Summary of Proceedings

Workshop on

Indicators of Sustainable Development

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Workshop on Indicators of Sustainable Development

A major accomplishment of the World Summit on Sustainable Development in Johannesburg was an increased focus on implementing sustainable development: "words are good, actions are better." This results-oriented focus raises several important questions:

- What indicators are available for measuring progress towards our sustainable development goals?
- What is the quality of those indicators and the data upon which they are based?
- What international processes exist for creating and maintaining such indicators?
- How does the U.S. Government participate in domestic and international indicator efforts?

This three-hour workshop was designed to educate senior U.S. policymakers on the current state of sustainable development indicators and stimulate discussion about how these indicators can be used to support our sustainable development objectives.

Panel 1: The International Organization Perspective

Speaking on this panel were:
- **Charles Di Leva**, Lead Counsel, Environmental and International Law Unit, The World Bank
- **Jan Vandemoortele**, United Nations Development Program (UNDP)

Charles Di Leva presented selected development indicators in a multilateral context as they are being used at the World Bank. Di Leva pointed out that many people are working on specific indicators in different areas of the Bank. He then focused on elements that come up frequently when the Bank uses indicators.

The first element he discussed was population, particularly the growth of young populations in the developing world. He pointed out that the population of the earth is projected to increase by two billion people in the next thirty years, and by one billion in the next twenty years. Almost all of this increase will be in urban areas in developing countries, particularly in coastal areas. Population in the developed world, on the other hand, is projected to remain relatively flat, while the average age in these countries will increase markedly.

He the discussed the *2002 World Development Indicators* update on the Bank's Millennium Development Goals (MDGs). A key finding of this report was that, although there has been significant progress toward the goals, this progress has been uneven. Though many middle-income countries have made real progress, there are often regions or ethnic groups that lag far behind. Poorer countries, particularly in Sub-Saharan Africa

have made less progress and there are significant gaps in the data available for these countries.

He then discussed factors that are important to meeting MDG targets. He broke this discussion up into three parts corresponding to the "triple bottom line" which underlines the Millennium Development Goals: economic, environmental, and social progress.

On the economic front, Di Leva pointed out that 29% of the population of low- and middle income countries live on $1 per day or less (a figure that represents close to 2 billion people). He went on to say that current global overseas development assistance (ODA) amounts to about $57 billion per year. This represents a decline of about 8% in real terms over the past decade. About half of this assistance goes to the poorest countries (those with per capita incomes below $755 per year). Foreign direct investment (FDI), in contrast, amounts to about $300 billion globally – over five times the size of ODA flows. He pointed out, however, that this investment is not distributed in the same way as ODA. The bulk of FDI is focused on only 12 to 15 countries. In the same way that FDI is unevenly distributed between nations, it is often also unevenly distributed within nations – tending to benefit some economic groups more than others. He then observed that, in order to meet the MDGs, the income of poor countries would have to grow at an average annual rate of 3.6%.

Di Leva then discussed World Bank lending activities in relation to these goals. He observed that Bank lending is increasingly aimed at social and economic adjustment rather than investment. He suggested that the decline in Bank investment lending in all regions except Africa might be due to greater access to other sources of capital in middle income countries, a general shift toward the private sector for infrastructure financing, and to Bank operational policies. As an indicator of this trend, he observed that bank lending for energy projects has dropped by half, while lending for social projects has doubled.

Di Leva then turned to proposals for ways in which the Bank can work toward furthering MDGs. First, in order to reach the MDGs by 2015, the Bank estimates that $50 billion per year in foreign aid will be required. He noted that both the amount of aid and its targeting need to be improved to attain the MDGs. It is also important to focus on the direction of capital movements – insuring that net flows toward poor countries remain positive. He also said that it is important to reduce trade barriers and certain subsidies – especially those that inhibit flow of agricultural and industrial goods from the poorest countries. He further emphasized the importance of improving infrastructure in poor countries to ease the flow of commerce.

