CHEATING

THE ORIGIN, NATURE, IMPORTANCE AND IMPROVEMENT OF BUSINESS AND OTHER ETHICS

WALLACE R. BAKER

has due to remarkable progress in science. Does this mean that there has not been much improvement in human nature and most of his ethical principles remain solid?

As we have seen from the above discussion, there are many possible sources of ethics, evolution of the humans who have survived, growing knowledge of biology, religions, public opinion in the community and culture. So it is likely that many sources have contributed to ethical conduct in different individuals up to the present.

5. DOES CONDUCT CONSIDERED ETHICAL VARY DEPENDING UPON THE TIME AND CIRCUMSTANCES OR THE CULTURE, GENDER, NATURE, PHILOSOPHY AND OTHER CHARACTERISTICS OF THE PERSONS INVOLVED?

Environmental Ethics – A New Challenge

Beginning in the last half of the 20th Century, the human race has become aware that some of its economic activities on Earth are causing major threats to our environment, to our health and survival as well as to life on our planet.

Some scholars and businesses, but not all, have recognized their ethical duty to take action to lead society to sustainable social and economic goals where harmful economic activities are damaging to our environment.

One must recognize there is respectable and serious opinion that one aspect of the environment, i.e., global warming, is not occurring or is occurring at a non-dangerous rate. Opinion polls seem to confirm that few people in the world are worried about global warming.

This issue like much of the opinion worried about the environment seems to be a left or liberal point of view with less concern by conservatives, although top scholars are on

both sides of this issue. Vested interests also seem to play an important role on opinions about burning coal and producing energy through highly subsidized wind and solar suppliers.

The most recent report has been by a distinguished science writer Dr. Matt Ridley, whose subject was "Global Warming versus Global Governing" presented at the 2016 Annual Lecture at the Royal Society in London, sponsored and published by the Global Warming Policy Foundation. Previous annual lectures were as follows: Vaclav Klaus – The Climate Change Doctrine (2010), George Pell – One Christian Perspective on Climate Change (2011), Fritz Varenholt, Second Thoughts of an Environmentalist (2012), John Howard, One Religion is enough (2013), Owen Paterson, Keeping the Lights On (2014), Patrick Moore, Should we celebrate Carbon Dioxide? (2015).

See also, infra, page 167, the opposition to Agenda 21 and Economist Herman Daly's view that with growth, sustainability is not possible.

According to the New York Times between 20 and 30 large companies including five major oil companies like Exxon Mobil, and other large companies like Walmart expect to "pay a price for carbon pollution in the future as a way to control global warming" and are "incorporating a price into their long term financial plans" in their budgets. This confirms that many important businesses foresee government action although many of these companies supported the Republican Party in which all but one presidential candidate either denied the scientific proof of the causes of climate change or opposed taking any action to alleviate climate change. As public opinion changes industry appears to conform to public opinion probably in

part for budgetary financial reasons and partly because they do not want to appear too stupid or unreasonable[94].

These new ethical duties not only concern the present population on Earth but, more importantly, future generations affected by our conduct. These are new ethical duties that have arisen as humans have begun to have serious effects on the Earth's ecological systems. Defining what these ethics are requires knowledge from many disciplines[95].

An effort to define sustainable development and possible action leading to it is presented later in this chapter.

Although many environmental laws and treaties have been enacted and signed much human conduct needs to be changed after there is a sufficient agreement on what and where. Since environmental conduct affects us globally and there is no world government to enact world laws and enforce such rules, proper conduct is undoubtedly a long way in the future unless the national states can agree on uniform or similar rules they enforce. However, progress has been made on a few specific matters i.e. ozone holes.

My introduction to sustainable development occurred when David Pines, a talented highly regarded physicist, invited me to a Santa Fe Institute (SFI) 1990 workshop on sustainable development attended by world class scientists, including several Nobel Prize winners, scholars, business and media executives, lawyers and others. George Cowan, a distinguished physical chemist and founder of the Santa Fe

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[94] http://www.nytimes.com/2013/12/05/business/energy-environment/l New York Times, page A1 on December 5, 2013.

[95] What is worth protecting? Some claim that the part of nature that should be protected is only that which is useful to human beings. Others believe nature has a moral value *per se* and all forms of life should be respected.

Sustainability needs definition as well. What rights should future generations have? For a discussion of these questions through a consultation of the ethical and philosophical community which also deals with practical and theoretical issues in environmental ethics, see Ten Haven, Henk A. M. J. et al. 2006. *Environmental Ethics and International Policy*. Unesco Publishing.

Institute, wrote notes on sustainability in 1991 which was a report on this workshop and his own thinking, which is, in part, summarized below starting in the section entitled *Energy*.

Among those attending this SFI workshop was Professor Nazli Choucri, an MIT professor of Political Science who participated in the drafting of Agenda 21 which lists problems covered by the concept of sustainable development. Since the SFI workshop, she developed the Global System for Sustainable Development (GSSD) with a little help from me and more important contributions by other academics at MIT, her students and others discussed later in this book. She, along with George Cowan, have been important teachers for me in increasing my knowledge and ideas about how to reach sustainable development.

Before discussing this subject in the U.S. in more detail we will deal with some recent developments in France for a comparative example of how France has reacted to the challenge of sustainable developments.

The French Nomenclature of Environmental Loss and Environmental Damages[96]

Since environmental law is relatively new, legal rules and procedures to enforce payment for those suffering from environmental losses are not yet well developed and are often vague and weak compared to other older areas of the law.

On November 16, 1982, the French Supreme Court recognized the right of an association of bird lovers to sue and recover damages from an association of hunters after an unknown member of the latter group killed a fishing buzzard ("balbuzard pêcheur") protected by environmental law.

[96] "La nomenclature des préjudices environnementaux est une proposition de grille de lecture commune du dommage environnemental."

As we will see later in this book government authorities in France have been very active in enacting measures designed to reach sustainability. This nomenclature is another example of French government and a private group's efforts to make significant progress.

In 2012 a working group of leadings French lawyers, economists, judges and scholars prepared a nomenclature of Environmental Damages[97] designed to encourage courts to act and speed up payment of damages based on the principle that the "polluter pays", set forth in the law of February 2, 1995.

There was an amendment to the French Constitution adding this principle which is also in the Environmental Charter of 2004. The European Union has lent a helping hand to make such remedies effective. These principles are now embodied in the rules of Government administrations policing duties in the law of August 1, 2008, as well as in Article 1382 of French tort law in the French Civil Code.

Environmental damages pose practical problems of how to evaluate the damage caused to the environment. Diverse solutions have been applied by the courts to different questions like: who is entitled to damages? If there is more than one plaintiff how can one avoid an excessive doubling up of damages? What method is simple, not too artificial or unrelated to ecological considerations? To try to answer these and other questions the Working Group did interdisciplinary research, including a study of what risks might be subject to insurance. It also sent out a questionnaire to interested or expert parties and who suggested answers. The subject matter includes public property or common property like the air, water and land which no individual owns or controls. This book of about 450 pages attempts to clarify and classify problems of what

[97] Neyret, Laurent and Martin, Gilles and a Working Group. 2012. *Nomenclature des préjudices environnementaux*, L.G.D.J., Extenso Editions

environmental damages should be allowed and the conditions for getting a judgment and enforcing payment.

Reasons for the Nomenclature were set forth in the ten page *Exposé de Motifs* (Rationale) in this book by Laurent Neyret and Gilles Martin. This section of the book notes that the subject of damages in the Erika case of an oil spill were not only those suffered by the plaintiffs but also based on objective autonomous damages which arise "from all non negligible destructive action to the natural environment".

The Nomenclature applies a name to certain phenomena as well as provides common meaning on different definitions and norms for those concerned.

Former Prosecutor and distinguished scholar Dintilhac headed an earlier working group which produced a Nomenclature in 2005 relating to damage to life similar to the 2012 Nomenclature which deals with other environmental subjects. He wrote that the Nomenclature his group prepared is considered as an "open and evolving legal instrument" to make environmental damages more coherent, transparent and secure. As the Dintilhac report noted it is not a "rigid and intangible framework", so different types of damages can be included or not. An entity for observation ("Observatoire") was created to follow future developments and make recommendations.

The Nomenclature is designed to help prevent environmental damages as a warning to polluters that they will be creating liabilities for themselves, to facilitate securing damages and to facilitate punishment. The authors noted that the Constitutional Council ruled that parties have an obligation of vigilance to avoid environmental damages arising from their activities.

The studies mentioned above in France led to an article in Le Monde (17/09/2013)[98]. *Le préjudice écologique*

[98] http://www.lemonde.fr/planete/article/2013/09/17/le-prejudice-ecolog.

bientôt dans le Code Civil ? (Ecological damage soon in the Civil Code?).

Another Working Group Named In Honor of Professor Jegouzo

A report of this group gives a definition of ecological damages as those resulting from an abnormal attack of elements and functioning of ecosystems as well as profits collected by person from the environment. ("*résulte d'une atteinte anormale aux éléments et aux fonctions des écosystèmes ainsi qu'aux bénéfices collectifs tirés par l'homme de l'environnement*.")

The group also recommends the creation of a High Level Environmental Authority to evaluate regulations and insure vigilance in preventing loss and reparation of damages to the environment.

Another subject covered is financial penalties. The damage caused by accident should be recovered. However, intentional pollution with the expectation of profit when to pollute is cheaper than respecting the regulation should be subject to civil fines.

A fund to repair environmental damage is planned. For individuals its amount cannot exceed two million Euros. But for companies it can go as high as 10% of the sales of the enterprise – a significant amount. This working group's objective is to punish violators and to convince companies to avoid pollution. Sums collected would go into the Reparation Fund.

Finally the report recommends opening up class actions relating to environment claims.

The Minister of Justice

Christiane Taubira complimented the working group for its posing of provocative and daring questions and has recommended reasonable solutions. The discussion, she said, will be of high quality in the legislative bodies thanks

to this good work. She took charge of the draft law which was scheduled to be ready at the end of 2013.

After noting these recent developments in France, we now will return to the discussion occurring at the Santa Fee Institute in 1990 to consider issues raised there relating to Sustainable Development and subsequent developments in the U.S.

Population and Fresh Water Shortage

During discussions in this workshop, one of the major concerns the group had was of uncontrolled continuing population growth especially in less developed countries. According to a U.N. study released in 2005, the growth in population could decline after reaching 9.1 billion in 2050. However, no one is sure what will actually happen with population growth: estimate, vary. This leveling off, if it actually occurs, is at least in part due to more education of women and the increasing use of birth control in less developed countries.

There has been a huge acceleration of population growth especially starting in the last century (2 billion in 1927, now about 7 billion) which accelerates human death and illness due to lack of clean water. "Nearly one billion people have no access to clean drinking water". The increase in population also causes more water to be used in agriculture. "More than two billion have no sanitation system". This situation leads to an estimated 2.2 million deaths per year and poverty, starvation and conflicts – a tragic moral and ethical problem, for which no one takes the responsibility. The author, Frérot of the quotes in this paragraph also quotes the Karamazov Brothers by Dostoevsky in the beginning of his book "Each of us is responsible for everything to everybody"[99].

