

# NJSSI: THE NEW JERSEY SUSTAINABLE STATE INSTITUTE

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## WHAT DO SUSTAINABILITY INDICATORS HAVE TO DO WITH SUSTAINABILITY?

Sustainability, and sustainability indicators, have become big business. From the global to the local, governments and companies are developing sustainability indicators. The United Nations Commission on Sustainable Development has developed a prototype set for use worldwide. National systems, such as that of the President's Council on Sustainable Development under the Clinton administration, are adapting the UN model to country needs. From Oregon to New Jersey, and from Minnesota to Florida, states have developed systems to track their sustainability. Cities such as Seattle and Chattanooga have pioneered in the development of local indicator systems.

But what does all of this actually tell us about sustainability? If we move those indicators in the "right" direction – when we know what the right direction is – will we really be sustainable? How would we know if we were sustainable? Do we even know what we mean by sustainability? NJSSI is confronting these questions head on as we update our indicators and develop targets for them.

## WHAT DO WE MEAN BY "SUSTAINABILITY?"

The first thing we had to think about was what we really meant by sustainability. Since it came into common parlance after the Rio conference in 1992, the word has been used to describe everything from keeping our air and water clean, to finding new economic activity for towns whose old industries are gone, to ensuring that people in small African villages can retain their traditional way of life. We usually speak of the three "pillars" of sustainability – economic, environmental, and social – and the need for all of them to be sustainable in order for the system as a whole to be sustainable.

What does this have to do with the meaning of the word "sustainable" in ordinary English, before it

became a term of art? The American Heritage dictionary offers nine definitions of the verb "to sustain," of which the most relevant is "to keep in existence." So something that is sustainable is something that can be kept in existence – presumably more or less independently, without continuous infusion of outside support or influence. A sustainable society, then, might be one that will continue to exist in its current form.

This has a reasonably clear definition in economics. A sustainable economy is one in which the ability to generate income is maintained, usually because assets retain their value, since income is the payment made in return for use of an asset. (Salaries are the payment made for use of the "human capital" asset.) Sustainability also seems to have a reasonably clear meaning in biology – though scientists might disagree! An ecosystem is sustainable if at some level the species within it continue to exist and interact with each other, with only gradual evolution of species or the niches they occupy. From a human perspective, ecosystems are sustainable if we can count on them to continue to provide us with services such as clean water and air, food, watershed protection, or carbon sequestration. In some respects, social sustainability can be understood in an analogous way. If our consumption patterns cause people to become ill, due to pollution or unhealthy food for example, then the system cannot be considered sustainable because it doesn't allow people to survive.

Other aspects of social sustainability are harder to fit into this concept, however. Many sustainability advocates argue that to be sustainable, a society must be equitable, participatory, and democratic. But inequitable and dictatorial societies have been sustained very effectively for millennia. So a different concept may be useful here. Whereas there is an intrinsic meaning to "sustainability" in economics and nature that we can't override, in social terms the kinds of societies that have been sustained in the past may not be the ones we want to live in. So the third pillar of sustainability involves deciding what we *want* to sustain – values such as equity, participation, and democracy – and

searching for a way to achieve these in a system that is economically and biologically sustainable.

The value added of the concept of sustainability, above and beyond the social, economic, and environmental concerns that make it up, is that it forces us to recognize the links and trade-offs among the underlying issues, rather than dealing with them independently. To achieve sustainability, we need to sustain our economy, protect our environment, *and* achieve our social goals – at least in principle without trading off one goal for another.

#### HOW DO INDICATORS RELATE TO SUSTAINABILITY?

Sustainability indicators track progress in the three broad areas: economic, environmental, and social. The UN system, which is something like the “mother of all indicator systems,” has 58 indicators. (Details are on the web at [www.un.org/esa/sustdev/isd.htm](http://www.un.org/esa/sustdev/isd.htm).) Its social indicators provide information on life span, nutritional status, education, population, and child mortality. The environmental indicators look at ambient air and water quality, greenhouse gas emissions, land use and land cover, and species diversity. The economic indicators include conventional economic measures such as GDP per capita, as well as measures of consumption and waste generation.