Di Leva pointed out that the 2003 *World Development Report* focuses on the importance of institutions for the first time. The report recognizes that, "institutions such as property rights and rule of law are essential for creation of human-made assets and the efficient operation of markets as coordinating institutions." It further acknowledges that "additional institutions are needed to coordinate and ensure an adequate supply of the assets that are not spontaneously provided by markets: environmental assets and social

assets." Consistent with this thinking, multilateral institutions have become more willing to provide funding for recurring costs such as teacher salaries.

Di Leva said that the Bank is working toward better harmonization among donor nations and multilateral development banks in procurement, financial management, and environmental assessment as well as promoting partnerships among the public sector, the private sector and civil society.

Di Leva then moved on to the environmental front. He pointed out that development as currently practiced involved unsustainable patterns as discussed in the *World Development Report*, the *IUCN Red Book* of endangered species, and numerous other documents. One approach to addressing these patterns is to apply the scarcity rents collected on newly scarce environmental public goods, such as atmospheric absorption capacity, toward the alleviation of poverty and the financing of other public goods. He also recognized the contrarian view, exemplified by Dr. Herman Daly and others, that poverty cannot be reduced by economic growth because this growth in GDP may have greater social and environmental costs than it has increased production benefits.

He said that the World Bank was increasing its support for biotechnology research and regulatory frameworks. The Bank is planning to help developing countries assess, explore, and use new technologies. He pointed out that current disputes between the United States and the European Union on genetically modified organisms would play a large role in how this initiative proceeds.

Di Leva went on to mention emissions and effluent trading schemes as a means of environmental mitigation. He also pointed out the trend toward green procurement and certification in mining, forestry and fisheries – including the new Bank forests policy.

On the social front, Di Leva emphasized the greatly expanded role of non-governmental organizations (NGOs) in Bank projects over the past decade. He said that 70% of Bank projects involved NGOs in 2001 and that this has enhanced project results. He went on to point out the Banks increased lending for community-driven development projects – where loans are made directly to community-based organizations, rather than to central governments. He said that the Bank was also encouraging greater internal and independent scrutiny of investment impacts, as well as shifting its focus toward results-based foreign direct investment.

Di Leva also discussed the larger trend toward corporate social responsibility (CSR) and the development of the Global Reporting Initiative (GRI) with its effort to develop standardized indicators for corporate sustainability reporting analogous to current standards of corporate financial reporting. He pointed to the substantial success of this program in the paper and packing industry and growing reporting levels in the energy industry.

Jan Vandemoortele began his remarks with a discussion of the indicators developed to assess progress toward the Millennium Development Goals (MDGs), which were established at the UN Millennium Summit in September 2000. He said that the MDG indicators included thirty core factors on economic, social, and environmental sustainability.

He then turned to a particularly important indicator known as U5MR, which stands for under five mortality rate and indicates the probability of a child dying before reaching the age of five years. He pointed out that, while the decade of the 90s saw some progress on this indicator, it was less than that in previous decades. He said that this was a general trend across many indicators and many nations. He emphasized that the current, reduced rate of progress would not support the meeting of MDGs for 2015.

Vandemoortele also demonstrated that the progress in the past decade has often failed to reach the poorest people. He showed a graph comparing the ratio of U5MR between the top and bottom quintile in various developing countries in the late 80s and the late 90s. The graph demonstrated that the gap between infant mortality among the top quintile and infant mortality among the bottom quintile widened dramatically in many developing countries during the 1990s. For example, in Zimbabwe in the late 80s, a child in a poor family was twice as likely as a child in a relatively wealthy family to die before the age of five. By the late 90s, such a child was five times more likely to die.

Vandemoortele then discussed the various types of indicators used to track MDG progress. He broke indicator data into two broad categories: survey data and administrative data. He said that these two types of data often give markedly different results for the same phenomenon. He pointed to education and maternal mortality statistics as being particularly subject to differences based on the type of data collected.

He then discussed a range of survey instruments and offered the observation that those of national scope tend to be quantitative, while those of local scope tend to be qualitative. He pointed out that both types of survey are useful in the proper context.

Vandemoortele then examined the difference between outcome indicators and input indicators. Though input indicators are often easier to collect, outcomes are usually the actual object of study. He pointed out that, in many places, the allocation and spending of money does not translate directly into the provision of services. He underscored the desirability of tracking expenditures for basic services to the unit of service delivery (which might be a local school or clinic).

