

GOOD INDICATORS ARE HARD TO FIND

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ABSTRACT

The paper considers the statistical and analytical underpinnings that allow societies to measure progress toward sustainability and to understand how public policies can promote sustainability, especially with regard to rural development. The notion of measuring progress is not novel, although now there are new ambitions with respect to appreciating the sustainability and interconnectedness of economic, social, and environmental systems. At present, there is not a very complete understanding of how a rural sector works as an interrelated economic, social, and environmental system. How are meaningful indicators to be devised? An improved understanding of how systems work, of causal relationships within and between them, has to be developed. Data collection is at the heart of this endeavor. Improvement of policies and selection of good indicators ultimately relies on a good understanding of causality of the desired outcome. Understanding causality in the rural sector begins with a thorough grounding in the determinants of the behavior of the rural household. International cooperation on the question of design of rural household surveys would accelerate progress toward better indicators and better policy.

1. Introduction

The pursuit of economic, environmental, and social sustainability has motivated much contemporary national and international policy dialogue. Here at Cancun, our concern is with the statistical and analytical underpinnings that allow societies to measure progress toward sustainability and to understand how public policies can promote sustainability. I take sustainability in its meaning of leaving for future generations the same or expanded set of opportunities compared to those available to us today.

The conceptual and practical challenges to measuring and understanding sustainability are formidable. My purpose today is to assess those challenges from our shared perspective as a community that has largely focused on understanding the circumstances of agricultural commodity production, which is but a small part of what comprises sustainability. As we move from that narrow focus to an expanded vision of activity and well being in the rural sector, we encounter the challenge of measuring sustainability as part of our professional responsibilities. My perspective is necessarily that of a public sector economist in a developed country.

2. How we got here

For decades, centuries even, the compilation of statistics about rural economies revolved around commodity production, farm income, and land use. Keeping accurate statistics on commodity production supported goals for improving the well-being of rural households because most rural families were farmers, and most rural economic activity stemmed from agriculture. These production-oriented statistics also served to track a

nation's ability to contribute to its own food security at a time when domestic production mainly fed the country's population and trade was minimal. In the last half of the 20th century, however, this equation of rural with agriculture in many developed countries began to miss the mark. Industrial development pulled workers out of agriculture even as farm technology became more capital- and less labor-intensive. Rural economies and rural households began to diversify beyond agriculture.

Today in the United States, less than one percent of the general population lives on farms. For farm households as a group, more than 90 percent of income derives from off-farm employment and earnings. The rural economy is less dependent on agriculture than ever. In 1930, more than three quarters of all U.S. counties' economies depended on agriculture, meaning that in each of these dependent counties, more than 15 percent of business earnings were associated with farming and its supporting activities. Today, agriculture is the mainstay of only about one fifth of the nation's 3,110 counties. This shift away from agriculture implies that successful rural development must contemplate more than farm-based economic activity.

It is also the case that societies' interest in the rural sector has come to transcend agricultural production possibilities and now includes environmental factors (such as the quality of water) and social relations (such as the wellbeing of an aging population) among the outputs of healthy communities. In addition, there is the expectation that sustainability will be a criterion by which management of economic, environmental, and social activities and relations is to be judged. To know how we are doing in these respects is going to require laying a much more extensive statistical and analytical groundwork than currently exists in any of our countries.

3. The responsibility of the public sector

It falls mainly to the public sector (national or multi-lateral) to formulate methods that give us a better picture of what goes on in rural areas. The task is to measure improvement or deterioration of economic, environmental, and social conditions through the definition and collection of indicators and to collect data that support the analysis and design of public policies that would improve matters (i.e., move us toward sustainability). To assist government decision makers, then, indicators have to be relevant to policy goals in order to show whether society is moving in the desired positive direction. Ideally, government designs policy that promotes attainment of those goals. In this simple conception, then, all that must be done is to identify goals and then the measurements that have to be taken in order to know how we are doing with respect to those goals.

