

# Creating Indicators of Sustainability

A social approach

DRAFT FOR DISCUSSION

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## Introduction

Since the publication of the final report of the World Commission on Environment and Development, *Our Common Future*, sustainability has occupied a prominent but contested place on the public agenda. While few question the fundamental idea that human life on Earth must ultimately be sustainable, the precise definition of this term remains subject to deep disagreements—as do policies for implementing it. There is a key need, therefore, for more specific frameworks for interpreting and implementing sustainability if sustainability is to acquire significant meaning for human communities.

Consider, for example, the question of sustainability as it arises within one of the most central sectors of human society—agriculture. On the one hand, the continued, long-term ecological and economic viability of agriculture is obviously essential to the future of human civilization (to attach a common connotation to sustainability). A sufficient food supply is necessary in order for people to eat. Yet, it is also clear that when people talk about living sustainable lives, they don't mean doing so on a marginal, subsistence diet made up of the same foods everyday. Indeed, various groups associate a wide array of other important values with agriculture that inevitably factor into debates about agricultural sustainability.

- Beyond having an adequate aggregate food supply, each individual should also be entitled to receive an adequate food supply (i.e., the distribution of food must be sustainable in addition to the supply).
- Available food should also supply each individual with adequate nutritional intake.
- As a technology, agricultural production should not degrade the natural resources (soil, water, etc.) necessary to maintain its productivity over the long-term.
- Agricultural production should not unnecessarily degrade other valued aspects or features of the environment, for example, through excessive conversion of natural areas into agriculture or through pollution generated by agricultural technologies.
- Agricultural production should recognize proactively and make preparations to accommodate long-term changes in the environment that could alter the supply, distribution, or cost of food (e.g., climate change).
- Production and consumption of agricultural commodities should be secure from use as an instrument of terrorism.
- Production and consumption of agricultural commodities should also be carried out so as to avoid unnecessary health risks
- Production and consumption of agricultural commodities should be carried out so as to achieve one or more additional, important community values:
  - Support for family farms and farm families
  - Local, regional, or national food self-sufficiency
  - Low consumer prices for key items such as milk or bread
  - Over-sufficiency of production to prevent shortages, famines, or price spikes as a result of production contingencies (e.g., weather-related crop failures)
  - Maintenance of cultural traditions in foodstuffs
  - Consumer choice
  - Fresh fruits and produce in all seasons
  - Availability of organic foods
  - Ability to purchase from local producers
  - Rural development

- Etc.

Faced with divergent and sometimes contradictory goals like these described for agriculture, many communities have turned to indicators of sustainable development (ISD) as an approach to establishing a more specific framework for defining and implementing sustainability policies. Indeed, at least in part as a result of this advice, the ISD movement has become one of the most significant social movements of the last ten years. Hundreds of towns, cities, and counties in the United States have created lists of sustainability indicators identifying and defining the particular aspects of sustainability of importance to their community. Working with the United Nations and the World Bank, many countries throughout the world have established national indicators of sustainable development. A number of nongovernmental organizations have also established programs to create ISD for the planet as a whole, such as the World Wildlife Fund's Living Planet Index: a composite measure of biodiversity losses in freshwater, marine, and terrestrial ecosystems.

Yet, within the ISD movement, a key question arises. How does one define the set of indicators and measures to be used? My goal in this report is to briefly describe indicators of sustainability, to discuss why a community might wish to establish its own sustainability indicators, how it might approach that task, and what criteria it might use to evaluate the results.

## **Indicators of Sustainability: What are they and why create them?**

Generally speaking, an indicator is anything that gives an indication to its reader of a key feature or state of a human or environmental system. Moreover, a good indicator provides information valuable in the making of important decisions. Two commonly referred to examples of well-known indicators are the speedometer on an automobile dashboard and the growth rate of the gross national product. When driving, the speedometer provides the driver with a rough estimate of the speed he or she is traveling, providing input into decisions about whether to speed up or slow down in a wide variety of circumstances. Likewise, the growth rate of the gross national product provides input to decisions by federal reserve officials regarding the monetary supply, elected officials regarding taxation and spending, investors regarding investment choices, etc.

