



## **Sustainability, Past and Future: Ten Propositions on the Emerging Organizational Macro-System**

**Michael Marien**

Director, Global Foresight Books;  
Fellow, World Academy of Art & Science

### **Abstract**

*“Sustainability” did not appear in any book title until 1976, but there were many related ideas in the 1970s. A marked transition toward sustainability is now underway, driven by worsening climate change, with roughly 5,000 books and some 500 international organizations calling for sustainable societies, cities, businesses, and economies.*

*This “horizontal” exploration is based on current mapping research for a “Security and Sustainability Guide” to the organizational macro-system. As of April 2015, some 950 organizations have been identified, roughly half concerned with promoting sustainability (and greater social equity and human rights in many instances), and the other half concerned with related topics (security, energy, food, conservation). Roughly, about half of these organizations were initiated since 2000. The United Nations, formed after World War II to promote security, has been a major driver of sustainability in recent decades, with some 30 or so programs.*

*But this burgeoning movement with many leaders and many names still has a long way to go, and success is problematic: 1) accelerating climate change may offset gains; 2) despite a growing number of alliances, consortia, and networks, there is still considerable fragmentation, and the huge number of “coopetitive” organizations may be a political handicap; 3) leading organizations for sustainability are in cosmopolitan cities and countries furthest along the green path to robust sustainability; other countries may be unwilling or unable to follow; 4) major differences among sustainability groups dilute political impact, notably “realos” vs. “fundis,” generalists vs. specialists, and scientists/academics vs. activists/popularizers; 5) the broad realm of national and global security is both a barrier to sustainability and a potential driver, once it is realized that we cannot have security without sustainability—and vice versa; 6) infoglut is a major barrier, and better information management is needed; 7) we all have much to learn about sustainability, and “third-level scholarship” is needed to integrate second-level integrators. Illustrative proposals to accelerate efficacy of the sustainability movement include integration of Club of Rome reports, studying relevant alliances and consortia, creating information portals for energy alternatives and new economics that survey progress and prospects, a “portable lecture series” on sustainable development topics, a series of televised “Great Debates” in every country, and a portal for all “New Paradigm/Big Picture” agendas.*

## Introduction

Over several decades, I have had the privilege of addressing the inter-related questions of “What’s happening in our society/world?”, “What is likely to happen?”, and “What ought to be done?” from a variety of disciplinary and ideological perspectives. These interests are applied here to the topic of Visions of Sustainable Development, based on current research into international organizations promoting security and/or—especially—sustainability. This is an intentional exercise in horizontal/integrative thinking, with several areas of scholarly thinking explicitly identified. It is not “holistic”—nothing ever is in our era of complex, dynamic, and overlapping systems—but it does consider some critical parts of the emerging “sustainability” macro-system, and proposes further integrative work to grow the macro-system and advance serious sustainable development.

*“Without a new paradigm of knowledge, we cannot have a new paradigm of human society.”*

I can rightly be criticized here as being “a mile wide and an inch deep,” but my rebuttal is that the vast majority of human benefit knowledge is still “a mile deep and an inch wide,” and even the putative integrators and “multi-disciplinary” scientists/scholars/writers seem unaware of each other, and/or unwilling to acknowledge alternative views. Consider this as an experimental exercise in mile-wide thinking to overcome fragmentation and “silo-ization,” perhaps with a few foul balls but hopefully with a few hits to spark further reflection. At root, it critiques our outmoded system of knowledge creation/dissemination and, building on a 1937 proposal by H.G. Wells, hints at an effective “World Brain” for a sustainable 21<sup>st</sup> century. (1) Without a new paradigm of knowledge, we cannot have a new paradigm of human society.

### **1. (HISTORY). Sustainability did not appear in any book or chapter title until 1976. But there is an important prehistory that deserves to be noted.**

In 1976, I published a critical guide to the literature of societal directions and alternatives. (2) This was at the height of what I now call the great “futures vogue” of the 1960s and 1970s, which saw a huge number of books, generally dissatisfied but hopeful, explaining the nature of our society, where we were headed, and the society that we should have. I counted 81 titles for our present society e.g. “The Unprepared Society” (Donald N. Michael, 1968), “Age of Discontinuity” and “Knowledge Society” (Peter F. Drucker, 1969), “Temporary Society” (Warren Bennis and Philip Slater, 1968), “The State of Siege” (C. P. Snow, 1969), “Throw-Away Society” (Alvin Toffler, 1970), and “Spaceship Earth” (Barbara Ward, 1966; Kenneth Boulding, 1966; Buckminster Fuller, 1969), etc.

I also identified 63 evolutionary stage theories, both descriptive and prescriptive, leading to “Post-Industrial Society” (Daniel Bell, 1966, 1973), “Ecumenopolis” (Constantinos Doxiadis, 1967), “Systems Age” (Russell Ackoff, 1974), “Consciousness III” (Charles Reich, 1970), the “Electric Age” (Marshall McLuhan, 1964), and “Scientific-Planetary Civilization” (William Irwin Thompson, 1971).

Most important, I identified 206 clearly prescriptive titles for desired alternative societies, e.g.: “Planetary Society” (John McHale, 1969), “Global Homeostasis” (Ervin Laszlo, 1974),

“Steady-State Society” (Herman Daly, 1971), a “New World Order” (Richard Falk, 1975), “Convivial Society” (Ivan Illich, 1973), “Transformational Society” (Jim Dator, 1973), “Humanist Reconstruction” (Bertram Gross, 1971), “Humanistic Capitalism” (Willis Harman, 1974), “Ecological Humanism” (Victor Ferkiss, 1974), and “Socialist Humanism” (Erich Fromm, 1965).

What a fascinating *mélange*! But virtually none of the authors paid attention to any of the other authors. It was like the motor vehicle bureau, where each car owner is assigned a distinctive license plate! In a wry—some may say cynical—mood, I prefaced the collection with the famous 19<sup>th</sup> century poem by John Godfrey Saxe on “The Blind Men and the Elephant.” The first of the nine verses read: “It was six men of Indostan/To learning much inclined/Who went to see the Elephant/(Though all of them were blind)/That each by observation/Might satisfy his mind.” You probably know the rest, or can guess what happened as the different men—all men—approached the flank, the tusk, the trunk, the knee, the ear, and the tail. The problem is that, today, we have a herd of shifting elephants—not well understood—and we risk getting trampled.

Amidst this cacophony, it is significant that “Sustainability” or “Sustainable Development” were never mentioned *per se*! However, there were a dozen or so titles calling for ecological balance of some sort. Best known is the Club of Rome’s influential **Limits to Growth** report calling for “Global Equilibrium” (Donella Meadows et al., 1972). Other contenders included the virtually forgotten second report to the Club of Rome calling for “Organic Growth” (Mihajlo Mesarovic and Eduard Pestel, 1974), the well-regarded **Blueprint for Survival** from *The Ecologist* magazine advocating a “Stable Society” (Edward Goldsmith et al, 1972), and visions of massive structural transformations to “Ark II” (Dennis Pirages and Paul Ehrlich, 1974), a “Mature Society” in ecological equilibrium (Dennis Gabor, 1972), the “No-Growth Society” (Daedalus Special Issue, Fall 1973), the “Recycle Society” (Glenn Seaborg, 1974), and “Arcadian Life” (Rene Dubos, 1972). Also, 20 years earlier, consider **Resources and the American Dream: Including a Theory of the Limit of Growth** by Samuel Ordway (1953), who called for a “Balanced Civilization” and rethinking the quality of the Good Life, **The Limits of the Earth** by Fairfield Osborn (1953), and **The Challenge of Man’s Future** by Harrison Brown (1954), a durable classic that went into at least 15 printings, warning of “the fragility of our machine civilization.” Even earlier, **Road to Survival** by William Vogt (1948), with an introduction by presidential advisor Bernard M. Baruch, warned of “a sharp increase in world population” and “a falling carrying capacity over most of the earth.”

