Analysis&Perspective

Environmental Sustainability Index Likely to Become Important Management Tool

By Steve Charnovitz

At the recent meeting of the World Economic Forum in Davos, Switzerland, a task force unveiled the Environmental Sustainability Index (ESI). The purpose of the ESI is to provide a consistent method of grading the progress of each nation's efforts to achieve environmental sustainability. No such index existed in the past. So the new ESI may become an important management tool for governments and a valuable benchmark for business and civil society.

The ESI task force set up by the World Economic Forum is composed of business and environmental leaders from 10 countries. The task force is chaired by Kim Samuel-Johnson, a Canadian businesswoman. The ESI project director is Daniel C. Esty, a professor of law and environment at Yale University. The technical work for the index was performed by the Yale Center for Environmental Law and Policy and by the Center for International Earth Science Information Network at Columbia University.

Construction of a new environmental index would be an important event in itself, but sponsorship by the World Economic Forum gives the ESI high visibility and instant credibility. The new project reflects a growing appreciation among global business leaders of the importance of national environmental performance. Indeed, the topic of the environment received considerable attention at the Davos 2000 meeting.

In releasing the ESI on January 31, the task force described it as "experimental," a "pilot," and a "prototype" and invited an international dialogue over what constitutes environmental sustainability. The task force will continue to refine the index in the months and years ahead. It hopes, ultimately, to "isolate the drivers" of environmental sustainability. (See related article in this issue.)

The purpose of this article is to explain the new ESI index and to discuss its significance. The article begins by summarizing how the ESI is designed. Next it reports on the initial findings by the World Economic Forum task force. Then it assesses the ESI and offers a few recommendations for improving it.

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Designing the Index

The ESI is built from five *components*. They are: (1) environmental systems, (2) environmental stresses and risks, (3) human vulnerability to environmental impacts, (4) social and institutional capacity, and (5) global stewardship. Each of these components reflects several *factors*. For instance, one factor in environmental systems is urban air quality. As introduced this year, the ESI has a total of 21 factors that are counted equally to obtain the aggregate index for each country.

Each factor is measured by one or more *variables*, depending on the availability of comparable data across countries. Urban air quality, for example, is measured by the concentration of nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and suspended particulates. In total the project found 64 usable variables. The ESI team dropped countries for which it could not find data covering at least half of these variables.

The key design decision for the ESI was selection of the five components. The task force is saying that the way to achieve environmental sustainability is for a country to score well on these. A brief review of these five components will provide a basic understanding of the ESI and a flavor of its particulars.

Overview of Components

The **environmental systems** component examines whether the environment itself is being maintained at healthy levels. The key factors are urban air quality, water quantity, water quality, preservation of biodiversity, and land quality. This is the most straightforward of all the components. These factors are surely central in judging the condition of today's environment and in making predictions for the future.

Water quality had the greatest available data. For that the study team uses measures of the concentration of dissolved oxygen, suspended solids, lead, phosphorus, fecal coliform, nitrogen, nitrate, and nitrites.

Data on land quality proved challenging. For that the study uses measures of soil degradation from a database of the U.N. Environment Program. Yet this is just one aspect of land quality. The authors lament that they could not find cross-country data for the accumulation of toxic waste products in soil.

The **environmental stresses and risks** component examines whether "the levels of anthropogenic stress are low enough to engender no demonstrable harm" to key environmental systems. (Anthropogenic stresses emanate from people.) The study identifies several key factors. They are air pollution, water pollution and consumption, waste production and consumption pressure, population growth, and specific stress. Deforestation is examined as the most prominent specific ecosystem stress.

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The examination of waste production and consumption was hindered by the absence of data, but the authors found three useful data sets. To measure the amount of waste disposal, the ESI uses the percent of households in each country with garbage collection. To measure nuclear waste, the ESI uses spent nuclear fuel per capita. To measure "consumption pressure," the ESI borrows an index of consumption pioneered by the environmental organization Worldwide Fund for Nature (WWF). This index counts consumption of grain, fish, wood, cement, and freshwater; it also counts carbon dioxide (CO_2) emissions.