He next discussed issues associated with aggregating indicators and developing country rankings. One issue is whether to look at the level of an indicator or its trend. For example, a country with low scores that are improving rapidly might be thought to be in better shape than a country with higher scores that are deteriorating. He also discussed various methods of aggregating many indicators into a country index. He offered the Human Development Index (HDI) as an index that uses a sophisticated method to combine indicators. He contrasted this to a simpler method where each country receives

a ranking for each indicator and then these rankings are averaged. He suggested that both approaches have utility in different situations.

As an example of the importance of attending to aggregation methods, he presented U5MR statistics for Namibia and Bolivia. Both countries have comparable U5MR rates. However, in Namibia, while the differences in M5MR between the lowest 40% income bracket and the highest 20% income bracket are modest (about a 30% difference), they are quite stark in Bolivia (about a factor of four). Vandemoortele used this example to show how an index can mislead if not properly understood.

Vandemoortele closed with a discussion of the so-called "fallacy of misplaced concreteness."   He emphasized that averages and indicators help us to understand complex situations, but that they do not exist in reality. Rather, they are abstractions of the human mind. Concreteness is misplaced when unwarranted conclusions are drawn based on deductions from abstractions, rather than based on real observations. It is a fallacy, for example, to conclude that the income of the median income person necessarily goes up when the per capita income for a nation goes up. To focus on increasing per capita GDP in the name of helping the poor without examining distributional impacts is to commit the fallacy of misplaced concreteness.

Panel 2: Independent Efforts

Speaking on this panel were:
- **Robert Prescott-Allen**, Independent Consultant
- **Alex de Sherbinin**, Columbia University

Robert Prescott-Allen described the approach used to measure sustainable development in his book, *The Wellbeing of Nations*. He began by dividing the many components of sustainable development into two major classes, ecosystem wellbeing and human wellbeing. Ecosystem wellbeing combines environmental components like diversity and condition of land, freshwater and marine ecosystems, and of species and genetic variants; air quality and state of the atmosphere; and the supply of ecosystem resources and services. Human wellbeing combines economic and social components such as income, productivity, employment, infrastructure, knowledge, education, communication, culture, health, population, freedom, governance, social cohesion, security, peace, and equity.

He then suggested that a sustainable development indicator should also have many components – that it must be a compound indicator, or index, combining indicators of all of its components. He further suggested that an ideal sustainable development index would have several major properties. It should be:

- Comprehensive: its constituent indicators representing all the main features of sustainable development.
- An absolute rather than a relative measure: showing the sustainability of societies and not just how they compare with each other.

- Easy to grasp: portraying sustainable development graphically, including differences between places and change over time.
- Policy sensitive: readily disaggregated to show strengths and weaknesses, priority issues, policy results, and the contribution of policies to sustainable development.

Prescott-Allen then presented a graphical "Barometer of Sustainability" that represented countries as points in a two dimensional space with human wellbeing on the vertical axis and ecosystem wellbeing on the horizontal axis. Both of these index components were represented on a scale of zero (at the origin) to 100, with better performance rating a higher number. Countries closer to the origin are therefore less sustainable and countries further from the origin are more sustainable. He also demonstrated how the barometer could be used to show the progress of countries over time by plotting multiple points representing the status of a country at different times.

He then demonstrated how the barometer could be used to represent the major strengths and weaknesses of a country. Because the subcomponents of both human and ecosystem wellbeing are also indexes which range from zero to 100, Prescott-Allen is able to represent the components of the score as a cross with weak components to the left and downward and strong components to the right and upward.

Prescott-Allen then compared and contrasted his methodology with related efforts. In the process, he provided a further description of the conceptual and technical underpinnings of his indicator. He presented the challenge of indicator development as being one of taking complex inputs and generating simple outputs. To be meaningful and trustworthy, the indicators chosen must cover sustainable development comprehensively. To be useful in guiding policy and public opinion, they must be clear and easy to interpret.