The first two books with “sustainability” in the title appeared in 1976: **The Sustainable Society: Ethics and Economic Growth** by Robert L. Stivers (John Knox Press) and **Energy for a Just and Sustainable World** by the Working Group on Church and Society (World Council of Churches), followed by **The Sustainable Society** edited by Dennis Pirages (Praeger, 1977) and **Building a Sustainable Society** by Lester R. Brown (W.W. Norton, 1981). The concept received a significant boost with publication of **Our Common Future** by the World Commission on Environment and Development (Oxford University Press, 1987), also known as the Brundtland Commission.

After that, the “sustainability” concept took off, as I documented in **Environmental Issues and Sustainable Futures: A Critical Guide to Recent Books, Reports, and**

**Periodicals**, published in 1996. (3) It included many titles that still seem timely, e.g. *Envisioning a Sustainable Society: Learning Our Way Out* (Lester Milbrath, 1989; on the “new environmental paradigm”), *A Strategy for Sustainable Living* (IUCN/UNEP/WWF, 1991), *The Global Commons: Policy for the Planet* (Harlan Cleveland, 1990), *Saving Our Planet* (Mostafa K. Tolba, 1992), *Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future* (Donella Meadows et al., 1992; updating their 1972 *Limits to Growth* report), *Earth Politics* (Ernst Ulrich von Weizsacker, 1994; on making sustainable development a reality), *Choosing a Sustainable Future* (National Commission on the Environment, 1993), *A Sustainable World: Defining and Measuring Sustainable Development* (Thaddeus C. Trzyna/IUCN, 1995), *Environmental Refugees in a Globally Warmed World* (Norman Myers, 1993), *Climate Change and World Food Security* (Food Policy Special Issue, 1994), *Reversing the Decline of the Oceans* (Worldwatch Paper 116, 1993), *Facing Water Scarcity* (Sandra Postel, 1992), *How Mass Extinction Can Be Stopped* (Colin Tudge, 1992), *Sustainable Forestry* (Gregory Aplet, 1993), *Reducing Toxics* (Robert Gottlieb, 1995), *Ultimate Security: The Environmental Basis of Political Stability* (Norman Myers, 1993), *Ecological Economics* (Robert Costanza, 1991), *The Gaia Atlas of Green Economics* (Paul Ekins et al, 1992), *Sustainable Livelihoods* (David Korten, 1994), and much more. I joined the parade by co-editing a Special Issue of *Futures* (March 1994) on *Visions of Sustainability*, with essays by Lester Milbrath, Hazel Henderson, Robert Goodland, Herman Daly, Mary E. Clark, Dennis Pirages, and others. In the Introduction, I noted that Sustainability has “rapidly emerged only in the past five years...a profound and necessary multifold transition, now just under way.”

All of this was more than twenty years ago, arguably the age of robust sustainability literature. But are we closer to sustainability now?

## **2. (SOCIOLOGY). The Good News is that a major transition toward “sustainability” now is clearly underway.**

Historian Jeremy Caradonna of the University of Alberta has recently published a useful history of sustainability thinking and the sustainability movement (4), going back to roots in the early 18<sup>th</sup> century Germany, and noting that, today, the words “sustainable” and “sustainability” are nearly ubiquitous. He sketches a remarkable chart on page 3, showing an “explosion” of books with “sustainable” or “sustainability” in the title from 1980 to 2012, when there was a cumulative total of some 4,800 books. My [GlobalForesightBooks.org](http://GlobalForesightBooks.org) website has abstracts of more than 500 titles on sustainability, energy, and climate change published since 2009.

This upward growth line of some 75-80% for books on sustainability is virtually identical to the data from Google’s Ngram Viewer, which charts usage of words and terms in English-language books to 2008, showing “sustainability” sharply increasing since the mid-1980s. The “sustainability” usage is closely correlated with growth lines for “climate change” and “global warming.” In contrast, “future” was quite level between 1970 and 2008, while “futurist” increased from 1962 to 1998 but declined from 1998 to 2008, and “foresight” has declined by >50%. This confirms my suspicion that the “futures” movement, which was always more descriptive than prescriptive, has been superseded by a diffuse “sustainability movement” that is clearly normative. Caradonna admits that sustainability

is now a buzzword in widespread usage, but nevertheless hopes that “the practices inspired by the concept of sustainability could give rise to the world’s third major socio-economic transformation, after the Agricultural Revolution that took place 10,000 years ago, and the Industrial Revolution.” (5) The recent book by Jeffrey Sachs of Columbia University’s Earth Institute, **The Age of Sustainable Development**, calls it “a central concept for our age...both a way of understanding the world and a method for solving global problems.” (6)

The growth of sustainability books and usage of the “S-word” is paralleled by the growth of largely international organizations with “sustainability” in their title or in their statement of purpose. Along with David Harries, as of May 2015 we have identified some 950 organizations concerned in some way with security and/or (especially) sustainability. Among them, a very preliminary analysis of the founding date indicates that more than half of the “Sustainability” organizations were established in the 2000-2015 period. Many of the 950 organizations in our online Security and Sustainability Guide, still in the “interim draft” stage, are directly or indirectly calling for transition/transformation to “sustainable society” and “sustainable development”; less often for related concepts of green growth, degrowth, a low-carbon economy, a circular economy, or human security.

### **Chart 1. Major Categories in the “S&S Guide” Subject Index**

The following are major categories (five or more organizations listed) that are in the extensive Subject Index at the end of the Third Interim Draft of the Security and Sustainability Guide (May 2015). The number of organizations listed to date is in parenthesis, and these numbers will expand as more information is obtained. Some organizations are listed in two or more categories.

Accounting for Sustainability (7)	Governance (16)
Africa (8)	Green Growth/Jobs/Economy (16)
Agriculture (10)	Human Rights (11)
Alliances/Consortia/Networks (40)	Human Security (12)
Amazon Rainforest (6)	Indigenous Peoples (7)
Arctic Transforming (12)	Japanese Groups (6)
Biodiversity (10)	Nuclear Disarmament (22)
Business (28)	Oceans Transforming (34)
Children (5)	Peace and Disarmament (31)
Cities (19)	Physician’s Groups (5)
Climate Change (47)	Population (12)
Climate and Security (5)	Resource Efficiency/Protection (14)
Conservation (9)	Risk (6)
Corruption/Crime (8)	Scientist’s Groups (8)
Cyber-Security (5)	Security/Strategic Studies (35)
Ecological Economics (14)	Special Purpose Organizations (10)
Education: K-12 (12)	Sustainability in General (49)

Energy (47)	Systems Analysis/Integration (8)
Environmental Justice (6)	Terrorism (6)
Environmental Law (7)	UN Agencies/Programs (31)
Finance (27)	Universities (18)
Food (21)	Water (23)
Forests (18)	World Futures/Humanity/Global Affairs (37)
Former Leaders' Groups (7)	Youth for Sustainability (14)
Foundations and Funds (39)	

The United Nations is the major driving force in many ways. Some 31 agencies, programs, and projects have been identified so far. The UN Conference on Sustainable Development (Rio 2012, a.k.a. Rio+20) is well-known, as is the UN-sponsored Intergovernmental Panel on Climate Change (1988), which delivers increasingly certain and bad news about future climate. But also consider the Green Climate Fund (2010), the UNEP Climate and Clean Air Coalition (2012), UNESCO's Education for Sustainable Development (2005), the United Nations University Institute for the Advanced Study of Sustainability (2014, merging two existing UNU institutes), the UN Data Revolution Group (2014, to provide data for the Sustainable Development Goals and targets), the UNEP Finance Initiative (200 organizations for sustainable finance), the UN Conference on Housing and Sustainable Development (Habitat III, Quito 2016), the UN Sustainable Development Solutions Network (2012, which co-sponsored the Deep Decarbonization Pathways Project and offered two MOOCs on Planetary Boundaries and the Age of Sustainable Development), and the UN Global Compact (2000, claiming 12,000 signees to a set of 10 principles regarding human rights, labor, anti-corruption, and the environment).

Four other categories deserve special notice.

