noone, Å. Persson, F.S. Chapin, E.F. Lambin, T.M. Lenton et al. (2009), 'A safe operating space for humanity', *Nature*, 461, 472–475.
- Röpke, I. (2013), 'Ecological macroeconomics: Implications for the role of consumer-citizens', in M. Cohen, H. Brown and P. Vergragt (eds), *Innovations in Sustainable Consumption: New Economics, Socio-Technical Transitions, and Social Practices*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar, pp. 48–64.
- Schneider, F., G. Kallis and J. Martinez-Alier (2010), 'Crisis or opportunity? Economic degrowth for social equity and ecological sustainability', Introduction to Special Issue, *Journal of Cleaner Production*, 18 (6), 511–518.
- Schneider, F., J. Martinez-Alier and G. Kallis (2011), 'Sustainable degrowth', *Journal of Industrial Ecology*, 15, 654–656.
- Sekulova, F., G. Kallis, B. Rodríguez-Labajos and F. Schneider (2013), 'Degrowth: from theory to practice', *Journal of Cleaner Production*, 38, 1–6.
- Seyfang, G. (2009), *The New Economics of Sustainable Consumption*, New York: Palgrave Macmillan.
- Seyfang, G. and A. Smith (2007), 'Grassroots innovations for sustainable development: towards a new research and policy agenda', *Environmental Politics*, 16 (4), 584–603.
- Shove, E. and G. Walker (2010), 'Governing transitions in the sustainability of everyday life', *Research Policy*, 39 (4), 471–476.
- Stiglitz, J., A. Sen and J.P. Fitoussi (2009), *Report by the Commission on the Measurement of Economic Performance and Social Progress*, Paris: Commission on the Measurement of Economic Performance and Social Progress.
- Tarrow, S. (2005), *The New Transnational Activism*, Cambridge: Cambridge University Press.
- Tarrow, S., D. McAdam and C. Tilly (2001), *Dynamics of Contention*, Cambridge: Cambridge University Press.
- Thaler, R.H. and C.R. Sunstein (2008), *Nudge, Improving Decisions about Health, Wealth, and Happiness*, New Haven, CT: Yale University Press.
- Thøgersen, J. (2014), 'Unsustainable consumption: basic causes and implications for policy', *European Psychologist*, 19 (2), 84–95.
- Tukker, A. (ed.) (2008), *System Innovation for Sustainability I*, Sheffield: Greenleaf.
- UN DESA (2013), *World Population Prospects: The 2012 Revision*, New York: United Nations, Department of Economic and Social Affairs, Population Division.
- Van Griethuysen, P. (2009), 'Why are we growth-addicted? The hard way towards degrowth in the involuntary western development path', *Journal of Cleaner Production*, 18 (6), 590–595.
- Vergragt, P.J. (2013), 'A possible way out of the combined economic-sustainability crisis', *Environmental Innovation and Societal Transitions*, 6, 123–125.
- Vergragt, P., L. Akenji and P. Dewick (2014), 'Sustainable production, consumption, and livelihoods: global and regional research perspectives', *Journal of Cleaner Production*, 63, 1–12.
- Vergragt, P.J. and J.N. Quist (2011), 'Backcasting for sustainability: introduction to a special issue', *Technological Forecasting and Social Change*, 78 (5), 747–755.
- Victor, P.A. (2008), *Managing without Growth: Slower by Design, Not Disaster*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.
- Victor, P.A. (2010), 'Questioning economic growth', *Nature*, 468, 370–371.
- Wilkinson, R.G. and K. Pickett (2009), *The Spirit Level: Why More Equal Societies Almost Always Do Better*, New York: Bloomsbury Press.
- WorldWatch Institute (2010), *State of the World 2010: Transforming Cultures*, New York: WW Norton & Company.