Understanding Indicators At IDRC

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I. Understanding Indicators[1]

The goal of this report is to provide Program Staff at IDRC with a better understanding of indicators, and a synthesis to provoke discussion of future work. This report will explore the work which IDRC has done in the past, the dominant trends in indicator work outside of the Centre, and will apply the synthesis to IDRC's mandate to discover possible directions for future work.

The first section will attempt to answer the question: what are indicators? This report assumes that for any indicator process, it should be possible to identify a set of salient characteristics which could be used to group and differentiate indicators. The first section aims to provide a typology which will assist in the organization of indicator work. Three approaches are presented, along with the strengths and weaknesses of each. The next two sections will discuss indicator work in the context of this framework. The second section will draw examples from work being done outside of the Centre, while the third section will focus on IDRC's experience with indicators. The examples given are not meant to be exhaustive, but illustrative. Likewise, the section on IDRC's work is mainly to identify indicator work. The goal of this exercise is to provide Program staff with an understanding of how IDRC's indicator work fits into the larger scheme of things. The final section will discuss IDRC's evolving mandate in the context of the indicator framework and as a start to discussion on future research questions in indicator work.

What are we measuring?

Any process which uses indicators must make a clear distinction between system *modeling* and *assessment*. As this framework is developed, it will become clear that the two approaches to measurement have very different implications. *Modeling* is the process of mapping a system's boundaries, content and cause-effect relationships in as much detail as possible. Typically, modeling is used in research to allow mathematical testing of components of the system and long-term monitoring of a system. For example, econometric modeling allows researchers to test and monitor the changes caused by policy changes on the larger economic system. Similarly, atmospheric models are often used to monitor and predict the effects of increases of certain emissions. The use of modeling depends on converting the system to a set of mathematical relationships which describe the workings of the system.

Assessment is the process of determining the condition of a system and its components, the interaction between its components, and the actions which are being taken to improve the well-being of the system (Prescott-Allen, 1996: 5). An assessment depends heavily on who will be using its results. An assessment will be political if it is a highly aggregated process which averages the assessment of

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several groups (or regions). On the other hand, an assessment can also be very immediate to the user if it is used in a community setting, or for project/program and institutional evaluation. The key difference between both kinds of assessment, is the degree to which that assessment reflects the user's values. A political assessment, by its nature, is likely to reflect a set of values which is the compromise of a number of groups.

System assessment is a different process from modeling. It allows for the judgement of the state or progress of a system or certain aspects of that system. Assessment is often a shorthand for modeling, in that the mathematical relationships of models are replaced by causal relationships which are non-mathematical. Causal relationships can be hypothesized based on models or argued. Assessments can be divided between those which are based on models, but which lack the defining characteristics of models, and those which are more immediately tied to the user's understanding of the system in question.

Alternatively, a system assessment may not be based on a model, but instead will build on the user's perceptions of the system. In this case, the assessment fills the information need as defined by the user. The values of the user are closely associated with the assessment, but become increasingly displaced at higher levels of aggregation. This form of assessment has tended to work best at the community or institutional level and tends to disappear at the national assessment level where assessments are often based on models.

What are indicators?

An indicator is a piece of information which communicates a certain state, trend, warning or progress to the user. Indicators are pieces of information which are aggregated from data and give meaning through our understanding of knowledge. Indicators serve to distill data and provide a means of evaluating knowledge. They can be either descriptive, if used in models or prescriptive is used in assessments.

Indicators straddle a fine line between data and information. In many cases, indicators are little more than data with some context attached to them, while in others, individual indicators may be aggregated into indices which attempt to provide a single measure of a number of issues. Core to this idea is that "an indicator is a means devised to reduce a large quantity of data down to its simplest form, retaining essential meaning for the questions that are being asked of the data" (Ott, 1979: 2) As Wayne Ott points out, some people will always prefer raw data and its inherent complexity, however many others will prefer indicators, which have simplified and condensed a large amount of data into information, even if small details are lost in the process (Ott, 1979: 27) "In the process of simplification, of course, some information is lost. Hopefully, if the index is designed properly, the lost information will not seriously distort the answer to the question" (Ott, 1979: 27).

In simplest terms, indicators are simplified pieces of information constructed from data using a conceptual framework to quickly communicate a state, trend or change in trend to an audience whose purpose is planning, monitoring or evaluation. Indicators can "synthesize masses of data, show the

current position, in relation to desirable states; demonstrate progress toward goals and objectives and communicate current status to users so that effective management decisions might be taken" (Mitchell, May and McDonald, 1995: 105).

Some Characteristics of Indicators

While there are many potential characteristics of indicators, only two stand out as being particularly significant. The distinction between descriptive and prescriptive indicators and the difference between indicators and indices are particularly important to this discussion.

As we already know, descriptive indicators are used in modeling and prescriptive indicators are used in assessment. A descriptive indicator would be "amount of rainfall." As part of a water cycle model, this indicator tells us about the precipitation part of the model, but it does not tell us about how much rainfall is considered to be good and cannot be related to any politically agreed-upon targets. Descriptive indicators simply tell us "what is." Prescriptive indicators tell us about progress toward targets or can relate to a user's judgement about good or bad.

The distinction between indicators and indices is the difference between an individual indicator or a set of indicators and some combination of those indicators. Indices are desirable because they are supposed to represent a number of indicators with one number. As we know, the process of combining indicators can offer a simple, yet powerful communication tool, but arrives at a cost of precision. The process of combining indicators is very important for those who wish to create an index to which speaks to overall well-being, where that well-being is comprised of a number of components. Indicators can be combined by standardizing each indicator, particularly by assigning economic value or by using a performance scale (mathematical standardization)

Why measure?

