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Defining sustainability

Introduction

The emergence and development of sustainability

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What is sustainability?

There are many different uses of the term sustainability as well as its derivatives, such as social sustainability, environmental sustainability, sustainable development, sustainable living, sustainable future, and many others. Literally, the word sustainability means the capacity to support, maintain or endure; it can indicate both a goal and a process. In ecology, sustainability describes how biological systems remain diverse, robust, resilient and productive over time, a necessary precondition for the well-being of humans and other species. As the environment and social equality became increasingly important as a world issue, sustainability was adopted as a common political goal.

The concept of sustainability the way most of us use it today emerged in the 1960s in response to concern about environmental degradation. This degradation was seen by some to result from the consequences of industrial development, increase in consumption and population growth and by others as poor resource management or the result of underdevelopment and poverty. Sustainability was linked to ethical concerns, typically involving a commitment to justice between generations involving issues such as equal distribution of wealth, working

conditions and human rights, and possibly between humans and nonhumans, as discussed in chapters of Robert Garner, Holmes Rolston III and Haydn Washington.

We can distinguish between different types of sustainability, for example between social (in terms of promoting equality, health, human rights), economic (in terms of sustaining people's welfare, equitable division of resources) and environmental (in terms of sustaining nature or natural resources for humans and for nonhuman species) sustainability, as well as combinations of them. The study of sustainability involves multidisciplinary approaches, anthropology, political ecology, philosophy and ethics and environmental science. This type of multidisciplinary combination enables us to explore this new form of institutionalized sustainability science in a neoliberal age of environmental knowledge production and sustainability practice.

Finally, we can ask: 'Why be sustainable?' There is something quite strange about asking why anyone should be sustainable. To ask for an explanation about something implies that there is something else more convincing, more obviously fundamental than that for which we seek an explanation. For example, 'Why follow this course on sustainability?' can be adequately explained by 'Because it constitutes part of my Master degree', and 'Why study for a Master degree' can be explained by 'Because it will allow me to get a good job', and 'Why do you need a good job?' can be explained by 'To be happy'. But if we continue to ask why, there comes a point when all the answers are exhausted, as parents of young children would tell you, and the only rejoinder remains: 'Just because'. If the interviewer cannot see why happiness is desirable, then there is nothing much to be said – we have reached the ultimate explanation. In the end, we should be sustainable for two reasons, first because civilization as we know it might be seriously undermined if we are not, with ecological integrity all but destroyed, and second because it

provides the hope of living in harmony into the future with the beautiful world of which we are a part.

In his *Critique of Pure Reason* ([1781] 2000), German philosopher Immanuel Kant (1724–1804) developed the philosophy of humanism, distinguishing between a Categorical Imperative ('I just have to do it') as a moral law and Hypothetical Imperatives, which are merely local moral maxims ('If I want X, then I must do Y'). Asking 'why be sustainable?' can lead us to both categorical and hypothetical imperatives. Granting some modification of Kant's humanism, 'sustainability' could conceivably act as a categorical imperative. We might try to explain this by suggesting that being sustainable is good for the people and the planet, or we may have our ulterior motives for being sustainable. As future managers of commercial companies, for example, we may believe that sustainability is good for business (for example, as lower electricity bills save money for the company, or because proclaimed sustainability practices gives the public a sense of security that managers are responsible in fulfilling their obligations), but ulterior motives are not the same as good reasons. If we only abstain from unsustainable practices because we fear punishment by law, we cannot pride ourselves in our sustainability, as we are suggesting that we would not act in such a way if these incentives were not there. Thus, sustainability might be regarded as a Hypothetical Imperative, subject to various interpretations, but such imperatives can guarantee nothing in relation to the orderly or democratic world, or in relation to concerted international effort.

This book aims to introduce you to the manifold features of sustainability. Contributing chapters present various and disputed features, uses and manifestations of sustainability, as well as address its continuous reshaping. They cover the very broad spectrum of ideas covered under sustainability, from participation, resilience, growth and ecological modernism through to

ecological justice, culture, sustainable communities and sustainable consumption. These issues are particularly important given that sustainability is such a broad issue, where many different areas of expertise and forms of knowledge interact. While the majority of books on sustainability have a narrow focus, for example, business management aspects of sustainability or corporate social responsibility (CSR), this volume takes a much broader approach. Contributing chapters capture the concept of sustainability not just as a coherent theory or blueprint of practice, but as a multifaceted and complex matter with different possibilities.

In some cases, sustainability can be seen as both a fundamental issue (as some people see that we cannot do without it) and as strongly affective (as some people strongly care about sustainability). The ultimate answer as to why be sustainable thus depends on whether we view the issue as practical, profitable or fundamental. Sustainability, at any rate, is not something we can get easily around. The big question is how to be sustainable?

How to be sustainable?

The lived experience of sustainability – including your own, since you are reading this book – involves everyday confrontations with what might be termed ‘unsustainability’. Whether you are a Western shopper trying to pick the right ‘green’, ‘ecological’, or ‘fair-trade’ product from the shelf, or a poor farmer in a remote region of a developing country trying to save his or her harvest from encroaching drought, or an endangered animal trying to find a new place of habitation after its home has been destroyed by loggers, your experience with sustainability is going to be very different.

Sustainability is not easy to achieve, as it sometimes requires information and knowledge that individuals, societies, governments or corporate stakeholders either do not possess, only partially possess, do not want to accept or act upon (i.e. operate in denial of), and/or cannot afford. An example of this is climate change, caused by anthropogenic global greenhouse gas (GHG) emissions such as carbon dioxide, methane and nitrous oxides.

Climate science is highly complex and dependent upon combined insights from science and technology studies, innovation systems theory as well as research of meteorologists, biologists, geologists and many other specialists. Fundamental changes are needed to reform current systems of production and consumption, as well as changes affecting the actors, networks and institutions involved in the governance of these changes. Because the outcomes of any type of scientific research are not necessarily straightforward, policymakers and the public often want to have simple answers and accurate future predictions upon which they can act. We might want to know: by how many percent will the Arctic glacier melt per year? Per month? What effect will it have on us? Yet, such clear predictions are often impossible due to the very complex and myriad factors effecting climatic conditions. This complexity leads to scientific uncertainty that climate change deniers – and particularly political groups or corporate lobbies that have a stake in refusing regulation of emissions – are all too glad to exploit.

