Future Earth Knowledge-Action Network

on

Systems of Sustainable Consumption and Production

Research and Engagement Plan

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Chapter 1
Rationale for the Knowledge-Action Network on Systems of Sustainable Consumption and Production

The scientific community has made over the past two decades significant progress documenting and understanding the impacts of contemporary forms of material provisioning on the physical environment. Sizeable investments have additionally been devoted to applied research and technology innovation to increase the efficiency of natural resource use and to transition toward less harmful engineered systems. However, it is becoming increasingly apparent that focusing largely on science and technology, while necessary, is not sufficient for achieving the types and magnitudes of reductions in material and energy demand that are necessary to prevent looming social and ecological crises. Equal consideration must be given to end-user consumption and the social structures that relentlessly drive it upward.

This situation is attributable to several factors. First, production and consumption are parts of one system and are mutually reinforcing: producers seek to increase throughput while consumer purchases incentivize more production. Business and policy agendas are deeply dependent on maintaining these arrangements through the economic growth imperative, thus setting up a competition among physical, social, and political sustainabilities. Second, any large-scale dominant technology is embedded in complex and stable socio-technical systems and therefore successful transformation toward new alternatives requires changes in all constituent subsystems, including other technologies, institutions, culture and social practices, and the economy. Third, increasing efficiency of natural resource use, including recent calls for a circular economy, tends to stimulate demand through perverse rebound effects, thus at least partly offsetting initial technological achievements. Finally, the objectives of policies aimed at more sustainable production often compete with equally important social goals to reduce societal inequalities and poverty. One such instance includes so-called smart-city policies that strive to implement multi-modal transportation, to construct high-performance buildings, and to foster more "livable" cities, and which inevitably usher in gentrification and widening disparities. In another example, reducing global poverty will obviously lead to greater requirements for energy and materials, thus putting additional stress on the planet's biophysical limits.

To reconcile the competing agendas, account for unintended consequences of technological change, and address complexity the research community needs to be widely diverse in terms of disciplinary contributions and geographic and cultural perspectives as well as be deeply engaged in multi-directional interactions with practitioner communities. If we are to sustainably reconfigure agro-food systems, implement renewable energy sources, and reinvent housing, city planning, and modes of mobility, these socio-technical innovations will need to be formulated in ways that enhance global equity, reduce unequal access to resources, and enable all people on the planet to lead flourishing lives within biophysical constraints. These imperatives have been recognized in the United Nations' Sustainable Development Goals (SDGs) and Goal #12 is specifically devoted to the objective of "responsible consumption and production" which

"aims at 'doing more and better with less,' increasing net welfare gains from economic activities by reducing resource use, degradation and pollution along the whole life cycle, while increasing quality of life."[1] Concomitantly, the 2015 Paris Climate Agreement recognizes "that sustainable lifestyles and sustainable patterns of consumption and production, with developed country Parties taking the lead, play an important role in addressing climate change."[2]

The Future Earth (FE) Knowledge-Action Network (KAN) on Systems of Sustainable Consumption and Production (SSCP) was created specifically to address this research and implementation challenge and to develop the notion of "systems of sustainable consumption and production." The KAN was initiated in 2016 and is a global network that emphasizes the need to address whole provisioning systems, including consumption practices and production conditions, as well as life-cycle impacts and the economic, political, social, and cultural imperatives that impel consumerist lifestyles.[3] To promote a more systemic approach to sustainable consumption and production and to enable a transformation in theory and practice, the KAN is devoted to strengthening collaboration between communities of researchers and practitioners currently focused on either consumption or production, including decision makers and other stakeholders. The KAN received funding in 2017 for an organizational workshop from the National Socio-Environmental Synthesis Center (SESYNC) at the University of Maryland and receives administrative support from the Kyoto-based Future Earth Regional Centre for Asia (part of the Research Institute for Humanity and Nature). The administrative responsibilities of the KAN are carried out by a coordinating group with members based in the United States, Europe, and Japan and other activities engage a much wider global network of participants. Most of the creative work of the KAN is carried out by five Working Groups that are described in greater detail in this plan.

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[1] Quoted from http://www.un.org/sustainabledevelopment/sustainable-consumption-production.

[2] Quoted from http://unfccc.int/paris_agreement/items/9485.php.

[3] See http://www.futureearth.org/future-earth-sscp.

Chapter 2
Conceptual Framework for the KAN

2.1 Introduction

 With the global population projected to reach 9.6 billion by 2050, and in view of finite resource availability and resilience of the Earth system, current patterns of global development are not sustainable. An urgent fundamental restructuring of current systems of production, distribution, and consumption is indispensable to accommodate world demographic growth and rising consumption while facilitating sustainability for more people. Agenda 21, adopted at the Rio Earth Summit in 1992, first highlighted the need for a transition toward sustainable consumption and production (SCP). More recently, the United Nations' Sustainable Development Goals (SDGs) reaffirmed the overarching importance of SCP, identifying it as an explicit objective (SDG #12) and acknowledging its cross-cutting relevance to numerous other goals including health and well-being, clean energy, decent work and economic growth, and sustainable cities and communities (Bengtsson et al 2018). The concepts of "planetary boundaries" (Rockström et al 2009) and the "doughnut economy" (Raworth 2017) are basic building blocks for this emerging conceptual framework.

2.2 Main objectives

 The Future Earth Knowledge-Action Network on Systems of Sustainable Consumption aims to advance a systems perspective of SCP and to encourage and enable an urgent transition to SCP systems. The conceptual approach for research is based on the evolving SCP framework and life cycle approaches to sustainability.[4] This perspective emphasizes the need to address whole provisioning systems, including consumption practices and production conditions, as well as life-cycle impacts and the economic, political, social, and cultural imperatives that impel consumerist lifestyles. This approach is amplified by the differentiated interdisciplinary activities of the KAN's five working groups which are summarized in Section 7 and described in more detail in their respective scoping papers.[5]

 An important objective of the KAN is to bridge the divide between research and practice and to move from separate and "siloed" approaches toward more holistic and systemic approaches and solutions. Currently missing is a robust understanding of the systemic nature of the present production-consumption system (or systems) and a deep conceptualization of how systemic change could be triggered, accelerated, and managed. Bridging research and practice (or knowledge and action) in relation to the need to achieve sustainable patterns of consumption has long been an elusive pursuit. In recent years, SCP scholars have formulated a new research agenda on how to facilitate social change beyond consumerism but political obstacles have thus

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[4] See https://www.lifecycleinitiative.org/starting-life-cycle-thinking/what-is-life-cycle-thinking.

[5] See http://www.futureearth.org/sscp-kan-community-forums.

far limited its diffusion. Thus communicating *for* SCP will need to be an essential part of this emerging conceptual framework.[6]

2.3 A practitioner's perspective

Practitioners are often impelled by ambitious visions though their explicit plans almost invariably become bogged down in the mundane details of advocating for even minor policy changes. Research questions seldom emerge from these initiatives, especially not beyond tool development and evaluation of interventions. Co-production of theory and praxis, or closer collaboration between knowledge and action, seems to be the solution, but because of the inherent scale of the challenge there are few examples of successful cases. With respect to SCP most policy makers and business actors favor models that do not supplant existing socio-technical regimes, economic arrangements, or power relationships, and thus conveniently sidestep the root causes of present-day unsustainable provisioning systems.

However, new opportunities regularly avail themselves due to unfolding societal developments. For instance, there are increasing signs becoming apparent that consumer society is eroding (or at least waning) in the wealthy countries and consumption is losing its prominence as the major organizing principle of economy and culture. For instance, wage labor—the mainspring of consumerism—is receding in many countries of the global North as "gig" jobs become increasingly prevalent, income inequality intensifies, homeownership declines, and automobile use tapers off. Even so, despite worsening economic circumstances for a majority of households, aggregate levels of consumption remain high and the associated environmental impacts are well beyond what the planet can sustain over the long run.

At the same time, many scholars have concluded that so-called "weak" approaches to promoting sustainable consumption based on advertising appeals, consumer education, and efficiency improvements are not adequate to address overconsumption and planetary overshoot. The twentieth century solution to many social ills—centered around mass-consumption, economic growth, and social welfare systems—has proven to be ecologically unsustainable and seems furthermore to have lost its ability to realize political objectives. It is becoming increasingly clear that what is needed is deep, systemic social change.

2.4 The political-economic context

Contemporary ideas on how to achieve efficacious societal transformations given prevailing constraints and circumstances are in their infancy and we lack well-developed strategies for how that might happen. Moreover, India, China, and parts of both Latin America and Africa are rapidly implementing the same model of overconsumption common in North America, northern Europe, Japan, and elsewhere, with massive social and ecological consequences compounded in many instances by unrelenting population growth. At the moment,

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[6] See the scoping paper of the Working Group on Communicating for Sustainable Consumption and Production and discussion associated with the virtual community forum organized by the KAN in early 2018 (http://www.futureearth.org/sscp-kan-community-forums).

there are few indications in these countries that consumer society has run its course, but there is little question that unremitting emphasis on consumerist lifestyles is not a durable strategy with which to foster long-term well-being.

Unsustainable levels of production and consumption are the product of much more than individual choice. Prevailing practices are highly influenced by political and economic systems that emerged in a fundamentally different time period. As classical political economists Ricardo and Smith observed long ago, the wealth of nations can be built through the pursuit of self-interest and global competition. Today's challenges are manifestly different. Exploitation has become overexploitation to an extent that threatens further economic development and longer-term wealth. We face today a tragedy of the commons as individual nations compete for economic advantage at the expense of the environment, economically marginal populations, and future generations.

In the current dominant political-economic ideology, increased labor productivity and mass consumption are celebrated as important societal goals—essential for the health and wealth of nations at the same time as they threaten the very same system. The system is stuck on an unsustainable development path. Consistent with the logical imperative of capital to capture surplus value that can be reinvested, increased labor productivity and consumption have been channeled toward reinvestment in the interest of growth and wealth accumulation.

The effectiveness of such arrangements is enabled by the influence of people and organizations with access to capital to decide what will be produced and consumed, how labor will be hired and compensated, and how nature will be packaged and used. In this system political power and public influence are often beholden to the priorities of profitable investment of capital. Governmental policies on global finance are crucial to this story. The globalized financial system, which over the past three decades has come to represent an increasing proportion of overall gross domestic product (GDP) (about 8% in the United States), creates money on the basis of highly leveraged debt. While it lubricates the economy and spurs what counts as growth in the short term, it does so through financial speculation and the imperative of ever-greater volumes of production and consumption. The precariousness of this arrangement has already been proven to have contributed to economic and socio-political instability on multiple scales, including the near global meltdown in 2007–2008.

This system is extremely inefficient in producing public good and improving the lives of those people who need it most because in the current economy most of the benefits of growth go to the top earners. For example, in the United States during the first several years after the economic collapse 90% of economic growth was captured by the top 1% of earners. Nonetheless, politicians cling to the notion that growing the size of the economy is the best way to improve the lives of the bottom half of the society, both within and between countries.

The quasi-rationality of capital, wealth accumulation, and growth continue to critically shape contemporary global society, notably patterns of production and consumption despite dire warnings that growth in energy, materials use, waste, and pollution are simply not sustainable and perhaps, not worth the costs to human and ecological health.

The financial crisis of the last decade was a signal event and offered unambiguous and multifaceted evidence of what happens when an economy that is acutely dependent on debt-driven consumption runs aground. While predicting the future is inevitably fraught with risk, it seems incontrovertible that similar upheavals are not too far away and the prefiguring signs are not hard to discern. Waves of migration, rampant political instabilities, and right-wing populism only begin to scratch the surface.

The financial meltdown was, unfortunately, a lost opportunity for facilitating systemic change. Few observers in positions of consequence saw it coming and no strategies, blueprints, or even visions existed (and still largely do not) for how to take advantage of a short-term open political window of opportunity. After addressing the most elemental features of the crisis, society shifted back to business as usual, albeit only the super-rich are effectively able to derive benefit from the restoration of economic growth. After a few shaky years, consumerism again appears to be again well-anchored as fixture of lifestyles in the relatively affluent parts of society. These lifestyles are widespread enough to result in a massive ecological overshoot but at the same time there is an increasing number of people that are not able to participate in the competition. We face a profound paradox: overconsumption at the aggregate level while more and more people are becoming socially marginalized without the financial means to consume at a level that is considered "normal."

To prepare for the next major disruption, the KAN seeks to encourage its affiliated scholars and practitioners to actively consider how the potential for pervasive disruption could be used to facilitate societal transitions. By focusing on *well-being* we specifically seek to draw attention to *a good life* that entails limiting use of biophysical resources and energy. The term in this context refers not only to meeting basic material needs such as food, shelter, and transportation, but also psychological and social needs related to identity, belonging to a group of peers, and being able to adequately achieve aspirations to live a *fulfilling life*. One big issue is that this concept has become so distorted. We have been led to believe that a life of fulfillment requires frequent air travels for vacation, eating meat on a daily basis, regular reliance on a privately-owned car, and effective parenting entails surrounding children with limitless toys and gadgets. Where do these ideas come from? How could we roll them back?

Well-being obviously also applies to ecosystems. The prevailing system of social organization based on consumerism leaves people with a truncated understanding of well-being and perpetuates a variety of environmental harms. A transition to a new economic model is unlikely to transpire without major disruptions and struggles because such transformation threatens powerful political and economic interests.

The financial breakdown was—and for many people continues to be—a grim reminder that other complex socio-technical systems (energy, food, mobility) are similarly prone to abrupt and disruptive failure which could be triggered by reaching a heretofore unknown tipping point due to climate change, water and food scarcity, unmanageable migration, or severe political instability. At the same time, such eventualities could provide exploitable windows of opportunity for bringing about major systemic changes. We also anticipate that significant

developments in information and communication technologies (including artificial intelligence), as well as broad social movements that emphasize localism and communality, could catalyze and facilitate such a transition.