His response to this challenge is to divide the problem into three basic parts. Decide what to measure by designing a framework of components and aims. Decide how to measure by selecting high quality indicators. And finally, create a picture that presents a readily comprehensible graphic index. He proceeded to give more detailed accounts of each of these steps.

He presented a framework of components and aims. He derived the components of the indicators by beginning with the two subsystems (people and the ecosystem) and then developing increasingly specific elements until he arrived at measurable indicators. He suggested that this process should:

- Identify the essential components of the system.
- Avoid duplication.
- Avoid gaps.
- Highlight unavoidable gaps.
- Ensure an appropriate weight is given to each component.
- Show the logic behind the choice of components and weights.
- Measure key relationships between groups of components.

- Combine the indicators to give us measurements of major features, the system as a whole, and sustainable development.

He then argued that because human and ecosystem wellbeing are essentially complementary, they should be given roughly equal weight in developing an index. He warned against the danger of inadvertently reducing the weight given to environment by introducing subcomponents of human wellbeing (e.g. economy, society, institutions) and then weighting all components equally.

Prescott-Allen defined sustainable development as a high level of human wellbeing (because no one wants to sustain a low standard of living) plus a high level of ecosystem wellbeing (because the ecosystem supports life and makes possible any standard of living).

He further defined a high level of human wellbeing in terms of five aspects:

1. Long lives in good <u>health</u>, and a stable <u>population</u>.
2. The <u>wealth</u> to secure basic needs and decent livelihoods, promote enterprise, and maintain prosperity.
3. The <u>knowledge</u> to live well and sustainably, and a <u>culture</u> that links past and present, individuals and society, and spirit and nature.
4. A <u>community</u> that upholds the rights of its members, has an open and clean government, and is safe from violence and crime.
5. Benefits and burdens <u>shared equally</u> by males and females and <u>equitably</u> among societal groups.

He then defined a high level of ecosystem wellbeing in terms of five aspects:

1. Conserving the diversity of natural <u>land</u> ecosystems and the quality of developed land.
2. Conserving the diversity and quality of marine and inland <u>water</u> ecosystems.
3. Restoring the chemical balance of the global atmosphere and the quality of local <u>air</u>.
4. Maintaining all native wild <u>species</u> and the <u>genes</u> in major species.
5. Keeping <u>resource use</u> within the carrying capacity of the ecosystem.

Prescott-Allen proceeded to describe the process of breaking down the key elements of these aspects into high quality indicators. He defined high quality indicators as having the qualities of being representative, reliable, and feasible.

He then described the process of converting raw indicator data to a common unit for combination into an index. He noted that, of the three possibilities (a physical unit, a monetary value, or a performance score), all indicator-based indices use performance scores. However, he said that all but the Wellbeing Assessment derive these scores from the range and distribution on observed performance. The Wellbeing Assessment, in contrast, derives the scores from performance criteria. These performance criteria

combine a number of factors to map the indicator value to a 100-point scale ranging from good to bad. He said that indices derived from performance criteria could show the condition of societies in relation to defined standards of human wellbeing, ecosystem wellbeing, and sustainability, while indices derived from observed performance can show only relative performance (i.e. how societies perform in relation to each other).

Alex de Sherbinin discussed the Environmental Sustainability Index (ESI) and related efforts. He described the ESI as the work of a partnership between the World Economic Forum, the Yale University Center for Environmental Law and Policy, and the Center for International Earth Science Information Network (CIESIN) at Columbia University. It began as a pilot project in January of 2000 and has been refined since that time. 2002 saw the release of a pilot Environmental Performance Index (EPI).

He explained that the ESI was developed to:

- Help fill the gap between *goals* and *measurement* emerging in sustainability discourse.
- Encourage *policy debates* to shift to a more empirical foundation.
- Facilitate *research* on the drivers and consequences of sustainability trends.
- Focus principally on the *environmental* aspect of sustainability rather than on its social and economic development aspects.