[99] 5a See Antoine Frérot, 2009 Edition Autrement, Paris 2009 for the linkage between population and lack of clean water and water sanitation. *L'eau pour une culture de responsabilité*: Toward a Culture of Responsibility.

The problem is multifaced because water problems depend on geography, the shrinkage of water on earth due to abusive use and increasing use in agriculture so the problem is getting worse in many places. Other factors such as increasing urbanization often make solutions more complicated.

Energy

The importance of the rapidly accelerating growth in the use of energy and its effect on climate change was discussed especially in coal-fired electrical production. By 2050, it is now estimated our energy needs will at least double. George Cowan outlined the long term problems –the finding and developing renewable and non-exhaustible energy sources required to fuel our modern consumer way of life, which he thought could take up to three generations of research and development. The new U.S. technology producing more gas and oil (fracking) has now made the U.S. an important energy producer.

Human Behavior

George Cowan also noted the great difficulties in changing "deeply imbedded patterns of human behavior" where change is necessary to reach sustainability. He continued with the idea that "Presumably, the less mobile aspects of human behavior are determined by genes and the more mobile parts by nurture" and added that there is often much resistance to change in governmental and other institutions. Significant change in people's behavior generally occurs when a problem becomes urgent in times of war, financial or other crisis and/or when there is especially charismatic leadership in a community or nation.

Other Problems

His report lists other sustainability problems of poverty, migration, conflicts, pollution, deforestation, appropriate management of agriculture and the need for collective security.

Science and Technology

George Cowan characterized science and technology as being "the most mobile fields" because there has been more scientific and technical innovation in the 20th century than in all other centuries combined.

Business Action for Sustainability is Necessary

At this workshop, it became evident to me that if the business community did not take action to help solve sustainability problems, not much would happen. Such action could most easily come about by legislation and market forces if organized to make appropriate action profitable or mandatory. The business community, in partnership with government, has demonstrated it can get useful research done and attempt to invent ways to find technical fixes for sustainability problems in addition to social solutions. An increase in greater social consciousness, including better ethics in business and a heightened responsibility for the public welfare will be necessary. This is part of being a good citizen so necessary for a society to work well. Businesses are often our most powerful citizens and their actions cause significant social consequences for the benefit of society or they can cause severe ecological and social harm.

Complexity, Connections and Linkages

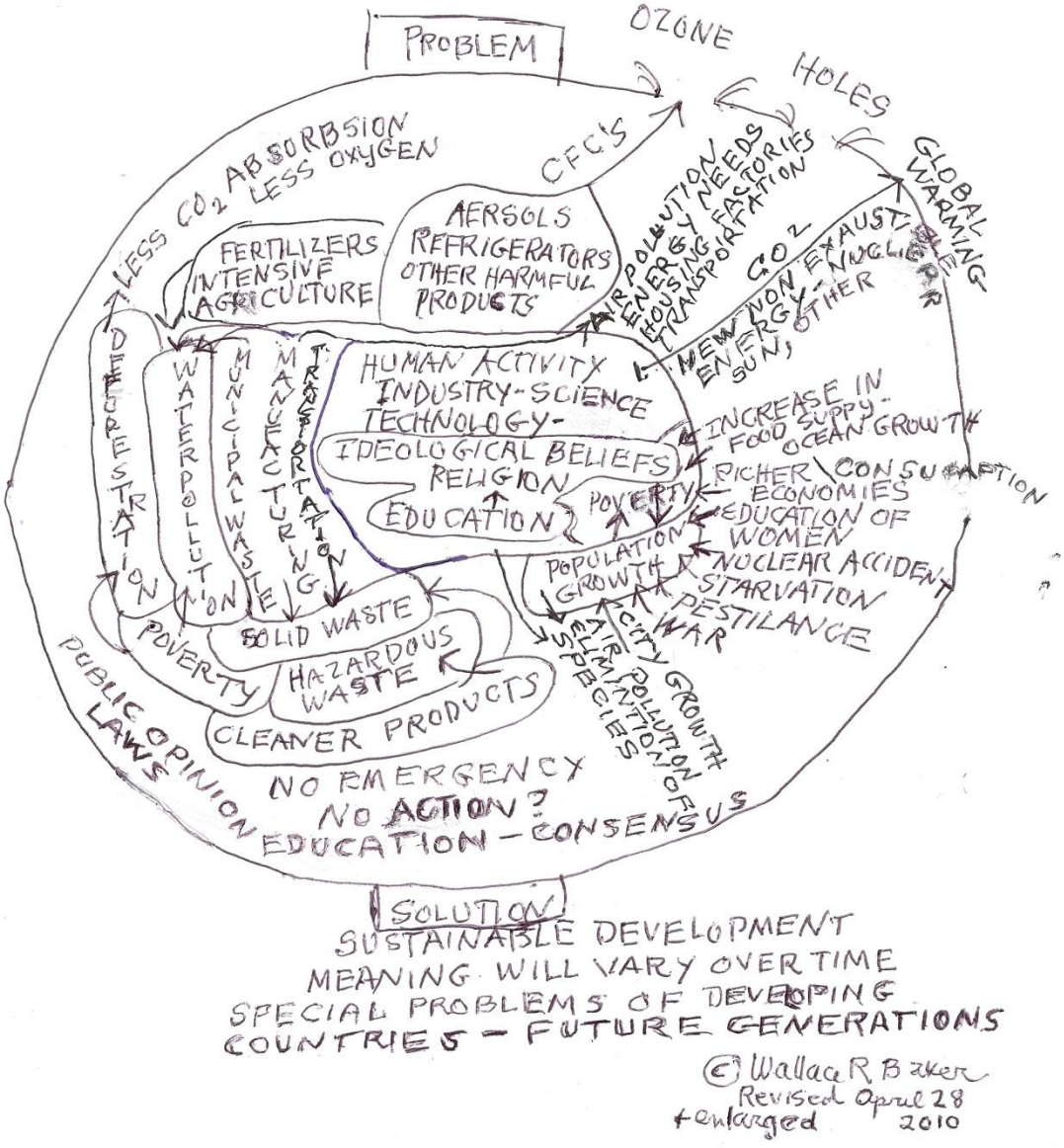
Since the 1990 workshop, with Nazli Choucri's encouragement and her supplying me with a number of important reading materials such as *Our Common Future*[100] and Al Gore's bestselling *Earth in Balance –Ecology and the Human Spirit*[101], my understanding of this subject and its complexity was further advanced. After reading Al Gore's book, and due to my early experience as a trial lawyer, I

[100] World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press, fourth reprint, 1990.
[101] Gore, Al. 1992. *Earth in the Balance: Ecology and the Human Spirit*. A Plume Book, Penguin Group, 1993.

reached another conclusion: this subject was far too complicated for the average person to understand unless it was broken down into smaller and more comprehensible and digestible pieces and relationships within the system explained. It seemed obvious that we needed to start to educate our children and the average citizen to understand these problems since it will probably take more than one generation to understand them, to learn how to think differently and to change our ideas and culture and the way we act. So in order to simplify sustainable development enough to begin educating young people, I was inspired by the Chinese saying that a picture is worth a thousand words and so I tried to draw a simplified picture of sustainable development and its different elements.

Sketch of Sustainable Development

Figure 1



In this earliest sketch, my interest was particularly strong in highlighting the connection or link between different actions indicated by arrows. Note intensive agriculture pollutes ground water due to fertilizers. Increasing agricultural land by deforestation alleviates poverty but reduces the absorption of CO2 by the trees and

is one of the causes of climate change. Pestilence limits population growth as does education which also affects ideological beliefs. Human activities, i.e., agriculture and urbanization, eliminate other species at an increasing rate.

Before one of her talks on sustainable development in France, I showed this sketch to Professor Choucri. She said she thought it was "interesting". She was inspired by it as she tried to develop a method to direct our attention in a way that involves our interaction and participation. With this germ of idea, she returned to MIT and began working on the key principles that could provide an underlying logic for addressing the elements in Figure 1. Her work would not be primarily directed to the man in the street or children but for policy-makers, international organizations, scholars, companies and other entities interested in gaining access to the latest detailed and usually complex reliable knowledge on specific problems of sustainable development. She was right that it was important to direct our attention this way in order to get the business sector, others and public opinion moving in the right direction. The education of children and ordinary people should happen in parallel. This effort would profit from the useful knowledge collected, created and disseminated by a knowledge system which she created, the GSSD. She enlisted the remarkable expertise available in the MIT faculty and the support of its able student body to help create this knowledge network. It took a number of years to design and define the concepts of the elements of the Global System for Sustainable Development (GSSD), to logically organize their relationships and create a useful knowledge network for sustainable development. An indirect method of securing a peer review of her accomplishment occurred when a U.S. patent was secured for the GSSD. This system has not been finished since other useful information needs to be added. In addition it needs to be dynamic and change in order to reflect new developments so it does not become out-of-date.

The work on the Global System for Sustainable Development continued with international cooperation of many people and institutions in order to incorporate websites of other reliable producers of knowledge and to collect, make available and encourage creation of new knowledge to add to the GSSD which will help us to reach sustainable development.

The 2007 Book published on Mapping Sustainability

Professor Choucri edited and wrote significant parts in a 2007 book: *Mapping Sustainability*[102] which describes what she, her students, her colleagues at MIT and other providers of knowledge have accomplished since 1990.

The first part of the book is theoretical and analytical as well as methodological and computational. It is computational in that it explains how the GSSD rides on the information revolution with knowledge networking on the Internet using the power of computers to work on sustainability problems, which B.R. Allenby describes as "mutually reinforcing the dimensions of the human future".[103]

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[102] This book, Nazli Choucri, Dinsha Mistree, Farnaz Haghseta, Toufic Mezher, Wallace R. Baker, Carlos I. Ortiz (eds.), *Mapping Sustainability: Knowledge E-Networking and the Value* Chain, Springer, AA Dordrecht. The Netherlands (hereafter referred to as "*Mapping*"), of about 500 pages, which is based upon twenty years of research by political science Professor Nazli Choucri at MIT, is volume 11 of the Alliance for Global Sustainability (AGS) Book Series. The AGS annual conference reports on research done in academia and elsewhere. The aim of the series is to provide timely accounts by authoritative scholars of the results of cutting edge research into barriers to sustainable development, and methodologies and tools to help governments, industry and civil society overcome such barriers. The level of presentation is for graduate students in natural, social and engineering sciences as well as policy and decision makers around the world in government, industry and civil society. The Alliance is presided by the President of the University of Tokyo, the Swiss Federal Institute of Technology, the Massachusetts Institute of Technology and Chalmers University of Technology. Its members are chosen from leaders in industry, academia, foundations and government and others from Japan, the U.S., Switzerland and Sweden.

[103] Allenby, B.R. 2001 Information Systems and Environment, National Academy of Engineering. Technology p. 48.

This book gives a description or inventory of the nature, definition and the construction of what is included in the GSSD and described as "ontology" by Professor Choucri, i.e., its "being".

The MIT Artificial Intelligence Laboratory was instrumental in drawing upon a novel set of computational tools for exploring a range of system design and implementation issues.