The ESI task force notes several problems with this component. One is that environmental stresses are hard to measure because they require a lot of information and a broad understanding of interactive effects. Another is that this component can be overdetermined by geography. For example, Singapore scored far lower than the authors believe it should score.

The **human vulnerability** component examines the susceptibility of people to environmental disturbances. The entire ESI, of course, is concerned with humans. But this component focuses on health-related ecological impact. The factors identified are basic sustenance, public health, and exposure to disasters.

The authors of the ESI found data for several measures of basic sustenance. They are the percent of households with electricity, the percent of urban population with access to safe drinking water, the percent of rural population with such access, and daily per capita caloric intake as a percent of total individual daily requirements.

The **social and institutional capacity** component examines political institutions and the underlying skills, attitudes, and networks that foster effective responses to environmental challenges. This component comprises six factors: science and technical capacity, efforts to track environmental conditions, eco-efficiency, capacity for rigorous policy debate, environmental regulation and management, and public choice failures.

The authors assemble a number of eclectic yardsticks to measure social and institutional capacity. For example, capacity for rigorous policy debate is measured by the number of environmental organizations in each country that are members of the World Conservation Union (IUCN). It is also measured by the extent of civil liberties using the ratings by Freedom House, the research institute that compiles the annual *Freedom in the World* report. Environmental regulation and management is measured by the percent of land area under protected status, the percent of urban population with access to sanitation facilities, and the transparency and stability of environmental regulations. The transparency and stability data come from a survey conducted for the World Economic Forum's annual competitiveness report.

So-called public choice failures occur when governments make decisions for the benefit of special interests rather than the public interest. The ESI looks at three variables to measure such policy failures: low gasoline prices, fossil fuel subsidies, and the Corruption Perceptions index developed by Transparency International, a nongovernmental organization that promotes government accountability and opposes corrupt practices. The ESI team tried to find cross-country data on agriculture and fishing subsidies but was unsuccessful.

The last component is **global stewardship**. It comprises two factors: international cooperation and avoiding harmful effects on other countries. To measure commitment to cooperative solutions, the ESI uses variables such as the status of ozone treaty ratifications and the status of strategies to implement the U.N. Framework Convention on Biological Diversity (INER Reference File 1, 21:4001). To measure negative environmental impacts on other countries, the ESI uses the amount of forest area certified as sustainably managed, total SO_2 emissions that flow beyond national borders, and total CO_2 emissions multiplied by per capita emissions.

What the Index Shows

The ESI task force found data for 56 countries and was able to rank them. Cautioning that the results should be considered "illustrative," the report puts Norway in the No. 1 position and Vietnam at the bottom. The top quintile (top one-fifth) contains industrialized country members of the Organization for Economic Cooperation and Development (OECD). The second quintile is mixed. It includes the United States, Japan, and Germany, but also Argentina and the Slovak Republic, for example. The bottom quintile contains developing countries. Besides Vietnam, the countries at the very bottom were the Philippines, El Salvador, and Egypt.

The task force highlights its concern about limitations in the available data. The report declares that these deficiencies "drastically limit the ability of the world community to monitor the most basic pollution and natural resource trends." To remedy this deficiency, the task force recommends that the world community "invest in data collection and analysis" because "environmental policies need to be more data-driven." The task force also proposes making better use of information now fragmented in data sets throughout the world.

Perhaps the most notable finding from this first round is that no statistical relationship exists between a nation's economic growth rate and its standing in the ESI. What this means, says the task force, is that "when it comes to making fundamental policy choices having to do with environmental sustainability and economic competitiveness, there is no significant trade-off." In other words, the decision to pursue better environmental policies does not require nations to sacrifice economic growth. As Esty explains, the "ESI results show that countries don't need to remain dirty to gain greater competitiveness."

Furthermore the national performance charts show that among like-income countries, considerable variation can be found in environmental quality and sustainability. This undermines the contention that poor countries should grow now and clean up later.

The media attention already given to the new ESI confirms that the time was right for introducing this measuring tool.