De Sherbinin described that the ESI is comprised of five components, which are considered essential to environmental sustainability:

- Environmental Systems
- Environmental Stresses
- Human Vulnerability
- Social and Institutional Capacity
- Global Stewardship

Each of these components is in turn composed of between two and five indicators. This yields a total of 20 indicators. He then described how his group has identified two to six variables to serve as quantitative measures for each of the 20 indicators. This yields a total of 68 variables. Each of the twenty indicators is weighted equally in computing the index – thus implicitly weighting those components with more indicators more heavily.

De Sherbinin presented a list of the 68 variables, showing how they are grouped into indicators and components. He pointed out that the data is spotty and unreliable in some critical areas. He went on to describe the large variety of data sources and types that the group used to develop a useful index.

He presented the top and bottom ten countries from the 142 countries ranked by the ESI. He commented that, while the overall scores provided a snapshot of performance, they are not terribly informative for deeper analysis of sustainability.

De Sherbinin presented a report card for an individual country. The report card compared the country's performance on each of the twenty indicators to an income-based peer group. The report card also showed a spider diagram that displayed actual performance in each of the five components as deviations from a pentagon whose five points represent perfect scores in each of the component areas.

He described the process by which his group used these spider diagrams to group countries with similar strengths and weaknesses in a process called cluster analysis. They found that five groups emerged from this analysis. Cluster one includes most of the poorest countries. These countries generally have high vulnerability – as represented by undernourishment, health problems and child mortality – but, given that they have low levels of industrialization, they are characterized by low stresses and low impacts on the global commons.

He described clusters 2 and 3 as being comprised of moderate- to high-income industrialized nations. Cluster 2 has the highest average ESI scores, as well as the highest average incomes. These countries tend to have larger territories and lower population densities than those in Cluster 3. Cluster 3 is characterized by higher levels of environmental stresses and slightly poorer systems. In addition to a number of densely populated Western European countries, the list includes Japan, South Korea and middle-income Eastern European countries.

He further described clusters 4 and 5 as representing slightly better off developing countries than Cluster 1. Cluster 4 countries manage to provide basic health services and piped water to their citizens, yet they have the lowest average scores across the other indicators. These countries are characterized by poor scores on governance, private sector responsiveness and capacity for debate, which portends a weak capacity to cope with unfolding environmental challenges. Cluster 5 is the largest grouping. On average its ESI scores are about equal to the scores for Cluster 3, and it has the lowest environmental stresses of any of the clusters.

De Sherbinin concluded his discussion of cluster analysis by presenting a map that showed that many of the cluster members are close in proximity, which might mean that they share many of the same environmental, geographic, and sociocultural characteristics.

He then compared the ESI with other well-known indices. He described ESI as a pragmatic effort, governed largely by what kinds of data were currently available, and not necessarily by what would be *ideal* sets of indicators. He said that the team felt that it was premature to set absolute thresholds of sustainability, given the complexity of sustainability as a multidimensional phenomenon, and the potential for technological changes that might alter what are currently considered to be fixed thresholds.

By comparison, the Consultative Group, which grew out of the CSD process and the Balaton Group, adopted a more consensus-driven approach to identify indicators. Many of their indicators – such as crime and out-of-wedlock births – do not strictly speaking relate to the environment. He characterized Prescott-Allen's Wellbeing Index as

adopting a different approach, separating human and ecosystem well being, and assessing each country against fixed performance benchmarks. The Ecological Footprint is focused on the consumption of renewable and non-renewable natural resources. Wealthier countries score lowest on this index. He said that there are also sets of indicators for the OECD member states, which tend to be the most data-rich countries. Data to compile these indicators – such as percent of waste recycled or sewage treated – often cannot be found for data-scarce countries.

De Sherbinin next gave a brief description of his groups new Environmental Performance Index (EPI). He said that the EPI measures current results and rates of change in high-priority environmental policy objectives including air quality, water quality, climate change, and land protection. He said that this index required more rigorous data than the ESI and so was limited to the 23 countries (mostly members of the OECD) for which such data were available.