Most frequently, indicators of sustainability take the form of quantitative measures of key features of human or environmental systems that relate to the long-term viability of human communities. The goal of creating ISD is often instrumental: to better inform consumers, citizens, public officials, scientists, or others who make decisions about aspects of sustainability so as to improve the choices they make. Most frequently, the approach taken to developing ISD is to revise or supplement other forms of knowledge, such as economic or environmental statistics or local knowledge, so as to make it possible to tie choices to the achievement of different goals or values than are traditionally pursued.

The instrumental approach to creating ISD has a number of weaknesses, however (Miller 2005a). The most important is that decision-making systems often form relatively closed

loops. People who make decisions regularly do so on the basis of knowledge and information from a fixed set of sources. Elaborate institutions are often in place to make sure that the knowledge used is readily available, reliable, and informative. A great deal of effort is often required to get new information or indicators into settings where decision-makers will see it, to get it there in a timely fashion, and to provide it in a form that they can make sense of and relate to the decisions they need to make. Moreover, decision-makers must often learn how to make sense of and use new indicators. In the process, it is sometimes even necessary that they rethink the process they are managing before it will be possible to make use of new information.

A second problem for the instrumental approach to ISD is that indicators go unused because they ultimately fail to align with community values. In part, sustainability has become an important topic because of perceptions of environmental degradation. It has also become salient, however, because people have become dissatisfied with the quality of life in their communities. Part of any ISD project must therefore involve defining what sustainability means for the relevant community. What is important or valuable to people in terms of their quality of life? What vision do they have for their future? The process of creating indicators of sustainability can be important, therefore, if it helps a community to operationalize its ideas about sustainability, to turn them from vague conceptions into somewhat more concrete realizations. The translation of broad goals into specific criteria is also an important purpose for ISD. A community that values nature preservation within its jurisdiction still needs to make important value decisions about what kind of indicators they consider sufficient to assess efforts to achieve that goal. Will it be enough to measure acres of greenspace within the community, or must explicit species counts be regularly conducted?

Finally, instrumental approaches to creating ISD run into problems when unsustainable practices or activities reflect structural features of the community: institutional arrangements that accord power to certain groups, a lack of engagement or sense of community among residents, jurisdictional boundaries that inhibit coordinated policies, or simply poor priorities. Better information cannot fix this sort of problem. However, the process of creating ISD can help to address some of these problems—if implemented with this goal in mind. My research suggests that ISD have become an important tool for communities to restructure political relationships, especially between experts, citizens, and public officials. Traditionally, when making decisions, public officials have relied heavily on statistical databases defined and produced by experts. In many cases, citizen-initiated projects to develop ISD have empowered citizens to define measurements of their own, in effect resorting priorities and re-establishing the role of the public as active participants in designing the future of communities. If designed well, the process of creating ISD could serve to aid in empowering consumers to set new priorities, in engaging citizens in processes of governance, and in realigning institutions, practices, and maybe even jurisdictions toward alternative visions of production and consumption.

## **Approaching the Creation of Sustainability Indicators**

There is often a kind of inertia when a community begins to think about indicators of sustainable development to want to call in a group of experts. Experts, after all, are the

repository of specialized skills and knowledge in modern, scientific societies. They have often studied an issue extensively and are familiar with existing databases and environmental monitoring programs. It is also easy for groups to look good using experts. For a relatively small investment of money, they hire a specialist or two who prepare a report that can be circulated to the media, put up on the internet under a banner headline, and so on.

As I've tried to suggest above, however, indicators are not merely technical measurements—they are hybrids that meld technical considerations with human values (Miller 2000). To get people to use sustainability indicators requires investing those indicators with meaning to the people who will have to use them, and that means adopting a different approach to creating them in the first place. Experts can and probably should be involved in that process, both as citizens in the community and to help facilitate the development of good indicators as community members begin to articulate the kinds of things they particularly care about.

Unfortunately, I suspect that there is no single answer for what the process of creating new ISD should look like. Each community is different. Many communities have adopted a community visioning approach, although the precise format often differs from place to place, and what works well in one community may not work at all in another. Other communities have taken a legislative approach, working through duly constituted political institutions. The key is finding an approach that community members will see as credibly and legitimately incorporating the breadth of their concerns about a sustainable future for them and their children.