Sometimes sustainable choices require decisions that politicians, corporate leaders and citizens are not willing to make. Many democratic governments at present are not willing to make unpopular decisions, such as demanding higher taxes on certain products. Political decisions that might result in socially and environmentally benign reforms may be costly to citizens who may be required to pay higher taxes, or asked to make lifestyle changes that they are not ready to commit to. Unfortunately, the biggest hurdle in the implementation of

sustainable practices and policies are too often politicians themselves who are worried about estranging voters and lobbyists.

Sometimes the sustainable choices are simply not available – for example, if governments do not provide public transportation, citizens may be forced to use cars. On the other hand, if citizens themselves are choosing to use cars, that behavior can undermine a government's support for public transport, such as running a bus in the province where the use of public transport is minimal. Thus, low carbon consumption by households, communities and businesses at local and regional levels, and transition pathways to low carbon energy at the national level are all possible – but dependent upon the availability and willingness of responsible stakeholders to initiate and maintain change. The corporate and political stakeholders are particularly important in this regard as billions are annually spent by the advertising industry promoting profligate consumption, supported by the power of large corporations and the dominance of neoliberal governments.

In some cases, sustainability can be a simple lifestyle choice. But how simple is it really?

Consider an example of a good citizen that thinks that the act of brushing his teeth in the shower is going to save water as he is doing two things simultaneously. This may or may not be the case, however, as he might be spending more time brushing his teeth while the water is running than he would at the sink, as well as actually washing, thus actually using more water.

Consider another conundrum. How can a consumer decide which form of energy is 'truly green', if this consumer is bombarded by contradictory and sometimes government- or corporate-sponsored information? Does biofuel or biodiesel qualify as 'green', as the European Union's Environmental Agency states? Considering that some of biofuel may be derived from

tree plantations that were planted in places where the old biodiverse forest, which took tens of years to grow to maturity, once stood, how sustainable is this form of green energy?

Another example is even more difficult as it has to do with morals and ethics. Most of us, editors and contributors of this volume, as well as probably yourself, the reader, may agree that helping the sick and the poor is the moral responsibility of the privileged classes or societies. But would increasing the human population and expanding the economic pie for the world's innumerable poor not result in even more natural resources being consumed and a deeper ecological crisis that will likely affect these same vulnerable populations the most? As contributors to this volume note, it is time to think about sharing a pie that is ecologically sustainable rather than growing a bigger pie and to widen our compassion outside our own species to the rest of nature.

Finally, consider this question. In order to feed the growing population, more and more agricultural products are needed. These 'agricultural products', or more specifically, plants and animals, are increasingly subject to genetic manipulation and intensive agriculture. Cattle and poultry are raised in confined spaces without ever seeing daylight, calves and chicks are directly removed from their parents, intensively fed, subjected to hormonal treatment and preventive antibiotic medicines, and slaughtered within a few months of their lives. Last but not least, these alternative forms of agriculture are more expensive for consumers. Opponents of organic agriculture have argued that given current and potentially growing human population, intensive agriculture and genetic modification are needed to stave off world hunger. What is more sustainable and what is more ethical in this case – abandoning concerns about animal welfare in favor of economic prosperity, or addressing the causes of high demand for such 'products' (such as population growth and the growth in demand for meat)?

What is the ‘right’ thing to do? This question is not easy to answer. We hope that this book will help you to think about sustainability by presenting not only the necessary nuances and complexities of the conceptual and practical challenges of sustainability, but also by offering some ideas and inspiration that may lead you, the reader, to find a way to a sustainable future. Environmental science is explicit about the urgency of doing so (as Washington summarizes in his chapter) – ‘time is of the essence’.

The reasons why environmental problems such as climate change or global poverty or protection of biodiversity are so difficult to tackle are manifold. We shall now discuss some of these issues and introduce the chapters.

Brief history of sustainability

Many scholars trace the origin of environmental problems and social inequality issues to the Industrial Revolution in late eighteenth-century England. The Industrial Revolution led to major changes in agriculture, manufacturing, mining and transportation; and had a profound effect on the socioeconomic and cultural conditions and development of the capitalist economy.

Capitalism is generally understood as an economic system in which the means of production are mostly privately owned and operated for profit and in which the distribution and pricing of goods and services are determined through the operation of a market economy. The early stages of industrialization were based on the assumption that natural resources are unlimited and a disregard for the working conditions of laborers. Fossil fuels for generating energy were discovered and put to use, and increasingly durable materials such as plastics were created.

Advanced industrialization propelled Fordism: the mass production of consumer goods that are

largely responsible for the rise of consumerism. It also propelled social and economic improvements.

The twentieth century has seen the improvement of working conditions in many Western capitalist countries, through which capitalism was shown to have a ‘human face’. Industrialization has also led to scientific and technological progress, better medical technologies, better health care and higher living standards. The same technologies that might have caused problems in the earlier stages of industrialization may now be much more effective in devising cleaner technologies. The Environmental Kuznets Curve (EKC) and ecological modernization theories all propagate the idea that further economic development will raise societal technological ability to deal with the challenges of unsustainability. Empirically, however, there seems to be no evidence that economically more developed societies are succeeding in addressing environmental challenges, ranging from monumental failure to address carbon emissions and mass extinctions, to an inability to provide truly sustainable forms of consumption. In fact, poorer and less developed (and specifically preindustrial) societies exhibit much lower consumption patterns and are less environmentally harmful than those of rich nations. These subjects will be discussed in greater detail in chapters by Peter N. Nemetz, Haydn Washington, Christian Kerschner and Daniel W. O’Neill.

From the 1950s onward, trade became increasingly intensified and internationalized, manifested through the growing dominance of multinational corporations (MNCs). Since World War II, financial markets supported by organizations such as the International Monetary Fund (IMF) and the World Bank have stabilized and investments in physical capital (e.g. commercial buildings, machinery) and human capital (e.g. education) have intensified.