De Sherbinin then discussed future directions in measures of sustainability. An examination of spatial patterns of sustainability is a major initiative of CIESIN. They are currently working to map MDG indicators at a sub-national level in many developing countries such as Brazil, India, and Mexico. Preliminary results from this project make it clear that there is substantial variation in major indicators between regions of many states. They are also moving toward the development of region-specific indicators for analyzing regional groups of countries. He said that they are working with partners in Asia and the Middle East to develop indicators for these regions. Such region-specific indicators have the benefit of eliminating some of the variation that is due to geography alone. He also said that he thought it was possible to develop information systems to track progress toward sustainability both spatially and temporally, providing policymakers at the national and international levels with a rich source of guidance as data availability increases.

He concluded by emphasizing that the creation of meaningful indicators is possible even though the quality and quantity of data is uneven. He saw a positive sign in the heightened interest in indicators of sustainable development as manifested by the MDGs, the Millennium Challenge Account, and work being undertaken by the Millennium Ecosystem Assessment. He said that these efforts were likely to yield more and better data.

Discussion

This panel was followed by a brief discussion period.

An attendee (Turner) said he was struck by de Sherbinin's remarks about the quality and quantity of data. He asked what were the most serious challenges involved in dealing with this problem.

Robert Prescott-Allen responded that environmental data is generally in much worse shape that human data. He said that we know very little about changes in the environment over much of the world. On the human side, he said that maternal mortality is reported very differently in different places.

An attendee (Turner) asked whether there was a correlation between the level of corruption in a country and the paucity of data in that country.

De Sherbinin responded that this hypothesis could be tested, but only for a limited number of countries. He pointed out that, in general, countries with low levels of development tended to have more corruption and less availability of data. However, both these two conditions might be driven by the level of development, rather than the one (corruption)driving the other (data availability). He agreed with Prescott-Allen that environmental data is very limited – even in the United States.

An attendee (Hecht) asked how these indices could be used to motivate policy action. He pointed out that these data are not often used to set goals and, when such goals are set, they are often changed later on..

Robert Prescott-Allen replied that moving goals were inherent in the process and did not necessarily present a problem. He underscored the need to work from the best knowledge at the time.

Panel 3. A U.S. Government Perspective

Speaking on this panel was:
- **H. Theodore Heintz, Jr.**, Council on Environmental Quality

H. Theodore Heintz, Jr. talked about U.S. government sustainable development indicator efforts.

Heintz began by discussing the basic concepts involved with indicators of sustainable development.   He said that such indicators differ from other economic indicators in that they are designed to address opportunities for future generations as well as current well being. They are also designed to include economic, environmental and social aspects of development on a fairly equal footing.

Heintz said that the objective of such indicators was to provide valid, trusted, and regularly reported measures of development in its various aspects. These indicators are designed both to inform policymakers and to promote public understanding, which is critical to making difficult policy choices in a democratic environment. To this end, he emphasized that the real purpose of indicators is to ground and verify the stories on which policymaking is based.

He then gave a brief summary of U.S. government efforts toward developing indicators of sustainable development since the Rio Earth Summit in 1992. These include the efforts of the Interagency Working Group on Sustainable Development Indicators (the SDI Group); the Montreal Criteria and Indicators for Sustainable Forest Management; the Sustainable Resource Management Roundtables for Rangelands, Minerals, and Water Resources; the Heinz Center Report on the State of the Nation's Ecosystems; the EPA Report on the Environment; and various state government and private sector group efforts. Heintz proceeded to discuss some of these efforts in more detail.

Heintz said the SDI group framework involves three types of indicators: endowments, driving forces, and current outputs and results. He discussed each of these types of indicator in turn.

Endowment Indicators
Endowments are assets that yield a flow of services over time. Economic endowment indicators include capital assets and less tangible, but still measurable factors like productivity. Environmental endowment indicators include surface water quality, acres of major terrestrial ecosystems, and the level of contaminants in biota. Social endowment indicators include children living in families with only one parent present, and teacher training levels and qualifications.

Driving Force Indicators
Driving forces are processes that change endowments into outputs. In generally they include things like investment and depreciation, restoration and degradation, and social institution building and decay. Specific economic driving force indicators include investment and energy consumption per capita and per dollar of GDP. Environmental driving force indicators include conversion of cropland, soil erosion, and the balance of timber growth to timber removals. Social driving force indicators include the number of people in census tracts where more than 40 percent of the inhabitants live in poverty.

