

Global Crisis Collaboration: The Key to the Survival of Civilization in the 21st Century



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Abstract : In the 21st century, civilization is threatened by multiple, interactive crises, any one of which could, in a worst case scenario, cause a huge reduction of population size and even human extinction. In short, both the planet and human society, including its economic system, are changing rapidly because tipping points have been passed and return to predisturbance condition is improbable. The primary areas in which humankind must adapt or take immediate remedial action include: (1) global climate change, (2) acidification of oceans, (3) overpopulation, (4) ecological overshoot, (5) damage to the biospheric life support system. Since risks and security are intimately connected, humankind must be very concerned. Improvising policies to resolve all these crises is essential since natural selection does not offer the option of coping with one crisis at a time. Economic globalization of a human population of nearly 7 billion has exacerbated problems that can only be resolved by global collaboration. Failure to do so successfully might well end in a population crash that would return *Homo sapiens* to its original state of small tribal groups spread thinly over the planet. Even if this catastrophe occurs, the small groups will have to adapt to conditions quite different from those that characterized the period of exponential population growth.

Key words : Interactive crises, Global collaboration, Improvising adaptation to climate change, Return to tribes, Biosphere, Ecological overshoot, Tipping Points, Population Crash

The great questions – “Who are we?” “Where did we come from?” and “Why are we here?” – can be answered only, if ever, in the light of scientifically based evolutionary thought.

E. O. Wilson

From seeing nature as fixed forever in form and composition to seeing it as forever changing, we have been transformed utterly by discovering and understanding evolution.

Michael Ruse and Joseph Travis

Crisis Collaboration

The currently occurring, multiple predicaments in the environmental realm lack any robust evidence on global collaboration for any of the planet’s major crises: (1) global climate change, (2) acidification of oceans, (3) overpopulation, (4) ecological overshoot, (5) damage to the biospheric life support system. Failure to collaborate on any one of these five important issues could mean the end of civilization as presently known and even the extinction of the human species. Despite massive global climate change studies by thousands of scientists over the last decade and earlier studies of the past century, little significant progress has occurred in reducing anthropogenic greenhouse gas emissions. In addition, the component of explosive human population

growth seems unable to even approach a dispassionate, free, and open exchange of ideas. The lack of literacy on acidification of the oceans, ecological overshoot, and damage to the biospheric life support system is appalling since human survival depends on an informed citizenry (as Thomas Jefferson opined). One can only hope that environmental literacy is improved and that intelligence does indeed have survival value.

(1) Global Climate Change

Anthropogenic greenhouse gas emissions are still increasing rapidly, and even international conferences on the subject are not inspiring. A world-class climate scientist, James Hansen, has stated “that corporate lobbying has undermined democratic attempts to curb carbon pollution. The democratic process doesn’t quite seem to be working” (Adam, 2009).

(2) Acidification of Oceans

The Inter Academy Panel on International Problems (IAP, 2009) has issued a statement that ocean acidification is irreversible on timescales of at least tens of thousands of years. The consequent loss of carbonate ions produces a critical situation with production of shells and skeletons of marine organisms – carbonate ion concentrations are now lower than at any other time during the last 800,000 years (IAP, 2009). Surely, this

matter requires urgent action as espoused by the G8+5 Academies' Joint Statement (2009).