Sustainable Development Defined

Sustainable development is subject to different definitions by different people. It is also difficult and complex because it is not easy to find affordable solutions to many environmental problems and because the way to reach sustainability varies in different localities and depends on what problems occur and upon whether the focus is local, regional or global. In addition, the long term is often required for sustainable development problems to manifest themselves. The fact that most people, including leaders and politicians, are more concerned with immediate problems complicates any solution of long term problems. Immediate problems get attention – long term problems tend to be ignored until they become urgent, with the risk that with the passage of time it becomes too late to fix them.

In France, the government under President Sarkozy gave high priority to actively seeking solutions to unsustainability through legislation, taxation or other government action. It instituted committees suggesting 268 commitments to move toward sustainability; these subjects have now been submitted to its legislature[104]. The Deputy Director in the ministry concerned with the environment spoke at a Sciences Po conference on "Can the Environment be the Object of Economic Regulation?" in the spring of 2009. He concluded that economic instruments like green

[104] See http://www.legrenelle-environnement.fr/IMG/pdf/GE_engagements.pdf, viewed 25 February 2009.

taxes, creating markets for emission permits, etc. can only do so much. Therefore there is also the necessity for direct "command and control" regulations to reach sustainable development[105].

On the other hand, the U.S. government has in the past been more passive, in part for political reasons, apparently believing that the free market system would provide technological solutions to these problems. In the U.S., both political parties and in particular the Republican Party had a preference to avoid government intervention to which many businesses are hostile on the theory that government interference in business through regulation increases costs of operation and stifles innovation.

Ronald Reagan thought that the government was the problem and not the answer. He was partially right because government regulation is often costly for businesses, inefficient and ineffective because it usually becomes out of date as the world changes. However, there is clearly an important role for government in providing public services and enforcing basic rules when it implements laws and regulations efficiently which protect the public interest.

It will be most interesting to see what President Obama can do that will last since he has announced there will be change and policies will be different. He recognizes the unsustainability of relying on foreign oil for energy. His success will depend on whether he can convince the legislature and the major companies, including oil companies, to cooperate with his policies despite the fact that their short term interests may not favor actions necessary to reach sustainability such as inventing cheap new renewable energy sources. President Obama's efforts have been opposed by the Republican majority in the House of Representatives so new legislation is difficult or

[105] Bureau, Dominique. 2009. *L'environnement peut-il faire l'objet de régulation économique ?* (Can the environment be the object of economic regulation ?) Private paper.

impossible. Therefore he has been forced to rely on regulations and policies of the Executive branch to try to reach his policy objectives to the extent possible.

Exxon has recently invested huge sums to increase its supply of liquefied gas in Qatar where the world's largest natural gas reserves are located. This investment is for profit and is also "green".

Recent technological developments sometimes referred to as the shale revolution and other technology advances have made the U.S. a leader in new technology for producing oil and gas in 2012. If this cheap energy continues to stimulate investments in steel and other industries in the U.S., it could reinforce the economic position of the United States significantly in enlarging energy available at reasonable prices. To the extent we do not need to wait for another generation of new technology this could be very good news for the U.S. citizens but less good news for Europe, Russia and Saudi Arabia.[106]

In addition to new technology resulting in producing new gas and more oil the enormous possibilities of improving efficiency in using energy and/or conserving energy have been analyzed by the International Energy Agency which has published helpful studies for its twenty eight country members and others. [107]

The most common definition of sustainable development is found in our *Common Future* on page 8

[106] Riley, Alan 20/3 geopolitiques and the Shale Revolution, International Herald Tribunes – Wednesday December 26, 2012.
According to Harald Schwager, a German Industrialist, member of the BASF executive board, as quoted on page 18 of the Financial Times of November 8, 2012 : "*We Europeans are currently paying up to four or five times more for natural gas than the Americans*".

[107] 25 Energy Efficiency Policy Recommendations 2011 Update.
The IEA estimates possible energy savings in buildings equal to the annual electricity consumption of the U.S. and Japan.
More efficient appliances, lighting, transport and industry could be very significant.
Information on "Saving Energy in a Hurry Update 2011" Sara Bryan Pasquier, lead author and IEA Energy Policy Analyst.

where it is stated that humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.

A somewhat expanded definition of sustainable development is given in Mapping on page 12 as: "the process of meeting the needs of current and future generations without undermining the resilience of life-supporting properties of nature and the integrity and security of social systems". This definition implies that the action of man has unfortunately begun and continues this process since many, if not most, serious observers note that evidence of this undermining has already occurred.

Nazli Choucri's vision: Mapping a Global System for Sustainable Development (GSSD) Distinguishing and Relating the Pieces to reach an Integrated Vision

What is the GSSD?[108]

Figure 2 answers this question. It presents a brief summary of GSSD and its functions.

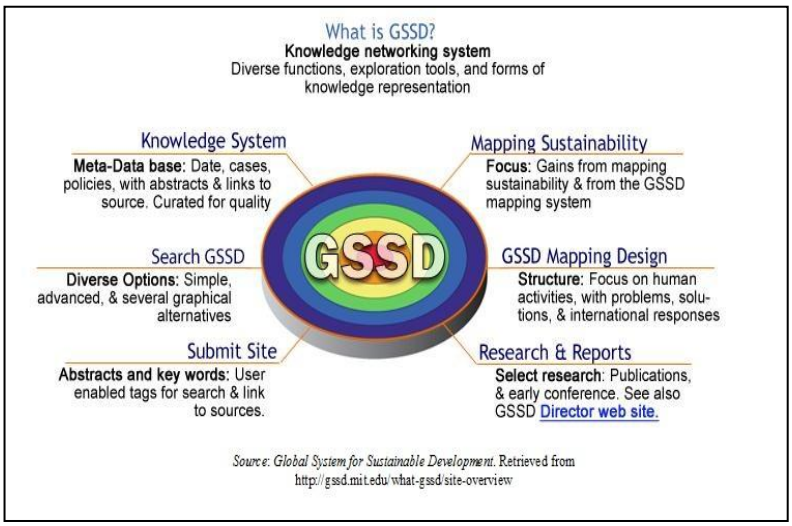


Figure 2 What is GSSD? Site Overview. (2012).

[108] Reproduced from GSSD.MIT.edu, with permission.

Another way to begin to understand the GSSD is by looking at the diagrams in Mapping Sustainable development. This is a form of visualization, a technique of representing situations and facts in a way that facilitates understanding and analysis. For a more detailed explanation of visualization, see Carlos I Ortiz's chapter "Visualization" on pages 231 to 261 of *Mapping*.

The remainder of this discussion only includes the knowledge structure devoted to “sustainable development”. It does not cover all the functions or features of GSSD.

The GSSD serves as a framework for organizing, in as inclusive a way as possible, the different elements in sustainable development and seeks to make explicit the connectivity logic of the system, how different pieces in the system are connected and dependent upon others. It is hoped that the connections between the different concepts and sub-concepts will be automatically integrated in the GSSD computer system as further progress is made, i.e., these relationships will be part of the system and be searchable electronically. Thus relationships not necessarily obvious will be delivered to researcher

More details about GSSD are presented later on. This knowledge architecture is based on current understandings. But it must also be open to new developments and new realities, such as the growing importance of the Internet and cyberspace. Thus in addition it needs to be dynamic and change in order to reflect new developments so it does not become out-of-date.

For the purposes of this discussion, it is important to differentiate among three features of GSSD:

(a) the knowledge framework that represents sustainable development (a more formal version of Figure 1);

(b) the knowledge base, which consists of abstracts of important materials; and

(c) the various functions available for a user to meet different types of needs.

The work on the Global System for Sustainable Development continued with international cooperation of many people and institutions in order to incorporate knowledge and direct users to websites of other reliable producers of knowledge and to collect, make available and encourage creation of new knowledge to add to the GSSD which will help us to reach sustainable development.

Figure 3 shows, step by step, the way in which a particular issue or topic is organized, with a further break down into cells, concepts and sub-concepts that are found in lists in Appendix A "Guide to Core Concepts" by topics subjects shown in each slice throughout the various fourteen domains (and on the GSSD website).

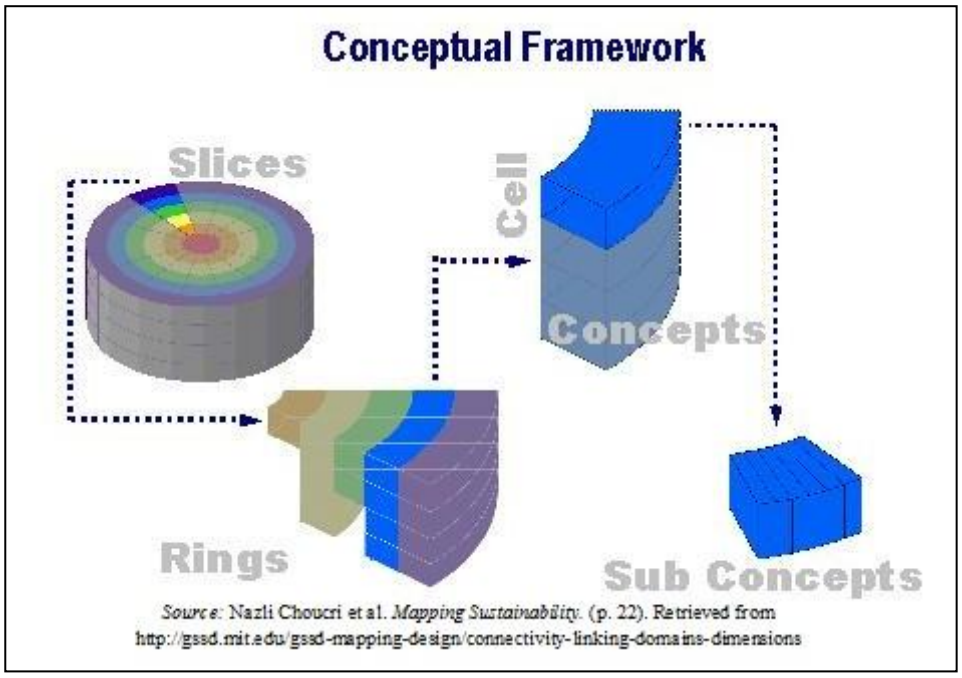


Figure 3 GSSD Mapping Design: Connectivity – Linking Domains & Dimensions. (2007).

The GSSD architecture is a system of organizing useful knowledge relating to human activities within each of

the fourteen topics or domains (slices), and each according to the types of problems that are tied to human activity, directly or indirectly, and solution strategies that follow (circles). This structure of logic – and its implementation in the GSSD architecture – provides known connections within each topic (i.e. actions and problems). However, it addresses in its architecture to the structure of connections linking different problems, which fall across different topics or domains (slices). These linkages, which are often controversial, need best to be accomplished by dynamic modeling supported by statistical analysis. This is to be accomplished by a researcher after drawing on information found in the domains he or she believes relevant, or so signaled by policy analysts, as well as through insights and new or existing evidence. If there are such reports, or results, then these would be available in the GSSD knowledge base. But the architecture of the system does not presume to provide such answers.

Example – Urbanization

Here is an example: Starting with a slice such as "Urbanization" – an important feature of population dynamics -- the GSSD continues to expand the contents and meaning of this issue with the circles beginning with human activities in the center through problems, and technical solutions, and social solutions. This completes two dimensions slices and circles. The larger circle, on international responses, is not devoted only to urbanization issues, but to all coordinated interactions surrounding the entire domain of sustainable development.