- **Cities** are especially active in promoting sustainability, following the lead of the UN's Global Compact Cities Programme in Melbourne, promoting the same 10 principles as the UN's Global Compact for corporations. Among the 19 groups identified are the Asian Cities Climate Change Resilience Network of 50 cities, the C40 Cities Climate Leadership Group for megacities, the Climate Alliance of European Cities, ICLEI: Local Governments for Sustainability, United Cities and local Governments, and the Urban Sustainability Directors Network which lists members in 114 cities and 22 counties in the US and Canada since formation in 2008 (including four members in Florida).
- **Universities** are led by the American College and University President's Climate Commitment (2006) with 685 signees, the Association for the Advancement of Sustainability in Higher Education, University Leaders for a Sustainable Future, and soon, perhaps, by the WAAS-sponsored World University Consortium. They are prodded by the College Sustainability Report Card, the Green College Honor Roll, the Responsible Endowments Coalition, and the Sustainable Endowments Institute and its Billion Dollar Green Challenge.
- **Businesses** are led by the World Business Council for Sustainable Development, Business for Social Responsibility, the American Sustainable Business Council, and

the World Economic Forum. They are prodded by the UN Global Compact, the Dow Jones Sustainability Indices, Corporate EcoForum (“forging next practice in corporate sustainability”), Sustainable Accounting Standards Board (Michael Bloomberg, Chair), Eco-Business magazine, Global Initiative for Sustainability Ratings, Sustainable Brands.com, Tomorrow’s Company.com, and various consultants and textbooks encouraging corporations to go green. The “Green Transition Scoreboard” from Hazel Henderson’s Ethical Markets Media shows a remarkable growth in private green investments from \$1.2 trillion in 2007 to \$6.2 trillion total by April 2015, adding up “sustainable sector investments” in renewable energy, energy efficiency, green construction, water, corporate R&D, and cleantech. (7)

- **Finance** sector organizations are waking up to green opportunities through the Capital Institute (for transition to sustainable living), the Climate Bonds Initiative to develop a green bonds market, the Carbon Tracker Institute to highlight global carbon investment risk, oil Change International to expose the true cost of fossil fuels, Green Century Funds (a Boston-based mutual fund), the Investor Network on Climate Risk (110 institutional investors representing \$2 trillion in assets), Global Alliance for Banking on Values, the Network for Sustainable Financial Markets (promoting long-term sustainable value), the Belmont Forum (an international group of non-profit funding agencies concerned with global environmental change), and—on the far horizon of possibility—Global4c.org proposing a new world currency to finance climate mitigation.

Using the hopeful metaphor of Naomi Klein’s blockbuster book, **This Changes Everything: Capitalism vs. The Climate**, this multi-faceted activity may be like “a rushing river fed by countless streams, gathering collective force to finally reach the sea.” (8) But, contrary to Klein’s over-simplified sub-title, capitalism is Janus-faced, both good and bad. Business and finance may well make an important contribution to sustainability, to counter—at least in part—the rapacious behavior of the world’s fossil fuel and mining industries, as described by Ugo Bardi in a recent report to the Club of Rome. (9)

### 3. (POLICY STUDIES/FUTURES STUDIES). **The Bad News is that the sustainability movement has a long way to go—and may never be successful.**

I am much more cautious today than I was twenty years ago. Hundreds of NGOs are promoting sustainability directly or indirectly, and boldly calling for transformation and radical change. Many battles are being won, with new technologies developed and worthy ideas implemented. But is the overall “war” being won? One must recognize the potential paradox of “improvement and growing inadequacy,” where sustainability efforts are successful, yet worsening climate change events and/or other developments offset green progress.

Climate change and weird weather continue to worsen, and 2014 was the warmest year ever since record-keeping began in 1880. And there is every reason to expect worsening in the next decades (despite some 47 organizations identified in the S&S Guide, devoted to studying climate and what to do about it). A recent report for the World Bank by the Potsdam Institute (10) suggests that 4°C of global warming will be the “new normal” by 2100—a level well beyond the 2°C that scientists suggest as the upper tolerable limit. It is quite possible that,

despite many apparent successes of the sustainability movement, the earth will reach one or more “tipping points.” Several planetary boundaries have already been passed, according to the Stockholm Resilience Institute. (11) Three of the nine planetary boundaries involve ocean acidification, species extinction (i.e. depletion of many fish stocks), and pollution caused by excessive flows of nitrogen and phosphorus. Despite some 34 organizations devoted to oceans, little progress has been made other than saving whales, and little can be expected in the near future, as jellyfish take over some marine areas—a form of reverse evolution.

Notably, green parties have yet to gain much influence in any country (except, to some degree, in Germany), and “sustainability,” “environment,” or “climate change” are not among the top political issues being addressed at national levels. Conservative right-wing parties denying or ignoring climate change are in the ascendancy or gaining more support than greens in the US, Canada, Australia, the UK, and France.

Most of the sustainability NGOs appear oblivious to the UN efforts and to each other, except for special purpose alliances, consortia, networks, and partnerships. More than three dozen of these have been identified to date, e.g. the Future Earth international research initiative, Sustainable World Coalition, New Economy Coalition, Global Call of Climate Action (450 non-profits), Global Partnership for Oceans (140 organizations), Global Campaign Against Poverty, and Partnership for Change. Are these NGOs, individually and collectively, making a significant difference? Can they become even more effective? Even so, despite improvements in understanding, technologies, and actions, the “war” could be lost. Failure is not assured, or even probable. But it is a possibility to be considered.

To sort out long-term possibilities, and restrain excessive and premature enthusiasm, it is useful to consider four generic scenarios for nations and the world, arrayed on a single axis: Catastrophe/Collapse, Muddling Down (two steps forward, three steps back), Muddling Up (three steps forward, two steps back), and Robust Sustainability. (12) What are the possibilities for the year 2030 and for 2050? I view worldwide Catastrophe/Collapse as possible but not probable, say 15%, and Robust Sustainability as highly unlikely, say 5% to be generous (it would require a widespread positive change in consciousness). Rather, the two middle and more subtle scenarios are more likely in my mind, especially Muddling Down (60%) and Muddling Up (20%). A recent report to the Club of Rome by Jørgen Randers, describing the most probable world in 2052, is a good starting point to consider these possibilities. (13)

The remaining seven “propositions” will explore the barriers to the sustainability movement, and possible remedies so as to reduce the chances of Catastrophe/Collapse and slow and spotty collapse, or Muddling Down.

#### **4. (GEOGRAPHY). The best-funded and most radical organizations promoting sustainability are in cosmopolitan cities and countries that are furthest along the path to sustainability.**

Preliminary evidence from the S&S Guide—a more precise count will eventually be made—suggests that Northern Europe is the hotbed for sustainability thinking and action: Sweden (Stockholm Resilience Institute), Norway (Partnership for Change), Denmark (Sustainia 100), Netherlands (Amsterdam Global Change Institute), and Germany (Potsdam

Institute, German Advisory Council on Global Change). Major cities housing important organizations include Stockholm, Amsterdam, London, Paris, and Geneva.

Within the US, the vast majority of sustainability organizations are located in Boston, New York, Washington, and, especially, the San Francisco Bay Area. In Canada, Toronto and Vancouver are modest centers for green thought, in contrast to the ultra-conservative Harper regime shamelessly ignoring science, favoring business interests, and extracting oil from Alberta tar sands. In the US, the new Senate Majority Leader is from coal-dependent Kentucky, and the new head of the Senate Environment Committee is from oil- and gas-dependent Oklahoma; he has written a book declaring climate change to be a hoax, yet was re-elected in 2014 by 68% of his electorate (where 20% of jobs are oil and gas-related).

Several sustainability organizations each have been identified in Brazil, China, Japan, and India. And one or two organizations have been identified in several dozen other countries, ranging from Bolivia to Sri Lanka. Notably, no sustainability organization has been identified in Russia, which is largely dependent on oil and gas exports. And a few countries are backsliding, notably Canada and Australia (both with right-wing pro-business leaders), and in Brazil (where anti-environment ministers of agriculture and science/technology have recently been appointed).

