

Insurmountable Opportunities?

Steps and Barriers to Implementing Sustainable Development

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Insurmountable Opportunities?¹ The World Since Rio

The world has experienced significant developments since its leaders last gathered for an Earth Summit. As will be described below, there has been an astounding amount of progress towards the goals set forth in Agenda 21,² and yet in many ways the situation has become worse rather than better. More than ever there remains an urgent need for both comprehension and action. To catalogue the challenges facing the earth and all living things, and the resultant movement towards sustainability would take fleets of researchers and volumes of reports. This paper draws from that vast and growing field a few examples of the more significant trends.

The Biggest Challenge: Loss of Ecosystem Services

Perhaps foremost, there is no longer any serious scientific disagreement that every known ecosystem on the planet is in trouble. According to *A Guide to World Resources, People and Ecosystems, the Fraying Web of Life*, a pioneering analysis of the world's ecosystems prepared by the UN Development Programme, the UN Environment Programme, the World Bank, and the World Resources Institute, "There are considerable signs that the capacity of ecosystems, the biological engines of the planet to produce many of the goods and services we depend on, is rapidly declining."³ According to the report, half the world's wetlands have been lost in the last century, half of the world's forests have been chopped down, 70 percent of the world's major marine fisheries have been depleted, and all of the world's coral reefs are at risk.

The fabric of life is fraying at an ever-faster rate. Sometimes this occurs through vandalism (the loss of tropical rainforests, boreal forests, fisheries, and coral reefs), sometimes inadvertent systemic change (changes in high Arctic), and most often gradual erosion of fertility from many causes (as is now degrading most of the world's farmlands, temperate forests, wetlands, and estuaries). Taken together, biologists concur, this is leading to the greatest mass extinction since the end of the dinosaurs.⁴ This loss of biodiversity and ecosystem integrity will probably cause severe breakdowns that gradually, cumulatively, interactively and increasingly threaten human survival, first locally and then more widely. These breakdowns will not be only ecological. The resulting losses of soil fertility, forest cover and fuelwood, medicinals, and water resources will lead to rural depopulation, joblessness, urbanization, hunger, disease, and hopelessness. They will contribute to political breakdown, as in Haiti and Somalia. Thugs, despots, corruption, and angry young men with AK-47s seldom ruin a country that's not already under severe ecological stress, usually rooted in dis-integrated policy uninformed by biology. Conversely, development basics (as implemented in Kerala, Curitiba, and Costa Rica), built on a sound understanding of how to protect and restore ecological integrity, are prerequisite to a stable polity and social progress.

Beyond the Limits, by the late Dana Meadows, provided scenarios of what could happen if these trends are not reversed. She described the world's present situation as one of "overshoot," in which a society draws upon earth's resources faster than they can be restored, and releasing wastes and pollutants faster than the earth can absorb them or render them harmless. Overshoot is characterized by falling stocks of groundwater, forests, fish, soils, and rising accumulations of wastes and pollutants. More capital, energy, materials and labor is needed to exploit more distant, deeper or more dilute resources, and to compensate for the loss of what were once free ecosystem services. There is deterioration in physical capital and reduced investment in human resources in order to meet consumption needs or pay debts. And there are increasing conflicts over resources or pollution emission rights, more hoarding, and greater gaps between haves and have-nots. It results from growing so quickly that limits are exceeded. If the conditions that are causing the overshoot are not corrected, it will lead to collapse. It is not an appealing future.

Meadows also provides a scenario of how the world can choose a much more desirable outcome, by understanding the challenge and acting to deal with it. "However, collapse is not the only possible outcome. That need not mean reducing population or capital or living standards, though it certainly means reducing their growth. What must go down and quickly, are throughputs—flows of material and energy from the supporting environment, through the economy and back to the environment.

"Fortunately, in a perverse way, the current global economy is so wasteful, inefficient and inequitable that it has tremendous potential for reducing throughputs while raising the quality of life for everyone. While that is happening, other measures—non-technical measures—can restructure the social system, so that overshoot never happens again."⁵

There is a growing realization that the environmental problem is not so much a polluted river here or a release of a particular toxin, but the worldwide loss of ecosystem services, the natural capital that enables the planet to sustain life.⁶ The processes that cycle nutrients and water, regulate the atmosphere and climate, provide pollination and biodiversity, rebuild topsoil and biological productivity, control pests and diseases, and assimilate and detoxify society's wastes are supplied by such ecosystems as estuaries, coral reefs, forests, grasslands, oceans, etc. The free and automatic services from these ecosystems provide tens of trillions of dollars of worth each year – more than the global economy.⁷ Indeed, their value is nearly infinite since without them there is no life and therefore no economic activity. But their value is nowhere reflected on anyone's balance sheets. Their loss is dooming many species, but is ignored in the reports from Wall Street.

Sometimes the cost of destroying these services becomes apparent only when the services start to break down. In China's Yangtze basin in 1998, for example, upstream deforestation triggered flooding that killed 3,700 people, dislocated 223 million and inundated 60 million acres of cropland. That \$30 billion disaster forced a logging moratorium and a \$12 billion crash program of reforestation. Worldwide, the economic losses due to extreme weather have been rising since the 1950s, when there were 20 "great catastrophes" and steeply since the 1970s, when there were 47 disasters, to now \$608 billion in 1990s, which suffered 87 weather related disasters.⁸

Deficient logic of this sort can't be corrected simply by monetizing natural capital. Many key ecosystem services have no known substitutes at any price. The \$200-million Biosphere II project, despite a great deal of impressive science, was unable to provide breathable air for eight people. Biosphere I, our planet, performs this task daily at no charge for six billion of us. We simply do not know enough or have the means to replicate ecosystems and the services they supply.

Such challenges are worsened by inequality. Globally, a huge gap remains between rich and poor. Only a fifth of the population enjoys the benefit of life in the 'developed world', and the gap between the haves and have-nots continues to increase, threatening stability. According to the World Bank, of the six billion people on Earth, 4.8 billion live in developing countries, three billion live on less than US\$2 a day, and 1.2 billion live on less than \$1 a day, which defines the absolute poverty standard. Access to clean water is denied to 1.5 billion people. And the disparities are worsening. Assets held by the world's 200 wealthiest individuals total \$1 trillion, for an average \$5 billion each. After doubling since 1995, the total wealth of the 200 richest people now equals the combined annual income of the world's 2.5 billion poorest people. Meanwhile, 80 nations report incomes lower than those of a decade ago. Sixty countries have grown steadily poorer since 1980.⁹ In contrast, per capita consumption of energy and resources in the US has risen to 50 times greater than that of two billion of the world's poor and undernourished. And much of that consumption is wasted. Of all the materials mobilized by the global economy, over 50 billion tons each year, less than one percent is ever embodied in a product and is still there six months after sale. Clearly the twin evils of waste and over-consumption threaten the future of humankind. With North America and Europe the leading consumers of the world's resources and the primary purveyors of unsustainability, that is where the greatest need for solutions resides.

The Next Industrial Revolution

At the same time that this is true, we stand on the threshold of changes almost unimaginable to us, an historic shift between all that has happened since the first industrial revolution and the Next Industrial

Revolution. Why now? Perhaps because of the gravity of the situation. Abba Eban once said, “People and nations behave wisely once they have exhausted all other alternatives.” But there are also fundamental economic shifts underway. The first industrial revolution grew out of conditions in which the scarcity of skilled labor was limiting material progress.¹⁰ All of our institutions today, from tax codes to mental models, derive from an attempt to penalize the use of people and encourage and even subsidize the use of natural resources to increase labor productivity. Business people responded to the incentives in front of them and helped to create the present economic and environmental conditions.

Now, when 10,000 more people arrive on earth every hour, what is scarce is not people. Today more people are chasing after fewer jobs and natural resources. The limits to economic growth are coming to be set by scarcities of natural capital and not by the scarcity of human labor that marked the first industrial revolution. This shift in relative scarcities is beginning to move the market. Now, profit-maximizing capitalists will seek not just greater labor productivity, but total factor productivity, using all resources as efficiently as possible.

Books such as Paul Hawken's *Ecology of Commerce* 11 pointed out that business is the cause of most of the environmental challenges, and is the only institution left on the planet large enough, well managed enough and resourceful enough to solve the problems facing us. This was followed by such books as *Factor Four* (Lovins, Lovins and von Weiszacker), and *Natural Capitalism* (Hawken, Lovins and Lovins) that demonstrate that increasingly the basis for competitive advantage will be dramatic increases in resource productivity, which by themselves have the potential to solve most of the environmental challenges that the world's nations must address. They also show how such principles as those introduced in *Biomimicry* by Janine Benyus 12 of doing business in the way that nature does, with no persistent toxins and with cycles of nutrients, can increase profits and decrease environmental harm. They present a compelling argument that the successful businesses of the future will behave in ways that are restorative, because conducting business in ways that do not liquidate the world's natural capital is increasingly profitable. Professor Michael Russo's 1997 article 13 , in which he showed that companies that adopt higher environmental standards than those required by government regulation post higher profits, supports this.

Ray Anderson's landmark book, *Mid-Course Correction*,¹¹ described how to put such concepts into practice within an industrial company that employs over 8,000 on four continents. *Interface*, Anderson's

company, now makes 27 percent of its operating profits from eliminating waste and has made a fundamental commitment to sustainability.

Behavior of this sort is clearly gaining momentum in North America and Europe. It is also eliciting great interest in such countries as China, Russia and any country seeking to establish sustainable capitalism/ Natural Capitalism. Disillusioned with industrial capitalism that doesn't work very well and that damages greater community goals (causing increasing disparity of income, environmental damage, etc.), many are looking for a system that brings the dynamism and freedom of capitalism without the drawbacks of the Western model. The first print-run of *Natural Capitalism* released in Shanghai in summer 2000 sold out in two days, and is being considered by the leading party ideologists as a basis for China's future.

The forthcoming book *The Human Dimensions of Natural Capitalism* (Lovins, Link and Lovins) will carry this logic further, demonstrating how the ultimate interests of businesses, of social and environmental activists and of ordinary people are converging. It will describe what individuals, companies and governments can do to implement Natural Capitalism as a systematic way to reorient society towards sustainability.

Such approaches shift the debate from the erroneous assertion that you can have either a clean environment or a healthy economy, but not both. It avoids the false tradeoff between increasing human welfare and protecting the natural systems that underpin all life. It is an approach to sustainable development that appeals to the world's business leaders, as it is based on market mechanisms. But it also posits an important role for governments in setting collective goals, and then clearing the myriad institutional barriers that hinder this transition, including subsidies and tax structures. It offers a future in which most governance can be relocalized, enabling communities and companies to implement the concepts of sustainability while the macro problems of the world are tackled by coalitions of multilateral organizations, governments, companies and NGO's. It is a future that is slowly implementing itself because it makes environmental, human and economic sense. Were the challenges not so pressing this gradually shifting economic and societal trend would tend, over time, to solve the problems. But because of the gravity of the loss of ecosystem services, it is an approach that needs immediate attention and deserves the full support of the world's nations.