(3) Overpopulation

As of June 2009, the global human population was approaching 7 billion at the rate of approximately 215,000 new mouths each day. “. . . for a long time it was simply assumed that rising population was the main challenge facing humanity. But now we understand that the effect of rising population depends on how much people consume and produce, and as the world gets flat, more and more people are going to be consuming and producing more and more” (Jared Diamond as quoted in Friedman, 2008). When Diamond refers to world as getting flat, he is referring to a “level playing field” where people the world over have an equal opportunity to consume the world's resources and produce goods for a global market. Thus, third world countries have more per capita income and compete for the world's oil and other finite resources. However, people refuse to discuss overpopulation in rational terms. The problem can be simply stated – exponential human population growth cannot continue on a finite planet. Why has humankind refused to worry about such an obvious danger? Rubin (2009) notes: “That's primarily because from an economist's perspective, natural resources are effectively limitless.” However, in the early 21st century, recognition developed that the physical supply of oil was not infinite and alternatives (e.g., ethanol and tar sands) could not replace oil at present rates of consumption. Oil supplies are dwindling rapidly and prices are rising, even during a recession. How many people can the planet support without cheap oil? How much longer can humankind use fossil fuels at the current or greater rate without passing another global climatic tipping point? Moreover, cheap, abundant oil has been responsible for cheap, abundant food. Abundant food, including potable water, and greatly improved medical care have been responsible for unprecedented population growth.

(4) Ecological Overshoot

Most citizens and politicians are unaware of the colossal threat of ecological overshoot. Ecological overshoot day each year marks the day that humanity has used all the resources nature can generate for that year (www.footprintnetwork.org). In 2008, humankind used about 40% more than nature could regenerate in one year – clearly, a grossly unsustainable lifestyle. Schor and Willis (2009) discuss in detail the concept of conscious consumption, which refers to choices for reducing or altering consumption that are conscientiously

made and motivated by values such as social justice, sustainability, corporate behavior, or workers' rights. Conscious consumption does not always result in the desired effects: “Conscious consumers may believe they are supporting a different way of living and consuming, but the market turns resistance into a new and profitable market niche” (Schor and Willis, 2009). However, a perpetual recession cannot be counted on to keep consumption down, so conscious consumption seems to be the best alternative at present. Given the vast disparity in individual wealth globally, achieving collaboration on ecological overshoot will not be easy. In the United States and elsewhere in the world, substantial disparities exist in the income of the very rich and the very poor; the gap is still increasing. The awareness of such disparities must be increased (Editorial, 2009a).

(5) Damage to the Biospheric Life Support System

Earth has had a series of life support systems over billions of years, but the present one has served the genus *Homo* well for 2 million years and *Homo sapiens* for 160,000-200,000 years. Humans are making a serious mistake to assume that the biospheric life support system will always provide conditions favorable to humankind. Dramatic decline in biodiversity, loss of habitat, and global climate change, to mention a few illustrative examples, adversely affect the biospheric life support system. However, the biospheric life support system has maintained an atmospheric gas balance favorable to most present life forms, even though humans are not doing much to protect the integrity of the biospheric life support system. Both ecologists and ecotoxicologists are essential to assessing and monitoring the integrity and condition of the biospheric life support system, but this essential collaborative relationship has been developing far too slowly.

Reasons for Concern

Five Reasons for Concern (first published by the Intergovernmental Panel on Climate Change) about increases in global mean temperature has been updated in the framework of global mean temperature in a *Proceedings of the US National Academy of Sciences* publication (Smith *et al.*, 2009).

(1) Risk to unique and threatened systems

This reason for concern addresses the potential for increased damage to or irreversible loss of unique and threatened systems, such as coral reefs, tropical glaciers, endangered species, unique ecosystems,

biodiversity hotspots, small island states, and indigenous communities.

(2) Risk of extreme weather conditions

This reason for concern tracks increases in extreme events with substantial consequences for societies and natural systems, such as the increase in the frequency, intensity, or consequences of heat waves, floods, droughts, wildfires, or tropical cyclones.

(3) Distribution of impacts

This reason for concern focuses on disparities of impacts. Some regions, countries, and populations face greater harm from climate change. Whereas, other regions, countries, or populations would be much less harmed – some may even benefit. The magnitude of harm can also vary within regions and across sectors and populations.