In the late 1950s, agricultural research programs funded by international agencies and sponsors led to the so-called Green Revolution. The Green Revolution has allowed food production to keep pace with population growth and caused great population increases. For example, while Mexico needed to import almost all its grain before World War II, by 1964 Mexico became one of the major exporters of wheat in the region. Today, we are familiar with all sorts of intensified agricultural practices, including genetic engineering of crops and ‘successful’ spread of large-scale monocultures.

The shift in power and trade relations has moved from ‘the centre’ (particularly Western and Northern European countries, the United States, Canada, Australia and Japan) to emerging economies of the BRIC region, notably Brazil, China and Russia, as well as India and countries in Southeast Asia. Postcolonial and labor migration to former colonial countries in Europe has intensified. The movement of people, goods and services has signified the truly global scale of trade relationships as well as what some see as a homogenization of culture and ideology that, while still variable, supports neoliberal democracy.

Critics have noted that the end of most colonial empires has also signified a return of what is termed neo-colonialism, in which power is still derived by the postcolonial elites from poorer regions that are exploited for raw materials or cheap labor. The new ‘holy grail’ of the West has included some export products that most of the readers of this book will probably find to be ‘good’ (democracy, concerns with egalitarianism, human rights, open markets, rise in value of human life, etc.), as well as some aspects of neoliberal democracy that can be found questionable – such as critique of other traditions and the spread of highly unsustainable practices. These unsustainable practices include the continuous spreading of consumer economy, facilitated by the globalization of financial markets, increases in global trade and exploitation of

natural resources. The questions of combining sustainability with economic interests have only really just started to dominate international political agendas.

In 1960, the Organization for Economic Cooperation and Development (OECD) was created to promote policies that would achieve the highest sustainable economic growth in Member countries in order to stimulate employment and increase living standards. The OECD defines sustainability in relation to eco-efficiency which is ‘the efficiency with which ecological resources are used to meet human needs’ and represents it as a ratio of an output (the value of products and services produced by a firm, sector or economy as a whole) divided by the input (the sum of environmental pressures generated by the firm, the sector or the economy). In business, sustainability often came to be understood as the triple bottom line, or three Ps – People, Planet, Profit – that stand for integration of social, ecological and economic interests.

In 1972, the Club of Rome, an influential think tank, published the ‘Limits to Growth’ report, which emphasized that there are limits to our planet’s capacity to cope with pressures of human industrial development (Meadows et al. 1972). Unprecedented economic growth was linked to the rapid loss of biodiversity, desertification, erosion of the soil, as well as the pollution of water, soil and air. The report postulated that environmental protection and social equity requires drastic measures, such as the halt of continuous economic growth, fostering steady state economy (Daly 1991) or what later came to be known as no-growth economy, and the curbing of human population through voluntary measures.

The United Nations Environment Program (UNEP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) called for the use of environmental education to develop ‘a new global ethic’ described in *The Belgrade Charter – A Global Framework for Environmental Education* (1975). The Belgrade Charter aimed to develop a world population

that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones. It suggested that, fundamentally, we need to tackle the ‘isms’ of modernism, industrialism and consumerism (Washington 2015).

The Earth Summit in Rio de Janeiro, Brazil in 1992, developed ‘framework conventions’ on climate change and biodiversity (as well as on desertification, which is presently less known), to establish basic aims, principles, norms, institutions and procedures for action. The UN Framework Convention on Climate Change (UNFCCC) was ‘to achieve stabilization of greenhouse-gas concentrations in the atmosphere’. The Convention on Biological Diversity (CBD) has pointed to the growing evidence of massive species extinction at the hands of humanity, also as witnessed by the WWF Living Planet Index. The action points were summarized in an acronym HIPPO: habitat destruction, invasive species, pollution, population increase and overharvesting; and included conservation actions: reduce rate of biodiversity loss, promote sustainable use of biodiversity, address major threats to biodiversity, and mobilize financial and technical resources for implementing the convention and the strategic plan, especially for developing countries.

Sustainable development

While empirical evidence is accumulating to support the prediction of the Limits to Growth model, especially in regard to the disappearance of species, increased pollution and mounting pressures on natural resources (e.g. Wijkman and Rockström 2012), the discourse of limits to

growth seems overshadowed by the optimism of ‘sustainable development’. The general message of the Limits to Growth advocates that significant ecological and social change will require fundamental changes to our current economic system and underlying ideology of free market already proven to be unpalatable to political leaders. A different set of ideas has emerged singling out economic development as the actual key to addressing both social and environmental problems. In terms of growing populations, the statement ‘Development is the best contraceptive’, made by Karan Singh at the World Population Conference in Bucharest in 1974 has come to signify hope that population pressures will subside once the global population becomes wealthier. This has not necessarily been the case, as education of women and family planning are crucially important as discussed in chapters by Blake Alcott and Haydn Washington in this volume.

Since the 1980s, sustainability has been defined as the integration of environmental, economic and social dimensions towards responsible management of natural resources. United Nations World Commission on Environment and Development (WCED 1987) or the Brundtland Commission characterized ‘sustainable development’ as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’. This definition of the Brundtland Commission has multiple ‘readings’ or interpretations. The general aim of sustainable development – something that is specifically important for the general idea of ‘sustainability’ that many of us still adhere to today, involved finding strategies to promote economic and social development in ways that avoided environmental degradation, overexploitation and pollution.

As stated in mission statements of the United Nations, the World Bank, and the World Trade Organization (WTO), sustainable development often singles out poverty reduction and

health as the core of its aims. The ‘Millennium Development Goals’ (MDGs) all refer to better and more equitable outcomes in the areas of health, housing, sanitation and natural resources, especially in reference to vulnerable groups. In the often-reprinted textbook *Introduction to Sustainable Development* (Elliott 2013), differences in wealth and income are seen to be important factors in explaining the range of spatial patterns of ‘unsustainable development’. Poverty is seen as a major cause and effect of global environmental problems and addressing poverty and inequality are long-standing and central concerns of sustainable development (Elliott 2013:1). Making globalization work better for the poor is seen as integral to sustainable development – as a human rights issue, as a moral concern, for peace and security and economic development in the future (WCED 1987). Many international initiatives to support sustainable development have been launched by corporate and government partners and NGOs, such as the Earth Charter.