Sustainability in a Globalizing World

It is interesting that such shifts occur at a time when the sovereignty of the world's nations is under attack by the pace of globalization. Of the hundred largest economic entities now in the world, well over half are

no longer countries, but companies. The shift in economic and political power away from nation states to corporations is profound. In the eyes of some members of civil society this would seem to condemn the world to the sort of future portrayed in some of the darker science fiction of William Gibson, with a benighted underclass battling rapacious corporate behemoths who rule the world. The truth is much more complex. Such stereotypes tend to divide the world into adversarial camps, rather than bringing it closer in a cooperative movement towards solutions. Not only is there the trend of leading companies large and small choosing to make a fundamental commitment to sustainability, but companies are becoming increasingly vulnerable. In an Internet world, a small group can destroy the entire brand equity of a major corporation and force it to fundamentally reorient its policies.

The Monsanto Corporation staked its corporate future on the success of genetically modified organisms (GMOs). Its GMO corn and soybeans are ingredients in a vast array of consumer products even today. It regarded this effort to increase agricultural output as good for business and consistent with its policy of environmental sustainability. Monsanto thought it was doing the right thing.

However a handful of consumers, especially in Europe, organized on the Internet to oppose GMOs. Many were mothers concerned about baby food. They communicated this concern to Gerber and Heinz, leading baby food producers, who, rather than risk a consumer boycott removed GMOs from their products.

The Internet campaign demanded that major grocery chains in Great Britain label GMOs. Following the refusal of suppliers to relabel, the grocers' required their suppliers to eliminate GMOs. Soon, non-GMO products were trading at a premium, while GMO-content foods were trading at a discount. Within a year, the Deutsche Bank, in an influential report titled "GMOs Are Dead," advised its investors to sell any stock they owned in companies promoting agricultural genetic engineering. The technology that was supposed to underpin U.S. agriculture actually cost it \$1 billion in lost exports in 1999, exacerbating a farm crisis that led to a \$7 billion congressional bailout.

In December 1999, *The Wall Street Journal* reported that Monsanto's share price had plummeted, forcing it into a shotgun merger with Pharmacia and Upjohn. The merger valued Monsanto's biotech division at zero. The CEO announced his retirement. European giants Novartis and AstraZenica likewise combined their biotech divisions into a single unit to be sold, "effectively washing their hands of crop biotechnology", according to *The Wall Street Journal*.¹² In sum, Monsanto's commitment to biotechnology led to one of the greatest dissolutions of corporate value in industrial history.

In contrast, Shell and other major corporations also learned the power of civil society and consumers the hard way, but they then used this experience as input to initiate fundamental changes. They recognized that the increase in access to information, communications and the ability to organize is enabling parts of Civil Society to gain much greater influence. This raises the question of whether at World Summits, is it sufficient any longer to seat only representatives of governments. Given today's situation, what is an appropriate form of global governance that reflects the effective power structures in the world? Civil society, like the corporate sector, has become a core power player that can no longer be ignored in world governance.

Whatever forms of governance evolve, they must integrate at their core a social and environmental agenda if humanity is to advance towards sustainability. One of the latest forms of governance that has been developed is the WTO. Civil society and unions from around the world are bitterly criticizing it for its failure to put social and environmental considerations on a par with trade concerns. Increasingly, local and national governments and their sovereign (the people) are also criticizing the WTO for eroding their sovereignty as local and national laws and regulations are overruled by the WTO's authority to impose its agenda of free trade.

In a world in which, increasingly, no one is in charge, there is an urgent need, as the Canadian Minister of International Trade Pierre Pettigrew calls for in his book, *A New Politics of Confidence*,¹³ for reinventing governance. The alienation and anger that motivated green voters who by voting for Ralph Nader and cost Al Gore the U.S. Presidential election are the same emotions that spilled into the streets in protests from Seattle to Davos and Los Angeles to Prague. But that anger is not only a reaction against big companies. More than that is going on, and it offers both threat and opportunity.

First, the information tools of globalization—the Net, mobile phones, pagers, faxes—that enabled the Seattle demonstrators to out-organize the police are also linking and empowering agile, capable networks of far-flung citizens who are rapidly forming communities of interest. A mining company that misbehaves in Irian Jaya will face awkward questions when it comes to Patagonia or the Yukon. A logging company that unsustainably cuts Congolese forests may find its capital choked off in New York. As a Shell official chastened by the Nigerian and Brent Spar disasters privately said, “We’re not so worried about regulation, because through the WTO we can get round anything we don’t like. But we’re absolutely terrified of the

way these citizen networks can instantly delegitimize our company and destroy our franchise. It's terribly difficult to get all our people worldwide to appreciate the risks of this new accountability.”

The WTO regime itself is in danger of delegitimization. It fails to command consensus in civil society. In part this is because it lacks basic democratic values and mechanisms (transparency, accountability, due process, equal protection, fairness, and incorporation of important non-trade values enshrined in national laws and international agreements). More fundamentally, the WTO regime omits from the trade equation the two most important and indispensable forms of capital, those which are vital to life and well-being. Physical and financial capital are readily portable, and under certain circumstances, trade in them can make some people better off and nobody worse off.¹⁴ However, the theory of free trade *ignores that you cannot trade ecosystem services or community*. Unlike physical and financial capital, natural and human capital are inherently rooted in a place—a biome or a community, respectively—and hence may be harmed by the physical mobility of trade in the other forms of capital.

If durable and equitable wealth is to be created, economic policy must be based on the productive use and enhancement of *all four* forms of capital, in ways that differentiate their trade attributes. Because Natural Capitalism does this, it offers an approach to reframing the trade debate in a way that can facilitate conversations between advocates and opponents of global trade. It is not about the alleged evils of capitalism but about how to be a better capitalist.

In contrast, governance structures that embrace the two mobile forms of capital and undervalue the other two forms are based on a logical imbalance that will make it impossible to attain sustainability. That imbalance will undercut present and future prosperity.

It is worth considering the way in which the European Union has developed a mini-globalization process among member nations of varying affluence and circumstances, while seeking to protect social and environmental values. The integration into a free, common EU market went hand in hand with important policies that increased the overall orientation of this market towards sustainability. Obviously this is a work in progress, with many challenges, but it does show that it is possible to integrate social and environmental concerns while building an effective international market. Needless to say, the political commitment to support member countries within the EU is far greater than the support of member countries within the UN or the WTO.

Global crises such as melting arctic ice, the hole in the ozone, and the loss of ecosystem services should motivate the member countries of the UN to find a similar commitment to each other's welfare, and their joint sustainability. In a highly interdependent world, one would think that such phenomena as climate change that respect no national or continental borders would give the leaders of the world the chance to create a sense of interdependence and solidarity. In fact, however, the objectives of the Kyoto protocol probably will be implemented by the joint (if at times adversarial) movement of civil society and companies long before it is ratified by governments.

This is good news neither for national governments, nor for the UN. Earth Summits offer the governments of the world the chance to take a leadership role. If they remain unable to do so in sustainability, their own legitimacy will be questioned, and leadership on this issue will pass even more to the sectors of society that have shown that they can create change: the corporate world and Civil Society.

Five Achievements Since Rio

1) The Rise of Corporate Social Responsibility

Perhaps the most significant achievement is the spread during the past decade of the realization that the corporate world is both the primary vehicle of unsustainability¹⁵ and the primary institution that can and must accept responsibility to reverse this situation and achieve sustainability.¹⁶ Many business leaders agree that Corporate Social Responsibility (CSR, which also includes environmental responsibility) is not only a moral and legitimate function of business, but that business can not long endure in its absence if it wants to succeed in modern markets and economies. Companies are increasingly realizing that commercial success and responsible behavior are mutually supportive, not exclusive. CSR values and practices are becoming part of the mainstream throughout the North, but in some instances the South is moving even faster. For example, Empresa,¹⁷ the leading alliance of CSR business organizations throughout the Americas, is wildly successful. The membership of the Brazilian Empresa organization, Ethos, created little over two years ago now represents almost 20 percent of the national GDP.

Since Rio, a large number of such business networks devoted to issues of sustainability and social responsibility have arisen, and the few that existed before Rio have been strengthened. These include:

- Social Venture Network, and Social Venture Network Europe,¹⁸
- Business for Social Responsibility,¹⁹

- CERES (the Coalition for Environmentally Responsible Economies), promulgators of the CERES Principles,²⁰
- World Business Council for Sustainable Development,²¹
- Prince of Wales Business Leaders Forum,²²
- Empresa, (The Forum on Business and Social Responsibility in the Americas)
- And a growing number of regional and industry-specific networks.

Increasingly, the role of such organizations is being recognized by the United Nations. The UN Global Summit in Istanbul not only included significant contributions from Civil Society, but also a three hour briefing of all delegates on corporate social and environmental responsibility by representatives of Social Venture Network Europe and other business people. The notion that business could have a social and environmental responsibility agenda had not been considered previously by many of the delegates. Kofi Annan's Global Compact is a welcome move to include civil society and representatives of the business community in the UN process, but does not go nearly far enough.

A growing number of NGO's now work with businesses to help them implement sustainability. A few of these include:

- Rocky Mountain Institute's Natural Capitalism Research and Consulting Practice that consults to 10 percent of the 50 largest brands in the world²³
- WRI's Management Institute for Environment and Business²⁴
- Natural Step organizations in many countries teaching the four "system conditions for sustainability"²⁵
- SustainAbility, a leading international think tank and strategy consultancy, specializing in the 'triple bottom line' of sustainable development,²⁶
- Pew Center on Global Climate Change, the lead organization bringing together companies committed to climate mitigation,²⁷
- EPEA (Environmental Protection Encouragement Agency), environmental, scientific consultancy especially on green chemistry,²⁸
- Cool Companies, an NGO that tracks businesses that have committed to reductions of CO₂²⁹
- Wuppertal Institute,³⁰
- Canada's Pembina Institute for Appropriate Development's Corporate Eco-efficiency Services³¹
- Product Life Institute³²
- The Global Academy³³

- Society for Organizational Learning's Sustainability Consortium,³⁴ and
- Sustainability Institute,³⁵ Dana Meadow's group that applies systems dynamics modeling to resource issues.

Hundreds of examples of what companies and communities are doing to implement sustainability profitably are chronicled in the book *Natural Capitalism*. And since its publication in 1999, various industry-leading businesses have begun implementing the sort of comprehensive approach it outlines. These include Interface, Nike, Ricoh, Shell, ST Microelectronics, Bristol-Myers Squibb, and Sony. Increasingly, the major brands are realizing that to retain credibility they must make clear to their customers that they have made a commitment to environmental responsibility and that they intend to live by this commitment. This is a significant enough trend that the Dow Jones Sustainability Group Index (DJSGI)³⁶ now tracks the performance of the top 10 percent of the leading sustainability-driven companies in the 2,000-company Global Index. In October 2000, this included 236 companies from 68 industries in 21 countries with a total market capitalization of \$5.5 trillion or 19 percent of the Dow Jones Global World Index.