2.5 Understanding consumption and lifestyles

Since the 1990s, a considerable amount of research has been conducted on the connections between sustainability and consumption. Earlier conceptions based on individual choice-making—and therefore calling for frugality (Bouckaert et al 2008), voluntary simplicity (Elgin 1982), and sufficiency (Princen 2005) —has been replaced with a more systemic and complex picture. While people invariably consume to satisfy basic material needs such as shelter, mobility, clothing, and food, they also seek to satisfy immaterial needs in a search for a meaningful life, self-realization, status, belonging, and security (Max-Neef 1991). As first described by Baudrillard (1998) and Bourdieu (2004), many consumer goods signal status, power, success, and identity. Peer pressure (or the pursuit of cultural capital in more sociological terms) is an important driver of consumption. For these reasons, explorations of human well-being and happiness have become an inseparable part of sustainable consumption research. Max-Neef (1991) made an important distinction between (material and immaterial) human needs and ways to satisfy them, which he calls satisfiers. Human needs are universal, but satisfiers are culturally determined and can, at least in principle, be influenced by policy interventions and other means (Layard 2005). Research into possibilities to fulfill needs with less material goods through services or through various forms of sharing has also become part of the sustainable consumption research field (Evans 2001, Botsman and Rogers 2011).

A transition to sustainable consumption and lifestyles is a very difficult challenge. First, in consumer societies the prevailing business models, political priorities, and dominant culture all work in tandem to encourage more consumption. Macro-level forces such as the system of global trade, the monetary system, and the debt-driven need for economic growth in a capitalist economy also translate in practice to fostering more consumerist lifestyles (Brown et al 2017). Second, the lock-in phenomenon anchors people in unsustainable lifestyles for reasons beyond their personal control. For instance, in the United States a search for affordable housing frequently leads to increasingly distant suburbs, suburban lifestyles and inadequate public transport compel car-dependency, and prevailing housing alternatives in more affluent communities favors large dwellings and other high-footprint consumption practices. Finally, rebound effects exacerbate the circumstances promising financial gains (for instance by on saving energy costs) and the financial gains are spent in ways that compound rather than ameliorate environmental damages. For example, energy saving through efficient LED lights prompts people to install electrical lighting in previously unlit (or less lit) places. Estimates about the magnitude of these perverse and largely unacknowledged consequences range from 10 percent to upwards of 60 percent, depending on the type of rebound effect (Gillingham et al 2014, IRGC 2013).

This complex nature of consumption is recognized in a definition of sustainable lifestyles provided in a recent report issued on behalf of the United Nations Environment Program (Vergragt et al 2016) on fostering and communicating sustainable lifestyles. The authors observe that "[a] sustainable lifestyle minimizes ecological impacts while enabling a flourishing life for individuals, households, communities, and beyond. It is the product of individual and collective decisions about aspirations and about satisfying needs and adopting practices, which are in turn conditioned, facilitated, and constrained by societal norms, political institutions, public policies, infrastructures, markets, and culture."

2.6 Social change beyond consumerism

A grand challenge of the next few decades will be centered on how societies might evolve beyond consumerism and reflexively and purposefully design more socially equitable and biophysically sustainable systems of social organization (Brown et al 2017, Cohen 2017). Meeting this objective will require drawing on a range of different perspectives, partly because current understandings have been forged within the confines of distinct disciplinary specialties. A number of frameworks have been advanced in recent years with particularly instructive guidance offered by the notion of interstitial social transformation (Wright 2010), the multi-level perspective (MLP) (Geels 2002, Geels and Schot 2007), practice theoretical approaches to systemic changes (Jensen 2017), the theory of fields (Fligstein and McAdam 2015), and the enduring work of political economist Karl Polanyi (1944).[7]

To complement these approaches, a social and equity perspective calls for a "just transition" which describes a transformation pathway toward a low-carbon and climate-resilient economy that maximizes the benefits of climate action while minimizing hardships for workers and their communities (Swilling and Annecke 2013). Just sustainability transitions require moving beyond "job counting" to "people accounting" and is not simply the replacement of declining industrial sectors with emergent alternatives but involves expansive transformation of society, including the greening of sectors that we do not normally think of as grey or green (Stevis and Felli 2014)

2.7 Social or higher-order learning

An essential condition for the transition to sustainable systems of consumption and production is to enhance individual and collective capacities to learn "our way together to a more sustainable future in dynamic multi-stakeholder situations of uncertainty and complexity." (Blackmore 2009). Such processes of "learning collectively to foster systemic change" (have been vividly discussed in recent years as social learning or higher-order learning (Kulundu, 2012).

By higher-order learning we mean reframing the problem definition and changing the interpretive frame among the diverse participants in an initiative. In other words, the undertaking becomes an interactive project defined as one in which

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[7] Refer to Brown et al (2017) for more detailed discussion.

[P]articipants re-examine, and possibly change, their initial perspectives on the societal needs and wants…as well as the approaches and solutions; examine and place the particular project in a broader context of pursuing a sustainable society; examine, and possibly change, their own perceived roles in the above problem definitions and solution; change views on the mutual relationships among each other relative to the specific project or the broader societal context, including mutual convergence of goals and problem definitions; change their preferences about the social order as well as beliefs about best strategies for achieving them" (Brown and Vergragt 2008).

Such reframing and reconceptualization may be conducive for translation into different contexts and situations. To stimulate social learning, communication is challenged to stimulate discourses about a range of issues that concern diverse social actors and provide different perspectives on societal transitions (Brown and Vergragt 2008). In addition, relevant individuals take a broader perspective on the interrelatedness of individual behavioral change and societal transitions. From such a perspective, social experiments in which social actors with different worldviews collaborate at a local level on concrete projects and engage in processes of deep and mutual social learning could possibly provide powerful examples that are amenable to peer-to-peer exchanges rather than traditional "communications" (Vergragt et al 2016).

2.8 Transcending "weak" and "strong" sustainable consumption and production

Research on sustainable consumption and production has to date been characterized by a dichotomy between so-called "weak" and "strong" sustainable consumption (also referred to as "reformist" and "revolutionary" positions) (Geels et al 2015). By promoting a systems approach, we aim to move the conceptual development beyond these contrasting conceptualizations. We acknowledge that prior work has devoted significant attention to the efficacy of individual behavior-change premised largely on consumer education and eco-labeling and, separately, the development and use of more efficient and less polluting technologies. These interventions have been aimed at reducing the adverse effects of goods and services on a per unit basis and to improve resource use and product performance. We also observe that wider perspectives informed by a macro-structural understanding of prevailing production-consumption patterns is needed to achieve absolute reductions in energy and materials throughput (Lorek 2010). Satisfying these more ambitious objectives is likely to entail radical policy measures that limit volumes of production and consumption and raise critical questions about social and economic equity, continued economic growth, and individual and societal well-being.

To achieve our ambition of developing an integrated systems-based approach that brings together "weak" and "strong" sustainable consumption and production, the KAN seeks:

- To identify conceptual and practice-based spaces where "weak" and "strong" approaches intersect.
- To forge a more integrated understanding of different pathways to sustainable consumption and production systems.
- To increase societal and policy relevance of an integrated systems approach of to sustainable consumption and production.

The KAN also aims to emphasize both in its research and public engagement the need for more resolute action based on strong perspectives and to build and disseminate knowledge on how this can be done in practice. An important part of this endeavor will be to improve understanding of opportunities for overcoming obstacles to the uptake of strong approaches and to be prepared to take advantage of fortuitous circumstances when they arise.

To enable societal transformations to systems of sustainable consumption and production in theory and practice, the KAN will strengthen collaboration between communities of researchers and practitioners that are currently focused on either production or consumption, including actors, decision makers, and other stakeholders. Consistent with these objectives, the KAN will work to co-design studies, to co-generate knowledge, and to initiate other activities with positive social, economic, and environmental outcomes.

Chapter 3
Historical Background of the Field of Sustainable Consumption and Production

During the decades following World War II, the conventional tendency was to attribute environmental problems at the international scale to rapid population growth. This view stemmed from the fact that improvements in public health had combined with other sources of social and economic change to sharply shift demographic patterns throughout large parts of Asia, Africa, and Latin America (Ehrlich 1971, Meadows et al 1972). The conceptions that emanated from these circumstances ascribed responsibility for the overexploitation of resources squarely on the doorstep of developing countries and, paradoxically, assigned primary accountability to impoverished and politically disempowered women in the global South (Bandarage 1997, Connelly 2008). The second upshot arising from this particular grasp of these contestable issues was that it enabled the wealthy countries of the world to avoid calls to reform their pre-existing colonialist practices or to restrain their vigorous demand for energy and materials that impelled increasingly resource-intensive lifestyles.

Publication of the Brundtland Commission's report, *Our Common Future*, in 1987 arguably marked the early emergence of a distinctly new and insurgent perspective and put the challenge of sustainable development on the international policy agenda (WCED 1987).[8] The authors provocatively wrote

> Living standards that go beyond the basic minimum are sustainable only if consumption standards everywhere have regard for long-term sustainability. Yet many of us live beyond the world's ecological means, for instance in our patterns of energy use. Perceived needs are socially and culturally determined, and sustainable development requires the promotion of values that encourage consumption standards that are within the bounds of the ecological possible and to which all can reasonably aspire.

Implicit in this critique was recognition that the lifestyle practices prevalent in high-consuming nations were responsible for outsized resource demand as well as the capacity of biophysical sinks to absorb the disposal of waste byproducts (Dauvergne 2010).

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[8] There are several exceptions to this general characterization. Especially notable was Indian Prime Minister Indira Gandhi's presentation at the United Nations Conference on the Human Environment held in Stockholm in 1972 where she noted "It is an over-simplification to blame all of the world's problems on increasing population. Countries with but a small fraction of the world population consume the bulk of the world's production of minerals, fossil fuels, and so on. Thus we see that when it comes to the depletion of natural resources and environmental pollution, the increase of one inhabitant in an affluent country, at his level of living, is equivalent to an increase of many Asians, Africans, or Latin Americans at their current levels of living." The full transcript of the speech is available at http://lasulawsenvironmental.blogspot.com/2012/07/indira-gandhis-speech-at-stockholm.html. See also Mathiesen (2014) and Caradonna (2014).

The issue of sustainable consumption first received careful and publicly prominent consideration at the World Summit on Environment and Development held in Rio de Janeiro in 1992 where part of Agenda 21 was prominently devoted to the subject. Chapter 4 of this foundational document was entitled "Changing Consumption Patterns" and it observed that "All countries should strive to promote sustainable consumption patterns [and]…[d]eveloped countries should take the lead (United Nations 1992)." While the overall thrust of the text was decidedly ambivalent about the role of consumption as a driver of excessive resource appropriation, the hesitancy was the result of extremely fraught negotiations during the summit's preparatory meetings and protracted resistance on the part of several key countries to even consider the adverse social and environmental implications of economic growth. Though the Rio conference is recognized today for a number of noteworthy achievements in international environmental governance—the framework agreement on climate change, the statement of principles on forest management, and the opening of the Convention on Biological Diversity— the matter of sustainable consumption left some country representatives extremely unnerved. This unease derived from concern that within large parts of the global community a grievous narrative had gained a foothold, one that placed consumers in the global North under an emergent indictment (Redclift 1996, Myers and Kent 2004, Cohen 2001).

During the years following the Rio Summit, the Nordic Council of Ministers and its constituent countries played an important role in assuaging tensions and developing initial policy prescriptions to encourage less resource-intensive modes of consumption in ways that would not hinder economic growth or trigger other sources of social or economic instability (see, e.g., Nordic Council of Ministers 1995). It was during this time, at a symposium held in Oslo during the mid-1990s that a still frequently cited definition was formulated. The report from this event defined sustainable consumption as "the use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of future generations" (Norwegian Ministry of Environment 1994). Further assisting the agenda-setting process was a highly influential work program implemented by the Organization for Economic Co-operation and Development (OECD 1997, 1998) and a joint project of the Royal Society of London and the National Academy of Sciences in the United States (1997). It was also during this period that the first tranches of research funding were allocated, first by the European Science Foundation and then various national science councils.

Somewhat separately, different communities of practice were engaged in efforts to develop scientific and policy capacity around the complementary notion of "sustainable production." This focus area built on much more deeply established expertise and experience at the interface between industrial engineering and environmental science and was centered on clean manufacturing, toxics reduction, byproduct exchange, and economic circularity and sought to refine several emergent methodological techniques including life cycle analysis, material flow analysis, and environmentally extended input-out-output analysis (Frosch and Gallopoulos 1989,

Ehrenfeld 2004). A significant step forward in amalgamating these modes into an integrated conceptual framework started with formal establishment of the field of industrial ecology in 2001 and it gradually became common during this time for practitioners, policy makers, and others to conjoin sustainable consumption with the pursuit of sustainable production. While such fusing was in some respects perfectly sensible and prudent, this linkage was also driven by political and institutional rationales. In particular, the more technical interventions associated with production-focused strategies made it possible to sublimate, and at times completely subsume, the insurgent ideas advanced by proponents of sustainable consumption (Murphy 2001, Cohen and Howard 2006). At the same time, the different disciplinary and epistemic foundations of the production and consumption sides of this undertaking has made it difficult to develop fully meaningful and legitimate linkages (cf. Tukker et al 2010, Mont and Heiskanen 2014, Moreau 2017).