But the GSSD then goes into for more refined and different details in each slice, or topic. If one is considering the "Urbanization" slice, its sustainability problems in paragraph II, page 428, include "Poverty Expansion" which in turn is broken down into

"1. Poverty imported from other poor areas through immigration to cities" and

"2. Poverty endogenously created in the city", which in turn is broken down into further details, i.e.

"a. Business disinvestment/unemployment/underemployment",

"b. Natural growth of poor population" and

"c. Infrastructure breakdown, reduction of services to the poor".

Other sustainability problems listed are in "B. Social stress", "C. Urban pollution and natural resource shortages" and "D. Spatial dynamics", followed by further details of each

Thus the breakdown occurs in the form of a cell (concepts) where A. B. C. D. are still in one slice. Sub-concepts are segments of these subjects divided and preceded by Arabic numbers and small letters.

The same logic applies to all other slices, or types of human activities.

The advantage of this two dimensional representation – and the elaboration into more and more refined details is to facilitate analysis, visualization and understanding of a sort of complex inventory and relationships within each slice, and across all slices.

To the extent these inter domain linkages become recognized and accepted – even if only as systematic as hypotheses --, these linkages would be incorporated into the system in an appropriate fashion for its future development. (See for a few examples the paragraph following Figure 1 above).

Table 1 shows the different kinds of domains or topics covered by Mapping. The domains are the first framework upon which the GSSD is based and built.

Table 1

The Topics of GSSD

Demographic domain

- Population Dynamics
- Urbanization
- Migration and Dislocation
- Consumption patterns
- Unmet basic needs

Energy and natural resource domain

- Energy use and source
- Forests and land uses
- Water uses and sources
- Agricultural and rural activities

Technology-centered domain

- Trade and Finance
- Industry and Manufacturing
- Mobility and Transport

Domains of decisions and choices

- Conflict and War
- Governance and Institutions

Source: Nazli Choucri, et. al. *Mapping Sustainability*. p.16.

This Table unbundles the master variables noted earlier – population, resources, technology—into different topics or domains. The domain of "Decision and Choices" in Table 1 represents critical processes central to the viability of the social order at anytime and in any place if governance and institutions are fundamental features of social systems. If they are not effective, then the system will lose is resilience and viability. Conflict and war become highly probable. Thus, the dynamics of Governance are designed to be system supporting. By contrast, the dynamics of conflict and violence are system threatening. The overarching and

generic challenge is to enhance the system supports and avoid the sources of threat and instability,

Figure 4 below shows the fourteen topics or domains of human activities chosen to represent most of the area where sustainability problems and various solutions are salient. These are represented in the form of slices across all circles. Accordingly, they refer to the first principle noted above, that is, identifying the key types of human activities. These topics, as slices across all circles, are separated by dotted lines to emphasize the fact that the relationships of these domains are fluid, often overlapping or joined together to create sustainability challenges in various way, and over different time spans.

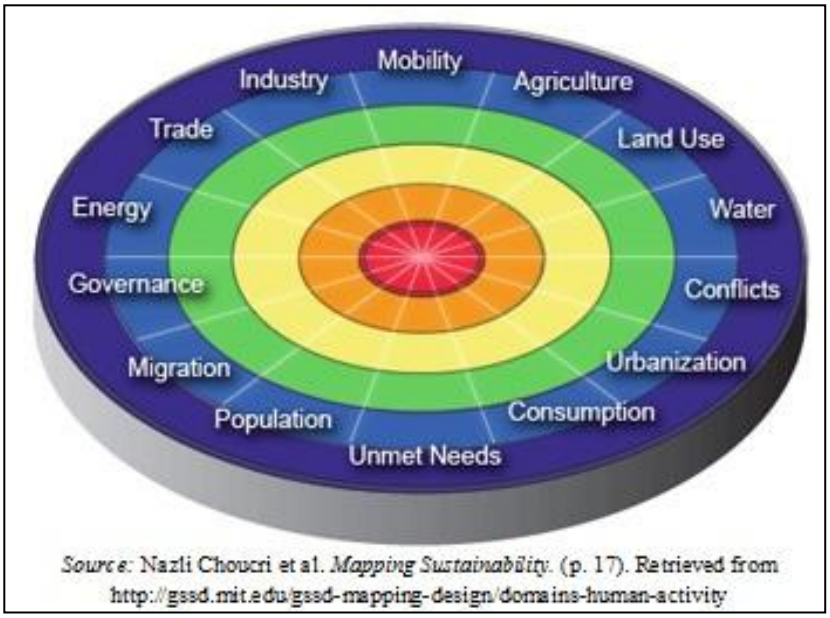


Figure 4 GSSD Mapping Design: Domains of Human Activity. (2007)

Next come the dimension of human activity, in Figure 5 below, which have circles intersect with the slices. They represent the second principle, namely the consequences of human activities. The center circle refers to fundamental and

generic human activities (in Figure 4 above). The next circle represents the problems created by these activates. Once these are identified described, then solutions are considered. First comes the circle of technical solutions, i.e., scientific answers. The next circle is devoted to social solutions, which include laws, regulations, social solution, ethics and other solutions human beings can contribute to reaching sustainability as distinguished from technical or scientific advances.

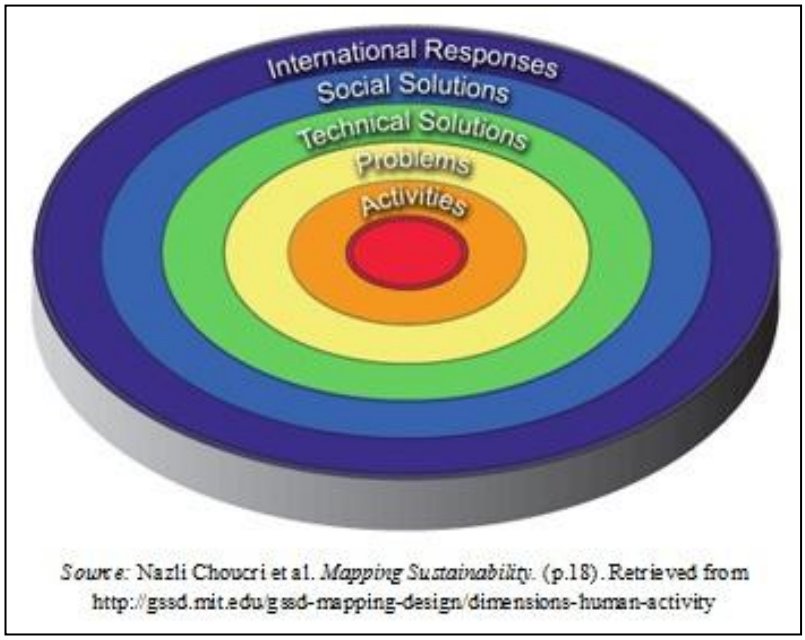


Figure 5 GSSD Mapping Design: Dimensions of Human Activity. (2007).

The separation into distinct circles is for conceptual and organizational purposes only. It is to provide some order in an otherwise complex area, with the understanding that this representation is situational and temporary. It does not reflect all relevant knowledge at all points in time. It does not imply that both types of solutions, technical and social, do not need to be applied to the same sustainability problems, which is often the case. On the contrary, in most cases, solutions require technical, financial, economic,

social and human solutions to address or even solve a problem.

Despite these caveats and qualifications, the distinction between technical and scientific solutions, on the one hand, and social, legal or regulatory solutions, on the other, is important. This is especially the case in the quest for sustainability, since innovations are required in all solution spaces to effectively reduce the damages on the natural environment due to human activities, as well as the derivative threats to the viability of the social order. In addition, given that today's solutions can create tomorrow's problems, the GSSD architecture can help address and even anticipate the conditions under which this might happen.

For an overview and a summarizing picture focusing on the substantive features of the knowledge system, see Figure 6, which shows the circles and subdivisions in the circles relating to each domain.

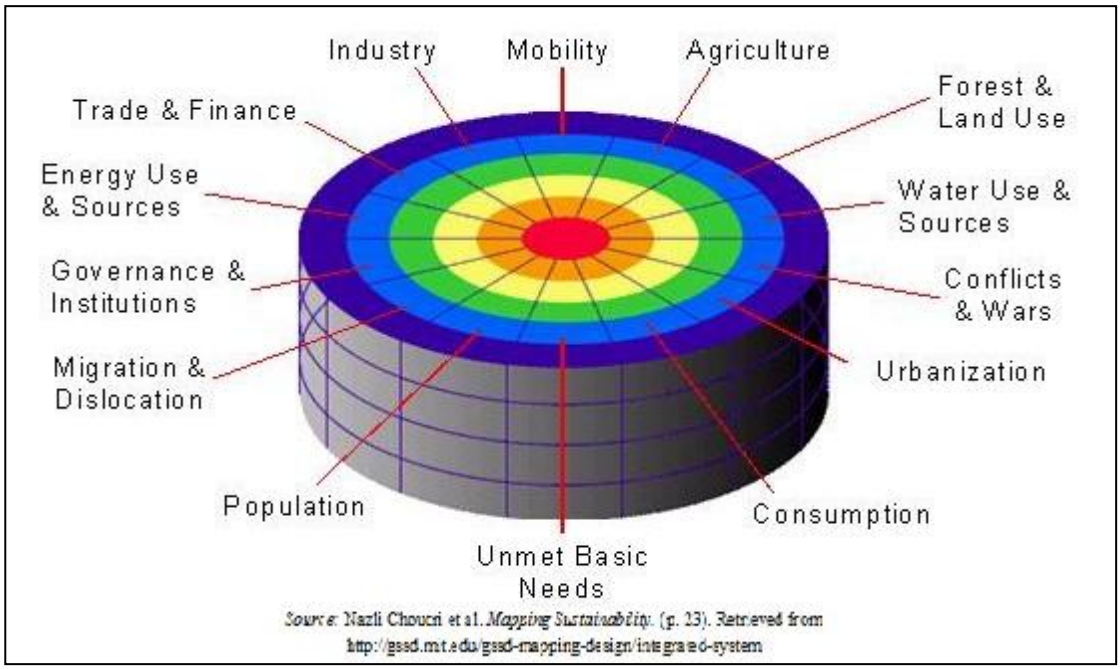


Figure 6 GSSD Mapping Design: Integrated System. (2007).

The outermost or largest circle shown in Figure 7 is devoted to international responses which generally consider

both Domains and Dimensions, but it is not organized in parallel fashion of slices (topics) that cut across circle (consequences, in terms of problems and solutions). Rather it is framed in all-inclusive terms focusing specifically on coordinated international action, such as international agreements, conferences, and other rubrics containing a mixture of many technical and social solutions but on an international level.

Figure 7 GSSD Mapping Design: Coordinated International Action. (2012)

Within this largest circle on the top is placed two major international initiatives, Agenda 21 and the Millennium Development Goals. (MDGs) Agenda 21 was released at the 1992 Earth Summit in Rio and the program was adopted by 178 countries. The program lists the (1) social and economic dimensions combating poverty, changing consumption, population concerns, integrating development and environmental concerns, (2) conservation

and management of resources, combating deforestation, correct agricultural practices, (3) strengthening the role of major groups -women, children, workers and (4) deals with means of implementation -financial resources, transfer environmentally sound technology, using science, international institutional arrangements, legal instructions and the spread of information. The MDGs consist of the international community current work plan toward sustainable development.