## 5. (POLITICS). **There are major divisions among sustainability groups, which discourage any coherence and dilute political efforts.**

Jeremy Caradonna concludes his important history of sustainability by discussing ten challenges to be faced. “Multiple perspectives is certainly a positive thing to have,” he says, “but the first and most important challenge of the sustainability movement is to get people on the same page.” (14) This is surely desirable and creating “a shared vision for the future” should be attempted, but it will be extremely difficult to make much progress. Three major divisions are briefly discussed here:

- **Realos vs. Fundis.** First, and perhaps most important, is the gap between “Realos” and “Fundis”, or the sober realists who present careful facts and analyses (e.g. IEA, OECD, IPCC, World Bank) and call for “green growth,” and the (rightfully) disgruntled idealists demanding immediate action for a wide range of desirable goals that have inadequate political support. A major difference between the two positions centers around technology in general and the role of nuclear energy in particular: Realos accept it along with renewable sources, while Fundis dismiss nuclear in any form and seldom mention any new technology at all. Recent “Fundi” statements are made by the “degrowth” movement and a new Report to the Club of Rome by David C. Korten, **Change the Story, Change the Future: A Living Economy for a Living Earth** (16). Of course we change the future if we change the story, but Korten makes no mention of the many competing green stories, past and present, and how to move beyond the reigning paradigm of what he calls “dead-world economics.”
- **Generalists vs. Specialists.** Second, there are differences between generalists/integrators who cover a range of issues related to sustainability, and specialists concerned only with agriculture, forests, energy, new economics, the oceans, etc. Ideally, the green generalists

and specialists should work together, and they occasionally do so, but they can and should have more interaction.

- **Scientists vs. Activists.** Thirdly, there is a gap between scientists and activists, although this gap, too, can and should be reduced so that activists are better armed with the latest scientific thinking, and scientists reach out to help them. Closely related is the gap between **Academics vs. Popularizers**. Also closely related is the difference between **Top-Down Thinkers vs. Bottom-Ups**. There are some who look only at top-down actions by the UN and national governments. In contrast, for example, Naomi Klein dismisses top-down action and lauds the activists and protesters as most effective, whom are seen collectively as “Blockadia.”
- **Eco-Centric vs. Human-Centric.** Although sustainability was originally centered on environmental issues, growing concern about radical inequality within and between nations has increasingly added human well-being concerns to the definition of sustainability, so much so that environmental well-being may be overshadowed. On the other hand, those on the left worry that “green economy discourse” is too limited, and forecloses alternative possibilities. (17)
- **Serious vs. Superficial.** Finally, there is a major division between those who are passionately and seriously concerned about sustainability, as reflected in most of the organizations that we have studied, and superficial expressions of being green, sometimes referred to as “greenwashing”. My favorite example is the “Friendly Skies” of United Airlines, now “United Eco-Skies Friendly” on their coffee cups, which go on to inform passengers that United is “Taking actions toward a more sustainable future” with their coffee cup made from “up to 50% recyclable materials”—and, to be fair, perhaps taking other actions too.

## 6. (CLIMATE SCIENCE). **The two major drivers of the sustainability movement in recent years have been various UN programs and climate change. Attention to increasingly weird weather drives sustainability thinking and action, but may eclipse it in coming decades, especially if Arctic methane eclipses CO<sub>2</sub>.**

The UN established the Intergovernmental Panel on Climate Change in 1988, which has resulted in five highly detailed Assessment Reports so far, each more worried and more confident than the one before it. Climate change has already eclipsed “sustainability” in some instances, as illustrated by Naomi Klein’s **This Changes Everything: Capitalism vs. The Climate**, who makes only three brief references to sustainability in her 560-page book. As climate change becomes more pronounced, and more people witness and suffer from weird weather events (heat, drought, more frequent and intense storms, floods, wildfires, rising sea levels and high tides), attention is focused on greenhouse gas emissions, especially carbon dioxide. But methane may eclipse CO<sub>2</sub> in coming decades due to accelerating releases in Siberia and the Arctic, which have been warming faster than sub-Arctic regions. By some accounts, methane is 23 times more potent as a greenhouse gas than CO<sub>2</sub>, although it does not last as long in the atmosphere. In their report to the Club of Rome on planetary boundaries, Anders Wijkman and Johan Rockström devote a brief chapter to changes in the Arctic, seen

as “the canary in the coal mine.” Due to the albedo feedback (where the degree of reflection changes from 85% of incoming radiation bouncing back into space to surfaces that absorb 85%), “more energy is injected into the biosphere, reinforcing the energy imbalance on Earth and speeding up change” (18), such that the entire Arctic may cross a tipping point and shift to an ice-free warm state.” In any event, the authors note that “permafrost is thawing faster than predicted, emitting large volumes of methane.” This is amply reinforced on the website of the Arctic Methane Emergency Group ([www.ameg.org](http://www.ameg.org)). Moreover, if the abundant methane clathrates in the ocean begin to melt at a substantial rate due to warming seas, the game may well be over for humans on earth. But no scientist knows if or when this will happen; only that it is possible.

### **7. (SECURITY STUDIES). The broad realm of national and global security is a barrier to sustainability, but also a potential driver, when we realize that we cannot have security without sustainability, nor sustainability without security.**

The two realms of “security” and “sustainability” are slowly beginning to overlap, and some organizations in the “S&S Guide” consider both, as concerns about food security, energy security, water security, and job security begin to mount. The UN-induced concept of “human security,” which broadens traditional focus on military and state security, is now represented by a dozen organizations such as the Civil Society Network for Human Security, Cordaid: The Human Security Network, the Pugwash Conferences on Science and World Affairs (now celebrating its 50<sup>th</sup> year and broadening its horizons from traditional nuclear weapon concerns), the Ford Institute for Human Security at the University of Pittsburgh, the Institute for Human Security at Tufts University, and the World Engagement Institute in Chicago (which publishes the *International Journal of Sustainable Human Security*).

The best illustration of merging security and sustainability concerns is in a recent report by 14 retired generals and admirals (13 Americans and one British admiral), warning that the “accelerating risks” of climate change are a “threat multiplier” making traditional security concerns even more problematic. (19) An earlier link between security and sustainability was made by Michael T. Klare two decades ago. (20)

Aside from climate concerns, thinking about security has widened in the past decade, especially due to terrorism and cyber-vulnerability. Cybercrime alone is already costing the global economy more than \$400 billion annually. (21) New security thinking should now include the various threats of climate change, and in doing so should help the cause of sustainability. At the same time, security matters are also a barrier, in that immediate attention must be given to terrorism and to growing threats of cyber-war and major hacking events. Also, national security also involves huge sums spent on military equipment and personnel, some of it justified and some not. Arguably some of this spending could be cost-effectively diverted to building sustainable societies and thus attending to long-term human security. There is also the growing threat of nuclear weapons, which, if detonated in any great number so as to create a “nuclear winter,” could doom hopes for sustainability. Aging stockpiles—themselves a danger—are being upgraded by all nuclear powers (the US alone will spend \$100 billion over the next decade), and troubled Pakistan plans to triple its nuclear arsenal.

And there are new threats of easily-produced bio-weapons, which if realized could also divert substantial funds and attention.

**8. (COMMUNICATION). We are undergoing a massive transformation in communications, with many pros and cons. Infoglut is perhaps the most important downside, because it increases fragmentation and thus is a major barrier to seriously pursuing sustainability.**

The new information technologies have obviously changed our world, for both better and worse. Information overload has been a concern for many decades, but it has obviously accelerated in the age of the Internet. The S&S Guide could not be compiled without Google/Bing and easily accessed websites for every organization identified. But the many enticements of the Internet and the flood of daily e-mail, not to mention cell phone tweets and the ever-expanding offerings of cable television, are a huge distraction. Not only is there more and more information, but, arguably, a changing ratio between edifying information and entertainment information, as well as a growing overlap. This does not bode well for citizen understanding in a democracy (indeed, many societies—notably the US—are increasingly plutocratic.)

