CONVERSATIONS ABOUT SUSTAINABLE USE OF THE PLANET

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Achieving sustainable use of the planet will require reaching a consensus on a number of important issues at the local, regional, national, and global levels. Much can be accomplished via the internet, professional journals, and environmentally literate news media. However, some of the most complex issues will be most effectively addressed in conversations where individuals can get immediate answers to their specific doubts and concerns. This approach will require substantial amounts of time from both professionals in the field of sustainability and those who wish to leave a habitable planet for posterity, including their descendants. An effective means of accomplishing consensus on environmental issues is ecological footprint analysis at individual, group, and national levels. Some internet sites for footprint analyses are included, as well as other illustrative approaches to accomplish this goal.

We aren't passengers on Spaceship Earth; we're the crew. We aren't residents of the planet; we're citizens. The difference in both cases is responsibility.
                                                        Astronaut Rusty Scheveikart

In 1948, my mentor Ruth Patrick used the phrase *use without abuse* to describe the aspiration now called "sustainable use of the planet." At first, I was enthusiastic about the term *sustainable development* to describe this goal because I viewed the word *development* to mean "bring to maturity" (as *Webster's Dictionary* defines it). At present, the word *development* means, to most people, either an increased number of human artifacts (e.g., highways, housing developments, shopping malls) or economic development, even if increases do exceed the capacity of Earth to renew the natural resources being used. In short, *unsustainable use*.

The major obstacle to sustainability is the highly variable time span that people view as appropriate for sustainability. Our daughter, Dr. Karen Cairns, has heard the time span defined as adequate for two generations of humans. Some cultures (e.g., Native Americans) have used a time span of seven generations. The life expectancy of Earth is estimated at 15 billion years beyond the 4.5 billion years that have already elapsed. *Homo sapiens* has been on the planet a mere 160,000 years. People have more difficulty visualizing an issue that is far removed in time and/or space. For example, most investors have difficulty caring about the outcome of an investment in stock beyond even the next quarter or next week (e.g., day traders), even when their own money is involved (Hulbert 2005). A global systems-level understanding would facilitate starting on the path toward sustainability.

The following observations are the result of conversations I have had with a wide range of people around the world from 1948 to 2005.

(1) Since 1948, I have preferred the phrase *use without abuse* to describe the ideal relationship of humankind and natural systems. If this concept were followed with dedication, the result would be sustainable use of the planet without complicated time and spatial dimensions. The idea of natural systems elicits positive images of trees, streams, lakes, and scenic areas. Associating non-destructive

uses with natural systems illustrates the benefits each person receives from them—benefits that should be available to future generations.

(2) Ecosystem services are the benefits each person receives from natural systems (e.g., maintenance of breathable air, desirable water quality, and aesthetic experiences), even if the systems are not "developed." Ecosystem services are difficult to explain because most people, even many professionals, are accustomed to thinking of nature as a collection of individual species rather than a functioning system. Since my town of Blacksburg is in a fairly heavily wooded area, I often use the example of tree leaves that have fallen to the ground in autumn. What would happen, I ask, if the leaves continued to pile around the house year after year? Eventually the house would be buried in leaves. However, this situation does not occur because natural systems break the leaves down and recycle them. Different examples could be used to illustrate the value of ecosystem services to the people of different regions. Until recently, ecosystem services, which collectively constitute Earth's biospheric life support system, were taken for granted—the services have always been there and they have been free. At present, however, they are seriously degraded and are no longer as self-maintaining as they once were. People have difficulty connecting personal benefits to such terms as *empty land*, *unused land*, and *open space*, which are used by housing and other developers to describe sites they have selected for a shopping mall or a housing construction site. When the ecosystem services these areas provide are described, people then understand their value, which often exceeds that produced by consuming the areas for economic use. Phrases and terms should be used that indicate the direct benefits of the areas to people. For example, if hiking trails exist in the area, or if it is suitable for establishing them, especially trails suitable for children, the value of the area as a natural system increases. These trails can also serve educational activities if the trees, wildflowers, and such are identified.

(3) I have found that restoring local, damaged ecosystems brings a strong positive response from local citizens. Many may have served in the restoration process in some way (National Research Council 1992). Once people see first hand the work involved in restoring a damaged ecosystem, they are more apt to favor preserving undamaged ecosystems.

(4) Selecting correct terminology is essential (as discussed previously), but overcoming global gibberish about global warming is crucial (Hyde 2005). Global warming is referred to as *climate change,* which is perceived as less threatening by some special interest groups. Not only does this terminology confuse people, but it is highly politicized. While industrial groups, politicians, scientists, and activists argue, ordinary people are just perplexed. Global warming has catastrophic consequences, such as melting glaciers, rising seas (making small islands uninhabitable), and reducing the sea ice protective coastal barrier in Alaska (forcing many villagers to move inland). On the other hand, climate change is often what vacationers seek when the northern winters are severe. Consequently, the phrase *climate change* has a positive connotation for residents of colder regions. For example, Svante Arrhenius, a Swedish scientist who theorized in the 1890s that the Industrial Revolution would cause warming, welcomed a warming climate change as a respite from frigid Swedish winters. Now that humankind is becoming more aware of the side effects of any climate change, especially global warming, the side effects are no longer welcomed by many people.