Such was the status of the uneven relationship during the period leading up to the World Summit on Sustainable Development in Johannesburg in 2002 but this event nonetheless gave rise to a call by national governments to establish a ten-year framework of programs (10YFP) on SCP. The initiative was advanced during subsequent years under the banner of the so-called Marrakesh Process spearheaded by the United Nations Environment Program in collaboration with a network of nongovernmental organizations and independent researchers (Church and Lorek 2007). After a decade of halting progress, the 10YFP was adopted at the United Nations Conference on Sustainable Development (Rio+20) in 2012 and as outlined above in more recent years sustainable consumption (and production) has become a progressively more visible focal point for a growing number of international initiatives including the Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change (UNFCCC 2015; see also Reisch et al 2016).

Chapter 4
Organizational Structure and Governance Plan

Formal discussions to create a Knowledge-Action Network on Systems of Sustainable Consumption and Production began in March 2016 under the auspices of the Future Earth Regional Centre for Asia. The first step taken by the small group of proponents at this meeting in Kyoto involved identifying and recruiting a larger group of "founding members."[9] On the basis of this momentum, a modest governance system comprising a Core Group and a Development Team was established. The Core Group initially comprised five members and has grown over time to encompass seven individuals. This central committee generally meets every two or three weeks for conference calls which have typically been preceded by multiple email exchanges and circulation of a formal agenda of proposed discussion points. Following each virtual meeting, minutes are distributed and follow-up activities are pursued. The Core Group reports to a Development Team and bi-monthly conferences calls are held to brief members about ongoing activities and solicit feedback on planned initiatives.[10]

During the process of drafting its Expression of Interest, the KAN established several Working Groups which sought to engage a wider circle of colleagues around a set of three broad themes: 1) Ecological Macroeconomics and Political Economy of a Transition to Sustainable Lifestyles, 2) Urban Provisioning Systems, Inequality, and Well-being, and 3) Social Change Beyond Consumerism. In early 2017, a fourth Working Group focusing on Communicating for Sustainable Consumption and Production was launched; and at the workshop in Annapolis, May 2017 a fifth working group on Sustainable Value Chains was formed. Over the intervening months, all of the Working Groups have grown in size, designed independent but interlinked portfolios of activities, and achieved a degree of durability.

In recent months, a Task Force has been formed to manage the communication and outreach of the rest of the KAN, to other KANs and affiliates of Future Earth, and to outside stakeholders and constituents. This Task Force designed a logo and is currently developing a survey to solicit feedback prior to upgrading the KAN's website. Other prospective activities include development of a KAN-wide communication strategy.

During the course of its early developmental stages, the KAN has also fostered development of several institutional resources that will be important in moving forward. First, the network enjoys a close working relationship with the Sustainable Consumption Research and Action Initiative (SCORAI) which is a pre-existing organization of more than 1,000 academics and policy practitioners working at the interface of material consumption, human well-being, and

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[9] See http://futureearth.org/knowledge-action-network-systems-sustainable-consumption-and-production-founding-members.

[10] See http://futureearth.org/knowledge-action-network-systems-sustainable-consumption-and-production-development-team. Agendas and other outputs of meetings of the Development Team are at http://futureearth.org/agendas-and-slides-web-calls.

technological and cultural change.[11] Second the KAN is a supporting partner in organizing the SCORAI conference being held at the Copenhagen Business School in June 2018. Finally, the network is a co-sponsor of the newly relaunched open-access journal *Sustainability: Science, Practice and Policy* (owned by Taylor and Francis) which will serve as an important platform for disseminating research and policy perspectives generated by the KAN.[12]

The next major challenge for the network will be to transition from a provisional governance structure to more a permanent arrangement. The Development Team has been an effective organizational form and will evolve into an Executive Board with approximately fifteen members. This body will meet on a bi-monthly basis and in the short term be responsible for drafting and implementing a set of by-laws, overseeing the budget, formulating development of a strategic plan, and providing overall direction to ongoing and future programs. A subset of five board members will comprise a Management Team that will guide the regular operations of the KAN and convene on a bi-weekly schedule. The Executive Board will have the authority to create subsidiary standing and ad hoc committees to implement specific tasks and oversee longer-ranging projects. Members of this body will serve two-year, staggered terms.

The research and engagement activities of the KAN will continue to be carried out by the five Working Groups, each led by two co-chairs, operating under the supervision of and reporting to the Executive Board.[13] The final element of the organizational structure will be an advisory board with approximately one dozen members. This body will consist of high-level stakeholders from outside the inner circle of sustainable production and consumption researchers and practitioners and will meet formally once each year to proffer overarching guidance. A condition of participation will be a willingness of members to make themselves available on a more frequent and intensive basis to provide consultative assistance on specific issues.

The Core Group is in the process of formulating procedures for enabling individual affiliation and the means with which affiliates will engage with the KAN. Through informal outreach, formalized recruitment, and public programming, a distribution list of approximately 400 people has thus far been assembled. It is likely that in the short term it would not be prudent to impose a membership fee as such a mechanism establishes strict boundaries around the organization and suggests that the KAN is able to provide dues-paying individuals with a regularized menu of services. The aim for the foreseeable future will be to keep the edges of the KAN permeable and fluid while at the same time creating opportunities for individuals to participate and contribute in meaningful ways, most particularly through engagement in one or more of the Working Groups. As a means of raising revenue to offset some of the KAN's

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[11] SCORAI has sub-networks in North America, Europe, China, and Israel. For further details, refer to http://scorai.org.

[12] See http://www.tandfonline.com/action/journalInformation?journalCode=tsus20. Several affiliates of the KAN serve on the Editorial Board of SSPP.

[13] The Executive Board will have the discretion to establish new Working Groups in response to evolving needs. It may also be necessary to intervene to discontinue a particular Working Group if circumstances suggest that this is a prudent course of action. Such issues will be addressed in more specific detail in the KAN's bylaws which will be formulated during the first year of fully authorized operations.

organizational expenses, an important activity for the next year will be to develop a plan for recruitment of institutional (annual dues-paying) members.

Chapter 5
Strategy for Transdisciplinary Engagement

5.1 Introduction

Engaging people from outside academia is one of the main rationales behind the existence of the KAN. A number of practitioners—people who are not university-based researchers—are currently playing active roles in its early establishment and this has been the case since the beginning of the process. The ambition is to continue to build an inclusive and diverse community of scholars from various disciplines and practitioners in policy, civil society, and the private sector. Such broad-based engagement is essential for the KAN's ability to facilitate co-design of research and other activities and to promote mutual learning and co-production of practice-relevant knowledge.

The complex nature of transforming systems of consumption and production implies, among other things, that there is no single actor (or group of actors) that has the agency to make such changes happen. The sustainable development literature sometimes refers to the triangle of change, consisting of governments, business, and civil society. Major changes in society tend to take place through a dynamic interaction among these three categories of actors. It is therefore essential that the KAN have substantial involvement of practitioners from all three categories. However, due to the fact that most practitioners have little experience with research and may not directly see the potential benefits of being involved in the KAN, successful practitioner engagement requires special efforts. A strategy for engaging non-academics in activities will be based on the following seven elements:

5.2 Appealing Framing and Narratives

A shift to sustainable lifestyles is often perceived as a need for sacrifices in quality of life and individual freedoms. This framing is a major obstacle to broad and committed uptake of the sustainable consumption and production, especially with regard to the consumption side of the equation. However, living more sustainability does not necessarily entail poor well-being. On the contrary, a shift away from career-focused competition in corporate hierarchies and status-driven conspicuous consumption habits—freeing up more time for family and friends, community activities, and creative pursuits—can be liberating and enriching. Some of the KAN's activities are expected to focus on these positive aspects, contributing to a reframing that can make sustainable consumption and production more appealing to larger groups of people and easier for practitioners to appreciate.

This effort will involve creating new narratives that help expand and enrich the perception of sustainable consumption and production—to show that that it is not just about consuming less in a very narrow manner but more profoundly about meeting human needs and aspirations in alternative ways: living, working, spending time, and socializing differently. And that this is ultimately about organizing society in ways that can better enable human flourishing

on a long-lasting and equitable basis. More appealing narratives and visions need to be able to link social and environmental dimensions and to show how these are mutually dependent.

Appealing narratives and frames will take different forms depending on whom they are targeting. A particular challenge will be to frame sustainable consumption in ways that do not trigger insurmountable resistance from the private sector. To deal with this challenge the KAN needs to show examples of enterprises that play a positive role in a sustainability transition while also managing to be financially viable.

5.3 Tactical Engagement with System Defenders

With an exclusive focus on transformational change it may be challenging for the KAN to engage fruitfully with practitioners who favor incremental adjustments and conventional policy approaches or whose actions are institutionally constrained—for example by the need to deliver high and rapid return on financial investments or to secure large campaign contributions for the next election. However, it is important for the KAN to find ways of working with such actors—both in order to learn more deeply about their perspectives and the factors that may constrain the range of actions they consider feasible and to build awareness on the limited efficacy of conventional policy approaches. This calls for a readiness for flexible and tactical engagement, including collaboration on activities with relatively low transformational potential. The KAN will try to develop a portfolio of activities that can attract and involve different kinds of practitioners, including those that are more in favor of radical changes and those that tend to try to protect the existing system.

Engaging a diverse array of practitioners can also be essential for addressing problems that require collective action—where no single actor group is able to work out and implement a solution independently. This can be the case, for example, with complex multi-tiered value chains and production systems. Under such circumstances, convening relevant actors to jointly recognize existing ecological and social impacts and to acknowledge the need for coordinated action can be an important first step toward addressing sustainability issues.

5.4 Safe Spaces for Critical Reflection

One of the rationales for the KAN is the observed ineffectualness of conventional policy approaches to sustainable consumption and production—premised on technical solutions, enhanced efficiency, and voluntary behavioral changes by informed consumers. This organizational initiative is based on the need for alternative (or complementary) ways of facilitating transformational change. However, most practitioners are institutionally constrained in what they can do in their professional roles—often the only options that seem feasible to them are of the conventional kind with little potential to impart meaningful change. Even so, the KAN will seek to involve also these practitioners, especially those that are personally convinced of the need for more systemic changes than they have leeway to pursue in their professional capacities. For such individuals, who experience strong dissonance between what they do in their day-to-day work and their personal convictions, the KAN could provide a safe space for critical

reflection and sharing of experiences. To encourage open and sincere discussions with such practitioners, some meetings could be held based on Chatham House rule.

5.5 City-level Engagement

Ever since the concept of sustainable consumption and production was coined, research and practice has tended to focus on individual consumers/households on the one hand and policies of national governments on the other. Less attention has been given to other levels of social organization, particularly cities. In recent years, the role of cities and municipal governments in shaping patterns of mobility and time-use, as well as other determinants of household consumption such as the availability of good quality public goods and services, has received growing attention (Barber 2013, Cities 2017). Cites are also major economic actors by means of their purchasing and thus have significant direct impact on production systems. Finally, recent collaboration with local government practitioners on sustainable consumption has gained some traction and met fewer of the ideological obstacles commonly encountered at the national level. Based on these observations, the KAN will make special efforts to involve city-level practitioners in its activities—not as an exclusive focus but as a complement to practitioner engagement at other levels of society.

5.6 Beyond the Usual Suspects

The agenda for sustainable consumption and production is very broad and multifaceted, meaning that a very wide range of practitioners are potentially relevant. Given this, the KAN will seek to involve not only partners who are already familiar with the issues but also other relevant groups, including those that do not use the term "sustainable consumption and production." This does not mean that the KAN should stay away from established processes and platforms but rather that the potential for generating added value is likely to be higher in engaging groups that have thus far only been marginally involved in sustainability-oriented conversations.

Research findings indicate that technical solutions are likely to be insufficient and that a transformational shift will require deep changes in society's dominant culture and value system. Based on such findings, it makes sense for the KAN to try to involve groups that contribute to shaping values and worldviews such as faith-based organizations, artists, and the media.

5.7 Strategic and Selective Involvement in Existing Forums

As previously outlined, sustainable consumption and production constitutes a broad agenda. It means that a very large number of forums and platforms that are relevant to the KAN already exist, with numerous and diverse activities. For the KAN to add significant value it needs to develop mechanisms for regularly scanning the field and to try to contribute where it seems strategically advantageous to do so. This challenging task requires at least some informal criteria on how to set priorities for external engagement. In general, priority should be given to activities where there seem to be good opportunities to establish longer-term relations and partnerships.

To avoid duplication, the design of the KAN's own activities needs to take into consideration what already exists. KAN affiliates could contribute to such meetings in the form of special sessions or tracks.

5.8 Outreach Tailored to Practitioners' Needs and Interests

One of the functions of the KAN is to enhance the accessibility of relevant research findings, especially for non-academics. This is not mainly a matter of making research papers easy to find but more of synthesizing and translating key findings of the scholarly literature and explaining the possible implications for practice in jargon-free language. Different groups of practitioners have different needs, interests, and levels of background knowledge, which means that output may be most effective when tailored to specific target groups. These materials can take the form of conventional briefing papers, but also other media should be utilized, including webinars, blogs, videos, and face-to-face interaction.

Chapter 6
Ten-Year Timeline of Projected Outcomes

The KAN seeks during the course of its anticipated ten-year (2018–2028) lifespan to become the premiere knowledge and networking platform for sustainable consumption and production. To achieve this lofty goal, numerous practical and aspirational outcomes are projected. The KAN, through its leadership and Working Groups, will deliver high-level research outputs including publications for academic and general audiences, host major academic and stakeholder-oriented conferences and events, and create the diverse organizational assemblage necessary to contribute to real-world change. In all of these activities, partnerships with societal actors will drive research agendas, co-creation and dissemination of knowledge, and encourage the ready integration of collaborative outputs as solutions to sustainability challenges.

The following is a list of projected outcomes as well as potential outputs. They are summarized in Figure 6.1.

1. KAN-level academic and transdisciplinary integration
- Develop a broad and inviting research and action framework for multi-disciplinary academics and non-academic stakeholders.
- Set agenda for academic publications in the field of systems of sustainable consumption and production.
- Generate on a regular basis topical publications for mainstream media outlets.