## What Makes for a Good Indicator?

In 2000, the International Institute for Sustainable Development, one of the world's leading NGOs supporting the development of indicators of sustainable development offered the following guide to useful criteria for judging the value of a given indicator:

- **Policy relevance**  
Can the indicator be associated with one or several issues around which key policies are formulated? Sustainability indicators are intended for audiences to improve the outcome of decision-making on levels ranging from individuals to the entire biosphere. Unless the indicator can be linked by readers to critical decisions and policies, it is unlikely to motivate action.
- **Simplicity**  
Can the information be presented in an easily understandable, appealing way to the target audience? Even complex issues and calculations should eventually yield clearly presentable information that the public understands.
- **Validity**  
Is the indicator a true reflection of the facts? Was the data collected using scientifically defensible measurement techniques? Is the indicator verifiable and reproducible? Methodological rigor is needed to make the data credible for both experts and laypeople.
- **Time-series data**  
Is time-series data available, reflecting the trend of the indicator over time? If based

on only one or two data points, it is not possible to visualize the direction the community may be going in the near future.

- **Availability of affordable data**  
Is good quality data available at a reasonable cost or is it feasible to initiate a monitoring process that will make it available in the future? Information tends to cost money, or at least time and effort from many volunteers.
- **Ability to aggregate information**  
Is the indicator about a very narrow or broader sustainability issue? The list of potential sustainability indicators is endless. For practical reasons, indicators that aggregate information on broader issues should be preferred. For example, forest canopy temperature is a useful indicator of forest health and is preferable to measuring many other potential indicators to come to the same conclusion.
- **Sensitivity**  
Can the indicator detect a small change in the system? We need to determine beforehand if small or large changes are relevant for monitoring.
- **Reliability**  
Will you arrive at the same result if you make two or more measurements of the same indicator? Would two different researchers arrive at the same conclusions?" (IISD 2000).

I like IISD's list, but I also think it needs to be supplemented. While the list briefly discusses the issues of policy relevance and simplicity, it does not include any consideration of either what might be termed the motivational value of indicators or the process of creating the indicator. A given indicator, if created by a small group of experts and offered to citizens and public officials, may be of far less value than the very same indicator arrived at via a process of community dialogue. This will be especially true if the latter process gets citizens active in the pursuit of sustainability or creates new institutions that pursue sustainability on their behalf. On the other hand, a different indicator, based on ad hoc, potentially unreliable data of questionable scientific validity, may nonetheless be of considerable value if it motivates citizens to take action. To be sure, scientific rigor is better than not, but if it means long delays or if it is simply impossible to collect data of sufficient quality, pragmatism may demand going ahead with the data one has. And quite often, communities may be working from intangible observations or evidence that is difficult to concretely articulate when they sense that something is wrong with their wellbeing. This kind of "local knowledge," which may be hard to replicate scientifically, may also be invaluable in moving a community toward sustainability.

Put another way, IISD's list assumes that the purpose of an indicator is to provide what web designers call content and the rest of us call information. On the basis of this new information, the argument goes, people will be able to make different choices. But good indicators don't always function in this fashion. Experts agree that the gross national product (GNP) could be substantially improved upon as a measure of national wellbeing. Yet, people continue to invest meaning in GNP. Why is that? Partly, it's historical inertia. People have learned to look for changes in the GNP, and it's now an ingrained habit. Even more, they generally think they know what the dips and rises in GNP mean for themselves, their families, their businesses, and their communities. They also know that the government uses GNP when making important policy decisions. In other words, GNP has become part of the social fabric of the nation and to change that would require an immense amount of

work, re-educating people, changing laws, etc. That can be done, but generally such work will precede the development of a new indicator not drive it.

Let me expand on this example. Over the past decade, countries from around the globe met as part of the London Group on Environmental Accounting to develop a standard metric for changing the calculation of GNP to incorporate changes in natural capital. Unfortunately, after negotiating for over ten years, they gave up, instead creating a handbook that lists lots of different approaches to environmental accounting. At the end of the day, they could not reach agreement on a single best approach that would work for all governments. Some wanted to “green the GDP”. Others wanted to understand the environmental impacts of industrial sectors. Both are potentially valuable goals, but they require quite different metrics of environmental accounting (Bandhauer, Curti and Miller 2005).