If only it were that straightforward. In real life, policy goals are notoriously ambiguous, and this is probably inevitably so in democratic societies. Political consensus demands compromise, and some degree of fuzziness in the description of shared objectives can be an aid to compromise. And, of course, many societal aspirations do not easily lend themselves to neat statements or precise characterization. As an example, just

consider the phrase “the pursuit of happiness” in the US Declaration of Independence. Happiness may be a goal, but how do we know when we have (collectively!) reached it?

To return to the current setting, how do governments identify the goals of rural development? I will consider the examples of the European Union and the US, both of which have created documentation that present statements of these goals. From the EU, we have the July 2004 proposal for a Council Regulation on Support for Rural Development by the European Agricultural Fund for Rural Development [Commission of the European Communities, 2004]. In it, the Fund is mandated to contribute to “the promotion of sustainable rural development.” Further, it states,

Support for rural development shall contribute to the achieving the following goals:

- improving the competitiveness of agriculture and forestry by means of support for restructuring;
- improving the environment and the countryside by means of support for land management;
- improving the quality of life in rural areas and encouraging diversification of economic activity.

As for the US, the strategic plan of the Department of Agriculture provides a similar statement [United States Department of Agriculture, 2001], which says that USDA will strive to

- expand markets for agricultural products and support economic development,
- further develop alternative markets for agricultural products and activities,
- provide financing needed to help expand job opportunities and improve housing utilities and infrastructure in rural America,
- enhance food safety by taking steps to reduce the prevalence of food borne hazards from farm to table,
- improve nutrition and health by providing food assistance and nutrition education and promotion,
- manage and protect America’s public and private lands working cooperatively with other levels of government and the private sector.

There is great similarity in themes between the two statements of goals for rural development. And there is similarity in the generality of the statements. How do we approach the development and construction of indicators to measure progress in achieving such broadly conceived goals? A medical analogy can help illuminate the nature of this job.

The goal of medicine is to cure illness, and the ultimate goal for us all is to be healthy. How do we know whether we are sick and, just as importantly, how we may move closer to health? Consider that a thermometer can produce a measurement of body

temperature, so it is possible to know whether a person has a fever or not. Body temperature is thus an indicator of health. But simply knowing that a person has a fever doesn't suggest either a cause or a cure for the underlying illness. Further observation, measurement and data are required to reach a diagnosis, to understand what is causing the illness. An understanding of causation then leads to the basis for a course of treatment. Bacterial but not viral infections respond to antibiotics; both can produce a fever but the appropriate response varies with the knowledge of the cause. Knowing whether a condition has improved or worsened is critical information provided by an indicator (here a measurement of body temperature), but the ability to act to restore health depends additionally on understanding the reason the fever exists.

The identification of appropriate indicators depends on an understanding of how the body works. Knowing that an elevated body temperature means the immune system is working to expel an invader is crucial in making the thermometer a good instrument of measurement of health in a way that observing eye color, for example, would not be. So, for indicators to be reliable and meaningful in telling how things are going, they have to be chosen based on an understanding of the system functions they measure.

The parallel exists with the description of the status of the rural sector. Consider an example. The economic indicator of the unemployment rate suggests the health of the economy. Understanding why unemployment is high or what to do to reduce the unemployment rate, however, requires more data on the nature of the economy and the behavior of the households that supply the labor. Effective policy intervention can then be based on an understanding of the root of the problem. It is important to know whether it is driven, for example, by a mismatch between demand and supply of labor with respect to quality (i.e., skills and education) or by a slow-down in demand on the part of hiring firms because demand for their product is falling.

At present, we must acknowledge that we do not have a very complete understanding of how a rural sector works as an interrelated economic, social, and environmental system. How do we proceed in devising meaningful indicators? The notion of measuring progress certainly isn't novel, although now we have new ambitions with respect to appreciating the sustainability and interconnectedness of economic, social, and environmental systems. An improved understanding of how systems work, of causal relationships within and between them, has to be developed. Data collection is at the heart of this endeavor. Improvement of policies and selection of good indicators ultimately relies on a good understanding of causality of the desired outcome.

4. Indicators

How far does the work done so far go in supporting the development of indicators of sustainability for the rural sector? First, we should remind ourselves that the set of useful indicators is NOT going to be defined by what is easy to measure, and we should not fall into that trap in a rush to show that these indicators can be developed.