(5) For me, the most effective conversations have involved measurements of ecological footprint size in two types of situations: (1) small groups (30 or less) with at least one computer available and (2) "conversations" via the internet to a group that works together for an extended period of time. Beginning at the individual level is best since footprints at all levels of organization are strongly influenced by aggregate individual footprints. In the United States, a common response from an individual upon learning his/her footprint size is disbelief and shock. Most people simply do not believe they are excessive consumers of natural capital. Comparison of the footprints of nations is a good strategy in this situation. The sequence I prefer is individual footprint (e.g., http://www.myfootprint.org) first. Then the ecological footprints of nations: (1) how much nature do they use? and (2) how much nature do they have? (e.g., http://ecouncil.ac.cr/rio/focus/reprot/english/footprint). An interesting component at the site just referenced is the ranking of nations, including ecological deficit. Not surprisingly, some nations with large ecological footprints also have sizable ecological deficits. Finally, I believe that universities and colleges, as well as high schools, should emphasize their footprint size as an educational exercise. The University of Vermont has a useful site for this (http://www.uvm.edu/greening).

My footprint has changed dramatically over the years. From the time my wife and I met in 1941, our recreation centered on hiking and other outdoor events, which then required little fossil fuel since we did not, in those days, need to drive because some good hiking trails were available from our residences. During World War II, personal travel was restricted and, while I was getting my degrees afterwards, we simply had little time for personal travel. When our family started going to field stations in 1961, the trip there and back was long; however, once there, hiking was available from our cabin. In 1995, when health prevented our return to field stations, we traveled very little, but did hike in the woods behind our house. During much of my career, the major part of my footprint came from extensive trips to give seminars, talks, and papers about the environment. What an irony! I was stressing the environment to talk about it!

Another influence on my footprint occurred when my wife was admitted to a nursing home in 2001 with Alzheimer's (and, later, Parkinson's). From then on, she had neither control over her footprint size nor any understanding of its significance. Although we had been vegetarians for most of our lives, she had no control over the food she ate. I lost significant personal control of my footprint size when I moved into an assisted living residence. This loss of personal control happens at all stages in life. For example, urban sprawl increases per capita energy use, which, in turn, increases footprint size. As a consequence, the footprint size of organizations must be of great concern.

Conversations about sustainable use of the planet will be markedly improved if environmental literacy is improved, especially in political leaders, corporate executives, and other decision makers, who are the "officers" of Spaceship Earth (for which there is, at present, no operating manual). However, numerous improvements, such as reducing anthropogenic greenhouse gases, would vastly improve the prospects for sustainable use of the planet.

(6) Biological evolution will eventually adjust ecosystems to changed climatic conditions, but not necessarily in a manner suitable to humankind. Theoretically, social evolution could produce changes in human behavior that would diminish greenhouse gases and prolong the climatic conditions so favorable to humankind. Ehrlich (2000) provides detailed justification for confidence in the process of social evolution, although he is well aware of the obstacles that must be overcome. Ehrlich believes that the assumption of a single, enduring human nature, which consists of a belief that people possess a common set of rigid, genetically specified behavioral predilections unlikely to be altered by circumstances (e.g., human nature cannot be changed), is inadequate. He uses the term *human natures* (plural) to indicate that humankind possesses diverse and *evolving* (italics mine) behaviors, beliefs, and attitudes, which are the basis of unique, human, mental functioning. Kahneman (1980) summarizes the situation by asserting that humankind's increase in power over its environment lacks a concomitant improvement in its ability to make rational use of that power. That is, if the present rate of technological advances were eliminated, a deficit would still exist in humankind's ability to develop a harmonious relationship with the environment because a significant gap would remain. One solution appears evident—a co-evolution of the increase in humankind's power over natural systems and improvement in humankind's ability to cope with this new set of circumstances. Almost certainly, the survival of society as presently known, even the survival of *Homo sapiens*, depends on the rapid development of this ability to co-evolve.

Consequently, the communication problem is twofold: (1) communication must be markedly improved about the need to make rational use of the power that humankind has over nature since this power is destroying the biospheric life support system upon which human well being and survival depends and (2) at the same time, communication must be vastly improved between cultures, professions, religious groups, and other special interest groups.

Some people will view this communication problem as an impossible challenge. However, since the consequences of humankind's failure to live sustainably are so appalling, the motivation to face the challenge should be compelling.

LITERATURE CITED

Ehrlich, P. R. 2000. *Human Natures: Genes, Cultures, and the Human Prospect.* Island Press, Washington, DC.

Hulbert, M. 2005. Looking long term? Get your glasses. *The New York Times*, Business 19June
http://www.nytimes.com/2005/06/19/business/yourmoney/19stra.html/?th=term=th+pagewanted=print.

Hyde, D. 2005. Terms of enfearment: Getting to the bottom of the climate-change lingo. *Grist Magazine*
22June http://www.grist.org/cig-bin/printthis.

Kahneman, D. 1980. Human engineering of decisions. Pages 190-192 in *Ethics in an Age of Pervasive
Technology,* M. Kraunberg (ed.). Westview Books, Boulder, CO.

National Research Council. 1992. *Restoration of Aquatic Ecosystems: Science, Technology, and Public
Policy.* National Academy Press, Washington, DC.