Agenda 21, a key set of plans aimed at achieving global sustainable development in the 21st century suggested that a balance must be found between the needs of the environment and those of humankind. Belief in human progress has given rise to environmental management policies that tended to view nature as a resource and put a price on environment. Twenty years after the publication of *The Limits to Growth*, economic and social development agendas moved away from blaming environmental problems solely on human mismanagement, and in fact saw environmental management as the key to preserving natural resources for future human generations.

Population and development conferences reflected the turn away from calls for environmental protection through population control and reduction of economic activity toward greater emphasis on actually promoting all forms of actions crucial for human survival and

welfare. International Conference on Population and Development in Cairo (ICPD) in 1994 put an emphasis on reducing mortality and fertility rates around the world.

Critical views

Some researchers have highlighted that the concept of sustainable development with its emphasis on poverty and wealth neglects our relationships with nature, and that sustainability simply becomes a matter of human welfare in preserving resources for future generations of humans (e.g. [Bonnett 2007](#)). Many critical scholars have argued that the idea of ‘progress’, ‘modernity’ and ‘development’ is relative and that the enterprise of development actually creates social inequalities and imbalance between humans and environment. The idea that the reduction of poverty and creation of wealth can help solve problems became highly disputed.

As the message of Limits to Growth faded, sustainable development was described by its critics as an attempt to offset or deflect the message of Limits, and the word ‘sustainable’ began to appear as an adjective that modified common terms:

It was drawn from the concept of ‘sustained yield’ which is used to describe agriculture and forestry when these enterprises are conducted in such a way that they could be continued indefinitely, i.e., their yield could be sustained. The use of the new term ‘sustainable’ provided comfort and reassurance to those who may momentarily have wondered if possibly there were limits. The word was soon applied in many areas, and with less precise meaning, so that for example, with little visible change, ‘development’ became ‘sustainable development,’ etc. One would see political leaders using the term ‘sustainable’ to describe their goals as they worked hard to create more jobs, to increase population, and to increase rates of consumption of energy and resources. In the manner of Alice in Wonderland,

and without regard for accuracy or consistency, ‘sustainability’ seems to have been redefined flexibly to suit a variety of wishes and conveniences.

(Bartlett 1994)

These critics have argued that current problems of poverty and inequality were created by the predecessors of the very same agencies that now promote (sustainable) development. Critics see the top-down development projects as a kind of neo-colonial enterprise in which foreign aid, structural adjustment programs and programs to promote development may have caused more harm than good in exacerbating global inequalities (e.g. Easterly 2006, Bodley 2008). The idea that some countries are more ‘developed’ than others implies a superiority similar to the colonial regimes supported by the ‘Victorian gentlemen’ who forced their ‘civilization’ onto the hapless ‘savages’ and dispossessed them of their own cultural wealth. Others have argued that poor nations have the right – and voluntarily choose - to share the benefits brought on by development and industrialization, and that the three Ps of sustainable development attempt to reconcile both human and ecological needs, and create a more equitable distribution of benefits. By looking at how the three pillars of sustainable development intertwine when opening up the concept of sustainability, some contributors to this volume take a critical stance and offer alternative visions.

Authors in this volume are, for the most part, critical of this idea. In their chapters, Nemetz and Washington refer to the belief in the power of economic development to solve sustainability challenges as one of the greatest myths of sustainability. In fact, they argue, the growth of industrial production and consumption has gravely exacerbated sustainability challenges. However, the chapter by Kamarulazizi Ibrahim, Kanayathu C. Koshy and Walter

Leal is more optimistic when reflecting: ‘When sustained economic growth, social cohesion and overall well-being of people are promoted through good governance, public-private partnership, education for sustainable development and Sustainability Science, then, in such a future, sustainability will no longer be a visionary dream, but a reality that we are all living out each day’.

A shift toward more inclusive and participatory approaches to sustainability, including community participation projects in developing countries and urban centers in the global North, has emerged. As Anna C. Evely, Mark S. Reed, David Adams and Emily Lambert discuss in their chapter, social media, social enterprise, crowd funding instead of applying for grants and, in general, a more bottom-up participatory approach to sustainability has become the hallmark of sustainable development programs. They argue that better integration and utilization of the Internet, and specifically social media, is key to achieving behavior change through social learning. Although online participation is not possible everywhere, Internet connections are rapidly increasing globally, and smart phone technology provides online access to users with lower incomes. The Internet brings people together by enabling the rapid and widespread emergence of ever-novel ideas, as well as the empowerment of communities to bring about change and raise awareness of injustice. Use of the Internet can therefore facilitate new bottom-up approaches to governance in which stakeholders across sectors and jurisdictions are engaged in consensus building and implementation processes.

In urban areas, participation as well as connectedness of different aspects of urban living, urban political economy, infrastructure, health, biodiversity and communications are all required as John Blewitt discusses in his chapter on urban sustainability. In his chapter on sustainable development of rural areas and livelihoods, Andreas Neef discusses the challenges of fostering

rural sustainability in different world regions through strategies and policies aimed at invigorating rural communities and at countering the trend towards further marginalization of peripheral areas in developed countries.

Eco-efficiency

Eco-efficiency generally refers to the idea of doing more with less; its history can be traced to the early industrial products, in which more value or products are created with less impact or material. The World Business Council for Sustainable Development (WBCSD) defines eco-efficiency as being ‘ . . . achieved by the delivery of competitively-priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life-cycle to a level at least in line with the Earth’s estimated carrying capacity’. Eco-efficiency can also be seen as a quantitative management tool that enables the consideration of life-cycle environmental impacts of a product system alongside its product system value to a stakeholder (ISO/DIS 14045). The European Environment Agency (EEA) defines sustainability in terms of eco-efficiency as ‘a concept and strategy enabling sufficient delinking of the “use of nature” from economic activity needed to meet human needs (welfare) to allow it to remain within carrying capacities; and to permit equitable access and use of the environment by current and future generations’.

Climate change

One of central concerns at the time of writing this book is climate change. While for years, developed industrial countries such as the United States have been the world's leading emitters of GHGs, the new lead players are China and India. Although the global warming has begun with industrialized countries it must end – if it is to end – through actions in developing ones ([Economist 2013](#)).