Overcoming tradition, we cannot take commodity output as more than one indicator of the health of the rural sector just as farm income cannot be taken as the measure of the

wellbeing of rural farm households. There are statistics, and there are indicators. What are the desired characteristics of an indicator or set of indicators that might distinguish it from a compilation of statistics?

It turns out that the U.S. has recently addressed just this question. In the spring of 2003, the Congressional Government Accounting Office held a forum in conjunction with the U.S. National Academy of Sciences to “consider a comprehensive indicator system for the United States that would help assess the nation’s overall position and progress” [United States General Accounting Office, 2003]. The motivation stemmed from the belief that more and better public information will be necessary to inform policy decisions. (The U.S. also realized that many countries were already engaged in an effort to develop useful indicators and that it needed to catch up). This passage from the proceedings is especially relevant.

Comprehensive indicator systems have two primary characteristics. One characteristic is creating an overall picture of how a community (or region, nation, etc.) is doing. The second characteristic is showing the interconnectedness of various key information areas, such as the interrelationship between economic development and environmental impact.

That’s not exactly enough guidance to enable one to go out and build an indicator system tomorrow, but it gets across the idea of measuring progress toward important goals and also taking into account the economic, environmental, and social aspects of those goals. What foundation exists on which to build new indicators?

No matter what the national context, the question of the composition of the “right” set of indicators depends on being able to understand the goals for rural areas and rural development. But, at this stage, the policy goals may or may not explicitly reflect a concern about sustainability. To see how indicators that address sustainability directly might be constructive, the World Bank’s work is instructive. Sarageldin has identified the concept of sustainability with different types of capital, such that the increase in capital represents an increase in opportunity for future generations [Sarageldin, 1996]. In this conception, the measurement of opportunity is framed in economists’ terms as the measurement of the stock of different kinds of capital. Man-made capital (e.g., roads and bridges, factories) is already fairly well documented. Natural capital is our natural endowment, and agricultural systems would be cultivated natural capital. The capacity and wellbeing of people represents human capital. Lastly, the concept of social capital, according to Sarageldin, is based on “inclusion, participation, and the promotion of an enabling environment.” It is sometimes defined as the set of norms that promote cooperation between two or more people. Compared to other forms of capital, social capital is perhaps the most difficult to define and so to measure.

The World Bank’s preliminary work on sustainability and the wealth of nations is found in its report on monitoring environmental progress [World Bank, 1995]. The Bank considers three types of capital: man-made capital (produced assets); natural capital; and human capital (human resources). As one can imagine, there are formidable

challenges to measurement and then valuation of these disparate types of capital, and for a full understanding of those issues, I refer you to Sarageldin and to the monitoring report. Let me go directly to a description of the graphical representation of their findings for the countries of the world grouped by income levels (i.e., raw material exporters, other developing countries, and high-income countries). The World Bank chart shows three pies, which grow larger with income levels and which also show variation in the composition of the pie by capital type. Of particular interest is the Bank observation about the importance of human capital in all cases, which for all but the lowest income group of countries represents a share of wealth that is equal to or exceeds the share for natural capital and produced assets combined.

Considering these calculations in the context of rural development, one might identify some rural areas with the raw material exporters, where natural capital has the most significant share of wealth and produced assets the smallest. Presumably, the goal of development is to make the pie larger, and if the situation of the higher-income countries is a guide, there is also a marked increase in human resources. Of course, what is cause and what is effect cannot be sorted out by the wealth calculations themselves, but causality is of paramount interest in designing policies that aim to move countries or areas into better circumstances. However, the Bank's approach is sophisticated enough to conceive of a production function that relates one type of capital to another in terms of substitutes as well as complements. This formulation, if it were more tractable empirically, would lead to a better understanding of the determinants of growth, creating clues about which policies would increase which types of capital. A measure of increase in wealth or opportunity for the next generation would be a true indicator of sustainability.