Promoting Better Environmental Policies

Looking ahead, a refined ESI will promote better environmental policies in three ways. First, the ESI provides environmental regulators a new management tool. As Esty notes, this will be important for a field that "has historically been unsophisticated in its use of management tools."

Second, the ESI will help raise the quality of the political debate within a country by giving elected officials

and challengers ammunition to defend or oppose current policies.

Third, the ESI will give business and civil society the information they need to push for better environmental laws and practices. This point was made at Davos by Samuel-Johnson, who said that the ESI could "be used by environmental advocacy groups to press their case in a non-confrontational way to government, using scientifically-based comparative data."

Assessing the ESI

The ESI is more than just a snapshot of environmental quality; the aim is to measure sustainability. That is one way the ESI is similar to the World Economic Forum's competitiveness index. Both indices are forward-looking and aim to predict future national performance.

Yet an important difference exists between an environmental index and an economic index. An economic index can be validated by looking at whether high rankings translate into future economic health, as measured by gross domestic product (GDP). But there is no similar statistic for measuring a healthy environment.

This difference could lead observers to conclude that environmental benchmarks are less scientific than economic ones. But such a conclusion would be unwarranted because GDP is not a good measure of national economic welfare and prosperity. Nor was it ever intended to be so by the national income accountants who designed it to measure economic output.

The deficiencies of using GDP for cross-country comparisons were recognized long ago. In 1990, the U.N. Development Program began publishing the Human Development Index, which balances GDP per capita with several other components. The inadequacy of GDP growth as a measure of a nation's economic health was well illustrated by the Asian financial crisis.

The ESI, like any broad policy index, is only as good as the necessarily subjective factors that constitute it. The traditional response to the challenge of finding the right factors is to employ lots of them so that no one factor is given too much weight. By taking into account everything of importance, the designers of an index hope to make it more objective by being more inclusive. Looking at the ESI in that context, one can appreciate why so many variables—64—are used.

If the ESI has one main weakness, it is its lack of organizational clarity. The five components seem to overlap. For any one variable, it is often unclear which component it belongs in. Consider the following example from the ESI. Nitrogen concentration is linked to the water quality factor that comes under environmental systems. But fertilizer use is linked to the water pollution factor that comes under environmental stresses. And safe drinking water is linked to the basic sustenance factor that comes under human vulnerability. Maybe this is appropriate—clean water is an overarching need. But only the most technically adept users of the ESI will be able to keep it straight.

Another organizational puzzle is the social and institutional capacity component. The measures of capacity (e.g., IUCN membership) are important. So are the measures of effective governance (e.g., avoiding corruption). Yet they do not fit together neatly.

Global stewardship may be the most coherent of the components. Indeed, its inclusion in the ESI is a striking innovation. Many efforts to develop report cards are purely inward-looking. For example, the *Freedom in the World* survey measures only the political rights and civil liberties within a country. Yet the ESI task force recognized immediately that good environment policy has to operate beyond national borders. For example, the stewardship component considers whether a country has joined recent global agreements on ozone.

One aspect of stewardship not counted by the ESI is behavior of governments within international organizations. For example, Norway, the ESI's top-ranked country, persists in killing minke whales despite a longtime ban by the International Whaling Commission. Some analysts contend that the commission is too precautionary in prescribing this ban and that controlled whaling should be permitted. But the commission has not been persuaded, and so at present, Norway is undermining the commission's whale conservation efforts. The ESI misses that.

Refining the Index

In refining the ESI, the task force should look for ways to emphasize some key issues that do not receive enough consideration. They are investment, the business role, and good governance.

The ESI includes several variables that measure investment (e.g., research and development). But no attempt is made to group them. This is a missed opportunity to highlight the importance of longer time horizons. The political process typically does not reward politicians who call for difficult action now to gain a higher payoff later. The ESI should.

The ESI also should assign more value to business efforts to promote sustainable development. At present, the ESI has a variable for the number of members in the Forest and Marine Stewardship Councils. But the ESI should look for other indicators of whether environmental concerns are being integrated into business planning. For example, data might be collected on certifications under the International Standards Organization's ISO 14000 series on environmental management systems.