What I take from this and other examples is that good indicators rarely if ever lead the way to good policies. In fact, historically, it has often been the other way around. People have decided on new policy courses and, in the process of developing and implementing those policies, have set up indicators that work for their purposes. Over time, these indicators have acquired a great deal of social meaning and resonance, like the GNP now has, but they were not the drivers of the policy process. Rather, the process worked the other way around. The central banking system in the United States was developed, first, in the 1910s and 1920s as part of a broad policy effort to curb wild swings in the economy. It was not until 1942 that the GNP and the system of national accounts on which it is based was created (by Wisconsin Senator Robert La Follette). Another widely cited example of a good indicator—your car’s speedometer—likewise developed almost ten years after the introduction of the automobile and the first speeding laws, and didn’t become a standard feature on automobiles until sometime after that.

I am tempted, therefore, to add additional criteria to my own list of what makes for a good indicator based on the social outcomes it achieves:

- **Meaning** – Does the indicator have meaning for people? Does it motivate them to want to change the way things are currently done? Does the indicator communicate more than just its factual content? For example, the gross national product also communicates the idea to people that they are part of a nation that is spatially co-extant with a national economy. Likewise, Metropatterns, a form of indicator set for metropolitan regions, is specifically designed to get multiple jurisdictions to see themselves as part of a regional community.
- **Good Governance** – Did the indicator emerge from a process that engages people in defining and implementing sustainability in their own lives or communities? Does the indicator contribute to the creation of new communities or institutions that further sustainability agendas?
- **Local Knowledge** – Does the indicator mesh with lay people’s sense of what is happening in their own lives and the lives of others in their community? Do those who are considered locally knowledgeable concur with its indications?
- **Historical Weight** – Have people had time to get to know the indicator, to learn what its fluctuations imply for their own lives and businesses, and to recognize its value as a guide to improving their wellbeing and that of their communities? Or are

- plans in place for allowing this kind of historical settling to occur? Perhaps with the opportunity for renegotiation and reconfiguration of the indicator?
- **Adaptability and Flexibility** – Communities are unlikely to get indicators just right the first time. As they work with efforts to achieve sustainability, they may acquire new values, learn new things, or find better measures. Is the system of indicators flexible and adaptable enough to change, too?
  - **Institutionalizing Knowledge Production** – Does the process of indicator development lead to the creation of new institutions or the modification of existing institutions that continually produce new knowledge and information about community sustainability issues?

Finally, it is worth pointing out that, despite many people's presuppositions, good indicators do not have to be quantitative measurements. The sense of force that you feel when driving around a corner is, for many people, a reliable indicator of whether the car is moving too fast. The "BGH-Free" label on a gallon of milk is also a good indicator. Both of these communicate the kind of information necessary for people to make decisions, even though they're not numerical. On the whole, American culture tends to see quantitative data as more scientific and therefore more trustworthy and reliable, but that does not preclude the use of other kinds of indicators.

## The Social Approach at Multiple Scales

I have focused above primarily on community-based ISD, where much of the original activity surrounding the social approach to ISD development has taken place. It is also worth noting that the social approach to ISD developed primarily in US and EU contexts. There are good reasons to believe, however, that the general principles associated with the social approach to ISD development are also applicable in other cultures and at other scales of political organization. In each case, however, the precise methods and processes used will need to be adapted.

One interesting example of the application of the social approach to ISD development at a national level has taken place in Canada, where Statistics Canada pursued a long-term program for the development of environmental accounting practices that included a substantial process of engagement with a wide range of regional and national stakeholders. Through this process, they succeeded in building significant support for their proposed approach to environmental accounting both among stakeholders and among politicians. By contrast, in the US, a similar effort to develop an environmental accounting program has run aground. Notably, this effort, led by the Bureau of Economic Analysis, was assumed to be a technical problem that the Bureau could handle in house (for details of the comparison, see Bandhauer, Curti, and Miller 2005).