One of the companies listed in this Index, Dow Chemical Co., has committed to manage its 123 manufacturing facilities in 32 countries under the principles of sustainable development. It has set a target of reducing waste per pound of product by 50 percent and reducing energy use by 20 percent by 2005, compared to its 1995 levels. It figures to reduce CO₂ emissions by 65 percent from 1990 to 2010 while increasing production six percent per year. They are also introducing renewable feedstocks.³⁷

In April 2001, Ricoh Electronics, Inc. facilities in Tustin, California; Lawrenceville, Georgia; and Toluca, Mexico; have all stopped sending waste to landfills and have instead achieved 100 percent resource recovery. Ricoh said it will refuse, return, reduce, reuse, or recycle items that would have previously gone to landfills, working with its vendors to develop new technologies for the reduction, reuse and recycling of waste.

Ricoh's President Takahide Kaneko said, "We realize that environmental conservation is not only a social issue, but a critical part of management. We do not take action to preserve our environment simply for the sake of complying with regulations; we do so because it is fundamental to our continued success as a business."³⁸

Consumers and employees, and through them, communities around the world, are core stakeholders to any business that is competing not only in the market for products and services, but also in other markets such as those for talented staff. Companies are not monolithic, homogenous entities, but are composed of many individuals who are motivated by diverse interests. There is, for example, a clear trend in modern economies dependent on well-trained professionals that these professionals increasingly want to work in companies that are in alignment with their social and environmental values.

Even companies that have not yet made a comprehensive commitment to sustainability are introducing products that will significantly contribute to solving the world's environmental problems. For example, while no car company has declared a sustainability commitment, essentially every major automaker now has a credible effort to create non-carbon motive systems using hybrid-drive, fuel-cell vehicles. Such emission-free vehicles are a key to a profitable transition to a hydrogen economy. Fuel cells are already being installed in some buildings to provide ultra-reliable backup power. As fuel cells become increasingly commercial, their waste heat will make them attractive in ordinary buildings. The systems that convert natural gas to hydrogen for the fuel cells in these buildings can also provide hydrogen to Hypercar³⁹ vehicles that can run while parked outside. These ultralight, fuel cell powered cars can then provide clean power to the grid. Given that the generating capacity in cars is over ten times that of the U.S. utility industry, these "mini-power plants on wheels" could put the utilities out of business. This one disruptive technology could also threaten the coal, oil, nuclear, aluminum, and steel industries. The technologies needed to do this are available, and such cars are expected on the market in a few years. This is only one example of the sort of technologies that are rapidly being introduced that use fewer resources or renewable resources or that otherwise help people reduce their footprint on the earth.

2) The Rise of Civil Society

At the same time that corporate programs to promote sustainability are increasing, Civil Society is gaining in strength and capability. Together, these two forces are bringing about most of the progress that has been made towards sustainability. North America and Europe have long had a vibrant civil society, but the last decade has seen a dramatic increase around the world in the number of groups addressing the challenges of sustainability. In addition to the groups listed above there are literally thousands of NGO's working locally, nationally and globally to implement the concepts outlined in Agenda 21. The Collective Heritage Institute is in the process of developing a database of such organizations and the solutions that they offer.⁴⁰ The following list is highly selective, but gives a flavor of what is happening.

Perhaps the preeminent international group is INRIC, International Network of Resource Information Centers, which hosts the Balaton Group.⁴¹ This group of analysts and activists from around the world grew out of the work of Dana and Dennis Meadows and their books *Limits to Growth* and *Beyond the Limits*. The Balaton Group is now the best international network of sustainability advocates. Its members communicate daily via list-serve, collaborate on conferences, projects and papers and mobilize assistance in the event of eco-disasters around the world.

This work has caused a growing number of residents of North America and Europe to ask, “How much is enough, and whether consumerism, the accumulation of more stuff, is contributing to their happiness?” They are supported by such groups as the Center for a New American Dream⁴² and The New Road Map Foundation.⁴³ Commentators like Paul Ray and Sherry Anderson posit that a large and growing constituency that they call the “Cultural Creatives”⁴⁴ share a value set that includes voluntary simplicity, sustainability, healthy lifestyles and some connection to a higher consciousness. They put the number of such people in the U.S. at 50 million. Other observers put the number lower, but it remains a growing if unorganized force for change whose members are now making their way into key decision-making positions in society.

Increasingly, consumers are voting with their dollars, favoring companies that they perceive are socially and environmentally responsible. Grassroots consumer movements have altered the policies towards natural and human capital of such companies as Shell Oil, Home Depot, and Nike. At Nike, sustainable development strategies have been adopted at the highest levels of the company. In the case of Shell, consumer pressure brought one of the world’s largest companies to its knees. The British government strongly opposed what it saw as a sell-out by the company to the pressure of civil society and consumers, but the company, while debating technical details, agreed with underlying concerns of corporate social responsibility and has now declared a company-wide commitment to sustainability.

In the Shell Sustainability Report,⁴⁵ issued in response to the attacks that Shell suffered because of its behavior in Nigeria and its decision regarding Brent Spar, Shell’s Chairman, Sir Mark Moody-Stuart said, “Shell companies also accept their responsibility to help deliver the economic, social and environmental requirements of sustainable development. Being trusted to meet societal expectations is essential for long-term profitability. We are committed to transparency, and to developing and integrating our reporting on how Shell companies fulfill their responsibilities....Sustainable development underlies our strategy and is being integrated into everything Shell companies do—in oil and gas as much as renewables. We have to

do business in the real world, with all its complexities. We look to governments to create conditions that foster social and economic development but some lack the means. We believe responsible business promotes development. We support Kofi Annan's Global Compact and the Global Sullivan Principles.”

Clearly what has happened are two sides of a coin: an increasing number of companies have recognized that behaving responsibly is not only important to their brand equity but is an underlying basis for profitability. At the same time, individuals are realizing that organized grassroots efforts are a formidable force in today's world.

Many NGOs support individual action to improve society. The Ashoka Network develops the profession of social entrepreneurship around the world by investing in extraordinary individuals with unprecedented ideas for change in their communities. They enable social entrepreneurs to work full time implementing changes in education and youth development, health care, environment, human rights, access to technology and economic development. It is extraordinarily effective.⁴⁶

Colleges and universities are starting to design curricula around environmental and sustainability issues. Unheard of as an academic discipline ten years ago, courses in sustainability are now offered by many colleges. As children and students around the world become more concerned with the environment, this trend will increase. Many academic institutions are also taking the lead by reducing their own use of resources. Oberlin College has undertaken to make its campus climate-neutral by 2020, using students to analyze the existing contribution to climate change, and design and implement ways to reduce it.⁴⁷ It intends to spread this work to at least a hundred other campuses in the next few years.

Clearly, educational institutions throughout the world that allow students and professionals to understand the importance of sustainability and ways to achieve it are key leverage points. A college student or even a young child, impassioned by concepts of sustainability and love of the environment, can have a positive impact on the thought process of his or her parents. At the same time, the lack of multi-disciplinary, systems-wide approaches and sustainability seriously limits the capabilities, for example, of architecture and engineering students, as they become the designers of future product lines. It is important to include sustainability curricula throughout all stages of education, and to optimize its impact.

Another vital component of Civil Society is the communities of faith. In addition to reminding us that most of what really matters is literally priceless—cannot be priced—the world's religions have long been

a force for social and environmental justice. Even in such a secular society as the U.S., it is estimated that 70 percent of the population is religious. The growing involvement of the churches in sustainability issues will strengthen the role of civil society in this area.

A recent trend is the proliferation of on-line information services featuring sustainability. These include Greenbiz, Grist, and Sustainable Business.com.⁴⁸ These offer daily or periodic e-mail or on line reporting on the latest developments in sustainability.

The fact that citizens throughout Europe and North America are today considering sustainability one of the core societal priorities would have been unthinkable without the activism of NGOs. Such NGOs, however, are often perceived as abrasive by members of the corporate sector and by governments. This lack of respect and understanding is caused not only by differing interests, but often more importantly by conflicting cultures and styles. One of the changes over the last decade is a co-evolution between members of these three core power blocs seeking effective ways to bring about change. It is one of the priorities and challenges of the 21st century not only to heal the cultural divide between countries and continents, but between those sectors of society that must work together to achieve the successful functioning of modern societies.

Such efforts as the Global Academy Genome Institute are seeking to bridge this chasm by bringing together leaders of the diverse constituencies of the highly controversial topic of genetic technology. By promoting respectful multi-stakeholder dialogues that go to the core of the issues rather than getting lost in the adversarial forms of rhetoric, it enables citizens, corporate representatives and decision-makers to craft better public policy. The newly emerging Global Dialogue Partners is engaged in a similar effort, bringing together highly experienced mediators and negotiators from around the world to design and facilitate constructive dialogues on such controversial areas as globalization.

Modern society in Europe and North America would collapse without the work of Civil Society, the diverse non-profit groups, communities of faith, unions, educational institutions, and others. Yet this increasingly powerful force is rarely given a formal seat in deliberations of the world's nations. NGOs provide the backbone of a lot of social services and public policy throughout society, yet are insufficiently integrated into the system of governance. Although more NGOs are working with both governments and business, many opportunities are still missed.

3) The Advent of Socially Responsible Investing

Another realm that has recently been influenced by social and environmental criteria is the market to which companies must go for capital, loans and insurance policies. Socially Responsible Investing (SRI) predates Rio. But since Rio, the SRI movement has matured to the extent that a 1999 study by the Social Investment Forum estimated that well over two trillion dollars is invested just in the U.S. using some social criteria. A 1999 report on responsible investing in the U.S. reported that one of every eight dollars under professional management was part of a socially responsible portfolio. Between 1997 and 1999 total assets involved in socially and environmentally screened investment grew 82 percent; assets in screened portfolios grew 183 percent.⁴⁹

Contrary to popular myth, such investments often outperform conventional ones,⁵⁰ in part because of the increased integration of CSR practices into companies and preferences of consumers. This is now regularly reflected in the fact that the Domini Index and Citizen Index, which track the stock performance of hundreds of socially and environmentally screened companies, have over the past years regularly outperformed the comparable Standard & Poors indices.

This is gradually being acknowledged in the traditional investment world, and is now entering the awareness of fiduciaries of pension funds, which own much of the privately held equity of western economies. U.S. pension funds represent 46 percent of American GDP, and 33 percent of market capitalization. In the UK it is 62 percent of GDP and 42 percent of market cap. It is lower in some European countries only because pensions are provided by the government.⁵¹

Traditionally, pension funds invested their substantial resources without any particular concern for social and environmental criteria, even though the invested money comes from constituencies such as workers, employees, teachers, churches, charitable organizations, and educational institutions that are typically value driven. The reason for this was the belief that screened investments would under-perform financially, and that the trustees had a fiduciary duty to create the highest possible return over the short term. Under the influence of the data above, the pension fund and state and municipal treasurers are redefining their fiduciary responsibility and as a result, reorienting their portfolios.