**Chart 2. 37 Notable Publications from Security & Sustainability Organizations**

This is a brief selection from a longer listing of 82 recent publications that appears in the Overview section of the Third Interim Draft of the “S&S Guide”. Most of these publications are short, well-written, handsomely presented, and free online. But they are considered “gray” literature by libraries and scholars, and too often ignored despite their leading-edge merit.

**Action for a Peaceful and Sustainable World** (Green Cross International, Geneva; 2013)

**Action 2020 Overview** (World Business Council for Sustainable Devel.; [www.action2020.org](http://www.action2020.org))

**Bonds and Climate Change: State of the Market 2014** (Climate Bonds Initiative, London)

**Business in a Climate-Constrained World** (Business for Social Responsibility, San Francisco)

**City of 2030, The** (United Cities and Local Governments, 2010)

**Climate Risk in California** (Risky Business.org, 70p, April 2015; Bloomberg/Paulson/Steyer)

**Deep Decarbonization Pathways Project** (UNSDSN.org & IDDRI, Paris: Sept 2014 report)

**Deepening Democracy** (Kofi Annan Foundation & International Institute for Democracy, Stockholm)

**Dow Jones Sustainability Indices** (on sustainability performance of 2500 large companies; annual)

**Earth Charter** (Earth Charter International, Costa Rica, 2000; endorsed by >2000 organizations)

- Economic Risks of Climate Change in the US** ([RiskyBusiness.org](http://RiskyBusiness.org), 2014)
- Freedom in the World** (Freedom House, Wash; 195 countries rated on 25 indicators; annual)
- Global Environment Outlook** (UN Environment Programme; GEO-5, 2012)
- Global Green Economy Index** (Dual Citizen LLC, 4<sup>th</sup> ed., Oct 2014; measures 60 countries)
- Global Nutrition Report** (International Food Policy Research Institute, Washington; #1, 2014)
- Green Economy Barometer: Who Is Doing What, Where** (Green Economy Coalition, London)
- Green Growth in Cities** (OECD “Green Growth Studies,” 2013, 132p)
- Green Transition Scoreboard** (Ethical Markets Media, Hazel Henderson; private investing since 2007)
- Human Progress Within Planetary Guard Rails** (German Advisory Council/Global Change, 2014)
- Inclusive Green Growth: The Pathway to Sustainable Development** (World Bank, 2012, 188p)
- Indispensable Oceans** (Global Partnership for Oceans, World Bank, 2013, 44p)
- Living Planet Report—2012** (World Wildlife Fund)
- New Climate Economy, The** (Global Commission on the Economy and Climate, Dec 2014)
- Now for the Long Term** (Oxford Martin Commission on Future Generations, Dec 2013, 85p)
- Outlook on the Global Agenda** (World Economic Forum; from its 80 Global Agenda Councils)
- Planet for Life 2013: Reducing Inequalities** ([www.iddri.org](http://www.iddri.org), Paris; 2012 on agriculture; 2011 on oceans)
- Powering Forward** (Center for the New Energy Economy, Colorado State University, Jan 2014)
- Renewables Global Status Report** (Renewable Energy Policy Network, 2014)
- SIPRI Yearbook** (Stockholm International Peace Research Institute; since 1969; on military spending)
- State of the Future** (Millennium Project, Washington; J. Glenn; on 15 Global Challenges)
- Sustainable World Sourcebook** (Sustainable World Coalition, Earth Island Institute, Berkeley; 4<sup>th</sup> ed., 2014)
- Taking the Green Economy into the Mainstream** (Green Economy Coalition, Sept 2014, 12p)
- Transformation Index** (Bertelsmann Stiftung, Germany; democracy in 128 countries; annual)
- Turn Down the Heat: Why a 4°C World Must Be Avoided** (World Bank & Potsdam Institute, 2012)

**Vision 2050** (World Business Council for Sustainable Development, 2010, 80p; a best-case scenario)

**World Governance Index** (Forum for a New World Governance, Paris)

**World's Worst Pollution Problems Report** (Green Cross International, Geneva; annual)

The growing abundance of sustainability books and journals, and the growing number of sustainability organizations (with their own reports, papers, pamphlets, newsletters, and videos) is a welcoming trend. But at the same time it leads to a fragmentation quite similar to that found in the early 1970s (22), despite a great number of organizations using the “S-word.” Somehow, somewhere, a “portal” to this burgeoning world is needed, bringing all sustainability-related information together in a coherent way, while highlighting the most important ideas, data, and actions. (23) Chart 2 highlights the type of important “gray” literature produced by sustainability organizations, much of it readily downloaded for free.

---

*“We are currently increasing human life by some .2 to .3 years per year. With the genomic and synthetic bio revolutions and the nanotechnologies, some are projecting major increases approaching eventually one year per year.” – Dennis Bushnell*

---

## 9. (POPULATION/TECHNOLOGY). **Due to many new biomedical advances that will enhance and extend human lifespans, world population growth may once again become a serious concern.**

Population growth in the US and the world was a major concern in the 1960s and 1970s, e.g. the Commission on Population Growth and the American Future report in early 1972, which suggested slowing down the rate of growth. (24) More alarmist was **The Limits to Growth** report to the Club of Rome in late 1972, which devoted its first two chapters to “The Nature of Exponential Growth” and “The Limits to Exponential Growth”. Special attention was given to “the exponential growth curve of world population” (p.34), noting that in 1970 world population totaled 3.6 billion, and the doubling time at the current 2.1% per year growth rate would be 33 years, or 2003. Fortunately, the growth rate has slowed, so that the doubling did not occur until mid-2014, when the total was at 7.24 billion. Further decline in the growth rate is expected, such that the mid-2014 projection for 2050 is 9.68 billion (25).

Curiously, Jørgen Randers, one of the original **Limits to Growth** authors in 1972, forecasts in his recent and ambitious report to the Club of Rome that “global population (will) reach a maximum of some 8.1 billion people in the early 2040s” (p.62), with total population then declining by 1%/year and reaching 7 billion by 2075. (26) “Exponential growth” proved to be a rather poor forecast in 1972, however, and I think that the Randers forecast of population peaking in the 2040s (based on the UN low projection) and then declining *may* also be off the mark. In contrast, I have noted a “projection creep” over the past decade in the PRB Data Sheet, such that, in several years, the projection may well be at an attention-grabbing 10 billion—quite a difference from 9 billion that is still widely cited by some casual observers. (27)

Indeed, there is so much uncertainty today that four scenarios are needed: of Sharp Decline (due to war, pandemic, or major environmental catastrophe), Slow Decline (the Randers forecast), Slow Increase (current conventional wisdom), and Sharp Increase (which would bring the population issue front and center again, and drive attention to sustainability matters). The reason to consider slow or perhaps even rapid increase is the growth of biomedical research that may conquer or control some or many major afflictions, and perhaps even halt or reverse the aging process. The possible impact of new technology for better or worse is a subject that demographers won't touch. However, Dennis Bushnell, chief scientist of the NASA Langley Research Center, has recently noted that "we are currently increasing human life by some .2 to .3 years per year. With the genomic and synthetic bio revolutions and the nanotechnologies, some are projecting major increases approaching eventually one year per year." (28)

Just as an early outline of this paper was being completed, two magazines both arrived at my home on Valentine's Day (a day of presumed heightened affection and copulation), each with a cover feature on anti-aging: *Bloomberg Businessweek* focused on Swiss pharmaceutical giant Novartis, which "has begun taking the first steps to position a version of rapamycin as the first true anti-aging drug" (16 Feb 2015, p46), while *Time* magazine offered "Dispatches From the Frontiers of Longevity" and a cover photo of a baby which "could live to be 142 years old" (23 Feb 2015). If many babies do so, the growth curve of global population aided by techno-capitalism could shift from convex back to concave (i.e. the "exponential growth once feared by Club of Rome), and population will again become a prominent concern. Perhaps the greatest anti-aging project of all will be Google's Calico project for "curing death" (29), lustily announced in 2013.