When thinking about national application of the social approach, it is essential to attend carefully to cross-cultural factors in the arrangements of citizens, experts, and policy that will necessarily impact both the process and content of ISD (Miller 2005b, Miller 2006). Cross-cultural variation in civic epistemologies (the ways that political communities reason about

and create knowledge regarding problems) will be crucial, for example, impacting such questions as problem framing, who is considered to have relevant expertise, norms for weighing different kinds of evidence, and other factors (Miller 2005a; see also Jasanoff 2005). Also problematic will be power relationships among citizens, experts, and the state that constrain the ability of communities to create and implement ISD independent from the politics of national sustainability policy. Given that the social approach to ISD challenges the authority of experts and the state to determine key elements of sustainability policy, it may be more difficult to pursue and achieve in political cultures where the rights of citizens and local communities are not strongly upheld.

Perhaps the most complex challenge of all is developing ISD for the planet via a social approach. At this scale, we have few exemplars of successful socially-derived indicators to work from. Indicators such as WWF's Living Planet Index or Conservation International's development of the idea of biodiversity hotspots, for example, have been created to satisfy the values of particular stakeholder groups (Miller 2003). Likewise, United Nations statistics are by-and-large the product of government statistical experts, while the graph of rising planetary temperatures emphasized by the IPCC is a product of scientific research.

Interesting illustrations of the social approach in action at the global scale include the original Bruntland Commission, which invented the term of sustainability, and the more recent World Commission on Dams, which offers another fruitful illustration of the value of the overall social approach for pursuing sustainability goals. In neither case, however, were the commissions oriented toward establishing crucial indicators of planetary sustainability that could achieve widespread buy-in.

The closest examples we have to global ISD developed via a more engaged social process are the Millennium Development Goals. Here, though, we see the great difficulty of abstracting sustainable development objectives for the planet. While the Millennium Development Goals represent important aspirational statements, they are far from deeply integrated into policy. Part of the problem, in fact, with all global ISD, is that the globe is not a homogeneous place and therefore we must find ways, within the sustainability agenda, to acknowledge and accept diversity within the concept of ISD—and yet continue to work toward the development of global approaches to policy reasoning. The most intriguing experiment in trying to build diversity into a global scientific assessment that I have witnessed were the sub-global assessments of the Millennium Ecosystem Assessment, which I believe could serve as a very interesting model for moving forward toward the creation of a global ISD via the social approach (Miller and Erickson 2006).

## **Conclusions: A social approach to sustainability indicators**

I believe strongly that indicators of sustainability will be essential features of the political landscape of the 21<sup>st</sup> century. The conviction that many people have that new ways of knowing are key to new ways of governing our relationships with nature is, in my view, absolutely correct. What history shows us, however, is that the creation of robust, reliable

policy indicators is the upshot of robust political processes, not the other way around. Sure, the plots of the average atmospheric temperature created by the Intergovernmental Panel on Climate Change (IPCC) have helped lead people to become persuaded of the need to address climate change. But we should not forget that the politics of climate change was over two decades old when the IPCC was first established. And, to make the point even more clearly, when push came to shove, images of melting glaciers and starving polar bears turned out to be at least as important as indicators in tipping US political culture over the edge.

If, on the other hand, we take a social approach to sustainability indicators, I think we have a good shot of moving in the right direction. Indicators can be powerful tools for helping us to see our lives and our practices in new and productive ways. But we expect too much of them if we expect them to act, in and of themselves, as instruments of policy transformation. Rather, we should learn to see the demand for new indicators of sustainability—and the process of creating them—as opportunities for political engagement. It is therefore not only the ISD indicators but also the processes of ISD construction, interpretation, and application that are the engines of political and policy change.

Put differently, carried out successfully, the social approach to ISD is an opportunity to strengthen democracy in local and global communities (Miller and Erickson 2006). To accomplish this will require considerable capacity building, not only in developing countries but also in the US and EU. Few communities start out with the requisite skills and organization necessary to pursue a social approach to ISD construction and use. But, even more importantly, ISD construction and use is an opportunity for capacity building for a much larger task, that of identifying, deliberating, reasoning about, and solving collective social problems related to the sustainability of individual and social life. Learning how to accomplish this larger task is what is truly critical for all communities, from the smallest village to humanity in its entirety. A social approach to ISD is valuable not only because it produces good indicators that are helpful in this larger task but also because the process of carrying out the social approach helps to build capacity for doing sustainability policy well.

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