Current Output Indicators
Current output represents what the economic, natural, and social system is producing at present. An example of an economic current output indicator is personal consumption expenditures per capita. An environmental current output indicator is the number of people living in cities not meeting air quality standards. Social current output indicators include life expectancy, educational achievement, and crime rates.

Heintz then described the SDI group process. Participants in the process included members of federal agency staff (who were mostly self-selected), as well as various stakeholders who participated in the process through conferences and meetings. The group published preliminary findings on the web in 1998 and in a printed report in 1999. These findings included forty experimental indicators that reflect the health of various aspects of the economic, environmental and social system of the United States. The group has generally maintained these as distinct indicators, avoiding the use of indexing to aggregate the indicators into a single number.

Heintz further pointed out that the SDI Group's findings are available in a revised and updated form on the website http://sdi.gov.

Heintz then moved on to discuss the Montreal Criteria and Indicators for Sustainable Forest Management. This protocol is the result of a multilateral negotiation involving ten countries. U.S. participation was informed by the participation of a group of stakeholders brought together in a series of round table discussions.

The result was a document known as the "Santiago Declaration" signed in 1995. It contains a series of criteria focused in seven areas: the conservation of biodiversity; the maintenance of productive capacity; the maintenance of ecosystem health; the conservation of soil and water resources; the maintenance of forest contributions to the carbon cycle; the maintenance of long term socio-economic benefits; and the extent to which the legal, institutional and economic framework supports the conservation and sustainable management of forests. Each of these criteria includes several indicators that represent concretely measurable phenomena, resulting in a total of 67 indicators. These criteria and indicators are discussed in detail in "A Report to Facilitate Discussion of Indicators of Sustainable Forest Management" by David Darr, USDA Forest Service, which is available at http://www.fs.fed.us/land/sustain_dev/sd/.

The United States expects to implement the Santiago Declaration through the publication of a national report on sustainable forests in 2003. This document will contain a preliminary interpretation of the criteria and indicators as they relate to United States forests and institutions.

Heintz went on to say that the roundtable approach used in developing the forestry criteria and indicators has had some success in developing similar indicators for other resources that are contested by multiple stakeholders, including rangelands, minerals, materials, energy, and water resources. Critical elements of this process are open, multi-stakeholder participation and facilitation provided by non-federal partners (because the federal government is often considered to be a stakeholder). He expects to see first reports on rangelands and minerals emerging from this process this year.

Heintz then turned to the Heinz (no relation to Heintz) Center report, "The State of the Nation's Ecosystems". This report was an out growth of National Academy studies and on Office of Science and Technology policy initiative. It focuses on ecosystems conditions and on human uses of resources.

The report develops indicators for six ecosystem types: coasts & oceans, farmlands, forests, fresh waters, grasslands & shrublands, and urban & suburban areas. It also develops a set of core indicators that reflect the state of the nation's ecosystems as a whole.

In general, the Heinz Center report analyzes ecosystems according to four basic characteristics: system dimensions, chemical and physical conditions, biological components, and human use. These, in turn, are broken down into components. System

dimensions include extent and degree of fragmentation. Chemical and physical conditions include nutrients, carbon, oxygen, chemical contaminants, and physical conditions. Biological components include plants and animals, biological communities, and ecological productivity. Human use includes food, fiber, water, and other services, including recreation.

The Heinz Center report exists as both a web-based (http://www.heinzctr.org/Programs/Reporting/overview.htm) and printed document. It identifies 103 indicators. National data is available for 58 of these indicators while partial data is available for 25. Data is inadequate for 31 indicators. Measurement methods are needed for an additional 14 indicators. The report is geared toward presenting data and identifying the many gaps in data availability, rather than toward data interpretation.

Finally, Heintz discussed the work of the Council on Environmental Quality. He said the council is founded on the recognition that the various efforts underway within the federal government provide a good basis for further work on indicators. It is working to develop an interagency process for coordinating indicator efforts.