How Does GSSD Work As A Knowledge System?

Chapters 2, 3, 4 and 5 of Mapping go into the details of the first version of GSSD to show how it was organized to process the knowledge considered worthy of entering the system, the preparation of abstracts (see Figure 8 for a sample submit form) and the transition from one language to another. The current version is considerably more efficient in the management of inter-language representations.

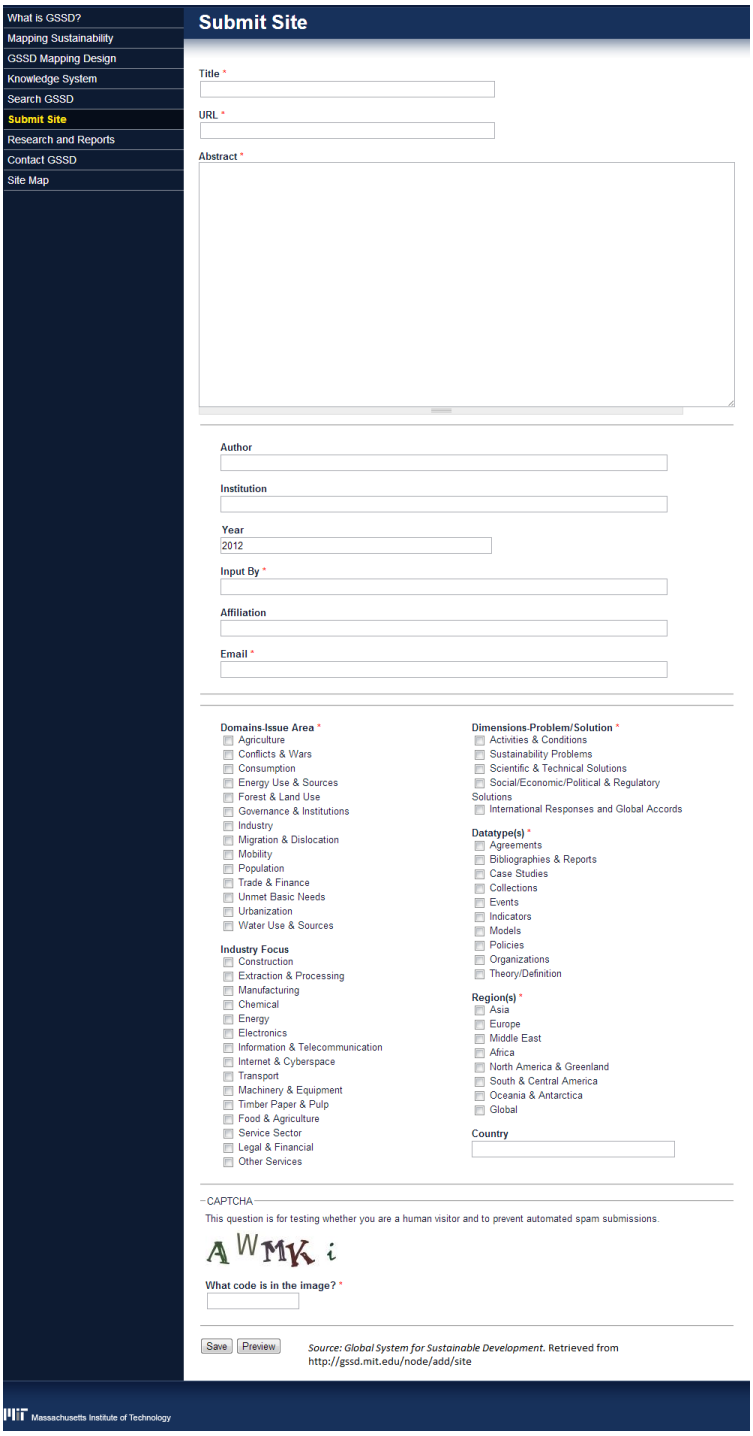
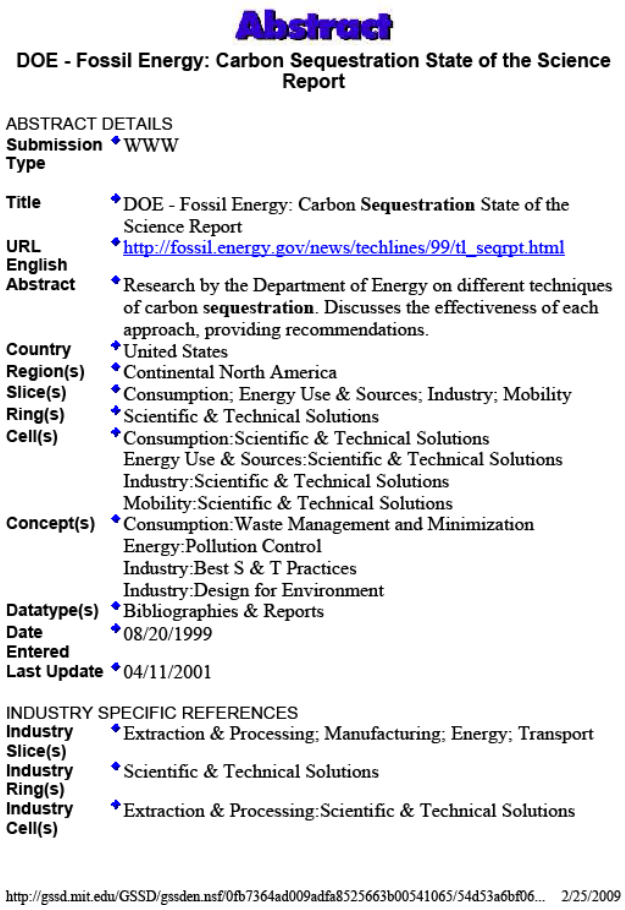


Figure 8 GSSD Submit Site. (2012).

Organization of Subjects By Abstracts – A Sample Abstract Form

Chapters 2, 3, 4 and 5 of *Mapping* go into the details how the GSSD is organized to process the knowledge considered worthy of entering the system, the preparation of abstracts (see Figure 9 for a sample abstract) and the transition from one language to another.

Figure 9



Abstract

DOE - Fossil Energy: Carbon Sequestration State of the Science Report

ABSTRACT DETAILS

Submission Type	WWW
Title	DOE - Fossil Energy: Carbon **Sequestration** State of the Science Report
URL	http://fossil.energy.gov/news/techlines/99/tl_seqrpt.html
English Abstract	Research by the Department of Energy on different techniques of carbon **sequestration**. Discusses the effectiveness of each approach, providing recommendations.
Country	United States
Region(s)	Continental North America
Slice(s)	Consumption; Energy Use & Sources; Industry; Mobility
Ring(s)	Scientific & Technical Solutions
Cell(s)	Consumption:Scientific & Technical Solutions Energy Use & Sources:Scientific & Technical Solutions Industry:Scientific & Technical Solutions Mobility:Scientific & Technical Solutions
Concept(s)	Consumption:Waste Management and Minimization Energy:Pollution Control Industry:Best S & T Practices Industry:Design for Environment
Datatype(s)	Bibliographies & Reports
Date Entered	08/20/1999
Last Update	04/11/2001

INDUSTRY SPECIFIC REFERENCES

Industry Slice(s)	Extraction & Processing; Manufacturing; Energy; Transport
Industry Ring(s)	Scientific & Technical Solutions
Industry Cell(s)	Extraction & Processing:Scientific & Technical Solutions

http://gssd.mit.edu/GSSD/gssden.nsf/0fb7364ad009adfa8525663b00541065/54d53a6bf06... 2/25/2009

The first generation Global Workflow Strategy is found in Chapter 3 which includes selection and content provision, identifying content and coverage. This chapter also lists the type of materials which are included, i.e.,

agreements, bibliographies, reports, journals, case studies, definitions/theories, events, indicators/data, models and organizations. The multilingual workflow process is described in detail in the chapter in Figure 3.2, including non-English submissions and English submissions requiring a non English version.

Chapter 4 focuses on the types of cyber partnerships that constitute the GSSD among other subjects such as GSSD operational roles and functions. The various partners are also outlined, i.e., content partner, translation partner, mirror site partner, development collaborator and general support. This chapter also raises the necessity to transcend the dominance of English.

The GSSD Is The Result Of Extensive Cooperative International Effort.

Colleagues at MIT and other universities, undergraduate and graduate students, both inside and outside the United States, Lotus- IBM and other companies and organizations have worked with Professor Choucri, who masterminded Mapping, edited it and wrote substantial parts of it.

The development of the GSSD has served as a useful tool for educating students who have worked with the faculty to create and operate the GSSD on the web.

A network of different actors participates in this activity in their own self-interest to increase their knowledge and/or in the public interest by contributing their own knowledge. These actors are governments, universities, the United Nations, companies, non-governmental organizations and others. They are a consortium of prestigious and carefully chosen knowledge contributors through their own websites or parts of them which are chosen to become part of the GSSD. These entities are expected to update the information they provide on their website and, to the extent they do not maintain this

reliability and quality of their information or do not remain current, they are removed from the system.

The subject of sustainable development is especially attractive to many young people who seek to work in activities in the public interest rather than for private profit. These efforts also serve to help private enterprise become a part of a sustainable future. This is essential because if business does not actively participate in trying to reach sustainability it will not happen.

Thus, the efforts in creating and operating the GSSD serve several purposes, which include the education of undergraduate and graduate students who work on it. In addition it provides government policy makers with an effective tool to help them recommend solutions to politicians, allows industry to help solve its sustainability problems, and helps to educate the public which needs to understand and induce politicians to take appropriate action to move towards sustainability. This is essential to a properly functioning democracy.

Other Important Sustainability Subjects Analyzed in Mapping Sustainability

In Part TWO of this book are subjects such as:

- Information and Communication Technology in the Arab Region and creating an Arabic and Chinese GSSD,
- Strategies for Re-Engineering Global Knowledge E-Networks,
- The value of knowledge for extended commercial enterprises,
- GSSD Enterprise for Multinational Corporations,

Part THREE of this book includes:

- Visualization,

- Exploring E-Governance - Salience, Trends and Challenges,
- Growing Clean - Property Rights, Economics Growth and the Environment,

(the elusive relationship between levels of economic growth and environmental outcomes concluding that neither economic growth nor property rights protection appears to lead to an improvement in environmental quality.)

- Globalization and International Trade - Utilizing insights from graph theory or the study of networks,
- Synergy for sustainability - Law, Science and Computability,
- Financial Risks and Climate Change examines how the banking system is beginning to take into account the risks associated with financing infrastructures in light of climate change and limitations of the production of C02,
- Global Agenda! VERSION 1.0 - Interactive Gaming and Simulation of World Politics,
- Basic vs. Complex logic in international relations – Taking Stock via Comparative Inquiry,
- Conclusion to Mapping of Sustainable Development.

Ethics of Sustainable Development

In the Dimensions (circles) just outside technical solutions appear social solutions, which include the social sciences, regulatory solutions, economics, politics, philosophy and ethics.