Unfortunately, as of 2015, these plans and actions have not led to positive results for many species whose survival is critically endangered. Initial obligations of parties in the conventions were weak, with no stringent commitments for industrial states, and once again, drastic measures required for halting habitat destruction were not seen to be compatible with currently favored political and economic models of industrialist development and the neoliberal ideology of free markets. The issue of sustainability, when translated into protection of nonhuman species, became less prominent than renewed emphasis on integration of economic, social and ecological interests.

Climate change measures are also failing. The climate conferences have reinforced the ideas that most of the opportunities for sustainability lie in combatting unsustainable practices associated with human production and use of energy. International Panel for Climate Change (IPCC), consisting of world-leading climate scientists, was created in 1988 for assessing scientific information, the environmental and socioeconomic impact, and a response strategy for climate change and to serve as input for policymakers. The Kyoto Protocol was signed in 1997 and came into force in 2005. The first commitment period ran out in 2012. At the core of the Kyoto Protocol are legally binding commitments by industrialized states to limit their greenhouse gas emissions, all of which require further negotiation. The Kyoto Protocol has stimulated governments and corporations to reduce the amount of their greenhouse gas emissions

by 5.2% below 1990 levels during the five-year period between 2008 and 2012. However, recent assessment reports show that greenhouse gas concentrations have increased by almost 30% since the signing of the Kyoto Protocol (IPCC 2013). Despite all efforts targeted at the resolution of the problem, combatting climate change is proving to be one of the hardest political problems the world has ever dealt with. [The Economist \(2009:4\)](#) once observed that climate change is a prisoner's dilemma, a free-rider problem and the tragedy of the commons all rolled into one. At issue is the difficulty of allocating the cost of collective action and trusting other parties to bear their share of the burden. Despite ongoing discussion, proposals and protocols, mankind still has no framework for dealing with intricate, multifaceted and contradictory 'wicked problems' such as climate change ([Pokrant and Stocker 2011](#)). As contributors of this volume testify, there is a great need for realism now – which must necessarily include acceptance of the scale and nature of the fundamental drivers of unsustainability. Only after this acceptance can we propose positive solutions that situate this action as the exciting challenge of repairing the Earth. As a well-known sustainability commentator John [Foster \(2014\)](#) has reflected in his blog:

You have to be prepared, in the first place, to recognize the situation which we have brought on ourselves as a tragedy, involving terrible and uncompensated loss, not a set of problems which human ingenuity must be able to solve . . . You have to accept, as the constructive activity which that tragedy now leaves open to us, the retrieval of whatever forms of organic resilience we can establish in the present, rather than the attempt to second-guess and manage the medium-term future. You have to welcome that retrieval as a re-acknowledgement of profound natural responsibility, a recovery of ourselves as fully natural beings, however many cherished liberal-democratic assumptions about the individual as free-standing autonomous rights-bearer get subverted in the process. And you have to

see that herein lies our only genuine alternative to despair – while willed optimism, kept buoyant by denial, is not an alternative to despair but a form of it.

Yet, it would be wrong to brand these international efforts as complete failures.

International conferences such as The Earth Summit have had a large effect on – and were themselves affected by – developments in corporate and social arenas. There are many reasons for optimism that goes beyond mere denial and wishful thinking. A number of combined government and corporate activities have led to the development of standards and measurements for assessing sustainability in business operations (see chapters of Sarah E. Fredericks, Markus Pahlow, as well as Tom Waas and colleagues). A number of very helpful consumption-related frameworks, such as consumer-choice editing, have been also suggested (e.g. Kopnina and Blewitt 2014) and will be discussed in this volume by Cindy Isenhour.

Measuring sustainability: ISO, CSR and other approaches

Sustainability indexes and reports used by governments and corporations involve technical evaluations of what can be sustained under certain conditions and ethical evaluations of what index users want to sustain. For example, eco-efficiency analysis (EEA) is a method of quantifying and evaluating the environmental and economic performance of products and process alternatives. This analysis evaluates the economic and environmental impacts of a product or a process through its anticipated life cycle. The Environmental Protection Agency (EPA) lists sustainability practices and approaches such as labeling green products and promoting green chemistry and engineering, managing materials rather than creating waste,

using green infrastructure to manage storm water runoff, and supporting the sustainable design of communities (see www.epa.gov/sustainability/).

UNEP observes, evaluates and measures the state of the earth's environment through its Global Environment Monitoring System, its International Environmental Information System, and its International Register of Potentially Toxic Chemicals, as well as conducts The Millennium Ecosystem Assessment (MEA). MEA assessed the consequences of ecosystem change for human well-being, and included the work of more than 1,360 experts worldwide. Their findings provide scientific appraisal of the condition of and trends in the world's ecosystems and the services they provide, as well as the scientific basis for action to conserve and use them sustainably ([see www.unep.org/maweb/](http://www.unep.org/maweb/)). International Regulation on Pollution, for example, employs a product approach that regulates particular sectors of the environment, such as soil pollution, toxic waste and nuclear materials.

Sustainability Reporting (SR) shows promise towards helping corporate leaders and their employees contribute to more sustainable societies. Several guidelines, such as the Social Accountability (SA) 8000 standard and the GRI Sustainability Guidelines, address different sustainability dimensions, for example, Environmental Management System (EMS) focuses on the environmental dimension, SA 8000 mainly on the social dimension, whilst the GRI covers the economic, environmental and social dimensions. The International Organization for Standardization (ISO) initiated the development of ISO 26000, an international standard for social responsibility. ISO 26000 was developed to respond to a growing world need for clear and harmonized best practice on how to ensure social equity, healthy ecosystems and good organizational governance, with the ultimate objective of contributing to sustainable development (see www.iso.org). However, most of the guidelines and standards address

sustainability issues by category compartmentalization leading to the separation of economic, environmental, social and ethical aspects, as mentioned in chapters by Fredericks, Pahlow, and Waas and colleagues.