Many elements in the ESI might be considered direct or indirect measures of good environmental governance. Nevertheless, there are some important factors that have not yet been incorporated. For example, does the government use market-oriented regulatory techniques? Has the government eliminated tariffs on the inflow of environmental technology? Does the legal system discourage drawn-out environmental lawsuits? Is the government encouraging eco-tourism?

Conclusion

Constructing an index for environmental sustainability is hard, and the World Economic Forum should be commended for this impressive initial effort. With further refinements, the ESI will be a success because every society values the environment. Even countries at the bottom will take the ESI seriously if they perceive it to be fair.

While the task force was pleased that the ESI results show no negative correlation between economic growth and environmental sustainability, this finding may have disheartened those who believe that good environmental policies will promote growth. That hypothesis will have to await further testing following significant improvements in environmental policies. Now that the ESI is in place, environmental policies may get better sooner.

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HIGHLIGHTS

U.N. Forests Panel Fails to Reach Consensus on Creating Binding Treaty

Delegates to the fourth session of the United Nations Intergovernmental Forum on Forests adopt a consensus plan to establish a permanent body to continue the panel's work. However, they leave open the contentious issue of whether to embark upon drafting a legally binding convention on protecting the world's forests, officials report after the annual session of the U.N. body. **Page 141**

Commission Makes 'Polluter Pays' Basis of Environmental Liability Policy

After more than 10 years of preparation, the European Commission issues a white paper outlining a European Union-wide environmental civil liability plan that it says is based on the "polluter pays principle." The new plan would force companies to pay for the cost of environmental damage caused by accidents, especially if they damage biological diversity in nature-protected areas. **Page 143**

Parliament Foils Franco-German Move to Weaken End-of-Life Vehicle Draft

Franco-German attempts to water down controversial European Union proposals for mandatory collection of end-of-life vehicles and rules for recycling/recovery are voted down in the European Parliament. The draft directive, which also requires vehicle manufacturers to phase out use of toxic substances in car manufacturing, is now subject to a final round of conciliation negotiations between the Parliament and the Council of Ministers, representing the 15 EU national governments. **Page 144**

Industry Applauds Biosafety Protocol Allowing More Information Sharing

A biosafety protocol recently agreed to by 135 countries is being applauded by industry groups, which say it creates a framework for sharing information and validates technologies. The Cartagena Protocol on Biosafety, a legally binding agreement governing the transboundary transport of bioengineered products, is a "powerful victory," says one official with the biotechnology industry, while an official from Monsanto Company says he is "overall very positive about it." **Page 145**

OECD Establishes Pilot Program to Assess Industrywide Testing Initiatives

The world's industrialized countries launch a pilot program to oversee industry-led efforts to assess the environmental health and safety aspects of existing chemicals. The 30th Joint Meeting of the Chemicals Group and Management Committee of the Organization for Economic Cooperation and Development, attended by some 150 government officials from the 29 OECD countries as well as officials from a handful of nonmember countries, also takes up proposed plans to harmonize initial reporting of new chemicals and improve toxic release inventories. **Page 148**

ALSO IN THE NEWS

GERMANY: Chancellor Gerhard Schroeder and nuclear plant owners create a committee of experts in a final attempt to find a consensus on the shutdown of all 19 German reactors. **Page 151**

ASIA-PACIFIC: Governments and industries of 12 Asia-Pacific economies agree to promote an auto and auto parts environment and safety standardization effort by the U.N. Economic Commission for Europe. **Page 153**

JAPAN: A draft amendment would considerably toughen the waste disposal law by requiring more detailed documentation and obliging landowners who let out their properties for waste disposal to restore the sites to a pristine state. **Page 155**

BRAZIL: The environment council drafting a new forestry code must appease both a strong farm lobby pushing for rights to clear more land and nongovernmental organizations trying to protect forested acreage. **Page 157**

ANALYSIS & PERSPECTIVE

ENVIRONMENTAL INDICATORS: Steve Charnovitz, an attorney at Wilmer, Cutler & Pickering in Washington, D.C., discusses the new Environmental Sustainability Index and its likely importance as a management tool. **Page 174**

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