Recently, the debate in sustainable development has moved from one of definition to one of measurement. Similarly, social and economic measurements face almost constant debate. Indicators are a key part of this debate and have increasingly been criticized on a number of fronts. In particular, their relevance is often questioned, but for the most part, the concept itself creates a fair amount of confusion. Indicators have been described as a black box concept -- one which contains many parts, but is obscured by its packaging.

The first question to ask then, is why measure? For our purposes, measurement is a useful tool for planning, monitoring and evaluation. In the context of any given project or program, indicators are often used for all three simultaneously. An effective indicator can monitor a project while it is underway, be used to evaluate that project and then provide data for planning future priorities. Time may be the best way to differentiate the three processes. Monitoring deals with the collection of information in the present about something which is ongoing. Evaluation is the collection of information to understand a past action, while planning collects information for future decision making.

On a more technical level, monitoring is "...the continuous assessment of project implementation in relation to agreed schedules and of the use of inputs, infrastructure and services by project beneficiaries" (OED, 1996: 1). Monitoring can provide both stakeholders and managers with continuous feedback on implementation while identifying successes and problems as early as possible so that adjustments may be made (OED, 1995: 1). Monitoring is also taken to mean the long-term collection of certain types of data, mainly economic, social or environmental to track the progress of a set of problems or to anticipate new problems. For example, long term monitoring was responsible for the discovery of the depletion of the ozone layer, a problem which might have gone unnoticed if not for monitoring. Evaluation is "...periodic assessment of a project's relevance, performance, efficiency and impact (expected and unexpected) in relation to stated objectives (OED, 1996: 1). In addition to these criteria, evaluation serves the function of measuring the "reach" of the project, in terms of people affected by the project demographically, spatially and over time.

Of the three, monitoring is probably the process most associated with indicators. The dominant trend in indicator work is to choose a "core set" of indicators which is then used to monitor some aspect of the social, economic or environmental system with hopes of discerning trends and providing an early warning mechanism for policy makers.

Assessing Sustainability: An Example of System Assessment

A considerable amount of recent work on indicators has attempted to measure the concept of sustainable development. This example encompasses two notions: that measuring sustainability requires an attempt to include both human and environmental dimensions and that sustainability is a normative concept, and as such, can be expressed in terms of goals. Tony Hodge's systemic assessment of progress toward sustainability provides a framework which combines those two attributes.

This particular model of sustainability recognizes that any system is comprised of interacting human and ecological components. Hodge extends this idea by suggesting that the three components (human, ecological, interaction) can be further combined into a synthesis which reveals key attributes of the whole human-ecological system. The components of Hodge's reporting system are defined in Table 1.1.

Key to Hodge's understanding of sustainability is the notion that sustainability is a normative process, which can be defined in terms of the human-ecological system and is, in turn, tied to certain values. For example, "respect and concern" for the ecosystem is expressed by addressing both long (ecosystem) and short (human) time scales, spatial scales which extend beyond traditional political boundaries and situating individual ecosystem components in the larger ecosystem (Hodge, 1995: 75). Interaction between people and ecosystem is expressed by addressing the complete range of chemical, physical and biological stress; adopting an anticipatory approach and the recognition of uncertainty as something which can be accounted for rather than something which prevents action (Hodge, 1995: 75). Also, "respect and concern" for people is expressed by using assessments which: reflect and respect alternative and changing values, assess impacts on the widest possible range of social groups,

include participatory methods and address both quantitative and qualitative aspects (Hodge, 1995: 75). Finally, an assessment should be able to recognize: system properties which are not apparent from examining the system's parts, hierarchies of systems and the process of communication, feedback and control (Hodge, 1995: 75).

The goals of the system of reporting can, in turn, be used to determine goals for sustainability. In this model, goals pertain to human well-being, ecosystem health and integrity and the reduction of stress on either. In general goals relate to improving the health and integrity of the ecosystem and human well-being; while "interaction" goals aim to increase the ability of human activities to contribute to overall well-being, decrease stress on the ecosystem and increase human actions to restore the ecosystem (Hodge, 1995: 125). When linked to goals, this definition of sustainability recognizes that there is no absolute state, much as there is not a correct path.

Table 1.1. The Four Strategic Reporting Elements Needed for a Systemic Assessment of Progress Toward Sustainability

I. Ecosystem

Data and information that facilitate an assessment of the integrity and health of the ecosystem;

II. Interaction

Data and information that facilitate an assessment of the interaction between people and the ecosystem: how and to what extent human activities contribute to provision of basic needs and the quality of life - how these activities are valued; how these actions stress, or contribute to restoring the ecosystem; and how successful we have been at meeting the goals and objectives of policies, regulations and legislation.

III. People

Data and information that facilitate an assessment of the well-being of people including the range of physical, social, cultural and economic attributes.

IV. Synthesis

Data and information that facilitate the recognition of emergent system properties and provide and integrated perspective for decision-making and anticipatory analysis that spans Domains I, II, and III.

(Hodge, 1995: 80)

Indicators, then, aim to measure progress toward these goals. Generally, ideal indicators link system components with objectives, facilitate comparison both spatially and over time and facilitate action which reinforces positive changes and corrects negative change (Hodge, 1995: 124). For this assessment at least, indicators are chosen as part of a reporting strategy which identifies general goals and specific objectives first, and then chooses indicators to measure progress. This process also suggests a re-assessment function to ensure that indicators are timely and useful.

Developing a Typology of Indicators

Much of the confusion about indicators can be traced to the lack of a unifying typology which helps users locate individual indicator initiatives in comparison to each other. While there is a rich literature discussing individual indicator initiatives and their strengths and weaknesses, and plenty of state of the art comparisons of different types of work, there has not been an attempt to understand the core of indicators, to figure out what characteristics can be used to distinguish and organize the growing body of work. Often, indicators are superficially divided according to what level they address, such as global, national or community (grassroots), or by types (economic, social, environmental). As whole system assessments become popular and linkages between various levels necessary, it has become apparent that a robust framework needs to be able to identify how indicator work measures systems and to which degree they allow linkages among various levels. Most importantly, though, there is urgent need for a framework which allows users to quickly assess indicator initiatives according to the proposed user and required task. This simple typology organizes indicators by ten characteristics (Table 1.2).