But more generally and more importantly, implicit in the underlying purpose of the GSSD is the assumption that all of this effort is to safeguard the best interest of our planet and the societies of the people living on it. The GSSD is a guide for companies who, in addition to earning profit, are given the knowledge on how they can be responsible civic-minded ethical citizens. They are responsible for avoiding harming our planet and its inhabitants. Up to now, we have exploited our natural surroundings, generally ignoring the harm done to the earth's systems and the damage to our citizens.

The World Commission on Ethics of Scientific Knowledge and Technology (COMEST) recently prepared a 25-page report to make explicit the ethical implications of problems of sustainable development, energy and other domains listed in the GSSD. It notes "ethics is thus not something added on top of other environmental issues, but rather a constitutive part of all of the reasonably justifiable responses to such challenges. Therefore, these issues cannot be dealt with adequately and properly if the ethical dimensions discussed in this report are not highlighted, well understood, and taken into account in decisions about responses. The purpose of this report was to make ethics a core and necessary element of any debate about environmental challenges.[109]

The GSSD focuses on useful human-centered knowledge necessary to understand the various ways in which nature and society are harmed by the most normal human activities. The GSSD itself encourages ethical conduct by focusing not on profit generation based on monetary value, but on integrating and concentrating on knowledge as a critical currency. Competence is a part of ethics. The pursuit of profit is an honorable activity. It is necessary but not sufficient. One person should not pretend

[109] UNESCO Executive Board Document – No 182. EX./INF. 16, Paris, 2 September 2009.

to serve another if he or she is not drawing on the knowledge assets of a society and on its best and most competent uses.

This duality implies a new kind of ethics that lead to sustainable development. We need a different way of thinking about the world and our roles in it. The primary focus in the past was on rapid exploitation of the earth's resources, in the search for power and wealth, without taking into account depletion, degradation, and other negative effects.

In order to reach such an objective new ethics must lead the way to new laws and new regulations to supplement them. We have also recently seen much soft law - the use of instruments of persuasion, resort to principles and quest for norms, which often are the first step to national laws or international treaties. There could well be a chicken and egg dynamics here whereby new laws and regulations, shape new ethics which when internalized by humans, then create behavior designed to protect.

Ethical Business Leaders, The South Mountain Company – A Small Ethical Business

The South Mountain Company is a small construction business cultivating workplace democracy. All the owners work in the company and decision making is by consensus reached by facilitation by a leader who listens and guides the group to produce accommodation. Consensus is produced by synthesizing the wisdom of all participants. A consensus means people give their consent. Discussion precedes a consensus as to an idea presented which is modified if necessary.

The owners in this business believe in mostly no growth or growth only at a snail's pace. The company has long term relations or connections which can increase its capacity with other small architecture firms and craft based

general contractors which are micro businesses with one to four people.

It aims to foster all bottom lines: profit, the environment, social values and other desirable objectives in the interest of its people and the community in which it operates.

Even though this company has a strong social and environmental mission significant earnings are possible due to efficiency and to a considerable number of wealthy clients who often prefer environmentally favorable buildings even if they cost more in the short term. Often higher prices can be recovered in the long run by saving energy costs. Nevertheless this company also serves others who need low cost housing which often attracts public financing by using the latest innovative and low cost technologies.

It is extremely loyal and caring to its community which is Martha's Vineyard, the beautiful island off the coast of Massachusetts. [110]

This company celebrates its humanity and works hard to create and maintain friendship and good relations with its workers, owners and clients.

Another goal stated by this company is that "it believes that our collective future depends on strong prosperous self-reliant local economies that carefully shepherd resources and promote social justice."

It is dedicated to the highest level of craftsmanship in its wood working, carpentry, metal and other works: the people love their work so it is of the highest quality.

[110] The description is taken from John Abrams' book written in 2005 *The Company we Keep: Reinventing Small Business for People, Community and the Place*, forward by William Greider, Chelsea Green Publishing Company. Post Office Box 428, White River Junction CT 05011. *The following summary and quotes are taken from the contents of this book*.

The view of the owners is "squarely at odds with short term business thinking" but "it will continue for generations". They think like cathedral builders who often took fifty years to build a cathedral. For their workers who probably did not see their cathedrals finished they provided a certain kind of immortality in the church they created.

So what is different about this company? It's the values they hold. They are summarized in the title of John Abrams' book cited above – People, Community and the Place.

To this end it has adapted a new form of company available in Massachusetts – the Benefice Corporation described below.

There have been more and more businesses mostly small companies in the last few decades whose executives are ethical by conviction who believe that it is necessary for their companies to promote good environmental and other social goals and not only go for profit. Some have become employee owned. See for example Patagonia, a California company, a maker of outdoor clothing and gear.[111] However the majority of large U.S. businesses still go primarily for profit for executives and shareholders and not enough for ethical objectives in the public interest. Thus business continues to tend to destroy our environment and weaken our important social structures in our society while creating wealth.

Cases Where Companies Considered Doing Social Good – Dodge vs Ford

Henry Ford and his Ford Motor Company had huge accumulated profits of about $60 million made by manufacturing the model A in 1903 and the model T Ford in 1909. The company led by Ford decided that no dividends should be paid by the company but all accumulated earnings

[111] See Patagonia Road Tests New-Sustainability Legal Status by John Tozzi Jan 4, 2012. http://mail-google.com/u/o: PUI = 28ik = 040dic88178 view = pt8s

should be reinvested in a huge new factory. His stated purpose was to do "as much good as we can, everywhere, for everybody concerned [...] and incidentally to make money"[112].

He later stated that the high profits were awful profits that "we don't seem to be able to keep profits down". In his autobiography he wrote: "So it has been my policy to force the price of the car down as fast as production would permit, and give the benefits to users and laborers with surprisingly enormous benefits to ourselves. [...] My ambition... is to employ still more men, to spread the benefits of this industrial system to the greatest possible number, to help them build up their lives and their homes. To do this we are putting the greatest share of our profits back in the business." [113]

He wanted to become even more successful so he could pay his workers higher wages so they could buy more cars and expand the U.S. economy.

It was his long-term idealism that led him to think in this way. Even though wealthy he lived simply and spent modestly. He was following his ideas of how a good ethical person should act. It was an idealism not unlike that of those who believe reaching sustainability and saving our environment have today i.e. the long-term best interest of everybody.

However Mr Ford's plans were ruined in part because of his minority shareholders John and Horace Dodge who had manufactured Ford vehicles for him in the past.

These minority shareholders sued him and his company in 1916 which lawsuit was finally decided in the Michigan Supreme Court at 204 Mich 459 (1919). "Their claim was that the decision was based on Henry Fords'

[112] Henderson, M. Todd 2007 John M. Olin Law & Economies Working Paper No 373 Electronic copy available at http://ssrh.com/abstract_id = 1070284
[113] Ford 1922, My Life and Work at page 162.

idiosyncratic preferences about doing social good for workers and customers as opposed to making the most money for shareholders."[114]

The Michigan Supreme Court ruled that the Ford Motor Company must declare a dividend on the principal that a "business corporation is organized and carried on primarily for the profit of its shareholders."

The Supreme Court of Michigan rejected the Dodge's request for an injunction to prevent the Ford Motor Company from building the huge River Rouge Ford plant that exists today on the theory of the business judgment rule that courts will refrain from second guessing whether a board of directors' decision is justified. Courts are not experienced business experts.

Hershey Foods Corporation

In another case, in 2002 the New York Times reported: "the charitable trust that was a majority shareholder and controls the Hershey Foods Corporation abandoned its auction late last night even though it was on the verge of accepting a $12.5 billion cash-and-stock offer from the Wm. Wrigley Jr. Company, executives close to the negotiations said.

After a 10-hour board meeting in the Philadelphia suburb of Valley Forge, the trust said it has asked company executives to end their search for a buyer. Ten of the board's 17 members voted to halt the auction, a person close to the board said."

[...] "A person close to the trust's board said that the trustees had been overwhelmed by the outcry of protest from the community since the trust announced in July that it was considering selling its stake in Hershey Foods to diversify the trust's $5.9 billion base of assets."

[114] Id at page 1.

[...] "But Pennsylvania's attorney general, Mike Fisher, sought to block any sale in the Dauphin County Orphans Court, which oversees charitable trust activities, arguing that court approval was needed for any deal and contending that a sale could devastate the town, where about 6,200 people work for the company."

In this case the interest of the community took precedence over maximizing the return to the shareholders and diversifying the assets in the 5.9 billion bases of assets.[115]

These two cases illustrate different outcomes where the public interest was considered with different outcomes.

Legal Developments In The United States Encouraging Other Stakeholders Interests Which May Be Considered In Making Decisions In Addition To Shareholders Monetary Interets

In the U.S. in the 1970's state legislatures started to enact "Other Constituency Statutes" which typically provided that "in acting in the best interests of the corporation, the directors may take into account the interests of a variety of constituencies other than shareholders, including employees, the community in which the facilities of the corporation are located, customers, suppliers, creditors, the economy of the state and nation, societal considerations and the long-term as well as short-term monetary interests of the corporation including the possibility that these interests may be best served by the continued independence of the corporation" in case of a purchase of all the shares in a company.

[115] http!//www.nytimes.com/2002/09/18/business/18HERS.html?todaysheadlines.

These statutes[116] generally allow directors to take other factors beside shareholder profit into account but didn't require them to do so.

The Benefit (B) Corporation

In April 2010 the state of Maryland became the first state in the U.S. to pass benefit corporation legislation. By January 2013 there were twelve states with B Corporation statutes.

This movement has also spread internationally.

"As of July 2013, there are 780 certified B Corporations across 60 industries in 27 countries, including Canada (78 companies), Australia, South Africa, and Afghanistan. The most active community outside of the United Sates is **Sistema B**. Since 2012, Sistema B has been the adaptation of the B Corps movement in Latin America, including in Argentina, Brazil, Chile and Colombia. As of August 2013, 74 companies have passed the assessment. This non-profit adapts proprietary certifications and evaluation metrics and modifies both to the context of each country. B Lab is also assists Sistema B in incorporating a benefit corporation distinction into local legal systems."[117]

Historically U.S. corporations' purpose is to make money for shareholders not for social, environmental improvement or improvement of the community.

More recently entrepreneurs like John Abrams (mentioned previously in the paragraph about The South Mountain Company) have wanted their business to include in its goals objectives that improve the world, their local communities and lead toward sustainable development and improving the environment.

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[116] See Hansen, Charles, 1991. Other Constituency Statutes: A Search for Perspective, The Business Lawyer: Vol 46, August 1991 pages 1356-1376 and the Minnesota Statute cited in footnote 3 of the above article.

[117] B Corporation (certification) – Wikipedia, the free encyclopedia – http://en.wikipedia.org/wiki/B_Corporation_(certification), page 3.

Since these objectives do not fit into the purpose of a normal commercial company some shareholders expecting profit maximization could object and sue the directors for violating the corporate law, and for future to respect their fiduciary duties.

The Benefit Corporation framework "expands the duty of directors to also work for non financial stakeholders as well as the financial interests of shareholders. This gives directors and officers of mission driven businesses the legal protection to pursue an additional mission and consider additional stakeholders besides profit."[118]

Thus these B corporations must create a public benefit and shall have the right to name specific public benefit purposes. Directors have the duty to consider the effect of decisions on shareholders and the other stakeholders such as employees, suppliers, customers, communities, and the environment.