(4) Aggregate damages

This reason for concern covers comprehensive measures of impacts. Impacts distributed across the globe can be aggregated into a single metric, such as monetary damages, lives affected, or lives lost. Aggregation techniques vary in their treatment of equity of outcomes, as well as treatment of impacts that are not easily quantified. This reason for concern is based mainly on monetary aggregation available in the literature.

(5) Risk of large-scale discontinuities

This reason for concern represents the likelihood that certain phenomena (sometimes called singularities or tipping points) would occur, any of which may be accompanied by very large impacts. These phenomena include the deglaciation (partial or complete) of the West Antarctic or Greenland ice sheet and major changes in some components of Earth's climate system, such as substantial reduction or collapse of the North Atlantic meridional overturning circulation.

Increases in global mean temperature above circa 1990 measures are associated with higher risks (Hoag, 2009). Smith *et al.* (2009) summarize the level of risk in the five reasons for concerns. The first two reasons for concern – risks to unique and threatened systems and risk of extreme weather events – imply substantial impacts or risks between 1°C and 2°C above 1990 levels. Past risks were very low; a 1°C-2°C increase is more risky. The third and fourth reasons for concern – distribution of impacts and aggregate damages – reflect substantial risks beginning in the range between 2°C

and 3°C. Above 2°C is very risky, with above 3°C becoming dangerous. The fifth reason for concern – risks of large-scale discontinuities – becomes a substantial risk when global mean temperature climbs more than 4°C or 5°C above the 1990 mean. Unless precautionary measures to prevent further increases in global mean temperature are taken, humankind (and most other species as well) will experience some very difficult, dangerous, and possibly fatal global climate changes (Hoag, 2009).

Taking Precautionary Measures

The first reason for concern – risk to unique and threatened systems – involves the biospheric life support system, even though it is not mentioned specifically. Understanding how the global system functions is far from adequate. As a consequence, the tolerance of the biospheric life support system to anthropogenic stressors (e.g., toxic chemicals) is unknown. Of course, all complex systems have one or more tipping points that are not known until they have been passed. Once a major ecological tipping point has been passed, the changes are essentially irreversible in timeframes of interest to humans. “The magnitude of risks involved in climate change is vastly greater than, for instance, the disruption that would be caused to people were the Western financial system to collapse” (Stern, 2009, p. 2).

The second reason for concern – risk of extreme weather events – will have substantial consequences on security. The danger to the world's agricultural systems alone justifies taking precautionary measures to reduce risk and improve security. Agricultural productivity and global climate change are closely related, but humankind appears to be no more prepared for a food shortage than it was for the global financial meltdown. Of course, the global food system is quite different from the global financial system, but they share one thing in common – they both have tipping points. The recent global financial meltdown has attracted much attention: “The potential for catastrophe was clear to see, for all who had eyes to see it” (Paumgarten, 2009). Thus far, the same statement appears valid for the food crisis. Philpott (2009) comments: “These giant entities [i.e., agribusinesses] behave as if soil is an easily renewable resource, that the climate can absorb endless amounts of the greenhouse gas nitrous oxide (a synthetic fertilizer byproduct), and that communities and the biosphere can endlessly bear the toxic footprint of industrial meat production” (Philpott, 2009).

The world supply of potable water has decreased dramatically, and exponential population growth still continues. Tropical diseases are already moving into areas where they were previously rare or unknown.

The first two reasons for concern should be deeply troubling, but, at present, most individuals are concerned with the economy that affects their lives in unmistakable ways – job loss, decreased housing values, loss of value of savings, retirement plans, and so on, plus national and individual debt. Nevertheless, climate change could soon disrupt their lives even more than the global economic meltdown.

The third reason for change – distribution of impacts – concerns disparities of impacts. Some regions, countries, and populations face greater harm from climate change than others. For example, per capita emissions of greenhouse gases are higher at present in wealthy countries than in poor countries, but the latter suffer most from global climate change.

