The Post Carbon Reader Series: Culture and Behavior

The Human Nature of Unsustainability

By William E. Rees, FRSC
About the Author

William Rees is a professor in the School of Community and Regional Planning at the University of British Columbia. He is best known as the co-originator of “ecological footprint analysis,” a quantitative tool that estimates humanity’s ecological impact in terms of appropriated ecosystem area. He is a founding Fellow of the One Earth Initiative and a founding member and past president of the Canadian Society for Ecological Economics. In 2006 he was elected to the Royal Society of Canada. Rees is a Fellow of Post Carbon Institute.
Why does our reasonably intelligent species seem unable to recognize the crisis for what it is and respond accordingly?

The (Un)sustainability Conundrum

In 1992 the Union of Concerned Scientists (UCS) issued the following gloomy assessment of the prospects for civilization:

We the undersigned, senior members of the world's scientific community, hereby warn all humanity of what lies ahead. A great change in our stewardship of the earth and the life on it is required if vast human misery is to be avoided and our global home on this planet is not to be irretrievably mutilated.¹

Thirteen years of continuing eco-degradation later, the Millennium Ecosystem Assessment, the most comprehensive assessment of the state of the ecosphere ever undertaken, was moved to echo the UCS sentiments:

At the heart of this assessment is a stark warning. Human activity is putting such a strain on the natural functions of the Earth that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted.²

Just what is going on here? The world’s top physicists, ecologists, and climatologists have warned the world repeatedly that current development strategies are undermining global life-support systems, that we have “overshot” long-term global carrying capacity, and that human-induced impacts on global systems threaten catastrophe for billions of people. Yet still the dismal data accumulate with the accelerating loss of ecosystem integrity around the world. Despite decades of rising rhetoric on the risks of global change, no national government, the United Nations, or any other official international organization has seriously begun to contemplate—let alone articulate publicly—the revolutionary policy responses evoked by the scientific evidence.

Humans may pride themselves as being the best evidence for intelligent life on Earth, but an alien observer would record that the (un)sustainability conundrum has the global community floundering in a swamp of cognitive dissonance and collective denial.³ Indeed, our alien friend might go so far as to ask why our reasonably intelligent species seems unable to recognize the crisis for what it is and respond accordingly.

To begin answering this question, we need to look beyond conventional explanations—scientific uncertainty, societal inertia, lack of political will, resistance by vested interests, and so on—to what may well be the root cause of the conundrum: human nature itself.

Unsustainable by Nature?

Let’s face it: Homo economicus is one hell of an over-achiever. He has invaded more than three-quarters of the globe’s surface and monopolized...
nearly half of all plant life to help make dinner. He has netted most of the ocean’s fish and will soon eat his way through the world’s last great apes. For good measure, he has fouled most of the world’s rivers. And his gluttonous appetites have started a wave of extinctions that could trigger the demise of 25 percent of the world’s creatures within 50 years. The more godlike he becomes the less godly *Homo economicus* behaves.

—Andrew Nikiforuk

The Russian-born geneticist Theodosius Dobzhansky famously asserted in 1964 that “nothing in biology makes sense except in the light of evolution.” *Homo sapiens* is a product of evolution—it follows that the human brain and gene-based elements of individual and social behavior have been as much exposed to Darwinian natural selection as any other genetically influenced human qualities. It is therefore not much of a leap to assert that *nothing in human affairs—including much of economic and sociopolitical behavior—makes sense except in the light of evolution*.

In short, part of the explanation for the global ecological crisis must reside in humanity’s genetic endowment.

What can our genes possibly have to do with whether we act sustainably or not? The connection is actually quite simple. There are certain behavioral adaptations that helped our distant ancestors survive—and thus those predilections were passed on to us. But those same (now ingrained) behaviors today are decidedly not helpful in solving our sustainability crisis—they have become maladaptive. Moreover, these natural predispositions are reinforced by modern humanity’s technological prowess and addiction to continuous material growth.

From a systems perspective, we might say that our current “unsustainability” is a product of the natural systems that led to the evolution of *Homo sapiens* together with the resource-intensive societal and economic systems *Homo sapiens* has gone on to create. Nature and nurture have combined to generate a perniciously intractable problem.