Objective system modeling (OSM) starts with the assumption that a system whether it be an ecosystem or an economic system, can be modeled. Modeling is the process of identifying a systems' form, content and structure. The modeled relationships are often described in mathematical equations. Similar non-mathematical models are used in medicine to understand all aspects of human health, so that key indicators (temperature, blood pressure, heart rate, etc) can be monitored, remedies can be prescribed and future health can be predicted. Implicit in medicine is the assumption that all aspects of human health can be understood, treated and predicted. Similarly, the defining characteristic of system mapping is the belief that all aspects of the system can be modeled, measured and, if necessary, changed. The indicators produced by modeling are descriptive. Using these indicators, scientists and policy makers can monitor the state of the system and use the set of indicators to plan changes or detect problems.

Political assessment (PA) emphasizes the communication aspect of indicators. Here, the system is reduced into categories which approximate reality. The categories are based on modeling but provide only an approximation of the causal relationships of models. The System of National Accounts (SNA) (which measures by assigning market value to components of the system) and the Pressure-State-Response (PSR) framework are examples of this. This particular model is called political assessment because it is a popular choice of national policy makers who need an understanding of a system, but cannot cope with the detail produced by modeling. The labelling also reflects the political nature of negotiating consensus on the categories and the indicators themselves. What is chosen tends to reflect this aggregated consensus rather than any one group's understanding of the system or judgements about what is good or bad. The system, in this case, is typically the nation-state, although PSR and SNA are typically aggregated at the international level. Similar to modeling, indicators are chosen to provide information for monitoring the progress of policies.

Normative assessment (NA) relies on the values of the user to define the parameters of the system. Here, the system is recognized the have a normative component which guides its assessment. Indicators are developed as part of a process of assessment and planning and are chosen to measure progress towards goals after the state of the system has been assessed. The essential difference

between this model and the previous two is the degree of reliance on the values of the user. The system is assessed and goals determined on the priorities of the user. The system in this model is also defined by user, and typically is a community, program or project. One researcher is currently compiling a subjective system assessment of nation-states.[2]

It should be noted that in separating political assessment and normative assessment there can be some confusion about the use of the term normative. All assessment is inherently normative. Here, the distinction is made to separate normative assessments based on political consensus, and those assessments which are immediately tied to the user's values. The targets produced by political assessment are normative, but reflect consensus rather than any idea of good and bad. On the other hand, when the user develops indicators as part of a process, goals are set according to the user's values and the indicators are based on the understanding of what is acceptable or unacceptable. The distinction between a political and normative process is a matter of degree of the user's involvement. In political processes, individual groups of users are masked by the aggregate, while normative assessment distinguishes instances where the user's values are explicitly represented.

Table 1.2 presents the three models in terms of ten different characteristics to provide a basis for comparison. With this tool, one can differentiate indicator work or plan new work, while being able to keep the strengths and weaknesses of each model in mind.

Conceptual framework asks the question: how is the system mapped? Is the system modeled or assessed? Is the assessment based on a model or on the immediate perceptions of the user?

User shows who is using the indicators.

Indicators describes how key points in the system are chosen and measured.

Values refers to the use of normative ideals in developing the model and cases where values are obscured or omitted.

Level refers to the principle target of the indicators, which could include global, national, regional, community, institutional, program or project or even some combination. *Ordering* describes where indicators fit into the process; whether they are developed first to guide policy, or later to show the effects of policy or measure policy progress.

Product or process is tied to ordering and orientation tells us specifically whether indicators are developed first as the product, or later as part of a process which measures.

Goals tells us to what extent indicators are used to show progress toward goals, including

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[2] Robert Prescott Allen, author of *The Barometer of Sustainability* is completing a book entitled, *The Well-being of Nations*, in which he has demonstrated that indicators can be scaled according to value judgement as to what is or is not acceptable.

instances where goals are not part of the process and where goals are agreed upon by political consensus.

Combining indicators refers to the manner in which indicators are aggregated into indices which speak the overall state or progress of the system.

Assessment of indicators describes the circumstances under which indicators are changed.

In many cases, the activity which is being considered will exhibit characteristics of more than one

Table 1.2 Objective System Modeling (OSM), Political assessment (PA) and Normative assessment (NA) by Defining Characteristics.

Characteristic	OSM	PA	NA
Context/Conceptual Framework	system is modeled; all cause-effect relationships, feedback loops accounted for in mathematical relationships	assessment is based on modeling; mathematical relationships replaced by hypothesized relationships, usually by categories	assessment is based on user's ability to contextualize and argue certain cause-effect relationships
User	researcher	national decision maker	user (broadly defined)
Indicators	at key points of the system	group into categories	measure progress towards user's goals
Values	none; scientific objectivity	aggregated and obscured	user's
Level	systemic	usually national--can be disaggregated to subnational levels	could be used at any level
Ordering	system model--develop indicators--test/monitor in research setting	system model--choose categories (assessment method)--choose indicators--use for decision making	system assessment--plan/ choose goals--choose indicators--execute activities
Product or process?	product	product	process
Goals	no	targets (consensus-based)	goals plus idea of what is judged good or bad
Combining indicators	no	yes by converting to monetary value or on performance scale	yes, using performance scales

Assessment of indicators	only as uncertainty is cleared up (slow process)	only as categories change (slowest possible); may be linked to changes in underlying model, but not always	yes, as user's values change

of these models. In cases such as these, it is important to keep in mind the defining characteristic of each model. For example, some econometric modeling may attempt to map the interaction between economic and social systems, but is designed for use by national policy makers in pursuit of specific policy goals. Here, the approach seems to fit elements of both objective and political assessment. However, the defining characteristic of this approach, the attempt to model the system in question clearly places this project in objective system modeling. In this case the results of modeling, a relatively flexible process dictated by the ability to identify the relevant cause and effect linkages, is fed into a policy process. This would be different if economic, social and environmental indicators were placed in simplified model of categories and then fed into the policy process. In the first case, the use of modeling would allow for some policy experimentation, to test and isolate various relationships. In a less precise model where categories are utilized, there could not be any of the experimentation which is otherwise possible. The indicators would provide a rough picture of the success or failure of the policy, but additional analysis would be required to suggest changes.