The fourth reason – aggregate damages – and fifth reason for concern – risk of large-scale discontinuities – involve 3°C-5°C increases in global temperatures, which are not out of the question. Clearly, continuing “business as usual” will markedly increase risks to civilization and even to the survival of *Homo sapiens*.

Ecological Footprints, Deficits, and Biocapacity

Humankind is living beyond Earth’s regenerative capacity. Beyond ecological overshoot day each year, human society is moving into the ecological equivalent of deficit spending. Living unsustainably is a high risk situation that cannot continue for long, especially since ecological overshoot day (http://www.footprintnetwork.org/en/index.php/GFN/page/earth_overshoot_day/) is occurring earlier each year. Stated simply, Earth overshoot day is the day humankind’s total ecological footprint (measured in global hectares) is equal to its biocapacity (also measured in global hectares). For the rest of the year, humans are accumulating debt by depleting its natural capital and allowing wastes to mount (e.g., atmospheric carbon dioxide that exceeds Earth’s assimilative capacity). Ecological deficits lead to resource loss, ecosystem collapse, debt, poverty, famine, and war.

An individual country’s situation can easily be misjudged. For example, the United States has an ecological footprint of over 9.0 hectares but a biocapacity of just over 5.0 hectares (measurements from 2005). China’s biocapacity has remained relatively constant at just under 1.0 hectares, but, in 2005, its footprint was

2.0. The world’s biocapacity has declined from about 4.2 hectares per capita in 1961 to about 2.0 in 2005. The two were in balance about 1986. This problem is a comparatively recent one in geological or evolutionary time.

How Much Time Does Humanity Have Left?

Comments are made almost daily that events in climate change are moving faster than expected. Not only is time short, but global warming may be twice as severe as previous estimates have indicated (Rice, 2009). “The research, conducted by the Massachusetts Institute of Technology (MIT), predicts a 90% probability that worldwide surface temperatures will rise more than 9 degrees (F) by 2100, compared to a previous 2003 MIT study that forecast a rise of just over 4 degrees” (Rice, 2009). Even the rise of just 4 degrees that was forecast by the 2003 study would create an “alien” planet. Nine degrees would result in an extremely inhospitable planet. Even amid such reported studies, only the scientific community has a sense of urgency.

Political Expediency

The sense of urgency evident among scientists is rarely apparent in the anthropogenic gas emissions regulation debates. Must humankind witness the kinds of catastrophes that have already occurred in parts of the planet (e.g., Australia and Africa) in their own bioregion before taking action? The absence of risk and hazard in discussions of climate change is shocking. “The top US negotiator on climate change policy has said that domestic politics will not allow Washington to deepen its commitment to cutting carbon pollution over the next decade” (Foreign Staff and Agencies in Paris, 2009). Former US Vice-President Al Gore has stated: “To save the future we have everything we need except the political will” (Foreign Staff and Agencies in Paris, 2009).

The concept of *expediency* is defined as being conducive to advantage or interest, as opposed to right. “US Energy Secretary Steven Chu says that the US will not be able to cut greenhouse emissions as much as it should due to domestic political opposition” (e.g., Harrabin, 2009). The justification for less than optimum reductions is based on mandating part of the necessary actions as opposed to getting none. “If the world waits before taking the problem [climate change] seriously, until Bangladesh, the Netherlands and Florida are under water, it will be too late to back ourselves out of a huge hole” (Stern, 2009, p. 3).