The concepts of sustainable business, global supply chain management and corporate social responsibility (CSR) have become widely used by politicians, corporate leaders and the public. The concept of sustainable supply chain management, the management of sustainability issues beyond traditional organizational boundaries, presupposes that the acquisition of materials, services and equipment of the right qualities, in the right quantities, at the right prices, at the right time and on a continuing basis is essential to the survival and success of any business. As Thomas B. Long, Anne Tallontire and William Young have argued in their chapter, CSR can be regarded as a highly contested concept, or more descriptively, as providing legal motivation in that companies that do not act socially responsible may be faced with a long-term problem since they will be forced to pay fines or charges, and/or may suffer erosion of competitive position due to reputational damage. CSR has led to socially responsible investments, which arise when financial decisions are based on achieving a socially desirable end and acceptable economic returns. In order to satisfy CSR requirements the companies take different actions and apply different instruments such as social labels, socially responsible investments, codes of conduct and supplier CSR monitoring. Social labels inform the public of the firm's compliance to an established set of criteria, and tend to be more effective in certain situations than in others. CSR, voluntary standards, and sustainability as discussed by Long and colleagues are presently given attention through two areas of contemporary business engagement with sustainable development. These include corporate engagement with climate change and sustainable supply chain management.

From governments and corporations to individuals

Significantly, international conferences concerned with sustainability have produced not only prescriptions for governments and corporations, but also served as inspirations for citizens to develop sustainable lifestyles. The idea that eco-efficiency, first adapted by corporations, and sustainable consumption, also derived from corporate products labeled as green, eco- or fair-trade, can be adapted by citizens-consumers has taken precedence. In neoliberal societies, consumers were called upon and increasingly seen as driving change – something that combined well with growing awareness of value of human life and individualism, especially in Western developed countries. This belief in one person's ability to change things through sustainable actions, perhaps ironically in spite of the growth of the world population (which exceeded 7 billion in 2012) could be seen both as hopeful and frustrating.

Critics have noted that the focus on consumer responsibility, lifestyle choices and market-based solutions makes political sense as it allows the powerful political and corporate representatives to defend the status quo and to avoid more stringent controls of resource-intensive, polluting or socially damaging products. This is discussed in greater detail in the chapter by Isenhour. This leads us to consider some more significant questions associated with the efforts, threats and opportunities for being sustainable.

Critical approaches to sustainability

In discussing the triple objectives of People, Profit, Planet – with 'profit' still being one of the (sometimes most significant) pillars – the skeptics of sustainable growth have reflected that 'true

sustainability' was impossible. As physicist Albert Bartlett has noted, we must acknowledge the mathematical fact that steady growth (a fixed percent per year) of population or consumption gives very large numbers in modest periods of time. Thus, he has argued, that the term 'sustainable growth' implies 'increasing endlessly'.

This means that the growing quantity will tend to become infinite in size. The finite size of resources, ecosystems, the environment, and the Earth, lead to the most fundamental truth of sustainability: When applied to material things, the term 'sustainable growth' is an oxymoron as it is only possible to have sustainable growth of non-material things such as inflation.

(Bartlett 1994)

Sustainable growth was questioned in a number of significant publications since the 1960s, propelled by the growing concerns about human health, welfare and environmental degradation. The publication of Canadian biologist Rachel Carson's *Silent Spring* (1962), about the use of chemical pesticides and their influence on health and environment, for instance, raised awareness of the dangers of chemicals. Carson's work spurred unprecedented concern with environmental issues, including the availability of natural resources (energy, food, etc.), health risks (pollutants, etc.) and the preservation of biodiversity. Sustainability thus came to be seen as the maintenance of ecosystem and human health.

Another significant book published in the 1960s is *The Population Bomb* by Paul R. Ehrlich and Anne Ehrlich (1968), which warned of the ecosystem problems stemming from population growth and increased consumption. This book is largely based on the Reverend Malthus's (1766–1834) ideas about the fate of humanity given the fact that throughout history a

segment of every human population seemed relegated to poverty. Malthus (1798) argued that population growth generally expanded in times and in regions of plenty until the size of the population relative to the primary resources caused disease, war and starvation. Similarly, the Ehrlichs proposed that if unregulated the growing human population as well as growing desire for higher living standards is likely to lead to a struggle for resources and even starvation.

However, technological advances, particularly in industry (the consequences of post-Industrial Revolution) and agriculture (the consequences of Green Revolution) have led to greater economic productivity that has staved off world hunger. Pro-growth advocates eagerly seized the opportunity to point out that the Ehrlichs' predictions have been wrong. Speaking of overpopulation became unpopular and *The Population Bomb* was seen as a manifestation of neo-Malthusian fatalism.

While the dire predictions of mass starvation did not come true, some aspects of advanced industrial capitalism and political corruption have been blamed for causing widespread starvation in the poorest areas, particularly in Africa. Despite technological advancements, environmental threats, such as climate change and species extinction, have in fact continued unabated. Sustaining the growing world population became one of the preoccupations of the sustainability discourse, as discussed in greater detail in Michael Bonnett's chapter detailing paradoxes and opportunities of sustainability and also in Alcott's chapter on demographics and sustainability. Nemetz's chapter addresses the number of powerful sustainability myths and their impact on the potential outcome of both private and public sector initiatives to address this critical challenge to the continued welfare of humanity and the planet that supports it.

According to the critical sociologist Eileen [Crist \(2012:141\)](#), while 'raising the standard of living' may be nebulous shorthand for the worthy aim of ending severe deprivation, the

expression is also a euphemism for the global dissemination of consumer culture – the unrivaled model of a ‘high standard of living’. A growing population striving for an equitable distribution of natural resources is likely to lead to the continued exploitation of the natural world. In this view, the very idea of instrumental use of nature for satisfaction of humans is morally questionable. Treating other species as ‘resources’ testifies to the worst strain of anthropocentrism, that of human supremacy. According to Crist, human supremacy is so deeply entrenched, so taken-for-granted, that turning plant and animal species into ‘resources’ appears as a morally unquestionable means of achieving development, or progress and wealth. Relating this to the concept of sustainable development, Crist challenges the question: What is the maximal number of people that the Earth can provide resources for without severely degrading those resources for future people? She suggests that the question we should be asking instead is: How many people, and at what level of consumption, can live on the Earth without turning the Earth into a human colony founded on the genocide of its nonhuman indigenes? The latter is rarely posed, she reflects, because the genocide of nonhumans is something about which the mainstream culture, including the political left and academics, observes silence.