Each approach has a critical characteristic which can be used to distinguish one from another when there is an ambiguous mix of characteristics pointing to more than one model. For modeling, the attempt to explicitly map a system's cause and effect relationships and its feedback loops is the defining factor. Political assessment is distinguished by the use of categories to reduce all of the cause and effect relationships into a manageable system. Normative assessment use explicitly denoted values to help map the system; not all of the system is mapped, only the parts which are deemed to be important and necessary to the user's needs while providing a coherent picture.

Box 1. Types of Uncertainty is Mapping Systems

Lack of Data: we are ignorant about the system in question because data is lacking, often because the historical record is incomplete. To overcome, models and hypotheses help to assess the probability of certain occurrences.

Variability of Process: because of multiple causality, fluctuations in relationships or even chaotic relationships, the process is not well understood. This system cannot be modeled as with cases where data is lacking, but uncertainty of this type is overcome by scientific consensus.

Indeterminacy: the system being studied cannot be described in traditional scientific terms. They may be genuinely chaotic (un-predictable) or have threshold conditions where stability and instability dramatically change. Often, we do not even know what we do not know.

(O'Riordan and Cameron, 1995: 62-65)

What is each model good for? Strengths and weaknesses

By now it should be apparent that the aim of this framework is not to suggest the superiority of one approach over another. There are obvious instances

where modeling would be preferred to normative assessment, for example. There are also a number of strengths and weaknesses of each approach. Ideally, in a situation where perfect knowledge exists, modeling would allow policy makers to test various policy approaches and identify absolutes in order to be able to improve the well-being of all people in all groups *and* the ecosystem. For reasons which will soon become immediately obvious, this is not possible.

Objective system modeling can be an effective mode of modeling non-human systems. If we understand a system to be comprised of human and ecological subsystems, then modeling is ideal for analyzing . Modeling is useful because it has the potential of being very inclusive and can address complexity. The indicators which are derived from modeling can be diagnostic, used for hypothesis testing and are comparable (depending on data quality) both spatially and over time. A robust model and its indicators can be essential for providing early warning to policy-makers. A good example of this is the role of atmospheric modeling and monitoring in the discovery of the ozone hole over the Antarctic.

Modeling is also a risky proposition for two main reasons. The first is uncertainty (see Box 1). Since nature acts in non-linear and chaotic fashion, researchers are challenged to model this complexity using conventional mathematics. The process of designing mathematical expressions of non-linear and chaotic phenomena is still far from where it needs to be to become widespread and useful. Researchers have only been modeling systems for a short time, so there are large gaps in the data necessary to describe changes, and an overall lack of knowledge about which questions need to be addressed in order for the model to be representative of the system.

When modeling is applied to human systems (with the exception of economics), this process tends to break down. If data is incomplete in the observation of natural systems, one can only imagine the data considerations for human systems. Economic modeling tends to be the most useful of human system modeling because all relationships can be expressed mathematically all values expressed in monetary terms. By and large, no such standardization exists for other parts of human interaction. In natural system modeling, the laws of physics, chemistry and biology simplify things to the point where modeling is at least conceivable.

Modeling reflects the tension between complexity and uncertainty as well as the tension between precision and simplicity. System models are both complex and (potentially) precise. This tends to reduce the number of potential users which in turn reduces the utility of modeling as a communication tool. It is difficult to get a sense of the overall well-being of the system as modeling does not allow for these sorts of value judgements.

Political assessment is based on modeling in that the assessment categories chosen attempt to reflect the understanding of the model. In economic systems, at least, it is not unusual for data collected as part of the System of National Accounts to be used in econometric modeling. In other cases, such as Pressure-State-Response, the data collected would represent only a small fraction of the data requirements for ecosystem modeling. Political assessment is favoured because it emphasizes the communication aspect of indicators. The categories of the assessment framework represent a

shorthand of the system, which can be used to monitor what is believed to be the key points of the system. Political assessment's key strengths lie in the ability to simplify the process of converting data into information for the decision making process. The aim of political assessment is to provide comparable data which in turn can be used to monitor policy progress toward politically chosen targets. This approach can be quite flexible for adding new issue areas, however, the overall assessment framework (the categories) is often quite rigid. For example, the System of National Accounts has been around since the 1940s and was created during an turning point in economic history. Similarly, this is a pivotal moment in history with the emergence of sustainable development and PSR is being widely adopted by the United Nations to provide a long-term monitoring framework.

The effectiveness of various forms of political assessment can be directly linked to its attempt to simplify complex systems. Basing an assessment framework on modeling can provide a sound basis, but more often than not, the complexity of the system is lost and things which should be measured are not. In SNA, for example, large components of the economy, such as housework or environmental assets are undervalued or omitted entirely, providing a false picture of economic well-being. PSR tends to oversimplify the relationships between pressures and responses. Some contend that PSR is drastically unbalanced in terms of information, as our understanding of pressure and state far outstrips societal responses.