Clearly these indicators cover a range of issues that

we care about. However the real question we must ask is what they tell us about *sustainability* – as opposed to what they tell us about environmental quality, public health, or economic well-being. If the value added from thinking in terms of sustainability is that it forces us to be holistic, how can our indicators do the same?

#### INDIVIDUAL INDICATORS THAT CAPTURE SUSTAINABILITY

There seem to be a few strategies that might let us capture sustainability in indicators. The simplest is available when we can actually specify what would be sustainable in terms of one of the three pillars. Thus if we know the ambient concentration of air

pollutant that is safe to breathe, an indicator measuring air quality is a direct measure of sustainability, because we know that if it exceeds the safe level people will become ill. This single indicator does not cover all three pillars, and thus is only a partial measure of sustainability. If we exceed the standard, we know we are *not* sustainable, but if we fall within it, we don’t know that we *are* sustainable. Our expenditures to reduce air pollution might have been so high that we had to trade off other aspects of sustainability to achieve them. This suggests a general property of sustainability measurement; it can be easy to identify that we are not sustainable, or to see that one strategy is less sustainable than another, but it is very hard to know whether in fact we *are* sustainable.

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## COMPOSITE SUSTAINABILITY INDICES

Another strategy involves combining many indicators into a single index that includes components from all three pillars. There are many examples of such measures; the Genuine Progress Indicator (GPI), the ecological footprint, and Genuine Savings (GS) are among the best known.<sup>1</sup> The GPI is perhaps the simplest of the three. It takes data from the national income accounts – the economic data system used to calculate gross domestic product and other macroeconomic indicators – as a point of departure, and adjusts them to capture a range of social and environmental measures. The social and environmental elements are expressed in monetary terms, e.g. monetary valuation of the harm caused by pollution, so they can be added to or subtracted from the economic measures. This leads to a single monetary measure that can be tracked over time to assess whether society is making “genuine progress.” The ecological footprint is in some respects analogous, but all impacts are measured in terms of the land required to meet human needs and wants, rather than in monetary terms.

These kinds of indices provide simple and appealing measures of the overall sustainability of the society. However, they raise a question about how tradeoffs are handled, which is perhaps best understood by looking at Genuine Savings. Like the GPI, GS takes national income accounting data as its point of departure, in this case focusing on savings rates. The savings rate is a basic measure of economic sustainability, or the continued ability to generate income. Since in economics income is the return on assets, as long as our assets retain their value, our income will be sustainable. A negative savings rate is therefore unsustainable. As with the air pollution example, however, a positive savings rate is not necessarily sustainable; if positive savings are achieved at high environmental or social cost, then the system as a whole will still be unsustainable.

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<sup>1</sup> For information on GPI and ecological footprints, see [www.rprogress.org/projects](http://www.rprogress.org/projects). For information on Genuine Savings, see [lnweb18.worldbank.org/ESSD/essdext.nsf/44ByDocName/GreenAccountingAdjustedNetSavings](http://lnweb18.worldbank.org/ESSD/essdext.nsf/44ByDocName/GreenAccountingAdjustedNetSavings).

Genuine Savings modifies conventional savings to include change in the value of assets that are not part of the national income accounts, such as natural resources and human capital (the skills of educated people). Changes in all types of capital - manufactured, natural, and human - are valued in monetary terms and added together. A positive genuine savings measure is considered sustainable and a negative one is unsustainable.

This is appealing and simple. However, it assumes that assets can be traded off against each other at will and the resulting system will be sustainable as long as the result is positive. This is an excellent measure of “weakly sustainable income.” The word “weak” here means that different income sources can be traded off against each other, whereas in “strong” sustainability each income source must be protected and tradeoffs are not acceptable. Even if we do feel tradeoffs are acceptable, a composite index like GS doesn’t explicitly show us what the tradeoffs are or allow us to decide which ones to make. A genuine savings figure based on cutting down forest to invest in education can be the same as one based on sustainable forest management but no investment in schools or factories. The choice between the two strategies gets lost in the aggregation.