The World Bank approach is comprehensive and presents a conceptual framework for relating economic, social, and environmental dimensions, but its data requirements and analytical problems are immensely challenging. There is no lack of statistics relevant to rural development in the EU and the US, but they cannot be viewed as arising from a conceptual framework that characterizes the relations that support sustainability. Moreover, the indicator sets of the US and the EU are robust with respect to agricultural production but incomplete with respect to characterization of important environmental and social dimensions of rural development. Existing statistics, or aggregates of statistics, generally fail to describe the "interconnectedness" that is deemed an important characteristic of a national indicator. That is the state of the art of indicators of sustainability, as I see it.

My view is informed by the assessment of Marthe Riche, the former director of the U.S. Census Bureau, who has created a set of "prototype indicators" for the US [Riche, 2003]. She judges the information area development stage for economic indicators as advanced for the macroeconomy and formative for sustainability and transparency. For social indicators she judges them as advanced for education, health, crime, and social support, as developing for community and governance, and as formative for sustainability, transparency, and security. And for environmental indicators, she sees them as developing for ecology and formative for sustainability. My conclusion is that

the task of developing indicators of sustainability for any sector, for any country, is in its embryonic stages. The question at hand is what to do next. My plea is for emphasizing support in data collection for scientific research that will reveal important relationships among economic, environmental, and social factors in rural areas, thereby better informing policy and also the development of meaningful indicators. Ad hoc indicators are plentiful. An investment in understanding causality would, at this point and in my judgment, have a bigger payoff than simply multiplying measures of dubious significance.

5. Understanding causality

Understanding causality in the rural sector begins, to my mind, with a thorough grounding in the determinants of the behavior of the rural household. While sustainability requires attention to the needs of subsequent generations, it in no way diminishes the value of the current one. The well-being of rural people therefore must be an important aim of rural policy. And to the extent that rural households hold and affect capital of all sorts, no picture of interaction in the rural sector can be had without considering how rural households make choices about allocating labor, managing the environment, and interacting with their neighbors. Policies are aimed at affecting behavior, at affecting choices, especially in settings where market incentives cannot or do not provide the signals that lead to choices that improve welfare and sustainability. Individual choices are conditioned strongly by the household in the person lives, so the household is the appropriate unit of observation for understanding causality.

An appreciation of the importance of household behavior is much more likely to be found in analysis of developing than developed countries. Angus Deaton, well known for his work on household surveys under the auspices of the World Bank [Deaton, 1997], has written that such surveys

....provide information at the level of the individual household about many variables that are either set or influenced by policy, such as prices, transfers, or the provisions of schools and clinics. They also collect data on outcomes that we care about and are affected by the policy variables, such as levels of nutrition, expenditure patterns, educational attainments, earnings, and health.

In developed countries, the evolution of farm policy has led to a focus on commodity market outcomes and abstracted from the wellbeing of farm and rural households. While commodity programs and policies most certainly can be regarded as economic policy for the agricultural sector, they were originally strongly motivated by social concerns about rural poverty at a time when rural sector incomes lagged behind non-rural. If concerns about rural development are to go beyond commodity production, as expressed, for example, in the concept of multi-functionality, then all the activities of the rural household, not just farming, have to be considered.

What exactly does it mean to say farm and rural households should be the unit of observation? Observe what? Here, economists take their clue from the theory of

household production and consumption. The basic notion is that households are engaged in both production and consumption and that decisions about how to allocate time and money to these activities are interrelated. The agricultural household is a special but complex case because here a household must decide how to allocate its time and resources among the farm business producing marketable output, off-farm wage labor, different forms of public goods, and the time devoted to leisure and all other household activities (e.g., child rearing). The household may produce food for its own consumption, as well.

Multi-functional outputs of the farm household go beyond agricultural commodities to include environmental goods (or bads) and amenities such as farm landscape preservation, maintenance of a way of life, etc. Production of these outputs may or may not be joint with agricultural production, but they are inevitably the result of some kind of farm household decision. Markets exist for few if any of these multifunctional outputs. Policies designed to elicit provision of “goods” or reduce the supply of “bads” effectively remedy market failure by creating prices (incentives or penalties) to which the household responds. With the household production function, it should be possible to develop a much more nuanced view of why households adopt conservation practices, continue to supply amenities like traditional farm buildings and landscapes, or offer different levels of commodity supply with changes in subsidy levels.