The apparent completeness of large-scale whole system assessments developed by political assessment can lead to overconfidence by decision makers when in fact, there are serious or unexplained causal relationships in addition to a generally low quality of data. Since indicators are identified before policy decisions are taken, there is a danger that the information collected by political assessments will not be useful to the decision making process. Furthermore, as political assessments generally deal with aggregated data, the interests and complexities presented by various groups is obscured. Disparities based on age, gender, ethnicity, region or income are seldom addressed unless disaggregation of the data is deliberate and precise. Presumably, policy makers have need of such information which cannot be easily obtained with the process of political assessment.

Determining the overall well-being of the system in question is a matter of combining the various component indicators. This can be a challenge for PSR. As we know, indicators can be combined in two ways, either by assigning economic value to the indicators being measured or by scaling indicators according to performance. Monetary values tend to be abstract, except in relation to one another, and performance scaling may show progress towards targets, but it says little about the well-being of the system. Attempts have been made to create composite indices which are broadly representative of well-being, such as the Human Development Index, or the UNDP Gender Indices, but these are fraught with methodological problems. Indices often seek to modify our understanding of a political assessment, such as HDI seeks to replace the notion of progress which GNP cannot convey by itself. Only the Dutch government has had some success in relating targets to values in their performance scaling, but this may be only due to the fact that the Netherlands provides such a uniform system. These approaches will be discussed in greater detail in the next section.

Normative assessment is an emerging approach which situates the development of indicators in the larger process of assessment, planning and goal setting. The location of indicators within a user-driven process ensures that this process is very immediate to the users and their needs. Indicators in this context are typically combined using performance scales. The scale is controlled, denoting normative judgements about good and bad, by the user's values.

Normative assessment has the added strength of being very flexible. Because the indicators are based in a user-defined process, this approach could be used at any level, from community to institutional to national. This process could also be used for a variety of tasks, such as community or program assessment.

The use of a process-based approach with this much flexibility carries with it a considerable cost in terms of time and effort. To be successful, a process must be clear about what values, goals and context are to define the process, and indicators must be chosen carefully to reflect that clarity. If a standard process is instituted across a number of programs or communities, there is a possibility that the indicators generated would be comparable, however this is not typically the exercise unless local assessments are being combined into an aggregated assessment.

What is this Typology Used For?

In this report, the typology will have a couple of functions to facilitate discussion about the IDRC's role in this field. For indicator work both outside and within IDRC, this typology can be used to quickly sort different indicator projects according to a number of characteristics. By locating various projects in the typology, one can have a quick idea of the strengths and weaknesses vis a vis other approaches for the proposed activity.

The typology can also be used to quickly explore an institution's indicator needs in relation to its mandate. As we will see, certain aspects of IDRC's mandate suggest the advantages of using one indicator approach over another. This does not suggest that an institution should or will always use one approach to developing indicators, but only where its mandate might confer a comparative advantage.

II. Popular Approaches to Indicator Development

The indicator typology from the first section was developed to give a broad sense of different kinds of indicator work. In the next two sections, we will begin to locate some of that work using that typology. Given the growth of indicator work worldwide, it seems appropriate to start with some examples from organizations that IDRC does not typically work with. In the most general sense, the examples presented here represent the kind of indicator work in which IDRC does not engage, but which represents a significant portion of all indicator work.

Many of the examples given here represent a historical development of indicators. Gross National Product represents an early attempt to measure well-being according to economic progress. Critics suggest that GNP is an unsuitable indicator, omitting quality of life and environmental considerations. New approaches, such as the Human Development Index and environmental accounting attempt to address those shortcomings. Newer community approaches have tried to understand well-being in a less aggregated setting than GNP represents. This section will demonstrate that many of these approaches are politically oriented, and continue, despite rethinking, to have the same shortcomings as GNP.

The System of National Accounts and it Derivatives

The United Nations System of National Accounts is a standardized accounting system which provides the original indicator of well-being, the gross national product per capita. This is an important starting point in a discussion of worldwide efforts to develop indicators because the reaction to the shortcomings of GNP as an indicator have shaped much of our thinking about indicators. GNP is a highly aggregated index which measures economic wellbeing and has been used as a proxy measure for the economic wellbeing of people. As an aggregated measure, GNP masks inequities of income, gender, age, ethnicity and region. As an economic measure, there is considerable question as to whether this is a genuine measure of human wellbeing and as an indicator which measures only human wellbeing, GNP says very little about ecosystem wellbeing.

The attraction of SNA and GNP is the simple fact that monetary valuation is a quick and easy method of combining indicators. If one can attach a monetary value to various aspects of human and ecosystem well-being, then in theory at least, it is a simple task of adding up the numbers to arrive at an easily comparable indicator of wellbeing and progress.

However, SNA does not measure everything. Many parts of the economy, such as household or reproductive work, and the underground or barter economies are not measured. Similarly, costs of environmental degradation and the use of natural resources are not accounted for. There is no method of valuing important human needs and attributes such as life expectancy, education or health, not to mention intangibles (quantitatively speaking) such as freedom or equity.

Many different approaches to indicators have been developed to address these shortcomings. An

example of this is the United Nations Development Program's Human Development Index and Gender Indices. For the environment, methods to assign economic value to environmental assests are being developed and tested. Alternative models which do not combine indicator using monetary values such as the Pressure-State-Response framework have been developed and are gaining popularity. Finally, individual communities themselves have undertaken initiatives to define and measure their own well-being, often including the environment as part of that analysis. Some indicator initiatives, such as IDRC's Grassroots Indicators Initiative have made attempts to rediscover indicators rooted in local knowledge systems.

Better Indicators of Human Well-being

The UNDP's attempts to develop the Human Development Index reflect the belief that three components of human well-being, education, life expectancy and income, can be broadly reflective of human well-being. The Gender indices were developed to recognize the serious disparities between men and women which exist. This combination of indicators is believed to addresse the concern of equity in human well-being.