At the recent groundbreaking Bottomline 2001 conference⁵² in San Francisco such speakers as the Treasurer of California, the Chair of Calpers, one of the world's largest pension funds, and many other representatives from pension funds generally agreed to this redefinition. The combined assets of the funds

represented in the room were over a trillion dollars. The Chair of Calpers pointed out that pension funds are interested in the long-term success, the overall sustained upturn of the entire economy, rather than the short-term profitability of an individual company. It matters little to the pension funds if one company does well, especially if it does so at the expense of the store of natural capital, the health of which underlies the health of the economy. The pension funds are so large that they are invested in essentially all of the large companies in the world economy. Further, unlike day traders, next quarter's profits do them little good. What matters to them is that the whole of the economy be healthy in 20 years when they will be paying out the pensions for which they are investing the money today. They may turn out to be the institution with the greatest vested interest in sustainability.

Another large institution that has lately become concerned about such symptoms of unsustainability as climate change is the insurance industry. The insurance and re-insurance companies are among the most powerful forces in the economy, not only through the insurance business, but because they own substantial parts of the economy, including a lot of real estate. Such NGOs as Europe's Greenpeace are working with European insurance companies who are concerned that failure to abate climate change will bankrupt them.⁵³

4) The Creation of Standards and New Forms of Measurement

The Inadequacy of the GDP

This category combines a number of areas, each of which could rightly have its own section, but which collectively come under the umbrella of challenging the way society measures whether it is better off. The traditional measure of GDP is widely acknowledged to be useless for this (or for much beyond enabling nightly news commentators to feel that they have something to say). It counts the flow of money purchasing goods and services and as well as that spent to buy bads and nuisances. Making no distinction between transactions that contribute to and those that diminish wellbeing, the GDP operates like a business income statement that adds expenses to income instead of subtracting them. The Gulf War added billions of dollars to the U.S. GDP, but few would recommend repeating it to achieve economic development. Similarly, a divorcing cancer patient who gets into a car wreck contributes to the GDP, (as the healthcare, legal and car repair costs are all included), but hardly to society's or his personal wellbeing. We need to recognize that decision making will only be as good as the limits of tools and systems.

The Genuine Progress Indicator

To address the inadequacies of the GDP as a guide for public policy, the Genuine Progress Indicator (GPI) was developed in 1994 by Redefining Progress.⁵⁴ This system counts the financial transactions in the GDP that are relevant to wellbeing. It then adjusts them for aspects of the economy that the GDP ignores, revealing the relationship between factors conventionally defined as purely economic and those traditionally defined as social and environmental. The GPI differentiates between what most people perceive as positive and negative economic transactions, and between the costs of producing economic benefits and the benefits themselves. It also adds up the value of products and services consumed in the economy—whether or not money changes hands.

Global Reporting Initiative

To avoid the danger that the huge interest in alternative measurement systems could backfire by creating competing standards, CERES followed the example of the Financial Accounting Standards Board and launched The Global Reporting Initiative (GRI). Established in late 1997, it brought together UNEP, key advocacy groups from around the world, companies interested in CSR, and international accounting societies. They set out, in a multi-stakeholder, global consultation process based on the principles of transparency and inclusiveness, to develop globally applicable guidelines for reporting on economic, environmental, and social performance, initially for corporations and eventually for any business, government or NGO.

To make sustainability reporting as routine and credible as financial reporting, GRI seeks to:

- Elevate sustainability reporting practices worldwide to a level equivalent to financial reporting;
- Design, disseminate, and promote standardized reporting practices, core measurements, and customized, sector-specific measurements; and
- Ensure a permanent and effective institutional host to support such reporting practices worldwide.

A generally accepted framework for sustainability reporting will enable corporations, governments, NGOs, investors, labor, and other stakeholders to gauge progress in implementing sustainable development. It will provide the basis for benchmarking and identifying best practices to support internal management decisions, including, for example, disclosure requirements for everything from greenhouse gas emissions and biodiversity impacts to labor and human rights standards.

The GRI Guidelines were revised and re-released in June 2000 after a period of intensive pilot testing, commenting, and revision. GRI plans to release a 2002 version of its guidelines at the Earth Summit.

Social Accountability

There are a growing number of efforts to bring the same rigor to *social* accounting that has been brought to environmental and sustainability accounting. The Business for Social Responsibility Resource Center at the BSR website and the Institute for Social and Ethical AccountAbility⁵⁵ provide information about these efforts.

In 1997, the Council on Economic Priorities created Social Accountability International, to develop a consistent, verifiable set of international standards for workplace conduct.⁵⁶ The result, SA 8000, is being adopted by such companies as Cutter & Buck, a high-end clothing company, to respond to rising concern from stakeholders regarding human rights in overseas factories. SA 8000 takes the management systems approach of the International Standards Organization (ISO) and applies it to social responsibility as an overlaying business strategy. It prescribes a system where all levels of management and employees are involved in ongoing education about local laws, workers' rights and occupational safety, and work together to create a compliant workplace. Lawsuits made it clear to the garment industry that a code of conduct that lacked enforcement mechanisms would risk one of its biggest assets, brand image. Cutter and Buck made a commitment to ensure that every person involved with the production of its garments be treated with dignity and respect, by requiring its contract factories to be SA8000 compliant. Cutter and Buck reports that giving the vendors the power and the tools to make such changes resulted in performance on the factory floor that in many cases far exceeded the SA8000's baseline standards. The factories that have become certified have seen dramatic drops in days lost to injury and sickness, absenteeism and costs associated with injury/accidents. They have also experienced an increase in business from other buyers who perceive them as a low risk source of product.⁵⁷

ISO and EMAS

The most comprehensive measurement systems intended to enable companies to track their environmental performance are the ISO 14000 and the Eco-Management and Audit Scheme (EMAS). ISO 14000 is a product of the International Standards Organization while EMAS is a product of the European Union (EU). ISO 14000 is an international standard while EMAS applies to the European Union. Both ISO 14000 and EMAS are considered tools for achieving cleaner production.

An increasing number of companies are becoming ISO 14000 rated. Unfortunately the ISO standard, while a process that can educate companies, requires only that companies measure and track their performance, not that they change it. However companies that take ISO 14000 seriously and use it as a basis for improvements are also pressuring their suppliers to become ISO compliant. For example, GM, Ford, Nike and IBM are pressuring upstream companies to “get greener”. GM’s 1998 Environmental, Health, and Safety Report says, “The same issues recognized within GM must be recognized throughout the supply chain: continuous improvement, eco-efficiency, reducing waste in material, energy and resource usage, design for the environment, and recyclability.” Even the U.S. Department of Defense will require its suppliers to comply with ISO 14001.⁵⁸

ISO 14000 standards are voluntary instruments that are intended for use in countries at all stages of economic development and under a range of government systems. As such, they are considerably less stringent. EMAS, which came into force in April of 2001, was developed to meet the specific needs of governments, citizens and consumers in European Union member countries. EMAS takes a more prescriptive approach, while the ISO 14000 standards rely on voluntary acceptance of all parties. EMAS currently applies to manufacturing industries while ISO 14000 can apply to all types of organizations.⁵⁹

Indicators

There is a worldwide movement to develop and implement what are called Indicators. These are systems to measure progress toward sustainability that can operate at the scale of a town, a state or an entire nation. They translate the sort of information that has for years been published by the Worldwatch Institute⁶⁰ in its Vital Signs series into measures from which policy can be created. At the local level, such efforts engage citizens and communities to determine what sort of future they want, and put in place the measures to bring about positive change.⁶¹

There are indicators efforts underway at the UN Commission on Sustainable Development, UNDP, WRI, the World Bank, the European Environment Agency, the Scientific Committee on Problems of the Environment, the Dutch National Institute of Public Health and Environmental Protection, Sustainable Seattle and the International Institute for Sustainable Development. At the national level, Canada, Costa Rica, and the Netherlands have indicators projects underway, as do hundreds of communities. Ethos, the Brazilian Empresa organization, has also begun work on a set of corporate responsibility indicators. The BSR web-based Resource Center provides a good inventory of efforts to develop indicators.

The City and citizens of Santa Monica, CA, created indicators to measure the city's progress toward sustainability. Using a collaborative approach to develop them, the city linked the indicators to policies to be implemented by all city departments and offices, developing a "Sustainability Checklist" for purchasing decisions, a pilot alternative cleaning product program, and community education and promotional materials. The city has also created interdepartmental working groups that meet regularly to integrate projects to achieve the program's objectives. An annual "State of the City" document evaluates the program's effectiveness, sets new targets, and encourages community participation.⁶²

The "Dashboard of Sustainability"⁶³

The most comprehensive indicators effort underway is the "Dashboard of Sustainability" produced by the European Commission's statistical wing Eurostat. The Dashboard of Sustainability is a set of "instruments" (the name taken from the instrument panel of a car or airplane) designed to inform decision-makers, the media and the general public of a nation's progress toward, or away from, sustainability.

The product of a six-year international project led by the Canadian-based International Institute for Sustainable Development (IISD), the prototype was demonstrated during the 9th session of the UN Commission on Sustainable Development (CSD-9) in New York, in 2001. The goal is to enable quick assessment of the weak and strong points of a nation's performance in enhancing sustainability. On-going data updates will facilitate tracking of trends over time.

IISD is working to make the same tool, equipped with a search engine, usable by delegates in Johannesburg to track all of the issues surrounding the Earth Summit, as well as all of the proposals brought forward at the Summit to implement sustainability.⁶⁴

The Calvert-Henderson Quality of Life Indicators⁶⁵

This tool measures conditions and trends in 12 key socioeconomic sectors of the U.S. as a basis for making socially responsible investment decisions. Previously, little information was available to enable investors to understand the relationships between economic forces and societal or environmental impacts. The Calvert indicators were developed over five years under the guidance of Hazel Henderson, Jon Lickerman and Patrice Flynn. They cover the 12 domains of education, employment, energy, environment, health, human rights, income, infrastructure, national security, public safety, "re-creation" and shelter. US population/demographic data crosscut through all 12 indicators. The indicators show the

potential for redesigning infrastructure and production methods using better information. They also show how “greener technologies” can benefit the world’s climate and ecology—as well as quality-of-life.

Tax Shifting

Perhaps the most fundamental way to improve the systems of measurement is to change how taxes are levied. This approach, called tax shifting, is now being implemented in some form in nine European countries, and being explored in several states and provinces in North America.

Tax shifts would reduce current taxes on “good” things that society wants more of—labor, profits, property improvements, and investment—and replace the revenue with new levies on “bad” things that it wants less of, such as pollution, speculative land holding, resource depletion, waste, and habitat loss.

Such shifts would boost an economy by reducing taxes on productive economic activity while establishing tax-based incentives to reduce pollution or restore natural capital. Unlike other tax reform proposals, many different constituencies—environmentalists, middle-class families, anti-regulatory activists, small business owners, high-tech workers and investors—all find something to like about this. Taxes would be judged on their real contribution to the economy, in terms of job creation and productivity growth, equity for the people paying them, and resource conservation.