## 10. (EDUCATION/LEARNING). We all have much to learn about sustainability and how to advance it. To make serious progress toward this goal, we need a new paradigm of "third-stage scholarship" to integrate the many integrators.

A largely forgotten 1979 Report to the Club of Rome, **No Limits to Learning: Bridging the Human Gap**, argued that complexity was a "mounting challenge" and that we must face the human gap, or "the distance between growing complexity and our capacity to cope with it."(30) As was common at that time, the authors also noted "global over-population" as a "major and fundamental problem," as well as rapid degradation of tropical rain forests, the advance of desertification, and an "accelerating extinction of animal and plant wildlife" (31), which is still accelerating 35 years later! These problems remain, and others have been added, such that the human gap now seems wider than ever. Botkin *et al.* made a "plea for interdisciplinarity," synthesis to overcome disciplinary fragmentation, and "anticipatory and participatory learning" using "holistic approaches." And similar pleas are still being made. But interdisciplinarity and holistic approaches alone won't help to close the learning gap. Infoglut must be explicitly faced head on with a new paradigm for scholarship.

The path out of the expanding knowledge jungle is suggested by a 1990 Special Report to the Carnegie Foundation for the Advancement of Teaching, **Scholarship Reconsidered: Priorities of the Professoriate**, by Ernest L. Boyer. A "new vision of scholarship" was

proposed, identifying four kinds of scholarship: the conventional Scholarship of Discovery, the Scholarship of Teaching, the Scholarship of Integration (making connections across the disciplines, placing the specialties in larger context, bringing new insight to bear on original research), and the Scholarship of Application (responsible application to consequential problems...scholarship in service to the nation and the world). Boyer wrote that “At no time in our history has the need been greater for connecting the work of the academy to the social and environmental challenges beyond the campus.” (33) Arguably, this need is even greater today, similar to the growing “human gap” identified in the Club of Rome report.

---

*“The obsolete economics of the industrial era and the 20<sup>th</sup> century is not appropriate for the 21<sup>st</sup> century and sustainable development, where human capital and natural capital are increasingly valued and traditional estimates of wealth, national product (GNP) and human happiness are increasingly questioned.”*

---

Unfortunately, Boyer did not make specific proposals for the new paradigm of broadening scholarship to include the scholarship of teaching, integration, and application—what I suggest might be called “Second-Level Scholarship.” I will make seven explicit proposals to illustrate what is needed and to further develop understanding and effectiveness of the emerging sustainability macro-system.

1. *Connect the Reports of the Club of Rome.* There are now some 35 of these reports, but I have never seen all of them listed in any report. Every new report should list all previous reports, briefly abstracted, and be encouraged if not mandated to make reference to at least several earlier reports. The failure to connect the reports, many of which still have much to offer, nicely illustrates the fragmented state of conventional scholarship everywhere, which has resulted in so much wasted and duplicated knowledge, even when addressed to multidisciplinary topics.
2. *Study the Formation and Operation of the Alliances, Coalitions, Consortia, Networks, and Partnerships that Address Various Aspects of Sustainability.* This important development, similar to streams merging into a broader river (or consolidation in the automobile and airline industries), requires critical inquiry as to what works well and what doesn't, and how to enhance effectiveness of these alliances beyond the mere exchange of logos. Arguably, these alliances and consortia (40 have been identified so far in the S&S Guide) are the new post-industrial equivalent of labor unions, potentially providing “countervailing power” (a term proposed by John Kenneth Galbraith) for the well-being of “the 99%” non mega-rich, the poor and middle class, and workers everywhere.
3. *Create an Energy Information Portal that Surveys Progress and Prospects for All Energy and Energy-Saving Alternatives.* This function may already be largely performed by the International Energy Agency in Paris, but new outlier sources of energy such as cold fusion should also be considered, as well as simple new technologies such as the “Solar

Puff” rechargeable and portable lamp that could displace unhealthy and widespread kerosene use in developing countries. Unlike IEA reports, this information should be made easily available in several formats.

4. *Create a New Economics Information Portal that Surveys Progress for All New Economics Thinking.* The obsolete economics of the industrial era and the 20th century is not appropriate for the 21<sup>st</sup> century and sustainable development, where human capital and natural capital are increasingly valued and traditional estimates of wealth, national product (GNP) and human happiness are increasingly questioned. (34)

The best recent book, and an outstanding overview, is **An Introduction to Ecological Economics** (Second Edition) by Robert Costanza, Herman Daly, and five others (CRC Press, Jan 2015, 337p, \$99.95), with chapters on humanity’s current dilemma, planetary boundaries, the need to reintegrate ecology and economics, human and social capital, measuring welfare (GDP vs. the Genuine Progress Indicator), ecological tax reform, and the need to create an international consortia of universities—a MetaUniversity—to facilitate online synthesis courses on real-world problems. (35)

5. *Create a “Portable Lecture Series” on Sustainable Development Topics.* Most universities do not have the resources or the intellectual will to address the full range of sustainable development topics. The World University Consortium (and/or Costanza *et al.*’s “MetaUniversity”) should create a speaker’s bureau of several dozen scholars worldwide on a dozen or so sustainable evolution topics. Interested universities can arrange a lecture series on, say, any 6-12 topics, inviting listed speakers who are willing and able to participate. This can be good publicity for WUC, and a money-raiser.
6. *Create a Series of Televised “Great Debates” in Every Country, to Explore Pros and Cons of Sustainable Development Topics.* Universities are supposed to promote “debate” but this seldom ever happens. Rather, silos re-widespread, even within departments. The new 21<sup>st</sup> century debate format should encourage evidence-based argument, a search for common ground, and consensus on needed research. Each debater must provide a list of 5-10 relevant articles to appear on the Great Debates website, and a list of 5-10 books for further reading. This new and much-needed institution could bring Realos and Fundis together, as well as Sustainability thinkers, their critics, and others who think they have all the answers!
7. *Create a Portal for All “New Paradigm” Global Agendas, Past and Present.* Last but by no means least, an ongoing assessment is needed of various agendas, both for their similarities and differences. The starting point should be the 17 Sustainable Development Goals with 169 targets, to be adopted by the United Nations in late 2015. This should be contrasted with past and present reports of the Club of Rome, notably Ervin Laszlo *et al.*, **Goals for Mankind** (1977 update, 374p) which articulates goals for Global Security, Global Food, Global Energy and Resources, and Global Development. (NOTE: The “Post-2015” SDGs mention “peace” but do not consider broader Global Security goals). The most recent report to the Club of Rome by David Korten (Feb 2015) outlines elements of a “Living Economy for a Living Earth.” Some important historical overviews to consider should include **A Blueprint for Survival** by Edward Goldsmith *et. al.* of *The Ecologist* (1972); Dennis Gabor, **The Mature Society** (1972); Dennis C. Pirages and

Paul Ehrlich, **Ark II: Social Response to Environmental Perspectives** (1974), calling for the “planned evolution of a new culture”; Lester W. Milbrath, **Environmentalists: Vanguard for a New Society** (1984), which contrasts the New Environmental Paradigm with the Dominant Social Paradigm; Federico Mayor and Jérôme Bindé, **The World Ahead: Our Future in the Making** (2001), which calls for a new social contract, natural contract, cultural contract, and ethical contract; James Martin, **The Meaning of the 21<sup>st</sup> Century: A Vital Blueprint for Ensuring Our Future** (2006), and many more.

What do these seven proposals have in common? All of them are horizontal, explicitly promoting an *integration of the integrators*—which might be called “third-stage scholarship,” in contrast to the over-generalized calls for more multi-disciplinary problem-oriented scholarship, and Ernest Boyer’s 1990 “new vision of scholarship,” which could be seen as “second-stage scholarship.” And all of these proposals, if realized, can accelerate sustainable development.