While many supporters of mainstream sustainability are glad to recognize congruities in human and environmental welfare (for example, fighting pollution can benefit both human and nonhuman species), few are prepared to recognize contradictions in purpose (for example, when a poor farmer in developing country clears the remains of pristine forest in order to feed his hungry family). While some biologists have argued that all species are needed for the healthy functioning of ecosystems, including humans, planted monocultures seem to be currently favored throughout the world. The ‘left over’ species (and their habitats) that are not used for

consumption, medical experimentation, companionship, entertainment or other human purpose are given lower priority in ‘environmental’ agendas.

Thus, sustainability can be also seen as an issue that needs to be discussed from the perspective of those who cannot speak, and requires discussion of the intrinsic value of nonhuman species. This is a far cry from what most international agencies, governments and citizens concerned with environmental sustainability are willing to recognize. While the goodness of the alleviation of poverty, equality and improving human health is taken for granted by most sustainability thinkers, ethical treatment of other species has yet to be seriously considered. Thus, alternative frameworks for advancing sustainability were advocated.

Hopeful alternative frameworks for sustainability

When we speak of the hopeful alternatives to the ‘mainstream’ sustainability (that, empirically speaking, does not seem to be working), we speak more generally of closed-loop systems and circular frameworks. Brennan, Tennant and Blomsma’s chapter highlights the evolution of various alternative ideas and demonstrates the nuances surrounding the contemporary circular product-level frameworks, as well as introducing their typology of these alternative frameworks.

According to the critics of industrialization, such as the authors of the steady state economy, cradle-to-cradle (C2C) framework and the proponents of circular economy – which will be discussed in Brennan, Tennant and Blomsma’s chapter – industrialization unintentionally created a system that resulted in billions of pounds of toxic materials discharged into the air, water and soil as well as gigantic amounts of waste. The system of linear production linked environment to economy by creating prosperity by digging up or cutting down natural resources

and then disposing of them in landfills or incinerators. Socially, the stratification of society that results from the capitalist industrial system perpetuates inequality and exploitation and erodes the diversity of cultural practices.

The conventional mainstream eco-efficiency approach was criticized by proponents of these closed loop production systems. These alternatives have emerged from industrial symbiosis or industrial ecology. In their 1976 research report to the European Commission in Brussels ‘The Potential for Substituting Manpower for Energy,’ [Walter Stahel and Genevieve Reday-Mulvey \(1981\)](#) sketched the vision of circular economy and its impact on job creation, economic competitiveness, resource savings and waste prevention. The circular economy model uses the functioning of ecosystems as an exemplar for industrial processes and systems, emphasizing a shift towards ecologically sound products and renewable energy as well as highlighting the role of diversity as a characteristic of resilient and productive systems. More recently, [Diesendorf \(2014\)](#) has demonstrated that appropriate technologies such as renewable energy, energy conservation and sustainable building are both economically and socially feasible.

The ideas of circular economy were adopted by the American architect [William McDonough and the German chemist Michael Braungart \(2002\)](#). The idea behind their critique of the current system is that we use chemicals and produce toxic waste that harms us as well as the environment. Production is a linear, ‘cradle to grave’ process that, despite good intentions, still results in waste. Continuing with a system that generates massive amounts of waste in the endless spiral of production and consumption, the authors argue, will only prolong the essentially unsustainable system. This alternative framework criticizes sustainability defined in terms of eco-efficiency as it is seen as enabling the bad system to last longer.

The application of this idea at an economic level has risen to prominence since the World Economic Forum (WEF) in 2012 and was propelled forward by reports by the Ellen MacArthur Foundation and other initiatives stimulated by both government and business stakeholders. The tough message was that even well-intentioned practices such as recycling lead to mostly down-cycling, where materials are reused to make products of lower quality that require energy to be actually given new (and lesser) life.

Thus, proponents of both circular economy and C2C approach propose eco-effectiveness, which supports an endless cycle of materials that mimics nature's 'no waste' nutrient cycles. This framework contemplates not just minimizing the damage, but proposes how contemporary waste and depletion of resources can be avoided by adhering to the 'waste=food' principle. This principle is well illustrated by the metaphor of the cherry tree, which produces 'waste' (berries, leaves, etc.) that actually serves as food for other species or for formation of the soil.

C2C proposes that only biodegradable materials (biological nutrients) and noncompostable materials (technical nutrients) should be used so that a product can be disassembled and the two kinds of materials can be either left to disintegrate and be used for agricultural fertilization (although other uses are also possible), or reused without the loss of quality and energy for a different product. McDonough and Braungart provide examples of buildings and products they have designed using C2C framework, and demonstrate that practical application of their ideas are not that difficult to achieve. In fact, most preindustrial systems have functioned in this way, and what is 200 years of industrial (mis)management in comparison to millennia of human wisdom?

Basically – to use Shell's example – the sustainability initiatives such as eco-marathon (competition for inventors of more fuel-efficient car engines) can be criticized on two accounts.

First, oil is Shell's core business and it causes problems ranging from climate change to skewed geopolitical relationships and dependency on 'oil states' and thus is fundamentally unsustainable. If the car motors become more efficient, that would imply that a bad product would last longer, and no fundamental change to alternative sources of energy will be made. As the authors of C2C reflected, a bad thing should not be efficient.

However, while the closed loop and circular economy models have a significant role to play in sustainable resource management they are not without limitations. As Washington writes in his chapter contribution, 'sustainability should not be allowed to be subverted and high-jacked to justify further "business-as-usual" growth'. Even hopeful alternative frameworks can be subject to subversion, as the 'pioneers' of circular economy, Cradle to Cradle, or business ecology, among other frameworks, have sometimes profited from setting up certification systems, limiting the global applicability of their concepts, or sometimes cooperating with companies that are far from strictly adhering to these frameworks. In their contribution to this volume, Brennan, Tennant and Blomsma summarize the key messages to the reader.