Proposals by Alan Thein Durning and Yoram Bauman in their book *Tax Shift*,⁶⁶ and by Redefining Progress in *Tax Waste, Not Work*⁶⁷ would introduce new and progressively-graduated taxes to shift 10 percent of the federal tax burden in the next 10 to 20 years. The levies could include:

- Purging the tax code of regulations and loopholes that encourage environmental degradation, such as the \$17 billion cost of tax-free parking. New levies would be applied on pollution-generators like products containing lead, gas-guzzling cars, ozone-depleting chemicals and the burning of fossil fuels.
- Carbon taxes to decrease the generation of greenhouse gases. Governments could impose a tax—say, \$50 per ton of carbon emissions—or combine a smaller tax with user fees or revenues from the sale of pollution permits.
- Pollution taxes to reduce contaminants flowing into rivers and streams, filling landfills and eroding the quality of soil. There are an estimated 500 human-made chemicals that didn’t exist 100 years ago harbored in the living tissue of the average American.
- Point source taxes to reduce pollutants from the outflow pipes and smokestacks of sewage treatment plants, factories and incinerators.

- Traffic taxes in the form of higher tolls imposed during rush-hour congestion periods that could promote the use of carpools and mass-transit and flextime work hours.
- Higher use fees for resources owned by the public, such as grazing or mining on public lands.

5) *NGO, Business, Government Coalitions*

The complex nature of the issues of sustainability means that no one set of experts has a monopoly on solutions, or the ability to impose them. Coalitions of government, businesses and NGO's are arising to work together to design and implement solutions that are more sustainable and more appropriate to their circumstances. Many of the programs described above either arose out of such coalitions, or use them to implement their programs. Perhaps the most profound such coalition is the new movement to create and implement green plans. Increasingly common in Europe, they are now promoted in the U.S. by the Resource Renewal Institute.⁶⁸

Green plans are long-term environmental management strategies to achieve environmental and economic sustainability and a higher quality of life, whether for a city, state, region, or nation. They replace traditional single-issue policies with a comprehensive, integrated plan of action. Like business plans, green plans guide the efficient use and intelligent investment of resources to ensure healthy growth and sustained prosperity. Green plans integrate the interests of industry, government, community groups and the general public across geographical boundaries. They also integrate environmental efforts across institutional and jurisdictional boundaries, providing a framework to coordinate activities among, for example, competing government agencies or industries. Success is not measured by imposing one agenda over another, but by finding solutions that integrate the many needs and concerns.

Green plans use systems analysis so that the underlying interrelationships and patterns of change at the root of a problem can be evaluated for the development of an effective response. Such strategic environmental management:

- anticipates problems rather than simply reacting to them;
- establishes short- and long-term goals, as well as strategies and timelines for achieving them;
- allows flexibility in determining how goals will be achieved and encourages innovation;
- utilizes a mix of legal, regulatory, and voluntary measures;
- includes indicators for monitoring and evaluating progress toward goals and reporting the results;
- provides mechanisms for incorporating this feedback into the plan (can change in response to new information);

- is based on data deemed sound by credible scientists; and
- uses information systems and technologies to support decision-making.

The best examples of green plans are in the Netherlands. The Netherlands developed a systems approach based on the following key attributes:

- eight over-arching environmental "themes", including climate change and waste disposal,
- five levels of geographic scale, from local to global, and
- nine primary "target groups", or social sectors responsible for environmental problems (and their solutions), such as agriculture, industry, the energy sector, consumers, and the retail trade.

In 1995, New Jersey became one of six states in the U.S. to pilot the National Environmental Performance Partnership System, a federally initiated green plan. This program establishes new state-federal partnerships to strengthen public health and environmental protection through management for environmental results. It uses goals and indicators as measures of progress. The State recently signed its 3rd Performance Partnership Agreement (PPA) that sets forth goals, indicators and strategies in 9 environmental priority areas.⁶⁹

Such states as Oregon are operating under a directive from the Governor to make state government operations sustainable. In California, the Secretary of Environmental Protection is seeking to implement a similar policy.

At the national level there have been various efforts to promote sustainability. Under the Clinton Administration, the President's Council for Sustainable Development brought together business, NGOs and representatives of government to explore the issue. The process culminated in a National Town Meeting to promote sustainability.

Five Challenges and Solutions

1) Restructure the World's Economies from Devastating to Sustainable

The accomplishments listed above are a source of hope, but are only tentative steps towards creating a sustainable world. The hard truth is that most of the world's economic systems are driving humanity towards unsustainability. Even companies most dedicated to the ideals of sustainability are still polluting,

and struggle to make a profit in an economic system that is predicated on the logic that makes the present system unsustainable. In many ways the concept of corporate responsibility is still wishful thinking.

And time is running out. It is critical that the Earth Summit move beyond debate to take concrete action to move the world towards real sustainability. At the most fundamental level, the whole system within which decisions are made needs to be restructured so that the inevitable logic of the system leads to sustainability, not away from it. The rules of the world are not now designed to produce sustainability, and so they don't. But these are rules and practices that people created and put in place, and people can change them.

However such changes, even if we would agree upon their content, are very hard to implement. Though socially undesirable, the existing system possesses its logic. Every human system is influenced by countless individual and institutional interests, which will be upset by the change process. And every system tends towards self-preservation. This not only hinders the implementation of change, but also the recognition of problems and possible solutions. It is logical that a company or industry whose products are causing global warming is reluctant to recognize that global warming exists. A government beholden to such industries is unlikely to take such a problem seriously. In the same way, individuals, companies and governments will be unlikely to accept problems or their solutions if the solutions put them at fault or otherwise conflict with their interests. This, of all issues, may be the greatest challenge to overcome. The world knows most of what it needs to know in regard to technology and systems to attain sustainability. But why is this knowledge not implemented?

Overcoming these formidable challenges will require the following actions:

- 1) The leaders of the world should issue a clear statement that we are in a crisis, that its solution will require concerted action, and that answers exist. Such a statement *was* issued by the world's leaders ten years ago. It is called Agenda 21. If anything, the situation now is far graver. What is different is that comprehensive approaches to implementing sustainability now exist. These include the Natural Step and Natural Capitalism. The Earth Summit should ensure that the leaders understand these and commit to their implementation.

- 2) The world's governments must then implement the steps to achieve sustainability (as if we had a choice). Governments at all levels must create new regulatory environments that are supportive of sustainability and thus help to reorient the natural flow of societies and economies in such a way that

sustainability becomes the outcome inherent to the new system. So long as individual companies and people are expected to move towards sustainability in the present system that propels us towards unsustainability, it will not happen at a rapid enough rate.

All actors in society have a role to play in reorienting the system to align with sustainability. But in general, the public, the companies and the NGOs are further ahead in accepting the challenge.

Governments, however, should not absolve themselves of the responsibility to lead. Governments and the multilaterals have responsibility to set the rules of the game. They need to initiate a serious, on-going, action-oriented dialogue between civil society, the business sector, the unions, and other core institutions and the world's governments to define the rules and set the stage.

Markets and market mechanisms make a great servant, and a bad master. There is no indication that blind belief in unregulated markets will lead us towards sustainability, but there is plenty of evidence that the market, when regulated and incentivized in an appropriate manner is a very successful mechanism to achieve implementation of whatever it is oriented to do. Governments, civil society and the business sector all need to come together to set the compass and portray a vision of the road ahead. Then markets can do what they are so efficient at. But without this level playing field, without legitimate rules that set the goals for the market to accomplish, an appeal to voluntary goodness alone cannot and will not achieve sustainability.

3) Approach problems and solutions from a whole systems perspective. Much of the environmental problem comes from thinking of it as 'the environmental problem'—as a separate category isolated from underlying causes and linkages. This mental model is misleading. The functioning of the natural world reflects 3.8 billion years of biological experimentation and rigorous testing in which whatever didn't work got recalled by the Manufacturer. Life's intricate web of interlinked causation starts to unravel whenever mechanistic and reductionist habits make people try to do just one thing.

To be sure, car exhausts befoul the air, appearing to create an 'environmental problem'. But responding with cleaner engines and unleaded low-sulfur gasoline merely creates a climate problem instead. In turn, climate-safe, hydrogen-powered, but ever more numerous cars would just substitute congested roads: instead of shortages of air, oil, and climate, we'd have shortages of land, time, and patience—the constraint *du jour*. Overcoming one constraint typically bumps up against the next unless their underlying causes are systematically addressed. For example, excessive automobility is caused mainly by (a)

overprovision of urban roads and parking as apparently free goods, and (b) land-use laxity and externalized development costs that encourage sprawl. Moreover, the same causes also contribute to such 'non-environmental' but important problems as frayed family life and social fabric, outsourced parenting, failed Main Street shops, crime, alienation, and declining rural culture and wildlife.

In short, everything is connected to everything else. Recognizing and harnessing those links is the key to avoiding and resolving environmental problems *and* many others, all at once, and generally at an economic and political profit. Failing to address problems as interrelated and from a whole-systems perspective leads to a world of compounding problems, expensive non-solutions, and political polarization.

Without understanding of hidden connections, the cause of problems is solutions. Conversely, policy that harnesses connections can solve (or, better yet, avoid) a problem in a way that also solves (or avoids) many other problems too, without making new ones. "The environmental problem" is a symptom of a lack of holism, a vision across boundaries, or what Gregory Bateson called "solving for pattern".

4) Make a serious commitment to identifying and overcoming the barriers. As stated before, the needed changes will not be easy, nor simple. The present system is bound with inertia and resistance to change. The governments must make a serious commitment to involving all the sectors of society in dialogues to establish the incentives that will induce the business community to behave sustainably. Governments must strengthen civil society so that it can bring effective market pressure. To do this they must ensure that citizens and voters are well informed.

Despite many statements to the contrary, today's world is too divided to achieve a common agenda. Interests of the South are perceived to stand in opposition to those of the North. Economic interests are considered competitive with environmental concerns. Even political parties within a democracy care more about battling between their right and left of center positions than solving problems. The debate between civil society and such institutions as the WTO that are not sufficiently including the social and environmental agenda have become so polarized that a rational search for solutions has gotten lost in the squabble. All of this is a luxury humanity cannot afford. We need to rediscover the kind of unity that allowed the World War II victory of the allied forces that stood for democracy, peace and in that sense sustainability. In the face of the present crisis, we can't stand against each other, but need to find the means to understand each other's legitimate concerns and cooperate to implement jointly acceptable

solutions. Are we able to create this now, or must the world face a crisis that might prove irreparable? Certainly the threat of unsustainability is very serious already.

Sustainability will not be accomplished in the next decade, but if the decade is allowed to pass without beginning on the path, the world's governments will have consigned themselves to irrelevancy. The task for the Earth Summit is to set forth the steps to take to begin restructuring the system. To begin a journey, it is essential to outline a map and agree on measures by which to judge progress. The alternative measures outlined above can enable governments and managements to begin on this path.

The challenge of shifting the economy from devastating to sustainable obviously means dealing with all of the ways in which humankind is living beyond the limits, but the following four subsets of unsustainability deserve particular mention.