This perspective is not rooted in genetic determinism; it by no means denies that other factors contribute to humanity’s sustainability dilemma. But unless we factor in the bioevolutionary contribution, our understanding of the modern human predicament will remain unintelligibly incomplete and any “solutions” hopelessly ineffective.

**HUMANITY’S BEHAVIORAL “PRESETS”**

Humans share two behavioral traits with all other species that are critically important to (un)sustainability. Numerous experiments show that unless or until constrained by negative feedback (e.g., disease, starvation, self-pollution) the populations of all species:

- Expand to occupy all accessible habitats.
- Use all available resources.

Of course, different species use different reproductive strategies to achieve evolutionary success in different ecological settings. Humans, for example, are what biologists call “K-strategists,” a distinction we share with other mammals ranging from tapirs through elephants to blue whales. “K” stands for the long-term carrying capacity of an ecosystem; K-strategists are species that tend to have relatively stable populations approaching that carrying capacity. They are typically relatively large-bodied, long-lived, and late-maturing species that have evolved
to persist in relatively predictable habitats. They have low reproductive and dispersal rates but also extended parental care and thus high survival rates to maturity and reproduction. Their individual survival and overall evolutionary success depend on competitive superiority at high population densities when resources are scarce.

Given the intense competition for habitat and resources characteristic of K-selected species, natural selection would favor those individuals who are most adept at satisfying their short-term selfish needs, whether by strictly competitive or by cooperative means. Thus, a tendency for instant gratification may actually confer a selective advantage on its possessors compared to individuals with more conservative consumptive patterns. This suggests that humanity’s inclination to discount the future—as incorporated into all economic planning models—has actually evolved by natural selection.

How do the well-honed competitive skills of *Homo sapiens* play out in the modern world? C. W. Fowler and L. Hobbs show that in terms of energy use (and therefore carbon dioxide emissions), biomass consumption, and various other ecologically significant indicators, humans’ demands on their ecosystems dwarf those of similar species. They find, for example, that the human consumption of biomass is hundreds of times greater than biomass consumption by virtually all the other ecologically similar mammals tested. These and related data show that *Homo sapiens* has become, directly or indirectly, the dominant macro-consumer in all major terrestrial and accessible marine ecosystems on the planet. Indeed, our species may well be the most voraciously successful predatory and herbivorous vertebrate ever to walk the earth.

This very success is now the problem. Humans’ competitive drive as K-strategists is relentless; we have no built-in “off” switch tripped by sufficiency. On the contrary, we habituate to any level of consumption (once a given level is attained, satisfaction diminishes) so the tendency to accumulate ratchets up. This is particularly so if we perceive that another social group—or country—is “getting ahead” faster than we are. Even within wealthy societies, widening income gaps lead to personal frustration and declining population health, so efforts to “keep up with the Joneses” continue unabated. It complicates matters that humans’ technological capacity to exploit nature now exceeds nature’s reproductive capacity. As fish stocks decline, we both invent new fish-finding technologies to chase remaining schools farther and deeper and switch to alternative prey species lower in the food web.

To reiterate: Without powerful restraints, humans—like all other species—exploit all available resources; the difference is that, with people, what is “accessible” is defined by evolving technology.

**SOCIOCULTURAL REINFORCEMENT**

Of course, humans are also social animals, so the quest for sustainability depends also on sociocultural factors. We can even discuss cultural “evolution” in terms of Richard Dawkins’s concept of the meme. A “meme” is a unit of cultural information (e.g., social norms, shared beliefs, common technologies) that, like a gene, can be passed between generations and influences the cultural phenotype—the outward appearance or expression—of the society concerned.

Memes are the basis of cultural inheritance but actually have an advantage over genes in that they can spread horizontally among living individuals in the same generation or population. Thus, cultural evolution is potentially much faster than genetic evolution—witness humanity’s ever-accumulating technological tool kit.