2. Working Group-based research outputs
- Formulate frameworks, impact assessments, typologies, case studies, and best practices.
- Prepare research papers, assemble online databases, and deliver seminars/webinars.
- Write guides to literature pertaining to systems of sustainable consumption and production.

3. Educational tools
- Produce documentaries, mini-books/e-books, games, and content for YouTube channel.
- Conduct simulations and organize living laboratories.
- Develop university courses and curricula.

4. Events and Other Forums
- Establish a regular presence at major scientific conferences.
- Host a high-profile "stakeholder summit" in Year 5 (2021) and Year 10 (2026) and more modest-scale conference/symposia during intervening years.
- Host an annual webinar series on systems of sustainable consumption and production.

5. Funding and New Projects

- Submit several annual applications to major funding funders (e.g., Belmont Forum, Horizon 2020, Japan Society for the Promotion of Science, KR Foundation).
- Create multiple small- to medium-scaled spin-off research projects relevant to systems of sustainable consumption and production.

6. Contribute to International Science Policy Discussions

- United Nations Ten-Year Framework of Programs on Sustainable Consumption and Production (10YFP), especially the Sustainable Lifestyles and Education Program.
- Intergovernmental Panel on Climate Change.
- High-Level Political Forum on Sustainable Development.

7. Collaboration with Societal Partners

- Build an advisory board comprising ~12 non-academic participants.
- Develop ties with industries interested in systems of sustainable consumption and production.
  - Change current business practices to be more sustainable and transparent.
  - Co-design new business models and start-ups ventures (both for- and non-profit).
  - Establish working relationships and networks with prominent industry actors.
- Partner with city planners and urban policy makers
  - Co-develop policy briefs and best-practice documents around themes such as "the circular economy," "sustainable urban metabolism," and "green infrastructure."
  - Partner with specific municipalities for policy and planning consultation.
- Work with social innovators, storytellers, makers, and artists on the creation on new "imaginaries of systems of sustainable consumption and production."
  - Conceive alternative social institutions, "one-planet" lifestyle narratives, and new practices to experiment and shift toward absolute reductions in material/energy consumption.
  - Promote new institutions, narratives, and practices (film, immersive virtual reality experiences, games, experiments, living laboratories, and exhibitions).

Figure 6.1

Research / Events

Webinars, academic conference presence

SSCP Webinar series

2016.03 Kickoff WS · Spinoff research project(s) · Stakeholder Summit #1 · Spinoff research project(s) · Stakeholder Summit #2

Collaboration

2017.05 SESNYC WS · KAN advisory board est.

WG-to-business partnerships / networking → best practices → co-design new business models → value chain transparency policies

WG-to-city planner partnerships / networking → co-dev. thematic policy briefs → team up with specific municipalities

WG-to-artist partnerships / networking → creative conceptualizations "SSCP Imaginaries" → promote creations

Publication

Draft WG scoping documents · Scoping documents published · Agenda setting paper (Nature) · WG driven, TD oriented publications

Outreach / Education

Articles in mainstream media

|-- Communication campaign "SSCP Imaginaries" (narratives, games, art exhibitions, living laboratories) --|

|--Develop educational resources (K-12, Uni) --|

Produce film, documentary media

-Development team formed
-EOI submitted -Three WG formed
-Meetings 2x/month -Two more WG
-REP submission -Executive committee est.
-Executive committee reorganized

Milestones

| 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |

REP is ratified

KAN awarded major funding

Mailing list + Open Network members reaches 1000

KAN generated special issues & edited volumes = 5

Multiple KAN collaboration on major academic event

Mailing list + Open Network members reaches 5000

KAN generated special issues & edited volumes = 15

Sustainability: Science, Practice, and Policy has IF of 3.0 or >

KAN generates over 3 million USD in funding

SCP is a high priority item for researchers and policy makers worldwide

Figure X: Ten year timeline of projected outcomes for SSCP KAN

Chapter 7
Funding Opportunities

The field of sustainable consumption and production has struggled since its inception for adequate resources especially for activities specifically focused on shifting consumer demand patterns, facilitating system change, and overcoming consumerist lifestyles more generally.[14] Sustainable consumption per se is an area of research and policy practice that was initially launched by a United Nations process rather than a sizable commitment of funds by a national or international science council and customary funding bodies have been slow to evince support for work in this domain. Notable exceptions include the a research program under the auspices of the German Federal Ministry of Education and Research (*Bundesministerium für Bildung und Forschung*) from 2008 to 2013 and a recent initiative by the Swedish Foundation for Strategic Environmental Research (MISTRA). In addition, the European Commission's Seventh Framework Program and the current Horizon 2020 Program has been an important source of research funding.

Notably, funding organizations in North America have been to date extremely reticent to invest in projects devoted to developing understanding of how to achieve absolute reductions in energy and material throughputs and to enable transitions beyond consumerism. A handful of philanthropic foundations has periodically demonstrated interest in these issues but this attention has tended to be ephemeral and highly transitory. It merits remarking that other scientific research organizations in the region, for example the National Academy of Sciences in the United States supports various programs devoted to several of the United Nations Sustainable Development Goals (SDGs) but recently reported that it is not engaged in any activities pursuant to SDG 12 (Responsible Consumption and Production).[15]

Despite this downcast characterization, we remain cautiously optimistic. The KAN has thus far benefited from countless volunteer hours on the part of its Core Group, Working Groups, and Development Team. Hundreds of people have turned out to participate in the face-to-face and virtual events that have been organized over the past two years. Two of the KAN's Working Groups drafted preliminary submissions in April 2017 in response to the Belmont Forum's call for proposals on Transformations to Sustainability (T2S) with one of those bids receiving an

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[14] Research on improving materials performance, increasing energy and resource efficiency, and developing clean technologies obviously does not fit this characterization. These areas have been extremely well supported by national science councils and industrial sources. More innovative has been the funding priorities of, for example, the UK-based Ellen MacArthur Foundation which has supported programs pertaining to the notion of a "circular economy."

[15] At the time of the Rio Earth Summit in 1992, the National Academy of Sciences (NAS), and the Officers of the Royal Society issued a joint statement entitled *Population Growth, Resource Consumption and a Sustainable World* (see https://royalsociety.org/~/media/Royal_Society_Content/policy/publications/1997/10193.pdf). This statement led to a conference the following year of the world's science academies that was held in New Delhi. The NAS subsequently initiated a consultative program but it proved unduly controversial and ultimately unworkable and resulted only in publication of a very brief report by the National Research Council in 1997 with the title *Environmentally Significant Consumption: Research Directions*.

invitation to provide a revised proposal. Unfortunately this proposal was not funded at the end; which is also due to lack of representation of the field in relevant reviewing committees. The KAN was successful on a proposal submitted to the National Socio-environmental Synthesis Center (part of the University of Maryland in the United States) for financial support that facilitated a workshop for thirty international participants. This event was held in Annapolis, Maryland, USA in May 2017 and the gathering was instrumental in enabling initial progress on this REP. A full inventory of KAN activities to date is presented in Appendix 4.

The KAN aims to pursue a multi-track fundraising strategy whereby a newly installed Management Team (working with the Executive Board) will in the first instance pursue financial support for network-wide activities such as general administration, conferences, and outreach and public education. Funding for operations is always difficult to secure, but we hope to build on the crucial assistance that the KAN to date has received from the Future Earth Regional Centre for Asia. Second, each of the Working Groups will have responsibility for funding their own research and engagement activities. Two potential sources for these purposes are the European Commission's COST program (part of Horizon 2020) and the U.S. National Science Foundation's grant program for Research Coordination Networks.[16] In addition, the Working Group on Social Change Beyond Consumerism has submitted in recent weeks a proposal in response to the call issued by the Mobile Lives Forum.[17] Finally, several independent projects are affiliated with the KAN but they purposefully and usefully rely on their own sources of funding. In the future, the KAN would like to secure financial resources to enable more effective communication and collaboration among these different initiatives as well as to catalyze new activities through development of capacity to serve as a project accelerator.[18]

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[16] See http://www.cost.eu and https://www.nsf.gov/pubs/2017/nsf17594/nsf17594.htm.

[17] The Mobile Lives Forum is a Paris-based research institute supported by the French railway company SNCF (http://en.forumviesmobiles.org/). Details about the funding scheme are at http://en.forumviesmobiles.org/page/research-program-themes.

[18] See http://futureearth.org/affiliated-projects.

Chapter 8
Research Plan and Framework for Working Groups

The KAN established three Working Groups soon after its inception focused, respectively on political economy, cities, and social change. In May 2017 after the KAN held a major organizing event in Annapolis, Maryland, USA with financial assistance from the National Socio-environmental Synthesis Program a commitment was made to launch two additional Working Groups centered on communications and global value chains. Each of the Working Groups is led by a team of two-chairs and it is this institutional form where most of the KAN's research and transdisciplinary engagement occurs. To date, the Working Groups overall have submitted three funding proposals and published two journal articles. In coming years, the governance committees of the KAN will devote careful attention to ensuring the continued success of the existing Working Groups and monitoring opportunities for the establishment of new groups.

8.1 Working Group 1: Political Economy of Sustainable Consumption and Production

8.1.1 Overview
The Working Group on the Political Economy of Sustainable Consumption and Production starts from the premise that unsustainable provisioning practices are fundamentally linked to international political-economic relations. We build on research which suggests that efforts to address production-consumption levels have failed to yield transformative results, precisely because they have neglected to address the political and economic structures at their very base. International competition, unequal relations of exchange, and the global finance system make most modes of consumption artificially cheap. Even the most comprehensive knowledge of these systemic links between contemporary political economic relations and unsustainable production-consumption is difficult to translate into action. The Working Group aims to research a wide range of plausible actions including those that work to modify systems from within and those which leverage and exploit the contradictions inherent in current economic systems to influence change. Also on the agenda for consideration are radical challenges to global trade relations, systems of economic valuation, and basic ideologies of classical political economy.

8.1.2 Problem Statement
Recognizing the limitations of contemporary efforts to address unsustainable levels of production and consumption, we take a political economy and systems-based perspective to frame and explore the interrelated and inseparable economic, ecological, and social causes and consequences of unsustainable global production-consumption.

Political-Economic Systems

Unsustainable levels of production and consumption are the product of more than individual choice. They are the result of political and economic systems that emerged in a fundamentally different time. As classical political economists Ricardo and Smith observed long ago, the wealth of nations is built through the pursuit of self-interest. This has proven true for nations with advantage. Yet Ricardo and Smith did not live in such a global world, nor were their contemporaries aware of the ecological and human costs of deregulated markets. Today we face a global tragedy of the commons as nations and corporations rationally compete for economic advantage

In the current political-economic ideology, increased labor productivity and mass consumption are celebrated as important societal goals—essential for the health and wealth of the nations. Consistent with the logical imperative of capital to capture surplus value that can be reinvested, increased labor productivity and consumption have been channelled toward reinvestment in the interest of growth and wealth accumulation.[19]

Governmental policies on global finance are crucial to this story. The financial system, which over the past three decades has come to represent an increasing proportion of the overall GDP (about 8% in the United States), creates money on the basis of highly leveraged debt. While it lubricates the economy and spurs what counts as growth in the short term, it does so through financial speculation and the imperative of greater production and consumption. This system is extremely inefficient for producing public goods or improving the lives of those who need it most—because the benefits of growth accrue to investors of capital. For example, in the United States during the first several years after the economic collapse in 2009, 90% of economic growth was captured by the top 1% of earners.

Notions of "green growth," "green capital" "greening the economy," "circular economy," and "sustainable business models" divert attention from the political and economic context by suggesting that ecological and equity issues can be solved without changes to the prevailing system. This strategy of depoliticization renders problem definitions and response formation to a small knowledge-business-political elite that is deeply vested in the status quo. It prefers to keep hard questions about the basic organizing logic of the contemporary world economy out of sight and out of mind. The conceptual and methodological orientation of this Working Group seeks to challenge this powerful discursive construct (Dale et al 2016).

Ecological Degradation

The open-ended, expansive, perpetual growth of this political and economic system is possible only if the finite nature of socio-ecological systems is ignored. Scholars in multiple disciplines have now substantiated claims that, on a global level, contemporary systems of economic production and consumption have breached critical planetary boundaries (e.g. genetic diversity, nitrogen and phosphorous flows). Many non-renewable resource stocks, as well as

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[19] Note that there is not one *capital* but numerous *capitals* held by individuals, states, and corporations that compete with each other for the most attractive returns.

attendant ecosystem services, are being depleted far faster than they can be replenished (e.g., Rockström et al 2009, Hoekstra and Wiedmann 2014). And yet the demand for resources and energy and emissions-intensive production continues to grow (e.g. Chitnis et al 2013).

Technological solutions such as energy-efficiency gains, renewable energy development, and other climate-mitigation efforts are being outpaced by growth in global levels of consumption and production (Hoffmann, 2016). These ecological and social challenges are not new but have entered a critical phase. For instance, in order to have a chance to mitigate climate change and stay well below two-degrees warming, global emissions of greenhouse gases must be reduced rapidly in absolute numbers, starting within three years (Figueres et al 2017; see also Alfredsson 2018).

Social and Ecological Inequality

Empirical studies have shown that current systems of consumption and production, shaped around the desire for continuous economic growth, not only depend upon but also exacerbate wealth and income inequalities between and within countries (e.g., Piketty 2014, Kochhar 2015). In addition to social inequities these systems are based on and aggravate ecological injustice. It is now readily apparent that the social impacts of ecosystem degradation and breakdown in ecosystem services are experienced in a highly skewed manner along axes of race, caste, class, gender and nationality (e.g., Agarwal and Narain 1991, Martinez-Alier 2003, Mohai et al 2009).[20]

The systemic inequities of these systems raise ethical and political challenges. While many privileged global citizens consume more than their fair share of environmental goods and services, and tend to be shielded from the fallout of such consumption, a large majority barely consumes at levels necessary to survive, and yet are also forced to bear a disproportionate share of the environmental and social costs of this political-economic system.