2) Near Certainty of Climate Problems and Water Shortages

There is now indisputable evidence of global warming (from shrinkage of glaciers and icecaps to essentially complete correspondence of climate models predicting human cause of climate disruption with observed evidence) but there seems to be a paralysis among nations preventing them from adopting meaningful solutions. Climate will become less stable for at least the next fifteen years, probably at an increasing rate.⁷⁰ This will mean unprecedented floods, droughts, more frequent and severe storms, major insurance losses, local and regional famines, the spread of serious diseases to new areas, and more political instability and refugees. Some climate changes might be dramatic and hard to reverse. Europe's climate might abruptly revert to that of Labrador if the North Atlantic Conveyor currents wandered off course, a possibility that on present knowledge cannot be excluded. A major shift might even occur in the whole Northern Hemisphere's weather, because an ice-free Arctic Ocean, which is approaching sooner than most expected, is self-reinforcing⁷¹ and may weaken or eliminate the near-permanent polar anticyclone that anchors hemispheric weather patterns. If either of these things occurred, a crash program of improving the world's deplorably energy-inefficient building and automobile stock might become not merely a money-saver but a question of survival.

Climate change has resulted largely from using energy in ways that are economically inefficient. It is a problem that we needn't have and that it's cheaper not to have, because saving fuel costs less than buying it. Particularly in North America, where political gridlock has stalled prudent governmental action on climate, the private sector is in the vanguard of profitable climate protection. Smart companies are turning implementation obstacles into business opportunities. Such private-sector initiatives can be encouraged by

public-policy ‘barrier-busting’ efforts—key priorities in President Clinton’s climate strategy. This approach works. During 1996–99, US GDP grew more than six times as fast as CO₂ emissions, and total energy use per dollar of real GDP fell by 3.2 percent per year—nearly an all-time record—despite record-low and falling energy prices.⁷² The private-sector leadership is driven as much by direct profitability as by climate concerns. For example, by 2010, the world’s sixth-biggest chipmaker aims to emit zero net carbon and equivalent gases, while DuPont intends to emit 65 percent less than it did in 1990—all in the name of increasing shareholder value. With recent policy support from the EU, renewable energy has become the world’s fastest-growing source. Globally, wind power is doubling every two to three years and now exceeds 15,000 megawatts, equivalent to one-fifth of Britain’s national grid. Solar cells’ annual sales are rising by 26 to 42 percent a year.⁷³

A combination of energy efficiency and the currently available, commercial renewables is sufficient to meet the world’s energy needs without resort to nuclear power. Extremely expensive, a serious proliferation risk, and lacking in democratic support, nuclear power also makes a transition away from a carbon world harder, because it is so capital intensive. A dollar invested in nuclear means that the same dollar cannot buy far more energy capacity through efficiency. Nuclear power has died of an incurable attack of market forces, suffering the greatest collapse of any enterprise in industrial history. In the USA it absorbed more than a trillion dollars, yet delivers less energy than biomass, or 1/20th as much as energy efficiency. It is the world’s slowest-growing energy technology, while efficiency and renewables are the fastest. The current effort to revive it is shortsighted, and may waste a lot of taxpayer’s money, but will be unlikely to alter the outcome.

In 1998, while the global economy grew 2.5 percent, global CO₂ emissions *fell* by about 0.5 percent. The 1999 data, not in yet, are probably even better, thanks in substantial part to China’s reversal of energy policy. A rapid switch from coal to gas, efficiency, and renewables is now underway in the People’s Republic, not to help global climate but to boost economic development, and reverse a public-health emergency. In 1996, China mined 1.4 gigatonnes of coal, and most experts thought that would double early in the new century. But this year, China’s coal mining is back to its 1986 level—0.9 GT—and heading for 0.7 GT a few years hence. A modern natural-gas infrastructure is being built with wartime urgency in five key cities. Modern Danish wind turbines (now a major export industry) are being installed in Mongolia. China, which cut its energy intensity of economic growth in half in the 1980s, has cut it nearly in half yet again, with more to come. Chinese interest in hybrid-electric cars, fuel cells, and hydrogen is growing rapidly. Taiwan’s new fuel-cell scooters, replacing gas two-strokes, will win a big

market share on the mainland too. These and many other hopeful signs of a transition to climate-safe energy merit vigorous consolidation and encouragement worldwide.

While there should be no delay in implementing such profitable abatement measures, it is probable that the climate change that is inevitable will worsen such already serious situations as water shortages. A recent CIA report states, "...water scarcities and allocation will pose significant challenges to governments in the Middle East, Sub-Saharan Africa, and northern China. Regional tensions over water will be heightened by 2015...Water sharing arrangements are likely to become more contentious...Water shortages occurring in combination with other sources of tension—such as in the Middle East—will be the most worrisome...International and multilateral arrangements increasingly will be called upon in 2015 to deal with growing transnational problems...such as water..."

Severe water shortages will likely decrease standard of living and public health for many of the world's people. It will lead to food shortages through decreased agricultural production, as well as degradation of aquatic ecosystems, and the disappearance of estuaries. Building more water storage capacity not only poses a threat to regional peace; it also represents a huge draw on financial and natural capital of many countries. Increased damming and draw of river waters displaces people and habitat, causes severe disruption to downstream communities and ecosystems and can result in the inundation of upstream low lying agricultural land. As conditions in rural areas degrade, migration to cities will further increase stresses upon water supplies and waste disposal systems.⁷⁴

Throughout history, most failed civilizations have foundered on poor stewardship of land or water or both. All the same bad practices that have made water a source of conflict and hardship for millennia continue today. Water is used wastefully, it is supplied at an excessive quality and scale for most tasks, and it is often procured unsustainably. It is far too precious to be used as a vehicle for waste disposal. These errors have severe ecological, economic, and social costs. But such problems are unnecessary. Affordable, equitable, durable, and ecologically restorative water provision and use are readily available by thoughtfully applying the best existing techniques. This requires, however, rethinking one of the Nineteenth Century's less helpful British contributions—water-borne sanitation—which, as the World Health Organization has concluded, cannot meet basic criteria of affordability, equity, and sustainability. Superior alternatives are now available in Europe but are little known and less practiced. A complete policy rethink is in order.

3) Environmentally Caused Spread of Disease, Human and Animal Epidemics and Other Health problems

A combination of factors from climate change and increased globalization, to modern agricultural and industrial practices have made it essentially inevitable that there will be a continuing series of epidemics and affronts to health. For example, climate change is allowing diseases and parasites long thought confined to the South to migrate north.⁷⁵

Endocrine disruptors, toxins that mimic estrogen and other hormones, are just the latest of many bad surprises from imprudent chemistry. There will probably be more, especially as long-term, low-level, chronic exposure to hundreds of thousands of synthetic substances of which people and ecosystems have no evolutionary experience begins to yield unexpected and possibly synergistic effects. These might include degradation of the fertility and immune competence of the general population. Both are of special concern, especially as pathogens, co-evolving under the selective pressure of ubiquitous antibiotics, increase their predation on dense human monocultures.

Such basic effects imply that public health will probably become an ever-hotter political issue. Fortunately, it is hard to find an example where a persistently toxic substance is actually necessary and where safe substitutes are not comparable or superior in cost and performance. Chemists and designers have plenty of talent to invent these improvements if asked to do so; they simply haven't been asked because, in violation of the Precautionary Principle, new synthetic chemicals have generally been assumed safe until proven dangerous rather than potentially dangerous until proven safe. Wise governments will therefore err visibly on the side of caution, encourage innovation in developing and deploying nontoxic substitutes, and avoid any appearance of complacent or compromised regulators.

These, and the other challenges listed below are a symptom of unsustainability. Regardless, these symptoms are imposing huge costs. The industrialization of agriculture—its preference for an abiotic production process rather than respectful participation in a fertile ecosystem—will yield ever worse problems of pathogens, contamination, pests, ecosystem break-down, and declining fertility. Ultimately, the habits and institutions that encourage and condone such outcomes will be rejected. Europe's rapid market swing towards organic agriculture reflects a growing suspicion that industrially produced food may be unsafe in ways that are not officially acknowledged and may not yet be known to science. Underlying that sentiment is a deeply conservative and biologically correct intuition about the virtue of relying on nature's wisdom rather than people's cleverness—of treating nature as model, mentor, and

measure, not as a nuisance to be evaded. Fortunately, organic farming, by treating soil not like dirt but as a biotic community, benefits from free and highly evolved ecosystem services that, in the long run, make it as productive and profitable as chemical-based agriculture. Another important lesson is that transparent, democratic scrutiny by all stakeholders tends to yield better outcomes than closed decisions by technical elites. For example, Sweden, with a long tradition of open information and public participation, never got BSE, because long ago, on ethical grounds widely shared by their customers and amounting to a social consensus, Swedish farmers refused to feed animal parts to cattle.

Extensive prophylactic use of antibiotics is leading to antibiotic resistant strains of bacteria. The modern animal farm not only allows, but also paves the way for the outbreak of disease. Thousands of genetically uniform animals are densely packed into unhygienic warehouses, generating a buffet for microbes. Animal manure and slaughterhouse wastes are used as feed. Meat is rapidly processed in the presence of blood, feces, and other contagion. Long-distance transport of food creates endless opportunities for contamination.⁷⁶ It is probable that most of modern agriculture will have to be restructured. Such countries as Germany are already seriously considering how to do this.

The irony is that the industrial model of food production—designed to put economic gain ahead of good animal health—doesn't make any economic sense in the long term. BSE has already cost Britain, alone, more than \$1 billion. The price tag for foot-and-mouth disease is likely to be equally devastating. The Mad Cow crisis is bankrupting the European Union's farm budget and setting off a populist backlash against the Common Agricultural Policy. Franz Fischler, the agriculture commissioner, said BSE costs were spiraling out of control as fresh cases of the disease caused consumer panic. He said: "The crisis on the beef market goes further than one might think. The latest market indications are alarming." The costs of buying and burning the two million possibly infected cattle will reach \$4 billion in 2001 alone.

Beef sales have fallen 27 percent across the EU since the scare erupted in November 2000. (The costs of storing the unbought beef could top \$6 billion). In Germany, sales have fallen 50 percent, automatically triggering a compensation scheme for farmers, funded by EU taxpayers. (Guaranteeing beef prices throughout the EU would cost an additional \$2.8 billion). But the greater issue is the collapsing credibility of Europe's agro-industrial system, and with it the EU's policy of funneling billions of pounds in subsidies to mass-production plants that harm the environment.

Franz Fischler said: "The repercussions of the BSE crisis go far beyond the loss of consumer confidence and severe market disruption. It has, for the first time, awakened the feeling in society at large that we must stop these practices. Millions of concerned citizens are realizing that the way their society is treating animals does not correspond to their ethical values."

The political landscape has changed beyond recognition. The Franco-German partnership is under strain after the Nice summit, and the new German Agriculture Minister, Renate Kunast, is a Green party politician with *carte blanche* from Chancellor Schröder to confront the agro-industrial lobby.⁷⁷

Fortunately, as described in Chapter 10 of *Natural Capitalism*, there are ways to conduct agriculture that can better meet the needs of the world's people and avoid the problems of the present system. But even such shifts can not head off the likelihood of serious epidemics.