Heintz pointed out that the economic indicators that we take largely for granted today took considerable time to develop, and require substantial institutional capability to maintain. He suggested that indicators of sustainable development present a similar challenge.

He then enumerated five issues that the CEQ has identified for future work:

- What vision of the role of indicators in American society should guide the development of a national system of environmental indicators and related economic and social data?

- How should national statistical reporting on the environment and related economic and social factors be organized and how should such an effort relate to data collection for Federal program management?

- What efforts are needed to improve the validity, consistency, and coverage of the data used for indicators?

- What efforts are needed to fill the gaps in the set of indicators needed to understand environmental conditions and trends?

- How can we promote the development of assessment methods needed to help users and the public understand the implications of the indicators being published?

Heintz closed by emphasizing that democratic governance means that our government can not take major action unless most people agree that such action is needed. This requires assessments that the public can understand in terms of valid stories.

Concluding Discussion

The meeting concluded with a general discussion period.

An attendee (Turner) asked whether the United Nations was working to standardize data that is collected by its members to be used in projecting global trends.

Jan Vandemoortele replied that, while economic data is increasingly standard and complete, environmental data is far more complex. He attributed this largely to the lack of consensus on how to collect such data. He pointed out that, while social indicators tend to be easier to define (a person is alive or not alive, in school, or not), environmental indicators tend to be far less clear cut and therefore are much harder to agree on.

An attendee asked what sort of success stories exist concerning the role of indicators in a policy context.

Alex de Sherbinin responded that governments have been very interested in their Environmental Sustainability Index (ESI) score and are interested in improving it. He said that Mexico was now monitoring sustainability factors at a sub-national level in an effort to improve their score. He said that the success of this program is hard to predict, but that the Mexican government seems to be taking it seriously.

An attendee (Monaghan) asked if it was clear what Mexico would have to do better to improve its ESI score.

Charles Di Leva responded that institutional failure was the real problem in many cases and that it has been consistently difficult to develop a reliable and meaningful governance indicator.

An attendee asked whether indicators can tell us why things are happening as they are, rather than simply what is happening. He further asked whether the proposed environmental Kuznets curve (the idea that economic growth will automatically lead to sustainable environmental improvement) might render the development of such indicators superfluous.

Charles Di Leva responded that each situation is unique, every country and society is different, and that he considered it very dangerous to rely on the Kuznets assumption.

Robert Prescott-Allen added that indicators do not, themselves, provide all the answers, but that we would need good indicators before we could hope to adequately address the pressing questions of why things happen as they do. He further suggested that even with

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current data, it is possible to make significant generalizations. For example, he indicated that current data show that there is not a one to one tradeoff relationship between improvements in human well-being and improvements in the environment – that it seems possible to have a high quality of human life at a low environmental price.

An attendee asked if it was possible to put error bars or confidence ranges on indicator data and whether such an effort might spur the creation of better data.

Jan Vandemoortele responded that the data is improving rapidly. He pointed to a set of subnational maps of indicators for Mexico as an example of such improvement. He said that such refined data made it possible to tell (and verify) much more complex and subtle stories.

An attendee (Turner) observed that the United States is criticized for not having coherent statistics on sustainability. He asked how we, as a government and a society, are doing in addressing this issue.

H. Theodore Heintz replied that there are currently many efforts underway, but that they do not add up to a coherent whole. He suggested that the government was faced with a challenge to organize the efforts of its various agencies to present a unified government view on sustainability.

An attendee observed that indicators are useful for understanding, but can not be translated directly into policy. He pointed out that the process by which the indicators are developed is often as important as the resulting set of indicators.

Heintz replied that social learning is discussed in the National Academy's report. The authors of this report regard indicators as an important part of the social learning process. He observed that social learning is similar to science in that it proceeds by trial and error. Indicators are an attempt to provide input to this learning process that is more than anecdotal. He observed that the United States generally does not like top-down decision making (though such methods are often used), and that changes leading to sustainability were particularly unlikely to come about this way. He said that any real change would have to happen on many levels simultaneously and would have to be driven by discussion and substantial consensus.

An attendee (Monaghan) added that the same could be said of international efforts toward sustainability.