The Human Development Index

The Human Development Index (HDI) is a composite index designed to supplement GNP as a measure of progress. Recognizing that progress entails more than economic well-being, this index measures literacy, school enrollment and lifespan as well as economic progress in order to add a social dimension. The HDI is typically reported at the national level every year, although attempts have been made to disaggregate data within countries. HDI is expected to provide a public "wake-up call" to policy makers in individual countries.

The method combines variables by creating a standard deprivation measure based on a country's level of achievement relative to the maximum and minimum levels identified for each variable. For each of the variables, life expectancy at birth, adult literacy, combined enrollment rate and purchasing power parity (PPP), minimum and maximum values are established (UNDP, 1995: 134). Each country's actual value is scaled against the difference between the maximum and minimum values for that variable. The process is actually a little more complex for PPP, as the values are first adjusted using a formula to determine the utility of income. Adult literacy and combined enrolment rate are averaged to ~~cr~~eated the educational attainment index. Finally, the calculated values for adult literacy, purchasing power parity and educational attainment are averaged to created the HDI. The result is a dimensionless index with values from zero to one, where the higher the number, the greater the progress.

HDI attempts to provide a measure for the four essential components of human development (UNDP, 1995: 12):

Productivity: "People must be enabled to increase their productivity and to participate fully

in the process of income generation and remunerative employment."

Equity: "People must have access to equal opportunities. All barriers to economic and political opportunities must be eliminated so that people can participate in, and benefit from, these opportunities."

Sustainability: "Access to opportunities must be ensured not only for the present generations but for future generations as well. All forms of capital - physical, human, environmental - should be replenished."

Empowerment: "Development must be *by* people, not only *for* them. People must participate fully in the decisions and processes that shape their lives."

The composite HDI index uses life expectancy to represent a long and healthy life; educational attainment represents knowledge; and purchasing power parity to denote a decent standard of living (UNDP, 1995: 12). In the past the UNDP has tried to include political freedom as part of the HDI and, is now currently attempting to "green" the HDI.

The Gender Indices

Recognizing the needs for disaggregation, both for groups and regions, the UNDP has taken the first steps by creating the Gender Development Index (GDI) and the Gender Empowerment Measure (GEM) as a companion to the HDI. The gender indices attempt to capture the differences between men and women beyond merely disaggregating the HDI. The GDI measures the same sorts of things as HDI, but the methodology "...imposes a penalty for inequality such that GDI falls when the achievement levels of both women and men in a country go down or when the disparity between their achievements increases" (UNDP, 1995: 73). In simpler terms, the GDI goes beyond simply disaggregating HDI on a gender basis to providing a correction for disparities among women and men.

The GEM "...examines whether women and men are able to actively participate in political life and take a part in decision making" (UNDP, 1995: 73). GEM has three components: power over economic resources, access to professional opportunities and participation which leads to economic decision making and access to political opportunities in decision making. Power over economic resources is measured in purchasing power parity (PPP). Access to professional opportunities is measured by the share of jobs classified as professional, technical, administrative or managerial. Access to political opportunities is measured by the share of parliamentary seats.

Both indicators start with the assertion that the HDI is inadequate for measuring the disparities between men and women and both explicitly embrace the value of promoting gender equality. For the GDI, a constant is set to denote the degree of aversion to gender inequality. In the 1994, the GDI used a value denoting a "moderate degree of inequality aversion" (UNDP, 1995: 73).

Shortcomings

As a replacement for GNP as a measure of well-being and progress, the UN indices are a vast improvement. The debate which has emerged as a result has contested the choice of indicative issues, the manner in which the indicators are combined into the indices and the quality of data.
For HDI the averaging of education, life expectancy and income suggests that the three issues can be traded off against one another in contradiction to the essential nature of all three (Sagar and Najam, 1996: 6). Further, the standardization of income appears to suggest that Switzerland and Botswana enjoy a similar standard of living (Sagar and Najam, 1996: 7). These are two of the more serious methodological problems among many, which still do not begin to address the suitability of the three indicators as a measure of human well-being.

Data problems mean that the HDI is not comparable between countries or even comparable in the same country over time (Murray, 1992). The best data for this measure is census data, which is collected very rarely. Year to year changes are estimated on the assumption that improvements will occur. There is a tendency then, for the HDI to "jump" when new census data becomes available, making year by year comparisons suspect.

The GDI reflects these problems as well, being a derivation of the HDI. The notable advance of this measure is the manner in which men and women are disaggregated by measuring both the difference between the two, and the overall level of achievement in the society. On the other hand, gender analysis is not about taking aggregated snapshots of the differences between men and women. The GDI obscures the goal of gender analysis to analyse the power relations between men and women in their historical context, both by being an aggregated measure, and with its emphasis on year-by-year reporting.

Of the three measures, the GEM is the most troubling. The variables appear to be a prescription for liberal democracies, despite the fact that the UN claims that "The GEM is not meant to be a prescriptive index, with the intent of setting universal cultural norms" (UN: 83). However, later in the analysis, the UN observes that the GEM sends a "clear policy message" to countries where women are "...not yet allowed into the corridors of economic and political power" (UN: 86). The most telling example of this lies in the measurement of women's participation in national parliaments (part of GEM). The UN lists 116 countries which apparently have national parliaments. Not only is this figure highly suspect, but the number of effective parliaments, where women may wield some real power, is likely less than fifty. This measure bears not only the stamp of ethnocentricity, but also a distorted view of the sources of political power.