4) Genetic Technology

With the capacity to map and manipulate the genome, humanity is entering a realm that offers great promise and challenge. It will force our species to make some of the most difficult decisions in history. Like nuclear technology, the manipulation of the genome has the potential to alter life as we know it. It is shifting the pace of evolution, as Dana Meadows notes, from nature's sedate and measured pace to one far faster than we can discover and correct errors, and even worse, shifting the evolutionary pressure from that of nature to that of markets. Companies are making fortunes, but public policy lags far behind, and public understanding even among otherwise literate people is far behind that. Biopiracy, the purchase and patenting of the DNA of ethnic groups by western companies, is rampant.

Since evolution is a fundamental process, it must occur at every scale at which it's physically possible, down to and including the nanoecosystem of the genome. Randomly shotgunning alien genes into the genome is thus like introducing exotic species into an ecosystem. Ignoring or removing the 90+ percent of the genome whose function is unknown (commonly called "garbage" or "noise") is like monocultural agriculture that herbicides out the biodiversity without knowing what it is or does. Diversity in nature and in a gene provides proper ecosystem functioning and resilience. The ignorant may get away with disregarding it briefly, but nature catches up with them. With transgenics, organisms multiply, genes spread, and mistakes can escape any possible control. For example, division into diverse species seems to be nature's way of keeping pathogens in a box where they learn proper behavior (e.g., that it's a bad strategy to kill your host). Transgenics may enable pathogens to vault the species barrier and enter new spaces where they have no idea how to behave.

Transgenic crops, like nuclear fission, offer still another sobering case of how the key choices are not between unattractive alternatives—nuclear warheads or subjugation, nuclear power or freezing in the dark, transgenic crops or starvation—but between those bad choices and really good ones outside the orthodoxy—respectively, least-cost security, soft energy paths, and biologically informed agriculture plus fair food distribution. Those good choices tend to emerge and get adopted only if we take seriously the discipline of markets and the wisdom of informed democracy.

The gap between biotechnology and biology—between the manipulation of complex biological systems' genes and the principles that actually govern those poorly understood biological systems—could soon become as deep as the theological gulf of the Reformation. It is also important to remember that the technologies introduced to solve one problem should not themselves create worse ones.⁷⁸

5) Population

Ever increasing population means that to achieve sustainability—roughly defined from a human perspective as “natural capital per capita,”—natural capital must increase with population. At present, this is not happening. Population growth in Europe and North America, while slowing, is still enough to cause sustainability problems because the material footprint of each family continues to increase. Clearly programs that promote family planning and provide all of the world's women with choice are an essential component of a transition to a world that can care for all living things.

It is important, however to remember that population is only one term in the generally ignored Holdren and Erlich formula: IPAT. What this tells us is that Impact = Population x Affluence x Technology. The impact of a growing population can be offset by a reduction in the amount of resources that this population demands, and by better technology that allows more people to enjoy a higher standard of living using fewer resources.⁷⁹

Five Steps to Sustainability

1) Implement Natural Capitalism

The concepts of Natural Capitalism should be integrated throughout the UN system, the various multilateral organizations, and the world's governments, as stewards for all life on earth. Failing that, these institutions will lose first their credibility and then their legitimacy.

2) Reinvent Governance

Develop a system of governance that acknowledges and builds on what is working now: coalitions of NGOs, companies and governments. Strengthen the role of the organizations described above. Most of the NGOs that have developed the intellectual capital of sustainability operate on a shoestring. At least the core NGOs should be endowed to ensure that their brightest minds can get off of the funding treadmill and devote their full attention to crafting a sustainable world. This is especially true of NGOs in countries (such as Mexico) in which tax exemption is difficult to obtain.

3) Micro-lending

Far too little of the world's enormous flow of capital reaches those who most need it. The various systems of charity and development aid, while noble, have not addressed the structure of poverty, and in many cases, worsen it, creating a culture of dependence. On the other hand, work by the Grameen Bank, and other sources of micro-credit⁸⁰ have demonstrated how the creative force of entrepreneurship that is the engine of the market economy can also be successfully used to create genuine economic development at a fraction of the cost. The nations of the world simply must ensure that micro-credit is available to any who can productively use it. Societies around the world would be well advised to encourage social entrepreneurship such as that exemplified by Bill Dreyton's Ashoka Network. This and micro lending are only two of the examples of social entrepreneurship, which is at the center of much the inventions promoting sustainability.

4) Education and Communication

Education must address all aspects of being human rather than only providing job training. Such education would enable people to learn how to value and respect each other and the environment that sustains them and life, now and in the future. It would allow children to grow into practical stewards of creation rather than exploiters who try to fill their empty hearts with more and more consumption. Dana Meadows calls this, "Seeking to meet non-material needs with material acquisitions," and points out that it is at the heart of the consumption-driven lifestyles that now predominate in the world. Such education would also enhance our capacity to truly listen to and dialogue with each other. While we need to support a rich diversity of opinion, we also need to foster the capacity to find and implement commonly accepted solutions.

5) Adopt the Precautionary Principle.

This is simply sane policy for any species desiring a lengthy tenure on the planet. Already embodied in the Montreal Protocol, it should be national policy around the world, and the basis of all sustainability statements.

Conclusion

Lester Brown, the founder of World Watch Institute, said in announcing the creation of the new Earth Policy Institute, “We are losing the war to save the planet. Many battles have been won, but the gap between what we need to do to arrest the environmental deterioration of Earth and what we are doing continues to widen. Somehow we have to turn the tide. We need a vision of what an environmentally sustainable economy, an eco-economy, would look like, a roadmap of how to get from here to there, and a continual assessment of progress in this effort.”⁸¹

Implementing the myriad measures that have been outlined above would herald a huge new industrial revolution. It would revolutionize our systems and our thinking. It would also provide a boost to industries and societies around the world, offering an enormous opportunity to deliver the products and services needed to achieve sustainability. Providing these would not only solve the sustainability crisis, but would also solve the unemployment plaguing most countries. It would demonstrate once again that the supposed dichotomy between environmental protection and employment only obtains in an unsustainable system, and can be resolved by turning towards sustainability.

Dana Meadows, perhaps the greatest environmental writer of our time said, “We think a transition to a sustainable world is technically and economically possible, but we know it is psychologically and politically daunting....The sustainability revolution, if it happens, will be organic and evolutionary. It will arise from the visions, insights, experiments, and actions of billions of people. It will require every human quality and skill, from technical ingenuity, economic entrepreneurship, and political leadership to honesty, compassion and love.

“Are any of the necessary changes from resource efficiency to human compassion, really possible? Can the world actually ease down below the limits and avoid collapse? Is there time? Is there enough money, technology, freedom, vision, community, responsibility, foresight, discipline, and love on a global scale?

“The world faces not a preordained future, but a choice. The choice is between mental models. One model says that this finite world for all practical purposes has no limits. Choosing that model will take us even further beyond the limits, and, we believe, to collapse within the next half century.

“Another model says that the limits are real and close and that there is not enough time and that people cannot be moderate or responsible or compassionate. That model is self-fulfilling. If we choose to believe it, we will get to be right.

“A third model says that the limits are real and close and there is just exactly enough time, with no time to waste. There is just exactly enough energy, enough material, enough money, enough environmental resilience, and enough human virtue to bring about a revolution to a better world.

“That model might be wrong. All the evidence we have seen, however, from the world data to the global computer models suggests that it might be right. There is no way of knowing for sure, other than to do it.”⁸²

This is the challenge of Johannesburg.

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With Amory Lovins, she founded and oversees Rocky Mountain Institute, an independent 50-person nonprofit resource policy center in 1982. Together and separately the Lovins' have consulted for scores of industries and governments worldwide. They shared a 1982 Mitchell Prize, a 1983 Right Livelihood Award (often called the "alternative Nobel Prize"), the 1993 Nissan Prize, and the 1999 Lindbergh Award. In 2000 they were named Time Magazine Heroes of the Planet. In 2001, Hunter won the LOHAS Business Award.

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Formerly a partner of B.Grimm, a 125 year old South-East Asian industrial group based in Thailand with over 20 companies, engaged in engineering, health care, communications and construction, Walter is now primarily engaged in the international movement to promote corporate social and environmental responsibility (CSR). A founding member and former board chair of the Social Venture Network Europe, a network of business leaders, social entrepreneurs and companies, he is a co-founder and board member of Empresa, the leading alliance of CSR business organizations throughout The Americas. He is a member of the Investors Circle and Business for Social Responsibility, and a founding member of the Institute for Social and Ethical AccountAbility. Walter served as a member of a Danish Government and European Union think tank and briefed the General Assembly of the UN Global Summit in Istanbul on corporate responsibility. For these and other non-profit activities, Walter recently created the Global Academy, a center that builds capacity for civil society. GA consists of education, networking and action oriented institutes that focus on: CSR and Responsible Investing, Globalization and Leadership, Genetic Technology, Human Rights and Engaged Culture, Integrative Medicine, Education and Transformation.

Walter's earlier non-profit activities include creating an East-West exchange network around the fall of the iron curtain that convened events spanning psychological and cultural issues to peace and

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He earned his degree in a combined program of business, economics, law and political science from the University of Geneva.

¹ A phrase of the late Walt Kelly, whose cartoon character Pogo once remarked, “We are confronted by insurmountable opportunities.” Kelly is also the creator of the dictum, “We have met the enemy and he is us.”

² <http://www.igc.org/habitat/agenda21/index.html>

³ WRI report: *A Guide to World Resources, People and Ecosystems, the Fraying Web of Life*, 2000, WRI, 10 G St., Washington DC, 20002, USA.

⁴ Kristin Philpikoski, “The Dawn of a New Mesozoic,” *Wired*, 3 Aug 1999

⁵ Donella Meadows et al, *Beyond the Limits*, 1992, Chelsea Green Publishing. For an Executive Summary see the RMI website: www.rmi.org.

⁶ The following material derives from our work in Natural Capitalism. See Paul Hawken, Amory and Hunter Lovins, *Natural Capitalism, Creating the Next Industrial Revolution*, Little Brown, 1999, available from www.rmi.org. See also the website: www.natcap.org.

⁷ Robert Costanza, et al, “The Value of the World’s Ecosystem Services and Natural Capital,” *Nature*, 387:253 – 260, May 15, 1997.

⁸ *Vital Signs 2001*, World Watch Institute. www.worldwatch.org/ These numbers may understate the actual damages: While the insurance industry has a handle on the value of increased mortality (e.g., heat-related deaths, malnutrition in drought areas), health and mortality-related costs may not be included. In terms of natural capital, who counts reduced pollination and crop (and non-crop) losses, or the value of shifting, say, maple syrup production out of Vermont to Canada? Who counts the biodiversity losses from a drying Amazon? Do penguins have standing? Is there a cost of shoreline protection and harbor facility “improvements” from the 6-inch sea-level rise last century? What was the cost of spraying against West Nile fever in New York last year? Etc. If a thorough accounting were to be done, the current damages estimate might be closer to \$300 billion.