What has all this to do with sustainability? The entire world today is in the thrall of a particularly powerful “meme complex” whose effect is to reinforce humanity’s K-selected expansionist tendencies. The global community shares a socially constructed vision of global development and poverty alleviation centered on unlimited economic expansion fueled by open markets and more liberalized trade. This growth-oriented mythic construct has shaped the lives of more people than any other cultural narrative in all of history.
The concept of perpetual growth has actually taken hold in a remarkably short period of time. Only about eight generations of people have experienced sufficient economic growth or related technological change in their lifetimes to notice it. As an influential memetic construct, the growth imperative is actually just two generations old. Only in the 1950s did economic growth emerge from nowhere to become the “supreme overriding objective of policy” in many countries around the world.17

The problem for sustainability is that the infinite-growth myth knows no ecological bounds. Mainstream academic models of the economy make no functional reference to the ecosystems that contain it.18 Thus we dismiss collateral damage to “the environment” as mere “negative externalities” that can be corrected by “getting the prices right” (e.g., through pollution charges or taxes). Resource shortages? No matter—we can relieve local shortages through trade, and should the problem be more widespread, we play the technology card—the expansionist myth asserts that human ingenuity will find a substitute for any depleting resource.19

Consumption varies with income. Thus, while the citizens of rich countries require per capita ecological footprints in the range of 4 to 10 global average hectares (10 to 25 acres) to support their lifestyles, the poor subsist on less than half a global average hectare (one acre).21 EFA thus graphically translates socioeconomic inequity into biophysical terms.

A unique strength of the eco-footprint as a sustainability indicator is that, unlike monetary measures (e.g., GDP per capita) that have no theoretical limits, eco-footprint estimates (demand) can be compared to available supply. For example, EFA shows that densely populated rich countries such as the United Kingdom, the Netherlands, Germany, and Japan have eco-footprints several times larger than their domestic biocapacities.22 All such countries are running large ecological deficits with the rest of the world.

More critically, the average world citizen has an eco-footprint of about 2.7 global average hectares while there are only 2.1 global average hectares of bioproduc-tive land and water per capita on Earth.23 This means that humanity has already overshot global biocapacity by 30 percent and now lives unsustainably by depleting...
stocks of “natural capital” (e.g., fish, forests, and soil) and eroding critical life-support functions. EFA also shows that the world’s present growth-based approach to global “development” is fatally futile. For example, to extend North Americans’ present consumer lifestyles (with an eco-footprint of 9.2 global average hectares) to the entire human family would require the equivalent of three or four additional Earth-like planets (and we have yet to account for the additional 2.5 billion people expected by midcentury).

Humanity’s “Triune Brain”: Reason, Emotion, and Instinct

The fact that human behavior is influenced by subconscious predispositions does not explain why the defining intelligence of Homo sapiens plays so small a role in our collective response to the (un)sustainability conundrum. Part of the reason is the incomplete evolution of human consciousness—Homo sapiens is very much a work in progress.

Consider an evolutionary vector that begins with totally subconscious, autonomic, or instinctive behavior and leads ultimately to actions based entirely on conscious intelligence, logical analysis, and free will. Humans like to think that we have arrived at the free-will end of this spectrum, but much of modern cognitive science suggests that this is largely illusion. Psychologist Robert Povine argues from the available evidence that the starting assumption in behavioral psychology should be “that consciousness doesn’t play a role in human behaviour. This is the conservative position that makes the fewest assumptions.”24 The material basis for the gradient of consciousness is that most complex of evolved organs, the human brain. Neurologist Paul MacLean argued that the human brain has actually evolved in at least three broadly overlapping phases, each with its own anatomical subcomponent having distinct functions, memory, and “intelligence.” MacLean referred to the three quasi-independent structures of the human brain as the reptilian or R-complex (the brainstem and cerebellum), the limbic or palomammalian system, and the neocortex or neomammalian brain.25 These three sub-brains are concerned with instincts for basic survival, emotions/value judgments, and conscious reasoning, respectively. While MacLean’s compartmentalization of the brain may be somewhat simplistic, neurological research generally supports the behavioral implications of the theory.