The US House Energy and Commerce Committee has passed a bill that “will impose the first-ever limits on greenhouse gas emissions from cars and trucks” (Editorial, 2009b). The legislation “calls for a 17 percent reduction in 2005 levels of greenhouse gas emissions by 2020 – and 83 percent by 2050” (Editorial, 2009b). Three burning questions must be addressed: (1) will the goals of the legislation be met in time? (2) if the goals are met, will the reductions be sufficient to have a significant impact on the progress of global warming? (3) will China and other major greenhouse gas emitters make “in kind” reductions? Without international cooperation, the US effort, if successful, will not be enough to reduce the climate change risk substantially. Even if wildly successful, the bill represents only a “first step toward a solution too long delayed for a problem too long denied” (Editorial, 2009b). The legislation still must be passed by the US Senate where it will undoubtedly face many amendments and formidable opposition from Senator James Inhofe, who has called global warming the greatest hoax ever perpetuated upon the American public. Congressman Joe Barton (Texas) has made remarks explaining that carbon dioxide is harmless because it is everywhere – “It’s in your Coca-Cola . . .” (Baram, 2009). Barrett (2009) states: “The worst outcome would be for the United States to ‘commit’ to meet quantitative targets and timetables of emission reduction without being sure that these obligations will be approved by Congress.” Time is short, and serious risks are associated with any delay. Regrettably, collaboration and improvising is not being followed. The global financial meltdown has diverted the attention of politicians and the general public from everything but the economy (Krugman, 2009).

The Two New Cultures

In 1959, the British scientist C. P. Snow gave the prestigious Rede Lecture with the thesis of a breakdown of communication between the “two cultures” of modern society – the sciences and the humanities – which was a major hindrance to solving the world’s problems (Wikipedia). This lecture was subsequently published in book form and widely discussed.

In the United States, two even more widely different perspectives have emerged – political and scientific “cultures.” At the start of the 2008 presidential election campaigns, a number of candidates were vying for nomination from the Republican and Democratic parties. Most Republican candidates (7 or 8) stated in public forums that they did not believe in evolution when they were specifically asked about it. Regrettably,

candidates of the Democratic Party were not asked publicly about their views on evolution. The hypothesis of evolutionary change is at least a century and one-half old and the preponderance of scientific evidence supports it. However, in the United States, this concept is still controversial.

Conclusions

Thus far, not much collaboration is evident in the global climate crisis. The interconnected global crises (i.e., climate change, overpopulation, ecological overshoot, peak oil, biotic impoverishment) can only be resolved by global collaboration. National sovereignty should not impede this essential collaboration since, without it, civilization and even the human species may become extinct. Rubin (2009) provides two insights on the failure to launch major collaborative efforts: “Suddenly the textbooks seem to be describing some other world than the one we live in. It is hard to say which possibility is more alarming to economists – that the world has reached its peak oil production plateau, or that the rules of their vocation don’t seem to be working any more.” The rules do not seem to be working any more for quite a few academic disciplines as well, but time is too short to reinvent them, so humankind must start from where it is and do the best it can. Doing nothing (i.e., “business as usual”) is a high risk choice, but remedial measures based on science should markedly reduce risks.

Empathy must be at the core of any collaborative effort involving a diverse assemblage of cultures and varying financial circumstances. Lakoff (2009) comments: “Empathy is at the heart of progressive thought. It is the capacity to put oneself in the shoes of others – not just individuals, but whole categories of people: one’s countrymen, those in other countries, other living beings, especially those who are in some way oppressed, threatened, or harmed. Empathy is the capacity to care, to feel what others feel, to understand what others are facing and what their lives are like. Empathy extends well beyond feeling to understanding, and it extends beyond individuals to groups, communities, peoples, even species. Empathy is at the heart of real rationality, because it goes to the heart of our values, which are the basis of our own sense of justice. . . . But the target is not empathy as it really exists. Instead, the conservatives are reframing empathy to make it attackable. Their ‘empathy’ is idiosyncratic, personal feeling for an individual, presumably the defendant in a legal case. . . . The argument goes like this: Empathy is a matter of personal feeling. Personal feeling should not

be the basis of a judicial decision of the Supreme Court. Therefore, ‘justice is not about empathy.’” Empathy is central to any attempt for global collaboration on the many urgent issues humankind faces in the 21st century. The more limited, idiosyncratic approach is inappropriate and unsuitable for a major, global, collaborative effort.

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