Global North and South

Developing countries are inseparably embedded within this historical-ecological moment as nodes in the global relationships of production and consumption. Some of the socio-ecological impact of necessary development can be alleviated if resources are made available as the result of substantially reduced consumption in the industrialized world. However, developing countries too frequently rely on off-the-shelf models of human development and must chart a different path. Critical to this phenomenon is realization that the established urban-industrial model has yet to prove its efficacy with regard to ecological health and social justice.

The foundation of this Working Group is based on an assertion that in a global market system focused on national competition and the interests of capital, inequality and injustice drives the reproduction of unsustainable economic systems. Unequal relations of exchange enable carbon leakage, redistribute environmental burdens onto those least able to defend their

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[20] See also the *Environmental Justice Atlas* accessible at https://ejatlas.org.

land and health, and exacerbate the artificially cheap costs that contribute to production and consumption growth.

8.1.3 Formulating Research Questions to Inform Action

It is unlikely that the growing power of international business will dissipate significantly in the near future, or that current political power centres will change their course of promoting growth and consumption everywhere in the world. The questions confronting this Working Group center on how to transform highly unequal relations of exchange while at the same time reducing the environmental and climate impacts of global production-consumption.

Even as we seek changes to the political and economic status quo the Working Group recognizes that there are hundreds of initiatives around the world experimenting with "alternatives" in politics, technology, organization, economics and culture. We ought to know much more about these pilot programs

In addition to these pioneering efforts it is important to pay attention to lessons that can be learned from creative, persistent, and valiant projects to promote social and ecological justice. We are not starting from zero. Public policies to regulate production-consumption systems do exist and many can improve political and economic relationships qualitatively. Others, yet to be created, are the focus of vigorous social and political movements (for example, the struggle for living minimum wages of for affordable decent housing). What is the status of such efforts, who are these activists and their networks, and how might the Working Group partner with them? How can their individual political impacts be magnified through creating shared interests, framings, and momentum?

The early research of this Working Group is centred on conceptual mapping, intended to outline the connections and interrelations among social, ecological, and economic crises. We ask what structural challenges and/or changes in the current economic system *might* create opportunities to advance sustainable consumption and production—and how we might recognize these challenges/changes. Further our mapping includes layers of existing policy and advocacy as a means to explore how movements and policies centred on different crises might be effectively combined to advocate for more substantial market and economic adjustments. This effort is grounded using specific production-consumption networks as cases.

8.1.4 Strategies for Meaningful Action: Towards an Alternative Political Economy

Ultimately, this Working Group will measure its success in contributions to emerging "transformations" in the economic, financial, and political systems. This vast, ambitious, and bold political undertaking requires partnerships with social movements seeking justice, with policy makers working to restructure economic relations, and with other researchers focused on alternative political-economic arrangements.

How can the KAN support social movements, policy research, and advocates internalize each other's values and so create alliances and effective political coalitions? What policies and politics are feasible? What methodologies are available? We recognize not only the importance

of policy that can restructure political-economic relations as well as the importance of discursive formulations and political platforms that are inclusive of the interests of diverse constituencies. This calls for collaboration with other constituent parts of the overall KAN that also address discursive formulations.

To conclude, a lot more work needs to be done to further elaborate the research agenda and questions and to develop strategies for meaningful action. Pilot projects should be feasible, but a crucial question is how to obtain funding for these and other research and action-oriented projects. This agenda will be further developed in the coming months and years.

8.2 Working Group 2: Sustainable Consumption and Production in Cities

8.2.1 Importance of Cities for Transitions to Sustainable Systems of Sustainable Consumption and Production

Cities are increasingly emerging as focal points for transitions toward sustainability. More than half of the global population lives in cities and their numbers are expanding both relatively and absolutely. Cities are—and always have been—centers for technological, institutional, and social innovations. They are hubs for science, technology, arts, business, governments, experimentation, and learning. At the same time, cities have been stressed by waves of migration and, especially in the global South, by the challenge to create jobs and livelihoods. Cities promise modern lifestyles and a better tomorrow which attracts young people from rural areas.

Most consumers live in cities and urban consumption patterns and lifestyles are driven by technological and social innovations, fashions, and styles. Already consumption is moving from products to services and most of these novel forms or provisioning are generated within cities. It may be paradoxical that although urban lifestyles are often associated with high footprints, many (but not all) sustainable solutions and lifestyles are also pioneered in cities. Production and supply chains of consumer goods are also getting more complex and span the entire world, far beyond municipal boundaries.

There are important differences between cities in the global North and South. In the global North, especially in Japan and Europe, the population of many inner urban areas is shrinking because of gentrification, population aging, and changing demographics.[21] Another reason for contracting cities is the decline of traditional manufacturing activities, especially in the United States. In contrast, nearly all cities in the global South are growing rapidly because of migration from rural to urban areas, industrialization and job creation, and rationalization of agriculture with a steep decline in the demand for labor outside of cities. High population

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[21] See https://www.washingtonpost.com/news/worldviews/wp/2015/06/23/map-where-europe-is-growing-and-where-it-is-shrinking. This map is quite revealing. In Europe, it is the city centers that are shrinking and people are moving into suburbs and surrounding areas because of gentrification. In other words, European population distributions and settlement patterns are increasingly coming to replicate patterns generally associated with the United States. Refer also to Matanle (2016).

density, poor infrastructures, lack of affordable housing, emergence of slums, traffic congestion, and air pollution are serious urban problems.

8.2.2 Scope of Research and Main Research Question
Focus and Scope

This Working Group will focus on three interlinked issues relating to systems of sustainable consumption and production in the context of urbanization and cities—1) urban provisioning systems such as housing, transportation, food, and leisure, 2) social inequality, and 3) well-being. Our aim is to build on recent research on urban sustainability, for instance recent reports by such as the German Advisory Council on Global Change, work by the United Nations Environment Program on city-level decoupling, and the United Nations Habitat resolution that provide new perspectives and possible solutions to reduce direct and indirect footprints of cities.[22]

Aims and Objectives
The aims of this Working Group are:
- To provide a new perspective on the challenges related to urban provisioning, equity, and well-being in cities.
- To expose the trade-offs between mutually desirable yet competing objectives related to the pursuit of sustainable urban provisioning, equity, and well-being.
- To develop reflexive strategies to address these challenges.
- To support actors, actions, and development of policies to achieve systemic changes.

The objectives for fulfilling these aims are:
- To identify and close knowledge gaps, to formulate research questions, and to develop transformative and transdisciplinary research projects that contribute to improved understanding of urban sustainability transformations.
- To engage in and support activities and experiments by stakeholders (business, civil society, academia, local governments) and citizens to address unsustainable consumption, production, and lifestyles, by analyzing methods, activities, experiments, and projects (as well as their intended and unintended outcomes). This implies the important step of going from awareness to action and thus includes action research and being involved in co-creation processes with users and other stake-holders. The Working Group also will seek to widely disseminate the results and policy relevance of engagement and evaluation activities.

Main Research Questions
The main research questions that this Working Group aims to address is:

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[22] See http://www.wbgu.de/en/flagship-reports/fr-2016-urbanization, http://www.resourcepanel.org/reports/city-level-decoupling, and http://habitat3.org/wp-content/uploads/N1639668-English.pdf.

- How can a transformation toward sustainable systems of production and consumption be conceptualized and achieved in cities through policies and citizens' initiatives?
- How can sustainable provisioning, greater equality, and people's well-being in urban areas be simultaneously pursued while minimizing the trade-offs across these desirable objectives?

The Working Group will engage in overarching and systemic studies and addressing the present state and challenges, as well as required future transformations, through qualitative and quantitative research and data collection. The work program will also include a case-study approach to develop studies highlighting variety and commonalities among cities.

In particular, the Working Group aims to address the following aspects of unsustainable urbanization and associated patterns of sustainable consumption and production and the opportunities for bringing them about in an urban context:

- *Consumer culture and lifestyles:* In cities, higher income levels and a culture of consumerism lead to more material consumption and more waste. This includes the "nutrition transition" toward higher caloric and more processed food. These lifestyles are spreading worldwide, especially in urban centers and suburbs, and are major drivers for increasing material consumption levels and urban footprints.
- *Increasing waste generation* and emissions to air and water are pressing concerns of many cities, especially in developing countries where the deteriorating quality of urban environments has particularly negative effects on health and well-being. Waste and pollution are often the result of inefficient management systems, uncoordinated industrial activity, and automobile-based mobility systems. These situations call for alternative models of provisioning with lower environmental impacts while enhancing local economic development, innovation, and job creation. The overall challenge is to lower aggregate resource-consumption levels and waste generation of urban environments.
- *Growing inequality within cities*, especially in relation to consumption and production patterns and unequal distribution of benefits and burdens through urban provisioning systems (including unequal access to services like healthcare and education) is a growing concern. This includes quantitative relationships across income levels, education levels, and age distribution and the ecological footprints in cities.

The Working Group has identified six possible solution directions to address these issues:

- *Strengthening relationships among well-being, bottom-up citizen-led community initiatives, sustainable lifestyles, sharing, and social innovations* to establish localized systems of sustainable consumption and production in urban contexts with the goal to decouple urban footprints from urban quality of life and to promote sufficiency. Accordingly, social innovations such as sharing and exchanges question the role and narratives of middle-class lifestyles. Sharing connects and cuts across consumption,

waste management, cultures of ownership and property, and importantly production. Sharing is a socially constructive production-enabling practice as suggested by the examples of tool libraries, makerspaces, co-working spaces, co-housing, shared equipment, pooled buying of supplies by enterprises, and all types of knowledge sharing through Open Access information and online resources. Other approaches and potential solutions include sustainable urban consumption practices, urban living labs, urban transition experiments, urban visions that relate to developments in urban provisioning and more sustainable consumption, and social innovation in cities for sustainable lifestyles.

- *Circular economy innovations in urban contexts:* Pollution from industrial manufacturing and municipal solid waste can be addressed through circular economy innovations in urban areas. Such practices have the potential to create sustainable supply networks and provisioning systems and generate new employment opportunities. Repair businesses (or "repair cafes") and circular economy schemes for managing food waste are important elements which are linked to social innovation and community initiatives. In cities of the global South the role of the informal sector in urban provisioning systems, in particular regarding waste management and recycling, is significant. Acknowledging the role of the informal sector and livelihoods of marginalized groups such as waste pickers is critical for development of alternative narratives regarding the circular economy, with the goal of creating inclusive circular economy practices in cities.

- *Urban policies, governance mechanisms, and multi-stakeholder collaborations* that can address the tensions among conflicting issues and create synergies across solutions to address multiple problems are needed. This includes coordinating top-down policy and urban planning processes while enabling innovative citizen-led initiatives that steer sustainability transformations.

- *Increasing the role and contribution of big data, social media, the Internet of Things (IoT), and Artificial Intelligence (AI)* in facilitating change towards sustainable systems of production and consumption. While big data and IoT can provide accurate assessment about resource flows to make provisioning systems more efficient or measure environmental outcomes to provide users with information about potential health impacts, it is important to ensure that smart cities are not only smart, but also inclusive. Big data can enable fact-based decision making, but equally privacy concerns need to be considered. The role of social media in enabling collaboration for community-based action and social innovation has been emphasized, and can also play an important role in communicating successful transition experiments.

- *Making explicit underlying and potentially conflicting normativities, narratives, and values in sustainability transitions*: the systemic approach to systems of sustainable consumption and production is an important framework that allows adaptation to various contexts and applicability in different cities and urban lifestyles.

- *Identifying patterns, mechanisms, benefits, and implications of emerging good/better practices of sustainable consumption and production in cities*: sectoral or domain-oriented approaches to local provisioning systems can be used and distinctions can be made among different lifestyles and consumption domains/sectors such as housing, food, energy, mobility, use of manufactured products, leisure, and clothing.

Three Lines of Research

The Working Group will pursue three major lines of research:

- The current state, challenges, and foundations of sustainable consumption and production in an urban context that includes consideration of transition to a circular economy and circular cities. Where is sustainable consumption and production and circular cities aligned and what are possible tensions and conflicts?
- What are current best practices and how can they be more widely diffused and promoted? This question should consider what can be learned from comparing best practices in developing countries and developed countries as well as how they might benefit from each other and how lessons can be transferred between countries.
- Transformations to sustainable consumption and production in cities will focus on bringing about transitions in cities and how visions, scenarios, and pathways can be developed to support the transformation process.

8.3 Working Group 3: Social Change and Sustainability Transformations Beyond Consumerism

8.3.1 Overview

The dominant system of social organization throughout most of the global North has evolved over the past few hundred years from agrarianism to industrialism to consumerism. However, several factors are now contributing to erosion of the key features of consumerist lifestyles in these nations, most notably increasing income inequality, shrinking size of the middle class, declining participation in wage labor, aging populations, and rising digitalization, automation, and robotization.[23] These processes are unfolding in complex ways, upending customary modes of consumption (and production), and disrupting distributional systems that facilitate contemporary provisioning practices (Srnicek and Williams 2015, Mason 2015, Angus 2016, Monbiot 2016).

Concomitantly, there is growing political acknowledgement of the adverse socio-ecological implications of consumerism for both the global North and South. Institutions of global governance over the past thirty years have progressively recognized these conditions with the latest manifestation being the United Nations' Sustainable Development Goals (SDGs).

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[23] Consistent with the *Oxford English Dictionary (OED)*, the Working Group understands consumerism as "the preoccupation of society with the acquisition of consumer goods" and the attendant reliance of policy interventions to stimulate these impulses and to foster a system of social organization predicated on consumerist lifestyles.