⁹ Jeff Gates, “With Globalization, Poverty is Optional” Shared Capitalism Institute (www.sharedcapitalism.org).

¹⁰ Elizabeth Ryland wrote, “Around 1800 AD, there were about 800 million people in a world with vast unexplored and unexploited continents, which is why thinkers of the time proposed an economic system that valued maximum productivity or the limiting factor (labor) with little or no regard for resource efficiency. This business model is now creating massive problems in a world of more than six billion people and with looming resource scarcity.” Review of *Natural Capitalism, Journal of Organization and Environment*, Sept 2001.

¹¹ Ray C. Anderson, *Mid-Course Correction*, 1998, Chelsea Green Publishing.

¹² Wall Street Journal, 19 Dec 1999, p1.

¹³ Pierre S. Pettigrew, *The New Politics of Confidence*, 1999, Stoddart (available from Chapters, the Canadian web-based bookseller).

¹⁴ Classically, such a Pareto improvement results from trade in manufactured goods when, as Adam Smith clearly assumed, the mobility of financial capital is limited. However, when financial capital is highly mobile, trade is no longer to comparative but rather to absolute advantage, creating losers as well as winners (unless the winners choose to compensate the losers, which so far they show no sign of wishing to do). Some economists assert, on highly abstract theoretical grounds, that this classical conclusion is no longer valid, but it does seem to reflect an observed outcome of global free trade that distresses many developing nations and poor communities.

¹⁵ Clearly the primary cause of unsustainability is the demand for goods and services arising from all consumers, who in turn are also influenced by corporate advertising, but it is the corporate sector that extracts the resources, processes them, produces and markets the products in ways that are wasteful and damaging.

¹⁶ Many of us have been working with the corporate sector since the 70s, and have found it an effective leverage point for change, but the full extent of this argument was first put persuasively in 1993 in *The Ecology of Commerce*, by Paul Hawken, HarperCollins.

¹⁷ www.empresa.org

¹⁸ www.svn.org/. SVN was the first of such networks and continues to innovate in how to manage such networks.

¹⁹ www.bsr.org/

²⁰ www.ceres.org/

²¹ www.wbcasd.ch/

²² <http://biodiversityeconomics.org/business/links-101-00.htm>

²³ www.rmi.org

²⁴ www.wri.org/meb/

²⁵ www.naturalstep.org/

²⁶ <http://www.sustainability.co.uk>

²⁷ www.pewclimate.org/

²⁸ www.blueplanet.de/org/epea.htm

²⁹ www.cool-companies.org/

³⁰ <http://www.wupperinst.org/Sites/home1.html>

³¹ www.pembina.org

³² www.product-life.org

³³ www.theglobalacademy.org

³⁴ www.sol-ne.org

³⁵ www.sustainer.org/

³⁶ www.sustainability-index.com

³⁷ “Biographies of Corporate Sustainability Leaders, the Index of Dow Jones Indexes and SAM Sustainability Group, 2000, www.sustainability-index.com.

³⁸ “Ricoh Electronics, Inc. Achieves Zero Waste to Landfill Effective April 1, 2001,” Business Wire, Inc. April 2, 2001

³⁹ For more information on the transition to Hypercars and to a Hydrogen economy see hypercar.org, ch. 2 of *Natural Capitalism*, and “A Strategy for the Hydrogen Transition,” RMI, 1999, available from the RMI website: www.rmi.org or www.hypercar.org.

⁴⁰ Collective Heritage Institute, 901 W San Mateo Rd, Suite L, Santa Fe, New Mexico, 87505, USA, <http://www.bioneers.org/>.

⁴¹ www.unh.edu/ipssr/Balaton.html

⁴² www.newdream.org/

⁴³ www.newroadmap.org/default.asp

⁴⁴ www.cogenesis.com/culturalcreatives.html

⁴⁵ Shell sustainability report, <http://www.shell.com/royal-en/content/0,5028,31770-67726,00.html>

⁴⁶ <http://www.ashoka.org/home/index.cfm>

⁴⁷ RMI, 2001, Oberlin 2020: A Technical and Feasibility Study. Dr David Orr is involving students and faculty in this as part of his curriculum.

⁴⁸ <http://www.GreenBiz.com>, <http://www.gristmagazine.com>, <http://sustainablebusiness.com/>

⁴⁹ “The 1999 report on Socially Responsible Investing Trends in the United States”, Social Investment Forum. It is available at <http://www.socialinvest.org/areas/research/trends/1999-Trends.htm>.

⁵⁰ “Corporate Social Responsibility and Financial Performance,” New Circle Communications, a presentation to Bottom Line 2001, San Francisco, April 2001.

⁵¹ A.G. Monks, *The New Global Investors, How shareholders can unlock sustainable prosperity worldwide*, Capstone, Oxford, UK, 2001, P. 82, 83.

⁵² This conference was presented by the Link Foundation and Progressive Asset Management, www.progressive-asset.com.

⁵³ www.greenpeace.org/search/shtml, (enter climate in the search menu).

⁵⁴ To read more on the Genuine Progress Indicator go to: http://www.rprogress.org/progsum/nip/gpi/gpi_main.html.

⁵⁵ www.accountability.org.uk/index.htm

⁵⁶ www.sa-intl.org/introduction.htm#SA8000

⁵⁷ Personal communication: Brian Thompson Director of Operations, Cutter and Buck, brian.thompson@cutterbuck.com.

⁵⁸ According to the American National Standards Institute “The ISO 14000 series addresses environmental management systems, environmental auditing, environmental labeling, environmental performance evaluation, and life cycle assessment. These international standards are voluntary standards for the establishment of a common worldwide approach to management systems that will lead to the protection of the earth’s environment while spurring international trade and commerce. They will serve as tools to manage corporate environmental programs and provide an internationally recognized framework to measure, evaluate, and audit these programs.” See http://web.ansi.org/public/iso14000/faq/faq_a.html.

⁵⁹ www.tc207.org/faqs/index.html

⁶⁰ www.worldwatch.org/

⁶¹ For more information on Indicators, contact: Alan AtKisson, Pres., AtKisson + Associates, Inc. (A+A), Seattle * Boston * Stockholm. www.AtKisson.com +1 800 404 4208 or David Swain, Associate Director, Jacksonville Community Council Inc. Phone: 904-396-3052 Fax: 904-398-1469 2434 Atlantic Boulevard, Suite 100. Email: jcci2@leading.net Jacksonville, FL 32207. Web: www.jcci.org.

⁶² <http://pen.ci.santa-monica.ca.us/environment/policy/>

⁶³ <http://www.iisd.org/cgsdi/dashboard.htm>

⁶⁴ The idea to use the Dashboard as a “Newsboard” is driven by two different communities:

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- a) Statisticians and indicator experts (http://esl.jrc.it/envind/idm/idm_e.htm) are convinced that a strong Sustainable Development Index could have a tremendously positive role in driving politics towards the Path of Sustainability; however, they are aware of the overwhelming media dominance of economic lead indicators, and need therefore efficient ways of promoting SD indices.
- b) The “political” SD community needs an attractive way to promote and organise the Johannesburg Summit. The UNCED experience tells us that nobody is able to deal with the flood of documents from thousands of actors—one million pages of text had been produced for the Rio summit (or was it 24 million, as stated at <http://www.iisd.ca/linkages/download/asc/enb0126.txt>?).

The Dashboard can serve as an “organizing structure” for the Johannesburg Summit. The example above is illustrative; probably a compromise between the Agenda 21 structure (by chapters and issues) and the UN CSD indicator set (by issues and measurable indicators) will survive the screening process. The Dashboard would give access to:

1. Issues: environment, social & economic development (with about 50 sub-issues)
2. Countries: the over 200 countries included in the Dashboard database
3. Categories: government, NGO, media, events, tools etc.

The costs for providing this service can be extremely low, if it is e-mail based and automated.

⁶⁵ The Calvert Group’s Jon Lickerman can be contacted at www.calvert.com. Hazel Henderson is at www.hazelhenderson.com and Patrice Flynn, whose firm is under contract to update the Indicators and to construct the website is at www.flynnresearch.com.

⁶⁶ Northwest Environment Watch, April 1998, <http://www.northwestwatch.org/>

⁶⁷ <http://www.rprogress.org/>

⁶⁸ <http://www.rri.org/>

⁶⁹ <http://www.state.nj.us/dep/dsr/nepps.htm>

⁷⁰ This is because climate does not respond instantly, and some important factors such as ocean temperatures change only over years or decades. Much as stratospheric ozone holes have continued to worsen for years after CFC emissions were drastically reduced, so the full effects of greenhouse gases already emitted will start to be felt as built-in delays elapse and as the resulting mechanisms of climate change interact with each other. Thus even though there are encouraging signs, as noted below, that the rate of emitting greenhouse gases is starting to fall, climate change will nonetheless continue to get worse for a while before it gets better.

⁷¹ That’s because the exposed water, being darker than ice previously there, absorbs sunlight better, and wind can mix surface freshwater with saltwater beneath, reducing the freezing point. Both these effects inhibit refreezing.

⁷² A significant fraction of the saving appears to be due to structural changes related to E-commerce, as described by Dr. Joe Romm at www.cool-companies.org/energy/.

⁷³ Lovins and Lovins, “Climate, Making Sense and Making Money” 1999, www.rmi.org.

⁷⁴ Global Trends 2015: A Dialogue About the Future With Non-government Experts. Prepared under the direction of the National Intelligence Council, December 2000.

⁷⁵ Perhaps the only good news in this scenario is that now maybe the more resource-rich North will take seriously finding solutions to such problems.

⁷⁶ Brian Halweil and Dani Nierenberg, *Ecologue*, Worldwatch Institute, March 2001.

⁷⁷ http://mad-cow.org/~tom/UKCJD/CJD_news35.html#30,

⁷⁸ Amory and Hunter Lovins, “A tale of Two Botanies”, St Louis Post Dispatch, July 1999, available from www.rmi.org.

⁷⁹ For a fuller description of the IPAT formula and how it would work in regard to providing fiber from forests, see p. 178, *Natural Capitalism*.

⁸⁰ Numerous entrepreneurial micro-credit lending institutions have been created around the world. Some of them operate as not-for-profit companies. Others, such as the Panamanian Mi Banco have chosen to become fully regulated banks. In general, these operations have been highly successful, though hampered by their small scale, which increases their cost of operation. Besides allowing the poorest of the poor to become lower middle class entrepreneurs, micro lending promotes literacy, education and health care, and empowers women, especially, to claim their rightful place in society. Naropa University hosts an Annual Microfinance Training Program (MFT). The MFT focuses on the best practices in program design and management. Participants develop networks around the world with other practitioners and professionals in the microfinance industry.

⁸¹ www.earth-policy.org. Press Release, 11 May 2001.

⁸² Donella Meadows et al, *Beyond the Limits*, 1992, Chelsea Green Publishing. For an Executive Summary see the RMI website: www.rmi.org.