### Conclusion: Avoiding more of the same

Sustainable development must be broadly considered in time and space, as illustrated by ten propositions from different perspectives:

1. Historically, sustainability did not appear in any book title until 1976, but there were many similar ideas in the 1970s without the “S-word” and many still deserve consideration. Indeed, one might ask if there has been much of any progress since the 1970s, or just a shift in focus and language.
2. A major transition to “Sustainability” and coping with climate change is now underway, with roughly five thousand books and some five hundred organizations calling for sustainable development.
3. This burgeoning movement still has a long way to go. Many battles are being won, but the overall war may still be lost as the planet heats up and tensions mount.
4. The leading organizations that promote sustainability are in cosmopolitan cities and countries furthest along the path to sustainability. Laggard countries and regions are heavily invested in oil and gas, or coping with immediate demands of security.
5. Major differences among sustainability groups discourage any coherence and dilute political efforts. Divisions between “Realos” vs. “Fundis,” generalists vs. specialists, and scientists vs. activists can potentially be narrowed to some degree.
6. The United Nations, formed after World War II to promote security, has been a major driver of sustainability in recent decades. Another major driver is climate change, which drives sustainability thinking but may eclipse it, especially if there is wide-scale methane release.
7. The broad realm of national and global security is a barrier to sustainability, but also a potential driver. We cannot have security without sustainability, nor sustainability without security. The two realms are beginning to overlap, and more is needed.
8. Infoglut is a major barrier to realizing sustainability. Better information management is needed to identify relevant information, highlight that which is most important, and get it out into the public arena. (36)

9. Population growth was a major concern in the early 1970s, but interest has waned; it may well pick up again as new biomedical advances enhance and extend human lifespans, thus raising further concern for sustainability, resources, and space on Earth for *homo sapiens*, the ultimate invasive species!
10. We all have much to learn about sustainability, especially elite adults. But cross-disciplinary integration is not enough because there is already too much of this “second-level scholarship.” What we now need is “third-level scholarship” that integrates the integrators! Seven explicit proposals are made that can further the sustainability macro-system, as concerns Club of Rome reports, alliances and consortia, energy information, new economic information, a portable lecture series, televised series of Great Debates, and a portal for all “New Paradigm” agendas.

---

*“A major theme for future inquiry should be “waste”—not only waste of energy and food, but waste of financial and human resources, and of knowledge.”*

---

These ten propositions regarding sustainability could be expanded to include insights from Governance (autocratic/plutocratic/technocratic trends diminishing freedom and democracy), Criminology (especially corruption and Transnational Organized Crime) (37), Law (environmental crime is emerging as a major concern, as well as environmental justice reparations for pollution), International Economics (the persisting threat of another Great Recession—or worse—is quite possible in the years ahead), Technology (many advances that may enhance or inhibit sustainability), Urbanization (obviously underway, and perhaps a driving force for sustainability thinking), Capitalism (and whether it can be seriously green and how to get there), Higher Education (most of which is still trivial and inappropriate; serious rethinking is only beginning), Work (how to ensure decent livelihoods for all, as many jobs get automated), and Green Cost-Benefit Analysis (a compelling case can be made for the many co-benefits of climate policy; see Alison Smith, **The Climate Bonus**). (38)

In other words, many more tasty and nutritious ingredients can be added to the sustainability stew, with different recipes and proportions in different times and places to satisfy different cultures. We have much to learn about how to do this. And the sooner the better, as the uncounted costs and waste of our post-industrial era running amok continue to mount. A major theme for future inquiry should be “waste”—not only waste of energy (39) and food, but waste of financial and human resources, and of knowledge.

*Author contact information*

Email: [mmarien@twcny.rr.com](mailto:mmarien@twcny.rr.com)

## References

1. Michael Marien, “The Future of Human Benefit Knowledge: Notes on a World Brain for the 21st Century,” in Walter Truett Anderson (Guest Editor), *Futures* Special Issue, 39:8, October 2007, 955-962. Most of the essays in this issue, including mine, were derived from the 1995 WAAS meeting in Zagreb.
2. Michael Marien, **Societal Directions and Alternatives: A Critical Guide to the Literature**. LaFayette, NY: Information for Policy Design, 1976, 400 pages. This is the first opportunity I have had to self-reference this early work covering 917 items

- in categories such as The Technological Affluent Service Society, Optimists and Pessimists, The Cosmic Evolution View, Ecology and the Limits to Growth, World Order, Decentralization, Human Needs, Government Reform, Economic Reform, Redistribution of Wealth and Power, and (libertarian) Freedom from Government.
3. Michael Marien, **Environmental Issues and Sustainable Futures: A Critical Guide to Recent Books, Reports, and Articles**. Preface by Lester W. Milbrath. *A Future Survey* Guidebook. Bethesda MD: World Future Society, 1996, 170 pages, 450 items. Published in association with the IUCN (World Conservation Union) Commission on Environmental Strategy and Planning and the California Institute of Public Affairs Center for Environment and Public Policy (Thaddeus Trzyna, President).
  4. Jeremy L. Caradonna, **Sustainability: A History**. NY: Oxford University Press, Sept 2014, 31 pages. Also see George Perkins Marsh, **Man and Nature; or, Physical Geography as Modified by Human Action** (NY & London, 1864), an important early book by a former Vermont Congressman that led to establishing New York State's Adirondack Forest Preserve in 1885 and the unique 6 million acre Adirondack Park in 1892 (half public and half private), where I have a second home. A new edition of Marsh's book was published by the University of Washington Press in 2003.
  5. *Ibid.*, pages 2-3.
  6. Jeffrey D. Sachs, **The Age of Sustainable Development**. Foreword by Ban Ki-Moon. NY: Columbia University Press, March 2015, p1. This 543-page textbook was developed as part of a MOOC of the same name, sponsored by the UN Sustainable Development Solutions Network.
  7. Hazel Henderson *et al.*, **2015 Green Transition Scoreboard Report: Breakdowns Driving Breakthroughs**. St. Augustine FL: Ethical Markets Media, April 2015, 36 pages.
  8. Naomi Klein, **This Changes Everything: Capitalism vs. The Climate**. NY: Simon & Schuster, Nov 2014, p. 459. This informative 566-page polemic was among the "100 Notable Books of 2014" chosen by the *New York Times Book Review*.
  9. Ugo Bardi, **Extracted: How the Quest for Mineral Wealth Is Plundering the Planet**. A Report to the Club of Rome. Foreword by Jorgen Randers. White River Junction VT: Chelsea Green Publishing, 2014, 277 pages. Naomi Klein also has much to say about the "below-the-surface" extractive industries (oil, gas, coal, and minerals), and how they resist climate change action.
  10. Hans Joachim Schellnhuber *et al.*, **Turn Down the Heat: Confronting the New Climate Normal**. Washington: World Bank Group, Nov 2014, 320 pages. This third report in the "Turn Down the Heat" series, prepared by the Potsdam Institute for Climate Impact Research in Germany, warns of a "40% chance of exceeding 4oC warming above pre-industrial levels by about 2100," which would commit the world to much higher warming levels exceeding 6oC or more in the long term. In other words, we're cooked.
  11. Anders Wijkman and Johan Rockström, **Bankrupting Nature: Denying Our Planetary Boundaries**. A Report to the Club of Rome. London & NY: Routledge/Earthscan, Nov 2012, 206 pages. Wijkman is a WAAS Fellow and former Policy Director of UNDP, while Rockström is Executive Director of the Stockholm Resilience Center, co-chair of Future Earth, and lead author of two planetary boundaries articles in *Nature* (461, 2009, pp. 472-475) and *Ecology and Society* 2009; [www.ecologyandsociety.org/vol14/iss2/art32](http://www.ecologyandsociety.org/vol14/iss2/art32)). This important concept that goes beyond climate change is discussed by Jeffrey Sachs in **The Age of Sustainable Development** (Chapter 6, pp.181-218) and in **State of the World 2013: Is Sustainability Still Possible?** (World-watch Institute, Chapter 2, pp.19-27).
  12. William Halal and Michael Marien, "Global Megacrisis: A Survey of Four Scenarios on a Pessimism-Optimism Axis," *Journal of Futures Studies*, 16:2, Dec 2011, 65-84. This is followed by a Symposium of 13 essays responding to the Global Megacrisis scenarios, and essays by Halal and Marien responding to the critiques (pp. 95-167).
  13. Jorgen Randers, **2052: A Global Forecast for the Next Forty Years**. A Report to the Club of Rome Commemorating the 40<sup>th</sup> Anniversary of *The Limits to Growth*. White River Junction, VT: Chelsea Green Publishing, 2012, 392 pages. This brave and provocative forecast by one of the original LTG authors considers population, energy, food, ecosystems, declining consumption, stronger government, more focus on local solutions, less fixation with economic growth, collective creativity, and "numerous cases of overshoot and decline before 2052." See Michael Marien Review in *CADMUS*, 1:5, October 2012, 53-61.
  14. Jeremy Caradonna, **Sustainability: A History**, p.13.
  15. Giacomo D'Alisa, Federico Demaria, and Giorgos Kallis (eds.), **Degrowth: A Vocabulary for a New Era**. London & NY: Routledge, Nov 2014, 248 pages. Degrowth advocates shrinking of production and consumption to achieve social justice, ecological sustainability, and a steady-state economy.
  16. David C. Korten, **Change the Story, Change the Future: A Living Economy for a Living Earth**. A Report to the Club of Rome. San Francisco: Berrett-Koehler, Feb 2015, 169 pages.
  17. Ian Scoones, Melissa Leach, and Peter Newell (eds.), **The Politics of Green Transformations: Pathways to Sustainability**. London & NY: Routledge, Jan 2015, 220 pages. The editors sensibly state that multiple green transformations are required, and they must be both "top-down" involving elite alliances between states and businesses, as well as "bottom up," pushed by grassroots innovators and entrepreneurs and part of wider mobilizations in civil society.
  18. Anders Wijkman and Johan Rockström, **Bankrupting Nature**, p.117.
  19. CNA Military Advisory Board, **National Security and the Accelerating Risks of Climate Change**. Foreword by Michael Chertoff and Leon Panetta. Washington: CNA Corporation, June 2014, 37 pages ([www.cna.org](http://www.cna.org)).
  20. Michael T. Klare, "War, Weapons, and Sustainability in the Post-Cold War Era," in Dennis C. Pirages (ed.), **Building Sustain-**