## GROUPS OF INDICATORS

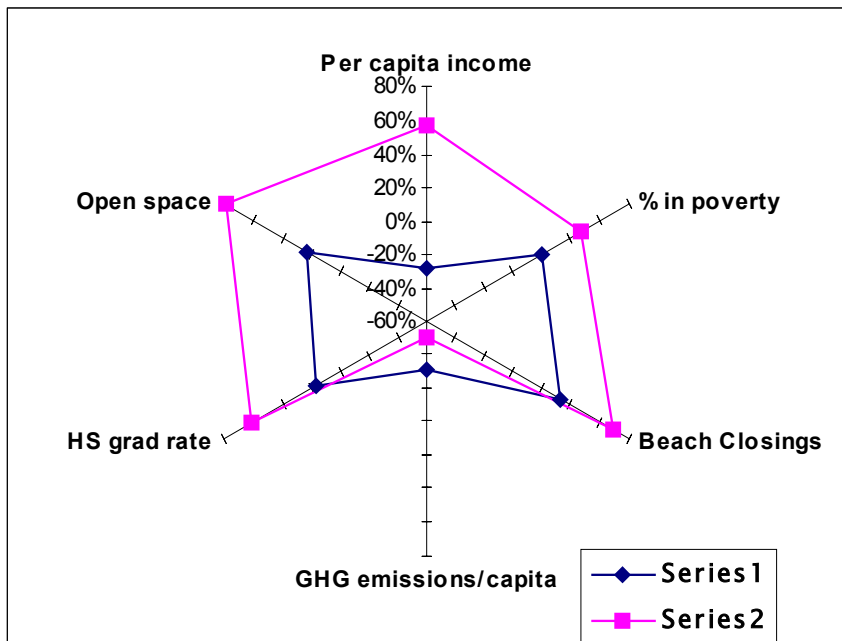
An alternative to composite indices is to maintain a set of discrete indicators, presenting them in a way that highlights tradeoffs among them and clearly shows how well each is doing relative to some agree-on target. The key issue in this kind of presentation is that the indicators are not used as stand-alones; they are always part of a suite of values tracked in relation to each other. If any one value lags behind, the whole system is considered unsustainable, and it may be possible to observe trade-offs among the indicator values by looking at time series data.

Visual presentation can help view data in this way, as the spider web graphic below (called a “radar chart” in Excel) shows. This provides data on six indicators, at three points in time. Each indicator is expressed in terms of how far it has moved towards

its target, where 0 is the baseline and 100% would mean the indicator has reached the target. The inner polygon on the chart represents the second data point and the outer polygon represents the third. In this example, four indicators improved continuously from the baseline through the second data point, high school graduation rate, beach closings, open space protection, and the share of the population in poverty. For those indicators the first data point is outside of 0 and the second outside of the first. Per capita income declined between the baseline and the first data point, and was considerably better by the second point. Greenhouse gas emissions became steadily worse (higher) throughout the time period.

A graphic like this can give a quick visual check of whether the overall system is becoming better or worse. If we had achieved all our targets, the picture would show a hexagon at the outside of the chart. Any part of the web that creeps towards the center rather than out to the edges is an area where society is less rather than more sustainable. This is easy to see with data for one time period (plus the

baseline). In our example, with two time periods, it is somewhat harder to follow but still fairly clear.



If we had a full time series, however, it could be impossible to follow. This kind of picture also will not readily show us tradeoffs among the indicators, i.e. patterns in which an increase in one indicator is consistently linked with a decrease in another. It is useful, however, for a simple snapshot of the status of a set of indicators at one time.

### CONCLUSIONS

Sustainability indicator systems will not give a definitive answer as to whether our society is sustainable. Probably nothing can do that. They can, however, help us track aspects of sustainability in ways that go beyond what the underlying indicators could do outside of the system.

- Some indicators, such as pollution or savings measures, in and of themselves can tell us whether our system could be sustainable.
- Even if we are not yet sustainable, when such indicators move towards their targets we can comfortably assert that we are more sustainable than we were before.
- Where there is agreement that tradeoffs are acceptable among the elements of sustainability, composite indices are a simple and elegant flag to draw attention to big-picture trends in the evolution of the society.
- Where tradeoffs are not acceptable, indicator presentations such as the spider web force the system user to get a sense of the whole system rather than considering one value at a time, drawing quick attention to both its successes and its failures.

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