6. Implications

It is one thing for economists to talk about how it would be nice to have all kinds of data and another for statisticians to figure out how to collect it. Economists are data opportunists and scavengers, finding data wherever it can be found, and generally agnostic about which agencies collect what. But many national governments are structured in a way that features specialized agricultural statistical agencies. In a world in which the definition of indicators and the need for behavioral data go beyond the circumstances of commodity production, what is the role of these historically specialized agencies?

The obvious challenge is how to move from measuring or counting physical commodities to making economic, social, and environmental measurements that go beyond farm operations. This is not to say that agencies haven't collected economic statistics, because prices and costs of production are routinely gathered. The difference here is the requirement to extract from farm and other rural households some kinds of economic and social data that may be regarded as sensitive. This is especially an issue when enumerators are themselves members of the community in which the survey is done. They may hesitate to ask a neighbor for information on off-farm investments but not about expenditures on fertilizer.

Many observers also feel that subjective indicators should be defined and collected (as about perceptions of personal safety, an indicator reported by the Organization for Economic Cooperation and Development). How would statistical agencies feel about, essentially, becoming pollsters? It's one thing to ask farmers about planting intentions,

it's another to ask whether they are satisfied with local governance or are comfortable with the ethnic diversity of their community.

Expanding the scope of data collection to support assessments of economic, environmental, and social sustainability inevitably raises the question of the inclination and capacity of current agricultural statistical agencies to adopt a new set of activities. The institutional setting varies considerably by country, so it is not possible to draw a universal conclusion about this possibility. But it has to be confronted. Either new money will have to be found to support more extensive data collection or resources have to be re-programmed. And, of course, the development and maintenance of many relevant indicators is and will be the province of other national statistical agencies (such as those that keep unemployment statistics for both rural and urban areas). Re-programming raises the alarm for many agricultural statistics agency because it means that traditional commodity-oriented activity would have to be scaled back to accommodate the new things. But if re-programming is resisted, it may be that resources are removed anyway (or that there are not increases in the future for traditional activities) and end up with another data collection unit either inside government or out. At this point, the vulnerability of specialization becomes clear.

Economists in agricultural ministries may be data opportunists, but they do also care who collects the data they need to analyze rural development. Having to compete with all the other economists of many different specialties for the attention of general statistical agencies is not an inviting prospect. Agricultural economists, in particular, are spoiled by years of exclusive and very fine service from agricultural statistical agencies as they together focused on commodity production. Giving up the special status that came with an interest in agriculture would be very hard. Leverage on general statistical agencies would inevitably be less than what was possible with sister agencies in the agricultural ministry. These unique institutional arrangements pose some interesting problems for moving forward with a rural sustainability agenda. It would be well if they were addressed explicitly by both the collectors and users of data.

What can be done to increase the collaborative relationship between these traditional allies as they face a brave new world? In the near term, I would urge international cooperation on the question of design of rural household surveys. Clearly there are very big differences between developed and developing countries in the circumstances of agriculture and rural economies, but it is not a either/or situation. There is a continuum along which countries lie, with those whose rural households are almost all engaged in agriculture on one end and those with very few rural households engaged in farming on the other. It's a matter of degree. Unifying intellectual forces to think about measurement issues in rural sectors of whatever character could be very useful. The advent of multi-lateral trade and other economic agreements is increasing the pressure to collect data that are comparable across nations. When policies move away from direct intervention in markets to affect prices and quantities and toward rural development programs and direct income transfers, questions about impacts can only

be answered with resort to micro-level data on firms and on households (this especially important for agriculture).

There are some who today lament that the definition of agriculture has never been harmonized across countries. It is time to move past that disappointment and work on a more general framework that transcends farm accounting. Saying who is a farmer and who is not cannot be a job for public statistics and economics agencies. Just report the facts. Indicators are a big challenge, but they are a big challenge for everybody, not just people with an interest in agriculture and rural development. Those who have roots in agriculture will increasingly find the need to integrate into mainstream discussions about how to define and measure sustainability.

Thank you for opportunity to speak here today. I want to do what I can to help our professions figure out how to move measurement and understanding ahead.

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