- able Societies: A Blueprint for a Post-Industrial World.** Armonk NY: M.E. Sharpe, 1996, pp 133-147. Klare argues that unless the “epidemic of armed conflict subsides, it is likely that international efforts to address the environment and other global problems will be subject to repeated setbacks and disappointments.” (p.133), while also noting that without sustainable development, “deterioration of the global environment will accelerate...thus ensuring the further proliferation of ethnic and regional conflict...Clearly, we will have to make progress on both fronts simultaneously if we hope to make progress on either.” (p.145)
21. *Bloomberg Businessweek*, 9 February 2015, p.14.
  22. See Michael Marien, **Societal Directions and Alternatives** (1976). The difference between mapping sustainability books and sustainability organizations for the “S&S Guide” is much like the difference of directing a museum, where the objects are static, and a zoo without cages, where the occupants are dynamic and mingle together in various combinations.
  23. Michael Marien, “Infoglut and Competing Problems: Key Barriers Suggesting a New Strategy for Sustainability,” in Doug McKenzie-Mohr and Michael Marien (eds.), **Visions of Sustainability**, *Futures* Special Issue, 26:2, March 1994, 246-256. Also in Dennis C. Pirages (ed.), **Building Sustainable Societies**, pp. 299-311. Suggested strategies for improving social marketing of “sustainability” include more crisp messages aimed at broad audiences, debate with anti-environmentalists, a nationally syndicated green columnist, an annual “Top Ten Greenlist of Books,” green Nobel prizes, widespread multi-age civic education, and a new sustainability-related labeling scheme for nations of the world to replace misleading Cold War and economic labels (e.g. instead of First World/Third World and Developed/Developing, grouping of strongly progressing nations, somewhat progressing nations, non-progressing nations, and regressing nations).
  24. Commission on Population Growth and the American Future, **Population Growth and the American Future**. Washington: U.S. Government Printing Office, 1972, 186 pages. NY: NAL Signet Edition, March 1972, 362 pages. **No convincing economic argument was found by the Commission for continuing national population growth. The Limits to Growth report did not appear until late 1972, and did not take off, I believe, until after the OPEC oil shock of early 1973.**
  25. Carl Haub, 2014 World Population Data Sheet. Washington: Population Reference Bureau, August 2014. This valuable annual compilation provides projections for 2025 and 2050 for all regions, sub-regions, and nations of the world.
  26. Jorgen Randers, **2052: A Global Forecast**, p.62.
  27. Carl Haub e-mail to Michael Marien, 26 December 2013, where he confirms my observation about “projection creep,” adding that “The projected 2050 population has indeed been creeping upwards over the years and not by a little. PRB’s 2050 population, projected annually, rises ahead of the UN’s biennial series.”
  28. Dennis Bushnell e-mail to Michael Marien, 12 October 2014.
  29. As of September 2014, the Google-backed life extension company, Calico, is partnering with pharmaceutical giant AbbVie to develop new drugs associated with old age and perhaps “curing death.” Each partner has committed \$250 million, with an option to add another \$500 million each.
  30. James W. Botkin, Mahdi Elmandjra, and Mircea Malitza, **No Limits to Learning: Bridging the Human Gap**. A Report to the Club of Rome. Elmsford NY: Pergamon Press, 1979, p.6.
  31. *Ibid.*, pp.2-3.
  32. *Ibid.*, pp.135-137.
  33. Ernest L. Boyer, **Scholarship Reconsidered: Priorities of the Professoriate**. A Special Report. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching, 1990, p.xii.
  34. Michael Marien, “New and Appropriate Economics for the 21st Century: A Survey of Critical Books, 1978-2013,” *CADMUS*, 1:5, October 2012, 86-102, covering 118 books and 10 organizations.
  35. Robert Costanza *et al.*, **An Introduction to Ecological Economics**. Boca Raton FL: CRC Press (Taylor & Francis Group), Jan 2015, pp.284-287.
  36. A simple common-sense scheme to deal with information overload is “Operation BASIC,” representing Bibliographies, Abstracts, Surveys, Indexes, and Copies. The “Copies” problem has been largely overcome, but the first four treatments for information are all greatly needed—together. See Bertram M. Gross, **The Managing of Organizations**; The Free Press, 1964, Volume II, pp.857-860. Also Bertram M. Gross, “Operation Basic: The Retrieval of Wasted Knowledge,” *Journal of Communication*, 12, 1962, 67-83. This should be combined with the proposal by H. G. Wells for a World Brain, an “adequate knowledge organization... (for) a great new world struggling into existence...a depot where knowledge and ideas are received, sorted, summarized, digested, clarified and compared.” See H. G. Wells, **World Brain**. Freeport NY: Books for Libraries Press, 1938, pp. 66-69. Many present enthusiasts view the Internet as today’s “world brain,” but it is far from the humanly wisdom-managed “depot” envisioned by Wells.
  37. See Jerome C. Glenn *et al.*, **2013-2014 State of the Future** (17th Edition). Washington: Millennium Project, April 2014. This overview of many trends and proposals is largely devoted to 15 Global Challenges, including Transnational Organized Crime, a major concern (as well as corruption) that is ignored by all writers on sustainability that I know of.
  38. Alison Smith, **The Climate Bonus: Co-Benefits of Climate Policy**. London & NY: Routledge, Jan 2013, 408pp. This highly detailed book described 37 benefits from cleaner air, greener land, safe and secure energy, less waste, a stronger economy, and better health and well-being. These positive returns from sustainability investments need much more publicity.
  39. Ernst Ulrich von Weizsacker *et al.*, **Factor Five: The Promise of Resource Productivity**. London: Earthscan, Dec 2009, 448p. Arguably, the same sort of thinking might be applied to much greater knowledge productivity in producing human benefit.