Directors shall also publish an annual Benefit Report describing what public interest they have fostered. Failure to pursue a public benefit can be the subject of legal action only if shareholders and directors.

There is also the possibility of securing a certificate from the B Lab, a U.S. non-profit organization that checks whether the B corporation "achieves a verified minimum score on an outline assessment for high social and environmental performance and a requirement that companies integrate their stakeholder commitments into the company governing documents."

In light of the above considerations in order to reach sustainable development the public needs to be more educated in how to act and actually act that way. Then the public must force its politicians to do what they are

[118] This section is based upon material and where quoted from http://en.wikipedia.org/WIKI/Benefit_Corporation consulted 12/28/13.

supposed to do i.e. what the educated people in a democracy want.

The Force of NGO's

Another growing force inducing business to act more socially responsible is the recent importance, growth, influence, number and power of Non Government Organization's (NGO's) who give publicity to harmful or unethical business practices especially in less developed countries. This puts pressure on multinationals by "blaming and shaming" them.

Oxfam International, a confederation of 17 non-governmental independent organizations, was formed in 1995 now working in 95 countries. Their aim is to work together for greater impact on the international stage to reduce poverty and injustice.

Oxfam has been involved in actions relating to excessive working hours in China with Apple's principal subcontractor Foxconn[119]. Another Oxfam intervention occurred with regard to Michelin's plans to build a plant and industrial park destroying 456 hectares of a community forest in India[120]. It has analyzed and wrote a critical report on IKEA on its social responsibility[121]. In Kenya Oxfam worked on a label on Unilever's tea products guaranteeing almost 200 environmental criteria.

Oxfam also measures how much poverty ("*empreinte pauvreté*") multinationals cause in poor countries. This is an endeavor to analyze social and ecological impacts. It

[119] Apple and the Fair Labor Association Enterprise\sustainable development Policy\Partnership NGO-Enterprise published 08-06-2012. mhtml:file//C:\Documents and Settings\bbonnamour\Local Settings\Temporary Internet Files\Content.Ou… 25/11/2013

[120] Michelin in India: a new step in disputes with NGO's. mhtml:file://C:\Documents and Settings\bbonnamour\Local Settings\Temporary Internet Files\Content.Ou… 25/11/2013

[121] Oxfam's campaign against Ikea. Mhtml:file://C:\Documents and Settings\bbonnamour\Local Settings\Temporary Internet Files\Contents.Ou… 25/11/2013

evaluated Coca Cola's social impact in Salvador and Zambia in order to develop new strategies.

As these examples illustrate non-governmental organizations have had significant impacts on companies causing ecological damage and irresponsible or unethical conduct through complaints, publicity and sometimes litigation.

In conclusion more legislation is needed to induce more companies and businesses to become B Corporations or work more in the public interest to reach sustainable development. Otherwise the profit motive will continue to dominate business activity and prevent enough practical effective action by the business community to help us to avoid environmental problems and fix existing ones. It is unfortunate but true that if the business community worldwide does not heavily participate in good faith we won't succeed in reaching sustainable development.

However, in practice it is highly unlikely that aroused citizens in a U.S. state could succeed in getting the B Corporation form forced on all businesses by legislation. The next best action might be to have the Federal and State governments allow partial tax exemptions to businesses willing to adapt the form of B Corporations to encourage adoption of this form.

For the remainder of the environmental problems State and Federal Government can enforce specific environment laws more effectively and enact new ones that become necessary under the supervision of the EPA on a case y case basis.

The time we will get to sustainable development, if ever, will depend on how fast our populations get educated to believe this effort is urgent, how fast it pushes their politicians to pass enforceable effective practical legislation to force all or enough members of the business community to pitch in and work hard on these problems.

Peoples' attitudes are usually very slow to change. Therefore new generations are usually necessary to facilitate significant changes. Many businesses still deny that there are existential dangers looming in the future like climate change that scientist foresee and other long term environmental problems. This is the usual reaction to the need to change especially where there are vested interests or costs connected to such changes that no one wants to pay. Even when evidence accumulates clearly indicating change is necessary, the next stage after denial is to argue there is inadequate proof to justify action. The coal and oil industries resist change. In addition we have a real problem in finding enough clean energy to drive our industrial system to produce wealth. For future generations, there is the potential problem of unlimited increasing population growth after the astounding recent growth which more than tripled to 7 billion since 1927. This growth hopefully will be slowed or stabilized by birth control and educating more women. There is also the very serious problem in many places of lack of clean water, sanitation and clean air. The business community may not be the only actor necessary to fix these problems but without it nothing significant or not enough can be done. But it will not be easy to convince the business community to not only work hard to earn profit but that sustainable development and saving a healthy environment is an urgent necessity. More governance by women would probably accelerate progress. This has worked for the Bonobo monkeys because their females cooperate to insure better governance than if only the males remain in charge. We surely can do as well as these monkeys.

Progress in Moving Toward Sustainable Development?

In 1987 the Bruntland Commission defined Sustainable Development as "development that meets the needs of the present without compromising the ability of future generations to meet their needs [...].

Education at all levels can help to move the concept beyond UN terminology and into practice but the educational community has yet to embrace the broader concept of sustainable development as it has incorporated environmental stewardship and other similar factors and the socio-political issues of equity, poverty, democracy and quality of life [...].

The question now facing the educational community is how can ESD (Education for Sustainable Development) be translated into practice so that it can be effective in transforming society to a more sustainable future?"[122]

There has been an enormous amount of research, scholars writing, and conferences on Sustainable Development including the 1992 UN Rio de Janeiro Conference in Brazil followed by meetings in 1997, and the 2002 at Porto Alegre Brazil where cultural policies were added to Agenda 21 considerations and a last meeting 2012.

In the U.S., the U.S. Partnership for Education for Sustainable Development is working to foster Sustainable Development.[123]

[122] Venkataraman, Bhawawi 2010 published on line; Environment: Science and Policy for Sustainable Development Volume 51, Issued, 2009.

[123] See also Educators for Social Responsibility's Mission Statement "to make teaching social responsibility a core practice in education so young people develop the conviction and skills to shape a safe, sustainable, democratic and just world." ESR Annual Report 2012-2013. www.esrnational.org. This organization at 23 Garden Street Cambridge MA 02138 (617 492-1764) provides consultants to schools and teachers and is partially supported by numerous foundations and individuals. It had revenue and support 2012 – 2013 of $2,173.018.

Opposition to Agenda 21

However, unlike in many places in the rest of the world there is substantial opposition in the U.S.. "The Republican National Committee has adopted a resolution opposing Agenda 21, and the Republican Party platform stated that "We strongly reject the UN Agenda 21 as erosive of American sovereignty." Several state and local governments have considered or passed motions and legislation opposing Agenda 21. Alabama became the first state to prohibit government participation in Agenda 21. Many other states, including Arizona, are drafting, and close to passing legislation to ban Agenda 21.

Activists, some of whom have been associated with the Tea Party movement by the New York Times and The Huffington Post, have said that Agenda 21 is a conspiracy by the United Nations to deprive individuals of property rights. Columnists in The Atlantic have linked opposition to Agenda 21 to the property rights movement in the United States. Glenn Beck co-wrote a dystopian novel on this subject.

The wealthy Koch brothers have spent over 65 million dollars financing organizations who are climate change deniers so politics and a conservative philosophy appear to deny the conclusions of a UN scientific consensus that according to a carefully constructed model there is a strong possibility that bad things are coming in the future.

A June 2012 poll of 1,200 United States voters by the American Planning Association found that 9% supported Agenda 21, 6% opposed it, and 85% thought they didn't have enough information to form an opinion."[124]

In summary, an enormous amount of study and conferences have been held on this subject by international and national organizations at all levels. In addition much work has been done to educate the public since 1950. See

[124] http://en.wikipedia.org/wiki/Agenda_21

the UN Global Sustainable Development Report which was launched at the High Level Political Forum on Sustainable Development of 24 September 2013. However such efforts are slow to reach the average citizen. Another document was prepared for the International Institute for Sustainable Development, a Canadian organization "Measuring Progress Toward Sustainable Development Goals" by László Pintér in 2013 which addresses how to track progress which requires targets, goals, and indicators, but this only works for one subject at a time. However many elements constitute sustainable development.

It is difficult to conclude now on how much progress has been made since there have also been respected scholars who believed there was no way our societies could be sustainable if companies continued on a business as usual growth agenda. If one considers the conservative Republicans in the U.S. it is obvious there is strong opposition as noted above.

With Growth --- No Sustainable Development - Economist Herman E. Daly

One former World Bank Economist, Herman E. Daly, believes that "not only is growth not sufficient for truly sustainable development, but is directly opposed to the goals that this doctrine generally responses."[125]

This review of about 3 pages is complex in explaining Daly's book drawing on "a medley of theory and practice from economics, ecology, sociology, political science and physics in order to argue that ever-increasing growth is not only an undesirable and inefficient economic outcome but that it is also a physical impossibility that will lead human society and the planet to ruin (page 1).

[125] Beyond growth: The Economics of Sustainable Development (1997 Boston MA: Beacon Press). Written by: Herman Daly Reviewed by Trip O'Shea, December 2008, htpp://mail.google.com/mail/u/0/?ui=2&ik=040dfc8817&view=pt&s.

"Although his analysis goes on to include highly specific recommendations and critiques of everything from loan interest, monetary policy, family planning, the banking system, intellectual property laws, the WTO, and the religion, his core argument is that our current growth paradigm is operating within "zero-sum" constraints, and that if we continue as we have in the past we are doomed to hit a wall, and hit it hard. Therefore, policy makers and macro indicators should move to a new paradigm away from growth and towards balanced development that is truly sustainable.

Daly's views were anticipated by Thomas Malthus' *An Essay on the Principles of Population* (1798) and Paul Erlich and other studies. However, Daly's background as a neo-classicist educated economist and his experience as Senior Economist for the World Bank working on sustainable development makes his opinions and research in a number of different disciplines an authority in the thinking on sustainable development.

International Energy Agency – Energy Efficiency

In order to make progress on sustainable development relating to climate change the world's top energy international think tank, the International Energy Agency (IEA) is concerned that "climate change could pass a critical level if the world waits until 2020 for the planned comprehensive UN deal to cut emissions […]. It urges stop-gap climate action –" described as "a sticking plaster […] some short term measures" which are politically more likely to meet with success at present.

These include energy efficiency "the bed rock of the approach (49%) with recommended energy performance standards in all countries for lights, heating and appliances" which is "typically resisted by manufacturers wishing to continue profits from current models." There should also be a big cut in the $523 billion a year subsidy for dirty fossil

fuels "which should be welcomed by governments" to save money.

The IEA is pessimistic about current trends which indicate "the world is moving further away from its target of limiting global temperature rise to 2c[126].

In the IEA's 2014 World Energy Outlook Special Report executive summary "Map Energy – Climate The Redrawing" it notes: "The world is not on track to meet the target agreed to by governments to limit the long term rise of an average global temperature to 2 degrees Celsius."

According to this report "we shall expect extreme weather events (such as storms, floods and heat waves to become more frequent and intense as well as increasing global temperatures and rising sea levels." This report suggests temperatures will more likely be increased to 3.6 c and 5.3 c.