Grassroots initiatives motivated by similar considerations have proliferated and in some communities have given rise to alternative systems for sourcing and allocating goods and services. As ensuing forces of social and technological change continue to challenge conventional social routines, political structures, and organizational arrangements these local experiments are likely to become more important in fostering new forms of societal (and even society-nature) relations.

Despite ongoing social change, conceptual understanding about possible future options remains stifled and underdeveloped (cf. Ivanova 2011, Cohen 2013, 2014, Blühdorn 2017). A grand challenge of the middle decades of the twenty-first century is centered on how societies might evolve beyond consumerism and reflexively and purposefully design a more equitable and biophysically sustainable system of social organization. Meeting this objective will require drawing on a range of transdisciplinary perspectives, partly because current understandings have been forged within the confines of distinct disciplinary specialties and are no longer adequate to address contemporary problems.

8.3.2 Transitioning Beyond Consumerism

It can be observed that while the socially engineered edifice that supports and reproduces consumerism is faltering in some parts of the world it is gaining stature in others (Wilhite 2008, Sahakian 2014, Yu 2014, Li 2016). In countries where consumerist lifestyles have become most prominent and deeply entrenched over the last few decades—often facilitated by strong political resolve to neoliberal policy commitments—ensuing social changes are generally ambiguous, incoherent, and difficult to discern. Steadfast fixation by governments, corporations, and others on consumer-impelled economic growth represents one manifestation of this phenomenon. However, accompanying trends like the secular stagnation of economies, climate change, and increasing injustice between and within countries demonstrate the limits and risks of this strategy. Certainly, evidence suggests that further extension of these processes is unlikely to lead to outcomes that enhance societal well-being.

The challenges around contemporary consumerism are fundamentally different from previous periods of societal transformation that were expedited by robust economic and demographic expansion, resource-intensive production, declining income inequality, and rising consumptive capacity (Kotz 2015, Cohen 2017). Today we are instead witnessing sluggish (and inequitably distributed) economic growth, labor-market informalization, and widening social vulnerability (Standing 2011, Breman and van der Linden 2014).

Initial emphasis of this Working Group will be on novel experiments for more sustainable consumption. Certainly, a number of countries have in recent years witnessed the amplification of alternative provisioning practices including collaborative consumption, do-it-yourself "prosumption," and relocalized arrangements for meeting basic needs such as transition towns and eco-villages (Schor and Fitzmaurice 2014, Böcker and Meelen 2016, Litfin 2013, Shirani et al 2015, Brombin 2015). Some observers contend that these adaptations represent valiant social innovations activated in response to the halting and unreliable performance of

conventional lifestyle arrangements predicated on wage labor and transactional acquisition of consumer products (Halkier 2013, Schor and Thompson 2014). At the same time, critics have highlighted the negative side-effects or the "non-transformative" and system-reinforcing character of these activities.[24] Nevertheless the emergence of inventive arrangements and their ways of (re)activating values like solidarity, responsibility, emancipation, participation, and community-building can be interpreted as signs of social change that begin to go beyond consumerism and open potential opportunities for a more sustainable future (Sahakian 2012, 2017, Davies et al 2014, 2017, Jaeger-Erben and Rückert-John 2015, Cohen et al 2017). While research to date on sustainable consumption and social innovation has generated significant insights on how experimental practices can enable alternative lifestyles, much remains to be done in terms of ascertaining the lessons of these efforts (Davies and Mullin 2011, Cohen et al 2013, Davies and Doyle 2015, Jaeger-Erben et al 2015, Genus and Jensen 2017, Martiskainen et al 2018).

8.3.3 Objectives for the Working Group
The objectives of this Working Group are:
- To develop a transdisciplinary understanding of the spectrum of processes of social change (both structural and strategic) that are undermining prevailing consumerist lifestyles and contributing to putative sustainability transformations.
- To deploy this understanding as a basis for generating practical knowledge for policy makers, social entrepreneurs, change agents, and others engaged in transformative social change.

As outlined below, the Working Group will pursue these objectives by 1) describing the current state of consumerism, 2) developing normative concepts for transitioning toward sustainability, and 3) enhancing transformation knowledge and literacy on how to stimulate requisite social changes.

Present Perspective/System Knowledge: Contemporary Consumerism and Processes of Social Change
The Working Group aims to establish a baseline that describes the current status of consumerism in contrasting cultural and geographical contexts and different spheres of society, as well as to develop greater understanding of (inter- and intraculturally different) processes of social change around the world through careful analysis and critique of existing frameworks and to formulate new concepts and theories. These investigations will generate a typology of the main modes of consumerist lifestyles and the challenges that they embody with respect to sustainable development. To complete this foundational description, the Working Group will

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[24] For example, Breman and van der Linden (2014) provide a useful framework that highlights labor-market informalization, micro-sizing of work, middle-class contraction, income inequality, economic precarity, and financial insecurity.

sketch alternative pathways and contextualized portraits with a specific focus on the main dynamics, catalysts, and accelerators related to unsustainable consumption patterns as well as windows of opportunity that occasionally become manifest due to ongoing local and global processes of social change.

Questions that the Working Group will pursue include: What are—despite all of its negative impacts—justifications for the perpetuation and extensification of consumerism and how are they increasingly being framed in countries of the global South? How does social change occur and what factors or processes could lead to further destabilization and eventual disintegration of consumerism? What are the present (or foreseeable) ruptures, irritations, transitory processes, and crises that might undermine the enabling conditions of consumerism? What processes are likely to advance alternative futures and visions?

Normative Dimension/Orientation Knowledge: Transitioning Beyond Consumerism
While the "present perspective" outlined above follows a descriptive approach and increases system knowledge, the normative dimension tackles the knowledge required for transitioning beyond consumerism. The Working Group will accomplish this task by clarifying in detail what the notion of "beyond" entails and how its precepts are delineated. Participants will reflect and compare different value-based concepts and paradigms pertaining to societal transformation toward individual and societal well-being in different sociocultural and economic contexts. The concepts will be discussed against the background of sustainability principles to develop an understanding of the linkages among well-being, systems of provision, and resource consumption. Transitions beyond consumerism need to be undertaken inside certain corridors that satisfy minimal standards for well-being while at the same time maintaining societal development within planetary boundaries (Di Giulio and Fuchs 2014; see also Raworth 2017). The Working Group will systematically assess the normative design of these pathways and consider the following questions: What characterizes currently dominant paradigms, norms, and values that violate the normative constraints of sustainable transformation pathways? How can well-being be fostered given the need to pursue intra- and intergenerational justice? Discussion of the normative dimensions also provides insights for development of visions for future scenarios centered on why, where, and how change should happen. In various initiatives, striving to pursue sustainable consumption will focus on how "responsibility" for sustainable consumption is defined and allocated. What conflicts arise from different understandings of this "division of responsibility"?[25]

Transformation Perspective: Strategies for Making Social Change Happen
The transformation perspective will focus on processes of promising social change. The activities of the Working Group will build on general theories and empirical studies of

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[25] The current tendency of policies to foster sustainable consumption is to assign responsibility to individual consumers and to encourage them to select on their own initiative the "sustainable" version of products and services as part of a process of "greening" provisioning practices.

emancipatory practices of societal innovation and transition, including emergency-driven adaptations where various actors and institutions assume responsibility, develop new approaches and solutions, and—possibly—set in motion shifts of power (see, for example, Seyfang and Smith 2007, Davies and Mullin 2011, Pel et al 2016). The Working Group will establish an inventory of innovative practices that helps to build a critical view of the dynamics responsible for renewal of interest in economic and cultural forms of solidarity, reciprocity, emancipation, participation, and community-building (McLaren and Agyeman 2015).

Integration of Perspectives

Bringing together these three perspectives will entail assessing suitable scenarios for action (see Figure 8.1). Accordingly, the Working Group will strive to support promising and purposeful activities aimed at identifying disruptions that have the potential to release perverse lock-ins. Visions and scenarios of futures that move beyond consumerism at different scales of change—personal/individual, group, systemic—will be strategically analyzed and accompanied by "roadmaps from the future" that backcast plausible routes and formulate plans to achieve them. Because such situations can also create anxiety and withdrawal, we are particularly interested in the notion of "transformative literacy" and questions concerning how to facilitate capacity for creative and proactive reactions. We will explore, collect, and organize the perspectives that are maintained by different stakeholders in civil society and policy making, science, arts, literature, and media (see Figure 8.2). The international composition of the Working Group provides capability to explore cross-national differences in how societal actors are responding to unfolding developments and formulating new alternatives for the future.

Action

The Working Group will engage with societal partners to catalyze impacts by brokering knowledge and helping to coordinate concrete actions. These pursuits will take three forms: academic outputs, practical knowledge for policy makers, and exploratory and inspirational tools for social change beyond consumerism.

Figure 8.1: Objectives and Forms of Knowledge Created by the Working Group on Social Change and Sustainability Transformations Beyond Consumerism
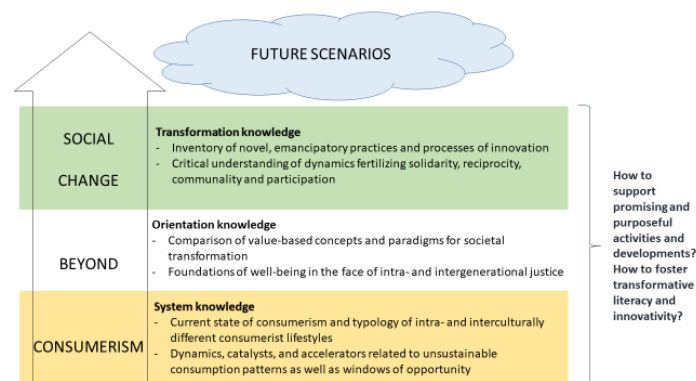
Figure 8.2: Proposed Actions by the Working Group on Social Change and Sustainability Transformations Beyond Consumerism

Map relations between social change and consumerism
Develop a typology of current consumerist lifestyles
Formulate an inventory of social change activities beyond consumerism
Assess the potential of ongoing and prospective social change activities to contribute to significant social transformations
Develop a theoretical framework for social change beyond consumerism
Co-create visions of social change for sustainability
Construct cross-cultural visions for social change beyond consumerism
Organize a database of creative materials for visioning

Academic Outputs

The Working Group will develop a theoretical framework for social change beyond consumerism and map relations between social change and consumerist lifestyles. We will also assess the potential of ongoing and prospective social change activities to contribute to significant social transformations.

Practical Knowledge for Policy Makers

We aim to develop a typology of the major challenges raised by current societal commitments to consumerism and to formulate an inventory of social change activities beyond this system of social organization.

Exploratory and Inspirational Tools

Visons of the future can be powerful motivators for social change. The Working Group will partner with societal visionaries—writers, artists, entrepreneurs—to catalogue existing visions of sustainable societies, lifestyles, and systems that are outside of the consumerist paradigm and compile and develop methods for creating new visions for communities, cities, and regions. An inventory of future visions and databases of creative materials and methods for visioning, forecasting, backcasting, and scenario planning will be developed and made accessible online and in various languages.

8.4 Working Group 4: Communicating for Sustainable Consumption and Production

8.4.1 Introduction

Sustainability-related domains such as climate change or public health have well-established fields of research, practice, and communication while sustainable consumption and production remains rather fragmented. Consistent with this pattern, Future Earth's strategic research agenda describes nine priorities across three themes with elements of consumption and

production featuring to some extent in several of them. Communication is explicitly referred to in the priority C2 on identifying and in promoting sustainable behaviors the question is raised how "communication and networking technologies [can] facilitate information exchange, collaboration and collective action for promoting systemic change towards sustainability."

With the mission of exploring, evaluating, and changing framings of sustainable consumption and production in and through communication that contributes to systemic changes, the Working Group on Communicating for Sustainable Consumption and Production (WGCoCo) addresses the challenges posed by the need to have a pragmatic approach to communication and education. Together with experimentation and academic research, we offer an inclusive, multi-disciplinary ground for civil society, businesses, and government to go beyond the belief that technologies alone can address social and environmental issues related to contemporary consumerism and its impacts and that citizens can be empowered to drive change.

It is important to highlight that the concept "sustainable consumption" is ambivalent, addressing consumption on all levels ranging from individual lifestyles and aspirations to the cultural notion of consumerism as embedded in the dominant culture of many countries. "Consumption" is originally an economic term and coupled with production it also refers to material flows through society. Reorienting existing ways to consume and produce requires altering mindsets of how we use goods and services in the normative context of sustainability.

Communication is also a complex activity and we need to distinguish among three types of communication: mono-directional (communication of), bi-directional (communication about), and normative (communication for).

The aims of the Working Group are:
- To contribute to better understanding of the conceptual and theoretical challenges related to communicating for sustainable consumption and production, to identify knowledge gaps, and to formulate research questions.
- To support activities and experiments in communicating for sustainable consumption and production by analyzing methods, activities, experiments, and projects (and their intended and unintended outcomes).
- To design and test new ways of communication and to explore diverse means such as social media, roles of influencers, online activism, games, and interactive websites.
- To contribute to establishment of a coherent conceptual framework, a set of methodologies, and a portfolio of actions and activities that could support communicators around the world.

Addressing communication from two angles—knowledge and action—the Working Group will focus on the frames, topics, narratives, modes, formats, and instruments of communication, exploring their impacts on engagement, empowerment, and action for more sustainable systems of consumption and production.

8.4.2 Theoretical Background

A transition to sustainable consumption and lifestyles presents a very difficult challenge. The initial understanding of consumption as individual choice-making—and therefore calling for frugality, voluntary simplicity, and sufficiency—has been replaced with a much more systemic and complex picture where peer pressure and intangible goods like satisfaction or happiness enter the picture.