Better Measures of Overall Well-being

Recognizing that human well-being is co-dependent with ecosystem well-being is an important advance over the SNA. Unlike the UNDP indices which measure only the human aspect of well-

being, alternative approaches such as environmental accounting and the Pressure-State-Response framework have attempted to overcome this deficiency. Environmental accounting works within the approach of combining indicators through monetary valuation, while PSR is a completely new framework, which in some instances, uses performance scales or equivalent measures to combine indicators to assess well-being.

Monetary valuation of the environment

Recalling that SNA tends to omit broad classes of the economy, including unpaid work and the environment, the development of economic valuation of the environment represents one of the attempts to correct this deficiency. It is believed that ideally, SNA will encompass what is currently left out, but for now satellite (alternative) accounts are used to include unpaid work (especially housework/reproductive work) and the environment.

David Pearce's work on developing Total Economic Valuation (TEV) is representative of this work. TEV attempts to provide a framework for the measurement of different aspects of ecosystems (Table 2.1). For example, direct use refers to marketable products of an ecosystem, while indirect use refers to the value of ecosystem functions such as climate, prevention of soil erosion and the like. Option values attach an economic value to preservation for the future, while bequest and existence values assume that people are willing to pay a certain amount to preserve ecosystems. This is a remarkable change from SNA, which would typically count only direct use values, or whatever could be sold at market.

Table 2.1 Categories of economic values attributed to environmental assets

Use values			Non- use values	
Direct use	**Indirect use**	**Option values**	**Bequest values**	**Existence Values**
Outputs directly consumable	Functional benefits	Future direct and indirect values	Use and Non-use value of environmental legacy	Value from knowledge of continued existence
Food, biomass, recreation, heath	Flood control, storm protection nutrient cycles	Biodiversity, conserved habitats	Habitats, prevention of irreversible change	Habitats species, genetic, ecosystem

(Pearce and Moran, 1994: 20)

However, there are serious difficulties considerable difficulties in assessing the values required by TEV. Direct use values can be typically undervalued by their market price. The economic value of

indirect use is both difficult to estimate and produces prohibitively high estimates so as to discourage its use. Option values involve setting a discount rate, or the rate at which we will trade natural resources now against capital (human, human-made or technological) in the future. The willingness to pay function for bequest and existence values is similarly difficult to estimate.

Pressure-State Response Framework

This framework is rapidly becoming the most popular among national decision makers for assessing sustainable development. The United Nations Commission on Sustainable Development (UNCSD) has recent adopted PSR as the core of its efforts to develop indicators to measure sustainable development. This follows efforts by the OECD and The Netherlands to implement PSR as part of national decision making on the environment.

What is PSR?

PSR is a system of organizing social, economic and environmental data in a quasi-causal framework which allows decision makers to trace the pressures of society to the state of the environment and subsequent societal responses. Simply put:

> Pressure (or stress or driving force) is the cause of environmental problems;
>
> State is the quality of the environment, or the quality of the environment in relation to the effects of human action; and
>
> Responses are the measures taken in society to improve the environment (Adriaanse, 1995: 10).

Stress can cover a range of types such as extreme natural events (weather, pests, diseases), addition or loading of substances, heat and radionuclides (chemicals, erosion, nutrients), physical restructuring and land use change (damming, land clearing, urbanization), harvest or extraction of renewable resources, extraction of non-renewable resources and introduction of non-native species and genetic manipulation (Hodge, 1995: 18). It should be noted that stress can "...help revitalize a system ...[or] may debilitate or even extinguish" a system (Hodge, 1995: 18). The use of stress also a useful concept to use in conjunction with thresholds (Hodge, 1995: 11). If a system is *elastic reversible*, when stress is released the original form and characteristics of the system will return. If the system is *inelastic*, then stress applied beyond a certain threshold will deform the system permanently, and if applied beyond a second threshold, catastrophic failure will occur. Unfortunately, it is quite difficult to predict thresholds.

Based on this framework, indicators are chosen to represent the categories of pressure, state and response for a number of different issues. The example given here is drawn from the OECD's core indicator set (Table 2.2). As we can see, considerable attention has been given to choosing

representative indicators for each issue in the pressure and state categories, but the response section is quite underdeveloped.

From Table 2.2, it is also apparent that the indicative issues can be hypothetically aggregated into overall pressure, state and response indices. For the OECD case at least, this still remains an untested hypothesis. Some users of PSR such as the Dutch government or the World Resources

Table 2.2 Matrix of Environmental Indicators for PSR Model

Issues	**Pressure**	**State**	**Response**
Climate Change	(GHG) emissions	Concentrations	Energy intensity; env. measures
Ozone Depletion	(Halocarbon) emissions; production	(Chlorine) concentrations; O_3 column	Protocol sign; CFC recovery; fund contrib'n
Eutrophication	(N, P water, soil) emissions	(N, P, BOD) concentrations	Treatm. connect.; investments/costs
Acidification	(SO_x, NO_x, NH_3) emissions	Deposition; concentrations	Investments; sign. agreements
Toxic Contamination	(POC, heavy metal) emissions	(POC, heavy metal) concentrations	Recovery hazardous waste; investments/costs
Urban Env. Quality	(VOC, NO_x, SO_x) emissions	(VOC, NO_x, SO_x) concentrations	Expenditures; transp. policy
Biodiversity	Land conversion; land fragmentation	Species abundance comp. to virgin area	Protected areas
Waste	Waste generation municipal, ind. agric.	Soil/groundwater quality	Collection rate; recycling investments/cost
Water resources	Demand/use intensity resid./ind./agric.	Demand/supply ratio; quality	Expenditures; water pricing; savings policy
Forest resources	Use intensity	Area degr. forest; use/sustain. growth ratio	Protected area forest, sustain. logging
Fish resources	Fish catches	Sustainable stocks	Quotas
Soil degradation	Land use changes	Top soil loss	Rehabilitation/protection
Oceans/coastal zones	Emissions; oil spills; depositions	Water quality	Coastal zone management; ocean protection
Environmental index	Pressure index	State index	Response index

source: Hammond, *et al*, 1995: 13.