Whatever the evolutionary details, the nominal sub-brains are intricately interconnected as an integrated whole. The emergent behavior and overall personality of the individual are therefore the blended product of reason, emotion, and instinct. Critically, however, there will be circumstances in which one of the sub-brains, with its distinct capacities and limitations, assumes dominance—and the individual may not be fully aware of what part of the brain is in control.

This last point is particularly important in the context of (un)sustainability. Humans “live” in consciousness as conferred by the human neocortex and therefore overestimate the role of mindful intelligence even as our actions are being controlled by the lower brain centers. In fact, much of expressed human behavior is shaped by emotions and subconscious mental processes including the innate propensities that qualify Homo sapiens as a dogged K-strategist. The problem for sustainability is that “biological drives... can be pernicious to rational
decision-making in certain circumstances by creating an overriding bias against objective facts.”26 Everyone is aware from personal experience that passion will trump reason in shaping one’s responses to emotionally charged or life-threatening encounters. The roles of reason and logic may actually be quite limited and their effect may be relatively trivial in the grand evolutionary context.

The key point for sustainability is that humanity is a conflicted species. We are torn on the one hand between what reason and moral judgment say we should do, and on the other hand by what pure emotion and baser instincts command us to do, particularly in stressful circumstances. We therefore cannot assume that global society will necessarily deal rationally with the data documenting accelerating global ecological change.

Can Humanity Become Sustainable?

[For humanity to survive the sustainability crisis] we must rely on highly-evolved genetically-based biological mechanisms, as well as on supra-instinctual survival strategies that have developed in society, are transmitted by culture, and require for their application consciousness, reasoned deliberation and willpower.

—Antonio Damasio27

Homo sapiens is the highly successful product of millions of years of K-selection, but something has gone awry. Certain innate behavioral traits that assured the competitive supremacy, growth, and long-term survival of primitive peoples—for example, the tendencies to act on short-term individual (and tribal) self-interest, to discount the future, and to abide by unifying myths—have become maladaptive in the much changed circumstances on a finite planet created by the expanding human enterprise itself. If the world community fails to adapt to these “much changed circumstances” we may be forced to confront the harsh Darwinian reality that both bad genes and inappropriate memes may be selected out by an ecosphere in convulsion.

Scientific studies suggest that the only certain way to avoid “irretrievably mutilating” our planetary home may well be through global economic contraction combined with a world program for income/wealth redistribution. Fortunately, with the right policies and incentives, wealthy countries could make the necessary deep cuts in material and energy use in ways that would actually enhance their citizens’ quality of life.28 Even the material transition need not be painful—the technology exists today to enable a 75 percent reduction in energy and (some) material consumption without substantially affecting material standards of living.29

At this crucial juncture in human evolutionary history, long-term selective advantage may well have shifted from competitive to cooperative genetic predispositions. The question is whether the world community can muster the national and international political will to create the complementary memetic mutations necessary for collective survival in a resource-stressed world.

Improving the prospects for human civilization requires that we organize—globally and consciously—to override those behavioral propensities that have become maladaptive in the modern world. To reduce the human eco-footprint, the fetishistic emphasis in free-market capitalist societies on individualism, competition, greed, and accumulation must be replaced by a reinforced sense of community, generosity, and a sense of sufficiency. All these qualities are part of the human behavioral spectrum—the former reinforce the dumb instincts of primitive K-strategists but the latter must prevail in the interest of collective survival in a crowded world bristling with nuclear weaponry.30

It would be naive to think that the creation of a radically new cultural narrative would not be met by strenuous resistance. “Contraction” is not a narrative that resonates with the times. On the contrary, most people are psychologically committed to continuous economic
Cognitive scientists have determined that cultural norms, beliefs, and values are effectively imprinted on the human brain.

growth, ever-increasing material prosperity, and the myth of progress.

Just how deeply committed we may become has only recently been revealed. Cognitive scientists have determined that cultural norms, beliefs, and values are effectively imprinted on the human brain. In the normal course of a person’s development and maturation, repeated social, cultural, and sensory experiences actually help to shape the individual’s synaptic circuitry in a neural “image” of those experiences. Once entrenched, these neural structures alter the individual’s perception of subsequent experiences and information. People seek out experiences that reinforce their preset neural circuitry and select information from their environment that matches these structures. Conversely, “when faced with information that does not agree with their internal structures, they deny, discredit, reinterpret or forget that information.”