Increasing consumption (consumerism) happens as result of prevailing business models in consumer societies, political priorities, and the dominant culture largely led by macro-level forces such as the system of global trade, the monetary system, and the debt-driven need for economic growth in a capitalist economy. An evident lock-in phenomenon also plays a relevant role when people find themselves making unsustainable choices for reasons beyond their control. The rebound effect is a third challenge to consider. Some of the most effective actions are campaigns in which consumers are promised financial gains (for instance saving on energy costs). These financial gains are then often reallocated in ways that are more socially and environmentally damaging—for instance increased volumes of visitors to natural reserves that undermine the integrity of ecosystems.

This complex understanding of consumption is captured by the definition of sustainable lifestyles provided in a recent report issued on behalf of the United Nations Environment Program (Vergragt et al 2016) on fostering and communicating sustainable lifestyles:

> A sustainable lifestyle minimizes ecological impacts while enabling a flourishing life for individuals, households, communities, and beyond. It is the product of individual and collective decisions about aspirations and about satisfying needs and adopting practices, which are in turn conditioned, facilitated, and constrained by societal norms, political institutions, public policies, infrastructures, markets, and culture.

8.4.3 Of, About, and for Sustainable Consumption and Production

Communication needs to address **what** is communicated (the content), **to** or **with whom** is communicated (the addressee, target group, or stakeholder), and what is the **intended outcome** or **function** (e.g., change of thinking or behavior, change of structure). Because of this, communication can be manipulative, instrumental and coercive—for instance when consumers are lured into buying goods they neither need nor can afford. However, communication can also be empowering and emancipatory as when it confronts people with different worldviews and problem definitions and stimulates higher-order learning that may ultimately make them reflect and change their initial problem definitions and frames of meaning. Communication in its broadest sense refers to processes in which representations of the social and natural worlds are exchanged and shared, thus, sustainability-related communication is understood as instrumental and transmissive (communication **of** a particular understanding of sustainable consumption and production by means of one-way communication), it focuses on fostering public deliberation,

participation, and discourse, stimulating communication ***about*** what sustainable consumption and production could mean by means of two-way communication. The WGCoCo will review both communication ***of*** and communication ***about*** sustainable consumption and production, emphasizing on communication ***for*** these initiatives and their potential impact for changing systems of consumption and production into more sustainable ones. This mode of sustainability communication focuses on processes of individual and social sense-making that seek to empower people to take an active role in relevant transformation processes. Such understanding of communication reflects the normative assumptions underpinning the idea of sustainability that entail capacity-building for reflexive, adaptive, and participatory decision-making. This means that it is insufficient to merely make people act in what experts/political leaders have set out to be a "sustainable" way.

A social learning approach means that communication for sustainable consumption and production needs to extend traditional mono-directional forms of communication that seek to convey framings defined by experts, scientists, and elites to broader lay audiences. There is a need to stimulate discourses and to provide different perspectives to enable social learning and broaden the understanding of the interrelatedness of individual behavioral change and societal transitions. Given the magnitude of systemic changes needed to realize sustainable systems of consumption and production, it is crucial that we go beyond fostering a better *understanding* in societal groups or to promote public *acceptance* of respective interventions in people's lives through communication. What communication needs to contribute is *to enhance individual and collective capacities to learn* "our way together to a more sustainable future in dynamic multi-stakeholder situations of uncertainty and complexity." Such processes of "learning collectively to foster systemic change" have been vividly discussed in recent years as social learning or *reframing* the problem definition and changing the interpretive frame among the diverse participants in an initiative.

8.4.4 Practices and Policies

Communication plays a crucial role for changing attitudes from a passive yet aware individual or community into an active and informed agent of change. It thus features as a key approach in several policy initiatives and activities seeking to seed social mobilization for sustainable consumption and production. The common assumption or normative foundation of many of these approaches can be characterized by a few key concepts: agency and empowerment. On one hand, individual agency is often defined as a sense of ownership that relates to the "ability to imagine and affect desired change" and is intrinsically related to the ways individuals make their lifestyle choices.

On the other hand, empowerment is another outcome of a latent sense of agency, the belief "yes, we can!" represents the conviction of being capable to drive change, both individually as a consumer and systemically as a citizen, as well as awareness of the implications that one's actions have (and could have). In our view of the field, three distinct avenues emerge that have been prominently addressed and targeted as breeding grounds for driving social

innovation towards sustainable consumption and production: bottom-up innovation in real-life contexts (social experiment and real-world laboratories), traditional formal and informal contexts for consumer learning (media, advertisements, and education), and new possibilities of transcending traditional boundaries in communicating that come along with development and maturation of new media (information and communication technologies).

8.4.5 WGCoCo Action Research

The practical utilization of communication has attracted the interest of researchers from a diversity of disciplinary backgrounds. The reflection of the three types of communication in the context of sustainable consumption and production depicts three approaches to study communication: **formation** (identifying key concepts, terminologies, and discursive figures as well as unpacking contested meanings and conflicting interest behind them. The objective of analysis is not so much on effects or effectiveness, but rather on the deconstruction of how different narratives and discourses evolve and compete (and on how they are framed in and through communication), **deliberation** (how different stakeholder groups can be motivated to engage with sustainable consumption and production. The emphasis is on fostering open deliberation and collective meaning-making rather than on persuasion toward predetermined ends. Of particular importance is social mobilization and clarification of desirable futures and **transformation** (approaches in this domain are often highly contested like the question of what type of economic growth should be promoted). Research in this field includes behavior-change intervention, social marketing campaigns, and choice editing in policy design.

The design of research requires the appreciation of different bodies of knowledge and modes of knowledge production, within academia and beyond. It is also characterized by a transformative orientation, spurred by the purpose to contribute to the advancement of strong notions of sustainable consumption and production and to lead to action. The work of the WGCoCo thus resonates with some overall characteristics of sustainability science and will seek to combine disciplinary with inter- and transdisciplinary research approaches to investigate in the frames, topics, narratives, modes, formats, and instruments of communication for more sustainable systems of consumption and production. Based on an overview of research, a review of practices and policies, and an assessment of knowledge and action gaps the WGCoCo has thus far identified the following provisional research questions and fields of action as relevant (Figure 8.3).

The WGCoCo considers communication to be a two-way effort: appeal to the end-user and unlock individual agency that will ultimately catalyze changes in legislation, production processes, and products on the shelves—this is to enable a bottom-up approach. In addition, communication efforts should be focused on decision makers, policy makers, institution builders, and multi-stakeholder alliances to build partnerships that include these actors as well as end-use consumers. Consequently, audiences for this work will include specific segments of the public and people in power: targeting people and institutions at key leverage points in different societal subsystems (e.g., politics/government, business, education, media).

Figure 8.3: Aims of Working Group on Communicating for Sustainable Consumption and Production

KNOWLEDGE	ACTION
K1–To identify different frames and narratives featuring in discourses about sustainable consumption and production in different societal arenas (critically reflect the formation of dominant narratives in the context of power relations, coalitions of interest groups, and political structures in order to assess root concepts such as economic growth, social justice, and well-being and their resonance in different societal subsystems)	A1–Draw on the insights gained in K1 and K2 and provide typologies/heuristics that offer an overview and guidance on different communication approaches and strategies to advance more integrated understandings, impacts, and a "strong view" of sustainable consumption and production
K2–To collect and systematize existing examples of communication approaches and campaigns (including the potential of social media) contributing to overcoming the fragmentation of research and to make it salient for future work.	A2–To develop tools and give recommendations for effective approaches and strategies to communicate sustainable consumption and production and implement respective dissemination plans (communications, but also education/training/capacity building) to equip practitioners with these tools and the competencies needed to use them effectively
K3–To synthesize existing scientific evidence and practitioners' experiences with regards to effects and effectiveness of such different communication approaches and strategies, using inter- and transdisciplinary approaches (emphasizing the process by which communication has resulted in specific impacts)	A3–To service the KAN as a whole with the knowledge gained and expertise gathered in the WGCoCo by contributing to formulation of a strategic communications plan the KAN

The work of the WGCoCo will build on earlier and ongoing activities by its affiliates as well as knowledge and expertise that is available through networks, e.g. through the UNEP project on communicating sustainable lifestyles, the international SCORAI network, and the PERL partnership.

8.4.6 The Way Forward

Building capacity and addressing funding opportunities are crucial for the success of the WGCoCo. To this end, two strategies have are advanced:

- To service the KAN as experts for dissemination and exploitation activities for the projects and proposals of the network's other affiliates. Continuous and consistent co-development of communication outputs will be the specialty of the Working Group. By channeling different KAN-based projects into one communication stream, we can contribute to building a recognized organizational identity for the KAN as well as a collection of lessons learned and practical tool kits for Future Earth associates. For the latter, there might be also additional and external third-party funding available.
- Self-initiated projects, endorsed by grants and third-party funding.

**8.5 Working Group 5: Global Value Chains**

8.5.1 Introduction

The Working Group is comprised of a group of interdisciplinary researchers and practitioners with an interest in and expertise pertaining to sustainable supply chains and transformative systemic change. It is working toward developing new conceptual approaches and methodological tools in sustainable global value chains. This work has practical utility, supporting the implementation of policies and practices toward more sustainable global value chains. Participants in the Working Group engage in transdisciplinary research, bridging the disciplines of social and natural sciences and engineering and work closely with industrial, governmental and societal stakeholders to define research objectives and to co-construct knowledge. Our approach is shown in Figure 8.4.

8.5.2 Background

Research and practice in sustainable supply (value) chain (SSC) management has seen significant growth over the past two decades (Fahimnia et al 2015). Organizations face a variety of forces including regulatory, competitive, and community pressures to improve their environmental and social sustainability (Zhu and Sarkis 2007, Zhu et al 2013). Risk reduction, supply chain resiliency, building competitive advantage, reacting to other actor's pressures, having the license to operate, improving image, and meeting regulations are all motivations for adopting SSC initiatives (Hofmann et al 2018, Sarkis and Dou 2017). However, multiple organizations coordinating their sustainability efforts and driving wider transformation is a complex endeavor, especially when one factors in differences in culture, politics, and economic systems (Acquier et al 2017).

In the foreground of recent SSC studies is a call for enhanced understanding of the global management of sustainability in supply chains from multiple levels of analysis (LeBaron et al 2017). From this multi-level perspective, we can identify current gaps in knowledge and avenues for future research. For example,

- At the level of the (focal) organization, there are calls for more research into the strategic challenges of developing and adopting new models of supply chain transformation (Pagell and Wu 2009, Beske and Suering 2014). The diffusion of "strong sustainability," going beyond "greenwashing" (Landrum 2018) and gaining "deep institutionalization" (Randles and Laasch 2016) across various functions of the organization (Chen and Kitsis 2017, Macchion et al 2018) is a major challenge.

Figure 8.4: Transdisciplinary and Sustainable Value Chains
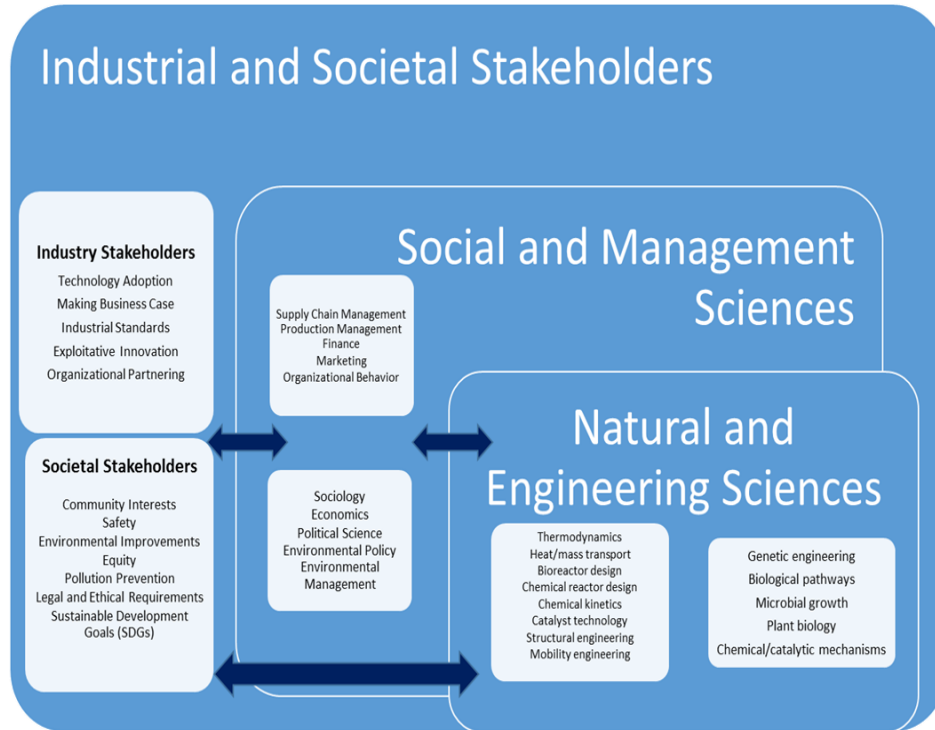
Source: Bergendahl et al (2018)

- At the level of focal organization's supply chain, literature and practice has moved away from the concept of a simple linear supply chain toward industrial supply networks (e.g., van Bommel 2011, Roscoe et al 2016). There is a gap in the literature concerning how relationships within these networks evolve into collaborative partnerships and other collective forms of action (Wu 2017), and how transparency, traceability, and the adoption of sustainability standards and other governance mechanisms can be diffused deep into supply chains (Tachizawa 2014, Dou et al 2017, Hofmann et al 2018).