At present it seems unlikely enough energy use can be reduced to reach the 2 c limit which will cause real problems for millions of people. So with regard to climate change the goal of reaching Sustainable Development seems unlikely now.

Some initial government planning has been done to adjust to the consequences but not much. Low lying land will be underwater forcing significant population movements. Frigid areas like in northern Canada, Siberia etc may become suitable for agricultural use, and hot deserts and surrounding areas will become hotter and dryer with water shortages becoming even more critical. Hopefully this will happen slowly to facilitate serious adjustments problems.

The UN CIEC models provide guides as to possible scenarios which could limit temperature rises.

[126] See Harrabin, Roger BBC News Science and Environment. http://www.bbc.co.uk/news/science-environment-22845425

However, models seriously prepared seldom reflect what happens in reality even though great care and top scientific knowledge and talent have worked on these models. As some wise man commented: “We can predict anything but the future.”

The History of U.S. Environmental Law

On the other hand if one reads the history of Environmental legislation by Richard Lazarus in his book "The Making of Environmental Law"[127] it is obvious that much U.S. legislation and regulation has been enacted in the 1970s when nearly 20 major environmental protection laws were passed. This continued in 1980s and 1990s in the U.S. at the Federal, State and local level. So if progress is measured by legislation and regulation one can conclude that there is much progress even though with varied enthusiasm for enforcing it... “in an on again off again” way. However, if one considers what needs to be done compared to what has been accomplished one could probably conclude we are not moving fast enough to reach sustainable development any time in the near or medium term future.

It is probably impossible in the absence of being able to definitively define and measure sustainable development in order to decide whether there has been progress. Never the less since there are plenty of unknowns in life many people believe it prudent to work toward sustainable development and try to solve environmental problems regardless of objections of vested business interests and the vagueness and difficulties in measuring progress. Action is usually justified even if based on probabilities of what seems reasonable and even if there are many important unknowns.

[127] Lazarus, Richard J, 2004, The Making of Environmental Law University of Chicago Press.

How Cyberspace and Cyberpolitics Facilitate Reaching Sustainable Development

In Professor Choucri's book *Cyberpolitics in International Relations*[128], the author discusses information and other technology in Cyberspace, claims that Sustainable Development and Cyperspace converge and meet and work together i.e., to create synergies for a better result than either of these bodies of knowledge can produce alone. However, she emphasizes that the key issue to understand is the difference between the Internet and Cyberspace.

She defines the Internet as:

- *"The people* – that is, the users and constituencies of cyber venues who participate in and shape the cyber-experience – who communicate, work with information, make decisions and carry out plans, and who themselves transform the nature of cyberspace by working with its component services and capabilities, and by making direct and indirect demands for the construction of new functionalities.
- *The information* – in its various forms and manifestations – that is stored, transmitted, and transformed in cyberspace.
- *The physical foundations* that support the logical elements, the fundamental physicality that enables the "virtual" manifestations of interactions.

Of course we recognize that the second, third and fourth layer are enabled if not operated by, people, but we differentiate here between those that are essentially users or "takers" who constitute the "demand" side, versus those that

[128] Choucri, Nazli, 2012, *Cyberspace in International Relations*, MIT Press.

are central to the layer functions that jointly enable the "supply" side."[129]

Professor Choucri notes that some of the organizing principles she defined in creating the Global System for Sustainable Development (GSSD) also are suitable for organizing knowledge in the field of Cyperspace. The relationship of these two disciplines is discussed in chapter 9 of this book entitled "Cyberspace and Sustainability: Convergence on the Global Agenda." She recalls that Cybernetics was a word used by Norbert Wiener at MIT on Control and Communication in Animal and Machine to describe the work he did. The word Cyberspace is generally attributed to William Gibson who used the term in his science fiction novel Neuromancers (1984).

Professor Choucri explains the nature of cyberspace as follows:

"**Cyberspace as domain of interaction with the Internet at its core:**

Cyberspace

Global Domain of Human Interaction

- Created through the interconnection of millions of computers by a **global network** such as the Internet.
- Built as a layered construct, where physical elements enable a logical framework of **interconnection**.
- Permits the processing, manipulation, exploitation, augmentation of information, and the interaction of **people** and information.

[129] Chapter 2 (drafted by David Clark), in Nazli Choucri and David Clark, *International Relations in the Cyber Age: The Co-Evolution Dilemma (MIT Press, under review 2016)*, reproduced with permission.
For an engineer's view from Schneider Electric for an industry definition of Cyberspace, see George Wren, MIT Cyberspace Seminar, MIT Spring 2015.

- Enabled by **institutional** intermediation and organization.
- Characterized by decentralization and interplay among these **actors, constituencies** and i**nterests**."[130]

As an amalgam of interoperable networks, the Internet has become a critical part of the emerging global communication infrastructure. When the World Wide Web came along, it was described as "a killer application... that took the Internet from a relative handful of enthusiasts into the domain of serious, commercial, and governmental users."[131] The information content layer is expanding at exponential rates. New information is being generated and transmitted, and more mechanisms are being created to facilitate content use and reuse. Such trends involve innovative organization and business practices, new state-based initiatives, new rules and regulations, and new institutional mechanism of management and regulation.

Over a relatively short period of time, what was initially constituted as a neutral domain of interaction created by technological innovations flowing mainly from the United States came to be influenced if not dominated by political contentions, both in the United States and elsewhere. The cyberspace is now a venue for competition among interests and interest groups, as well as an arena for conflicts and contentions surrounding the increasingly visible hand of government. We can no longer ignore the political salience of cyberspace: As one astute observer has noted, cyberspace is becoming "heavily contested,

[130] Choucri Nazli, Lectures on *International Relations Theory in the Cyber Age*, MIT, 2016. Based on Nazli Choucri and David Clark, *International Relations in the Cyber Age : The Co-Evolution Dilemma (MIT Press, Under Review 2016) ;* reproduced with permission.

[131] Spinello (2202, 28) citing Barrrett (1997).

colonized, and reshaped by governments, militaries, and private corporate and civic networks."[132]

Subjects considered in chapter 9 "Cyberspace and Sustainability: Convergence on the Global Agenda" are:

The Logic for Synergy

Convergence on the Global Agenda

World Summit on the Information Society

Millenium Development Goals

Institutional Alignment for Cyber Management

> This part considers which institutions do Development, Assistance, Policy Coordination, Standards, Laws and Regulations. See charts in this section organizing this subject matter.

Knowledge Imperatives for Cyberpolitics

Domain Ontology

> Organizing the knowledge in master variables

Knowledge networking

> Leveraging the power of networking

Multilingual Capability

The Future of Cyberpolitics

In describing four different possible cyber futures Professor Choucri makes one key assumption that "the traditional real systems of interactions, power, and influence will shape the contours of cyberspace in the future".

She relies on two aspects in her analysis relating to authority and decision, i.e., state sovereignty as distinguished from private authority. She also takes into account whether behavior is conflictual and violent rather than one of cooperation and working together. These

[132] Professor Choucri writes "I am grateful to an anonymous reviewer for framing the issues as quoted."

concepts allow identifying possible future situations in cyber politics that can happen but these are possible models and not specific predictions.

Each model is based on different assumptions relating to international relations and different decisions made by sovereign states or private interests of each nation. Reality will undoubtedly not follow precisely these models and can well be a mixture of more than one.

The first model is high sovereign control which exists in Saudi Arabia, Myamar, North Korea, and China. This model is referred to as the Garrison cyber system in a context usually associated with high levels of international conflict and violence.

The second model, cyber anarchy, is one with an absence of centralized control with high conflict: "a proverbial Hobbesian state of nature".

The third cyber future results "from international cooperation in a world dominated by non-state actors, agents, and entities." She calls this "global cyber commons" in which "civil society, local and global, would be the main supporter and constituencies of this model."

The fourth model is one managed by sovereign states characterized by a high degree of cooperation and collaboration. This model is referred to as cyber grand bargain.

As Professor Choucri convincingly writes, sustainability and cyberspace are converging on the global agenda.

Her view of sustainability as described in her Global System of Sustainable Development (GSSD) is in one way even more closely linked to cyberspace than merely converging on the global agenda because the GSSD is driven by the Internet. The Internet drives the GSSD as it is

connected to other reliable sites that provide important and updated information. It serves as its motor.

Eco-Carbone, an example of an Ethical Environmental Enterprise

Some companies not only generate profits but carry on new ethical conduct, i.e. "green" activities, which help alleviate global warming by reducing CO2 and promote sustainable development. Eco-Carbone, a French company, is one which qualifies as an ethical company working for the general welfare and also earning money in this relatively new type of ethical action. This remarkable company has highly skilled experienced personnel, a president, who led Degremont, the world leader in water treatment and a vice-president, François Falloux, who is a trained agronomist with a longstanding experience in development work and carbon finance at the World Bank. Operations of this company include eco-carbon activities in France and Europe, managed by Daniel Kreiss. François Giraudy is manager for Africa with activities in the agro-industrial sector. Tan Wenkui is head of Chinese activities working with Chinese coal mines using methane technology. Lys Nguyen works in Vietnam in raising jatropha plant used in bio fuel oil production and Tony Horta is a trained agronomist who works in Brazil on jatropha biofuels projects. Its other employees have similar qualifications. This company carries its own research and development department to develop high-yielding jatropha varieties, provides technical assistance to farmer cooperatives, guarantees purchase of crops, invests in ownership of industrial facilities including jatropha grain crushing facilities and it produces and markets jatropha biofuels and castor bean. It also provides consulting, technical assistance, project development. Eco-Carbone specializes in carbon reduction projects and markets the resulting carbon assets in both Kyoto Protocol related projects and voluntary markets,

and participates in Clean Development Mechanisms (CDMs) and Joint Implementation (JI)[133].

New Fields for Ethics - Biomedicine

A new field for application of ethics has arisen. Due to recent and rapid scientific progress in biomedicine, bioethics has become a field of intensive inquiry which has even led to formulating acceptable bioethics norms, such as those relating to cloning and genetic selection and rules relating to use of embryos for scientific research. This is a new field, one which UNESCO has given high priority. France has underlined its importance by inserting this subject into its constitution[134].

In previous centuries, the slave trade was not generally considered unethical by most of the population but ethics have changed.

These examples demonstrate how new situations arise to which ethical principles are applied.

6. ARE ETHICS SUBJECT SPECIFIC?

Professions

Many professions have deontological rules, specially designed to fit their activity. Governments and associations for medical doctors, lawyers, accountants and architects make and enforce their special rules. Some have complained that while the American Bar Association (ABA) promulgates rules for lawyers in the United States, it also promotes the best interests of the profession. Therefore these rules may not always be only in the public interest.

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[133] See http://www.eco-carbone.com (viewed 31 July 2010).

[134] UNESCO Brochure, 2nd ed. 2005. *Human Cloning*. *Ethical Issues*. It is stated, on page 11, that "The world community provided an answer when it declared human cloning contrary to human dignity in Article 11 of the Universal Declaration on Human Genome and Human Rights (1997)".

See also Byck, Christian. 26 March 2008. *La Constitution, loi suprême de la cité ou instrument du sacré de la bioéthique?* (The Constitution, supreme law in society or document to sacralize bioethics?). JPC/La Semaine Juridique, Edition générale, No. 13, page 3.