First, there are trade-offs that need to be considered when it comes to implementing circularity ideas, in terms of design and business implications; second, all frameworks need to be understood in terms of their strengths and their weaknesses. For example, they reflect: 'Keeping a product in use for longer implies that direct sales of new products decrease, impacting on-going profits that could otherwise be made. This is both a challenge to mainstream business operations that rely on repeat purchases but can also represent new business opportunities'. Overall their chapter has aimed to demonstrate that a critical position is required in order to apply circular or closed-loop frameworks appropriately so they can achieve the positive outcomes that they intend.

Thus, optimistic prescriptions and apparently easy solutions need to be treated with caution.

The relationship between economic growth and sustainability involves sometimes incompatible paradigms such as ecological modernization and the steady state economy. Proponents of neoliberal capitalism have argued that the globalization of a particularly American brand of democracy has led to the spread of liberal values such as gender and racial equality, universal access to education, and other benefits effective in addressing social inequalities. They also believed that economic development will help to create better technologies to help us cope with environmental crises and that growing wealth can solve problems associated with industrial development. This came to be known as ecological modernization theory.

However, many critics have pointed out that economic growth is simply incompatible with sustainability and social equality. The key parts of the steady state economy, the concept developed by Herman [Daly \(1991\)](#), are fixed population and a constant sustainable throughput of resources. The steady state economy espouses the vision that economy is an open subsystem of a finite and nongrowing ecosystem, the environment. The economy lives by importing low-entropy matter, energy (raw materials) and exporting high-entropy matter-energy (waste). It is suggested that any subsystem of a finite nongrowing system must itself at some point also become nongrowing. Additionally, critical authors have emphasized the environmental, social and economic problems caused by the growth economy, and that ‘growthism’ itself is an unsustainable ideology ([Washington 2015](#)).

As editors of this volume, we would like to signal our agreement with ideas expressed by these critical observers. These ideas will be further discussed in the chapters by Washington; by

Kerschner and O'Neill; as well as on related frameworks of circular economy and Cradle to Cradle by Brennan, Tennant and Blomsma.

Introducing the chapters

The chapters of this book reflect the breadth of ideas that are encompassed in the concept of sustainability, providing a comprehensive and approachable introduction to this wide array of ideas. The range of research foci amongst the contributors allows for a great number of topics to be covered from an expert's perspective. Rather than being focused on providing a limited perspective for a limited audience, these chapters aim to provide a general understanding of sustainability for students from across different disciplines and specialties.

Each chapter covers one key idea, and is written by an expert in that field, although many ideas are also cross-referenced to give a sense of cohesion. Most chapters will contain a definition of the key concept, a history of how and why the idea has emerged, a discussion of the advantages, drawbacks, main contributions and controversies associated with this idea, and sometimes a case study to demonstrate how it works in reality. This is one book that will leave you with an understanding of the key issues covered within sustainability. The book is split into five sections, each dealing with a different aspect of sustainability.

References

Bartlett, A. (1994). [Reflections on sustainability, population growth and the environment.](#)

Population & Environment, 16(1), 5–35.

Bodley, J. H. (2008). *Victims of progress*. Mountain View, CA: Mayfield.

Bonnett, M. (2007). Environmental education and the issue of nature. *Journal of Curriculum Studies*, 39(6), 707–721.

Carson, R. (2002) (Original edition, 1962). *Silent spring*. 40th anniversary ed. Boston: Houghton Mifflin.

Crist, E. (2012). Abundant earth and population. In P. Cafaro & E. Crist (Eds.), *Life on the brink: Environmentalists confront overpopulation* (pp. 141–153). Athens: University of Georgia Press.

Daly, H. (1991). *Steady state economics*. Washington, DC: Island Press.

Diesendorf, M. (2014). *Sustainable energy solutions for climate change*. London: Earthscan.

Easterly, W. (2006). *The white man's burden: Why the West's efforts to aid the rest have done so much ill and so little good*. New York, NY: Penguin Group.

Economist. (2009, December 4). Getting warmer. <http://www.economist.com/node/14994872>

Economist. (2013, February 2). China, India and climate change: Take the lead. p. 68.

<http://www.economist.com/news/books-and-arts/21571109-emerging-markets-are-big-part-problem-they-are-essential-any-solution-take>

Ehrlich, P. R., & Ehrlich, A. (1968). *The population bomb*. New York, NY: Ballantine Books.

Elliot, J. (2013). *Introduction to sustainable development*. New York, NY: Routledge.

Foster, J. B. (2014). Environment and sustainability. After sustainability: Life beyond the end of pretending? [Web log post].

http://www.routledge.com/sustainability/articles/after_sustainability_life_beyond_the_end_of_pretending/IPCC_2013

IPCC (Intergovernmental Panel on Climate Change) 2013. Fifth Assessment Report (AR5).

<http://www.ipcc.ch/>

Kant, I. (2000). *Critique of pure reason*. Cambridge: Cambridge University Press.

Kopnina, H., & Blewitt, J. (2014). *Sustainable business: Key issues*. London: Routledge.

Malthus, T. R. (1798). *An essay on the principle of population*. Chapter II, p. 18 in Oxford

World's Classics reprint.

McDonough, W., & Braungart, M. (2002). *Cradle to cradle: Remaking the way we make things*.

New York, NY: North Point Press.

Meadows, D. H., Meadows, D. L., Randers, J., & Behrens, W. W., III. (1972). *The limits to*

growth. New York, NY: Universe Books.

Pokrant, R. J., & Stocker, L. (2011). Anthropology, climate change and coastal planning. In H.

Kopnina & E. Shoreman-Ouimet (Eds.), *Environmental anthropology today* (pp. 179–194). London: Routledge.

Stahel, W. R., & Reday-Mulvey, G. (1981). *Jobs for tomorrow: The potential for substituting*

manpower for energy. New York, NY: Vantage Press.

UNESCO. (1975). Belgrade Charter.

<http://unesdoc.unesco.org/images/0001/000177/017772eb.pdf>

Washington, H. (2015). *Demystifying sustainability: Towards real solutions*. London: Routledge.

WCED. (1987). *Our Common Future: Report of the World Commission on Environment and Development*. Retrieved February, 2015 from <http://www.un-documents.net/wced-ocf.htm>

Wijkman, A., & Rockström, J. (2012). *Bankrupting nature: Denying our planetary boundaries*.
New York, NY: Routledge.