- At the systems level, there has been a focus on the activities of upstream supply chains. Downstream supply chains, for example the role of hybrid (social entrepreneurship) organizations, non-governmental organizations and civil society, have received relatively less attention. A better understanding of the transdisciplinary environment within which value chains operate is needed (Bergendahl et al 2018, Tate and Bals 2018). Also deserving of more attention is the role of standardization, corporate self-regulation, and effective management of "big data" in the transformation of supply chains (Bennett 2017, Jabbour et al 2017, Montiel et al 2012, Trentesaux et al 2016, Vermeulen 2015). The embeddedness into wider social norms and (competing) institutional logics has to be considered as well.

- Moreover, to understand more comprehensively the challenges at each level, it is also necessary to study how these various levels interact (Boons and Wagner 2009).

There have also been in recent years calls for expanding the discourse around sustainable value chains. Environmental issues, especially climate change and materials-usage management, have crowded out other issues such as biodiversity and water concerns (Bazan et al 2017, Genovese et al 2017). In addition, social issues have been marginalized (Fahimnia et al 2015) and emerging economy perspectives have also been under-represented (Silvestre 2015a, 2015b).

In summary, while advances have been made over the last couple of decades, there remain large gaps in our knowledge as well as considerable complexity in researching the many dimensions of sustainable global value chains. To address this situation, this Working Group intends to apply various theoretical lens, combining approaches from the sustainable supply chain-management literature with insights from, among others, institutional theory, innovation systems perspectives (e.g., Dewick and Foster 2018), stakeholder-management theory (Freeman 1984), business-model literature, and theories of cultural change.

To extend and elaborate the literature and make both theoretical and practical contributions, including the development of tools and models applicable for practitioners and policy makers, the intention of our working group is to co-create with transdisciplinary stakeholders a research program to accelerate a transformation toward sustainable global value chains.

8.5.3 Research Aim and Objectives

The aim of this working group is to explore the process of transformative change toward sustainable global value chains. Four primary research objectives have been identified:

- To identify the generative mechanisms and critical conditions of transformative change for corporate global value chains at a multi-field level: the organization, the supply chain, and the systems level.
- To understand how the three levels are intertwined, co-dependent, and co-evolutionary.
- To develop tools for industry and recommendations for policy makers and societal stakeholders to steer a pathway toward sustainable corporate global value chains.
- To recognize and realize the economic and other impacts of sustainable value chains on all stakeholders, including business, their supply chains, and society at large.

8.5.4 Research Questions

The Working Group has devised a number of initial research questions. Our expectation is that they will provide a starting point as we seek common goals with a wide group of transdisciplinary stakeholders and co-design and co-produce a research program.

To contextualize the research program:

- What characterizes sustainable corporate global value chains (CGVCs) and economic global value chains (EGVCs) and what are the conditions facilitating and hindering transformative change towards sustainability in both?
- Can we map the relationships among different value chains and the diffusion of sustainable production/consumption practices across these actors?
- How can corporate, governmental, and societal actors independently and collectively support transformation to more sustainable corporate global value chains?

To explore CGVCs from multiple levels:
- How can organizations facilitate transformative change within their own organizational boundaries? What are the strategic challenges for organizations?
- How can organizations support transformative change with their first-tier suppliers/customers and beyond into multiple tiers?
- How can transformative change be supported by existing and new institutions (i.e., understood as widely diffused practices, rules, technologies) and the work of institutional entrepreneurs?
- What role do new business models play in shaping wider systemic change? Would a shift toward a circular economy model (value co-creation) facilitate systemic change, and how could this shift be supported?

To expand the discourse:
- Critically, what are the implications of transformative change in corporate global value chains if scaled up and replicated? Do new CGVC arrangements support sustainable, equitable growth? What are the trade-offs and paradoxes associated with transformative change?
- How do technology, automation, digitalization, inequality and sustainability in global corporate value chains play an interacting role?

8.5.5 Research Methods

To study transformative change in global value chains we will use a mixed methods approach including qualitative methods, comparative case studies, ethnographic and action-based research, quantitative methods (e.g., input/output analyses, energy analysis, life cycle analysis, optimization and multiple-criteria decision-making models).

8.5.6 Next Steps

To achieve the co-creation and co-production of a research program on sustainable global value chains, the Working Group's next step is to engage widely with the following stakeholders:
- Private sector actors including focal organizations and industry associations
- Governmental policy makers at local, regional, and national levels

- Civil society, non-governmental organizations, and think tanks.
- Academics and scientists
- Socially responsible investors, ethical risk insurers, and stock exchanges

Once the Working Group is more fully established, participants will engage with wider consortia such as the Council of Supply Chain Management Professionals, World Business Council on Sustainable Development, the Global Reporting Initiative, United Nations Global Compact, and the United Nations Environment Program. Outputs will include academic journal articles, white papers, practitioner workshops, practical tools, and implementation frameworks. The research program will seek funding from governmental, corporate, and philanthropic agencies and we have already identified several potential sources and made early applications as outlined in the Working Group's scoping document. A rolling task for us will be to search for upcoming grants and remain agile so as to respond when opportunities arise.

Looking further forward we envisage the following roadmap:

- To 2020: Collaborations formed, resources identified, initial research teams, and agendas co-created.
- To 2022: Publications in peer-reviewed outlets, initial databases to be shared, and workshops on early results from research studies.
- To 2024: Initial pilot studies, tools that are applied and data gathering from implementations, and dissemination and knowledge-transfer activities.
- To 2026: Tools developed to be applied in real-world settings and teams evolve and mature to identify necessary educational tools.

To 2028: Publication of several popular press books, formulation of templates for easy application, living websites as research tools shared for public consumption, consultants use tools to help make some transformations, industry associations partner to educate affiliates of their organizations.

Supplementary Material

Appendix 1
Future Earth Knowledge-Action Network on Systems of Sustainable Consumption and Production

Core Group Members

Name	Institutional Affiliation	Country of Residence	Native Country
Magnus Bengtsson	Independent Researcher/Consultant	Japan	Sweden
Maurie Cohen	New Jersey Institute of Technology	USA	USA
Steven McGreevy	Research Institute for Humanity and Nature	Japan	USA
Hein Mallee	Future Earth Regional Centre for Asia	Japan	Netherlands
Leida Rijnhout	Independent Researcher/Consultant	Belgium	Netherlands
Patrick Schroeder	Institute of Development Studies, University of Sussex	UK	Germany
Philip Vergragt	Clark University	USA	Netherlands

Appendix 2
Future Earth Knowledge-Action Network on Systems of Sustainable
Consumption and Production

Development Team Members

First Name	Surname	Institutional Affiliation	Country
Kartika	Anggraeni	Collaborating Center for Sustainable Consumption and Production	Germany/Indonesia
Magnus	Bengtsson	Independent Researcher/Consultant	Japan
Halina	Brown	Clark University	USA
Shun Fung	Chiu	De La Salle University	Philippines
Maurie	Cohen	New Jersey Institute of Technology	USA
Anna	Davies	Trinity College Dublin	Ireland
Masayo	Hasegawa	International Environment and Economy Institute	Japan
Cynthia	Isenhour	University of Maine	USA
Charlotte	Jensen	Aalborg University	
Sylvia	Lorek	Sustainable Europe Research Institute	Germany
Hein	Mallee	Future Earth Regional Centre for Asia	Japan
Michael	Maniates	Yale University/National University of Singapore	Singapore/USA
Steven	McGreevy	Research Institute for Humanity and Nature	Japan
Lucie	Middlemiss	University of Leeds	UK
Jaco	Quist	Delft University of Technology	Netherlands
Leida	Rijnhout	Independent Researcher/Consultant	Belgium
Joseph	Sarkis	Worcester Polytechnic Institute	USA
Patrick	Schroeder	Institute of Development Studies, University of Sussex	UK
Craig	Starger	Future Earth	USA
Alyson	Surveyer	Future Earth	Canada
Philip	Vergragt	Clark University	USA
Lei	Zhang	Renmin University	China
Laszlo	Zsolnai	Central European University	Hungary

Appendix 3
Future Earth Knowledge-Action Network on Systems of Sustainable Consumption and Production

Founding Members

First Name	Surname	Institutional Affiliation	Country
Lewis	Akenji	Institute for Global Environmental Strategies	Japan
Julia	Backhaus	Maastricht University	Netherlands
Magnus	Bengtsson	Independent Researcher/Consultant	Japan
Halina	Brown	Clark University	USA
Alison	Browne	University of Manchester	UK
Ilan	Chabay	Institute for Advanced Sustainability Studies	Germany
Shun Fung	Chiu	De La Salle University	Philippines
Maurie	Cohen	New Jersey Institute of Technology	USA
Anna	Davies	Trinity College Dublin	Ireland
Sonali	Diddi	Colorado State University	USA
Frances	Fahy	National University of Ireland	Ireland
Daniel	Fischer	Leuphana University	Germany
Cynthia	Isenhour	University of Maine	USA
Charlotte	Jensen	Aalborg University	Denmark
Wenling	Liu	Beijing Institute of Technology	China
Sylvia	Lorek	Sustainable Europe Research Institute	Germany
Hein	Mallee	Regional Centre for Future Earth in Asia	Japan
Michael	Maniates	Yale University/NUS	Singapore/USA
Steven	McGreevy	Research Institute for Humanity and Nature	Japan
Lucie	Middlemiss	University of Leeds	UK
Anne-Hélène	Prieur-Richard	Future Earth Global Hub	Canada
Jaco	Quist	Delft University of Technology	Netherlands
Lucia	Reisch	Copenhagen Business School	Denmark
Marlyne	Sahakian	University of Geneva	Switzerland
Gerd	Scholl	Institute for Ecological Economy Research	Germany
Craig	Starger	Future Earth Global Hub	USA
Dimitris	Stevis	Colorado State University	USA
Masachika	Suzuki	Sophia University	Japan
John	Thøgersen	Aarhus University	Denmark
Vanessa	Timmer	One Earth	Canada
Philip	Vergragt	Clark University	USA

Appendix 4
Future Earth Knowledge-Action Network on Systems of Sustainable Consumption and Production

Timeline of KAN-Related Major Events and Activities*

Date	Event/Activity
2016	
2–3 March 2016	Two-day scoping workshop in Kyoto sponsored by the Research Institute for Humanity and Nature and the Regional Center for Future Earth in Asia to discuss proposition of establishing a KAN focused on sustainable consumption and production (attended by fifteen participants)
24 May 2016	Webinar for thirty invited scholars in the field of sustainable consumption and production
June 2016	Submitted to the Future Earth Secretariat an Expression of Interest to establish the Knowledge-Action Network on Systems of Sustainable Consumption and Production
15–17 June 2016	Served as organizational partner in and coordinated KAN-focused session at the Third International Conference of the Sustainable Consumption Research and Action Initiative (SCORAI), Copenhagen Business School, Copenhagen, Denmark
September 2016	Established three Working Groups respectively focused on political economy, cities, and social change
5 October 2016	Convened first meeting (via webinar) of the KAN's Development Team (Subsequent meetings for 2016 held on November 2 and December 7 and for 2017 on January 11, February 8, April 5, June 7, September 7, and November 17)
2017	
3 April 2017	Submitted two proposals in response to the Transformations to Sustainability (T2S) call released by the Belmont Forum
3–5 May 2017	Hosted workshop on further development of the KAN at the National Socio-environmental Synthesis Center (SESYNC) Annapolis, Maryland, USA
June 2017	Established two additional Working Groups respectively focused on communications and global supply chains
27–29 June 2017	Presentation at the Third Global Research Forum 3rd International Conference on Sustainable Lifestyles, Livelihoods, and the Circular Economy, University of Sussex, Brighton, UK
24–26 August 2017	Participated in the Seventh International Sustainability Science Conference, Stockholm, Sweden
1–5 October 2017	Organized session at the 18th conference of the European Roundtable on Sustainable Consumption and Production, Skiathos Island, Greece
1 December 2017	Submitted White Paper on International Network-to-Network Collaboration to the United States National Science Foundation
2018	

15–16 January 2018	Participated in the conference Sustainable Consumption in Asia: The Sixth International Symposium for Future Earth in Asia, University of Kyoto, Kyoto, Japan
January 2018	Became publishing partner of the journal *Sustainability: Science, Practice, and Policy* (published by Taylor and Francis)
January–February 2018	Hosted three Community Forums (via webinar) to discuss the activities of the Working Groups (January 23, February 12, and February 27)
7 February 2018	Provided organizational assistance and participated in Cross-Cutting Future Earth KAN Workshop, Berlin, Germany
8–9 February 2018	Plenary presentation at the Third German Future Earth Summit, Berlin, Germany
5–7 March 2018	Participated in the IPPC Cities and Climate Change Science Conference, Edmonton, Canada
20 March 2018	Hosted a Collaborative Charrette to discuss the draft Research and Engagement Plan
27 March 2018	Submitted proposal in response to the Mobile Lives Forum's research program
30 March 2018	Submitted input to the Talanoa Dialogue led by the United Nations Framework Convention on Climate Change
April–June 2018	Hosted Virtual Seminar Series: Practitioners Communicating Sustainable Consumption and Production (April 17, May 15, and June 12)
May 2018	Published article in *Sustainability: Science, Practice, and Policy* entitled "Why achieving the Paris agreement requires reduced overall consumption and production"
May 2018	Published article in *Sustainability Science* entitled "Transforming systems of consumption and production for achieving the sustainable development goals: moving beyond efficiency"
May 2018	Contributed content to the final report of the IPPC Cities and Climate Change Science Conference
27–30 June 2018	Served as organizational partner in and coordinated KAN-focused session at the Third International Conference of the Sustainable Consumption Research and Action Initiative (SCORAI), Copenhagen Business School, Copenhagen, Denmark
25–28 September 2018	Organized several sessions at the World Social Science Forum, Fukouka, Japan

*For source documents and other materials pertaining to these events and activities, refer to http://futureearth.org/archive.

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