The lesson here is that any attempt to create a cultural transformation must confront the fact that humans are naturally behaviorally conservative. We are indeed creatures of habit. To reestablish cognitive consonance between ingrained perceptions and new environmental realities requires that affected parties engage in the willful restructuring of their belief systems and associated neural pathways. These efforts require conscious effort and will not always be successful: “There are indeed potions in our own bodies and brains capable of forcing on us behaviours that we may or may not be able to suppress by strong resolution.” Even when people accept that such a change in their beliefs and their thinking is necessary, the process can be lengthy, difficult, and unpredictable.

It boils down to this: Modern society has been paralyzed by cognitive dissonance, collective denial, and political inertia in dealing with the sustainability conundrum. However, assuming international agreement on the nature of the problem, a global solution is at least theoretically possible. All the world community needs is commitment to a collective solution, unprecedented political will, and the creative engagement of modern communication technologies! These are the minimal cultural tools needed to socially reengineer ourselves, and to educate the next generation from scratch, in a whole new sociocultural paradigm for survival.
Endnotes


7 The argument may be stated from a system-dynamics perspective in this way: “Unsustainability is an inevitable ‘emergent property’ of the systemic interaction between contemporary techno-industrial society and the ecosphere. Contributing factors include both genetically-programmed behavioral strategies that heretofore assured human survival and contemporary socio-economic norms that reinforce these now-negative attributes” (Rees, “Are Humans Unsustainable by Nature?”).


9 Within-group (e.g., family, tribe, or nation) cooperative behavior increases between-group competitive success.


11 Rees, “Are Humans Unsustainable by Nature?” This is no small irony. Many economists and other technological optimists argue falsely from monetary analyses that the ecological crisis may ease because the human enterprise is “dematerializing” and “decoupling” from nature.


13 People not only deplete real resources, but also create virtual resources—bank loans and credit cards, for example—and use these to capacity as well.


16 There is actually a second layer of nature-nurture interaction in play here. Humans are natural storytellers, genetically predisposed to myth making. The social construction of (perceived) reality, including disciplinary paradigms, political ideologies, and cultural myths, is a universal property of human societies (C. Grant, Myths We Live By [Ottawa: University of Ottawa Press, 1998]). The key point is that while the tendency to mythologize is yet another vessel cast from our genes, what we put into it is determined by sociocultural context.


21 To facilitate comparisons among regions with different eco-productivities, ecological footprints are converted to “standardized” hectares of world average productivity known as global average hectares (gha).


23 Ibid.


27 Ibid., 123.


30 There is a counterargument for all-out conflict. Some people will survive any human-induced apocalypse, most likely the richest and most militarily powerful. In these circumstances, the ancient intelligence of the reptilian complex and limbic system wins out once again (but it wouldn’t be a pretty sight).


32 Damasio, *Descartes’ Error*, 121.

33 Wexler, *Brain and Culture*.

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The Post Carbon Reader
Managing the 21st Century’s Sustainability Crises
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In the 20th century, cheap and abundant energy brought previously unimaginable advances in health, wealth, and technology, and fed an explosion in population and consumption. But this growth came at an incredible cost. Climate change, peak oil, freshwater depletion, species extinction, and a host of economic and social problems now challenge us as never before. The Post Carbon Reader features articles by some of the world’s most provocative thinkers on the key drivers shaping this new century, from renewable energy and urban agriculture to social justice and systems resilience. This unprecedented collection takes a hard-nosed look at the interconnected threats of our global sustainability quandary—as well as the most promising responses. The Post Carbon Reader is a valuable resource for policymakers, college classrooms, and concerned citizens.

Richard Heinberg is Senior Fellow in Residence at Post Carbon Institute and the author of nine books, including The Party’s Over and Peak Everything. Daniel Lerch is the author of Post Carbon Cities.

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