Institute (WRI) have proposed different ways of combining these indicators with varying degrees of

success. The WRI approach has divided all of the indicators into four different domains: source indicators, sink or pollution indicators, life support indicators and human impact indicators. For each of these domains, pressure, state and response indices are generated. Using the Dutch approach of converting pollution emissions into equivalent units has been utilized here, but the methodology for combining indicators for the life support and human impact domains have not yet been discovered. The domains and their indicators are represented in Table 2.3.

Criticisms

The use of PSR is essentially a trade-off by policy makers. Here, a concise model is valued over the need for detail. As with any shorthand model which aims to describe a system, it is important to know if the message which the indicator is trying to convey is being , lost distorted or significantly altered. Critics would suggest that this is happening. As an approximation of causality, PSR's limited categories does not allow for multiple causality. In simpler terms, any response to state and stress may be a stress on another part of the system (Hodge, 1995: 11). There is no method by which to accurately link stress and response, especially given the interdependency of stress and response. This framework would be quite useful in a society which is relatively homogenous (geographically, socially and economically). However, there are few countries which share this chracteristic. Like any aggregated indicator set, certain groups in society and geographic regions are masked (averaged out) by the aggregation of data. The problems which indicators are to discover then, cannot be linked to target groups and geographic regions which require policy attention.

Who is Using It?

The **Organization for Economic Cooperation and Development (OECD)** has started the process of choosing a core set of indicators for use in long term monitoring. Many of the indicators chosen require expensive monitoring techniques, and the process of choosing indicators is by no means finished. There is no indication of who will use this set, or it any targets have been set.

The Government of **The Netherlands** has made the most coherent effort to try to use PSR as a framework for reporting on the environment. The Dutch have chosen their indicators to not only fit PSR, but also to reflect a number of themes. The themes include climate change, acidification of the environment, eutrophication of the environment, dispersion of toxic substances, disposal of solid waste, disturbances of local environments, dehydration of soils and squandering of resources at a variety of geographic scales (global, continental, fluvial, regional and local) (Adriaanse, 1993: 3). Each indicator is comprised of a number of data sources. The aim of this exercise is to account for 80 percent of the sources of the particular stress. For example, when accounting for the gases which contribute to climate change, the Dutch aim to measure those which cause 80 percent of the effect, reasoning that the picture generated is accurate enough for policy makers and that to collect data for many small effect gases would be prohibitively expensive. In addition to themes, the environmental and economic contribution of certain target groups (agriculture, traffic and transportation, industry, energy sector, refineries, building trade, waste removal and consumers and retail trade) are calculated.

The data is standardized by theme equivalents (for example, climate change is measured by CO_2 equivalent units) and then calculated as a ratio of environmental pressure (theme equivalents) to economic activity (or target groups). Data for the indicators are collected in a time-series and related to goals set by the Dutch government. The indicators can be combined using a performance scale which mathematically relates themes to goals.

There is no indication yet, as to the effect on Dutch policy. However, the use of PSR in this particular situation appears appropriate. The Netherlands is a relatively homogenous country,

Table 2.3 Matrix of Environmental Indicators for PSR Model

Issues	Pressure	State	Response
I. Source Indicators			
1. Agriculture	Value added/gross output	Cropland as % of wealth	Rural/urban terms of trade
a. Land quality	Human induced soil degr.	Climatic classes & soil constraints	.....
b. other	.....	.....	.....
2. Forest	Land use changes, inputs for EDP	Area, volumes, distribution; value of forest	In/output ration; main users; recyc. rates
3. Marine resources	Contaminants, demand for fish as food	Stock of marine species	% coverage of Int'l protocols/conv.
4. Water	Intensity of use	Accessibility to Pop. (weighted as % of total)	Water efficiency measures
5. Subsoil assets	Extraction rate(s)	Subsoil assets % wealth	Materials balance/NNP
a. fossil fuels	Extraction rate(s)	Proven reserves	Reverse energy subsidies
b. metals and minerals	Extraction rate(s)	Proven reserves	In/Output ration, main users, recyc. rates
II. Sink or Pollution Indicators			
1. Climate change	.....	.....	.....
a. Greenhouse gases	Emissions of CO_2	Atmosph. Concentr. of Greenhouse Gases	Energy efficiency of NNP
b. stratospheric ozone	Apparent consumption of CFCs	Atmosph. Concentr. of CFCs	% coverage of int'l protocols/conv.
2. Acidification	Emission of SO_x, NO_x	Concentr. of pH, SO_x, NO_x in precipitation	Expenditures on pollution abatement
3. Eutrophication	Use of Phosphates (P), Nitrates (N)	Biological oxygen demand, P, N in rivers	% pop. w/waste treatment
4. Toxification	Generation of hazardous waste/load	Concentr. of lead, cadmium, etc. in rivers	% petrol unleaded
III. Life Support Indicators			
1. Biodiversity	Land use changes	Habitat/NR	Protected areas as % threatened
2. Oceans	Threatened, extinct species % total	.....	.....
3. Special lands(wetland)	.....	.....	.....

IV. Human Impact Inds.			
1. Health	Burden of disease (DALYs/person)	Life expectancy at birth	%NNP spend on health, vaccination
a. water quality	.....	Dissolved oxygen; faecal coliform	Access to safe water
b. air quality	Energy demand	Concetr. of particulates, SO_2, etc.	.....
c. occupat'l exposures	.....	.....	.....
2. Food Security & Qual.	.....	.....	.....
3. Housing/Urban	Population density (persons/km2)	.....	%NNP spent on Housing
4. Waste	Generation of industrial, municipal waste	Accumulation to date	Exp. on collect. & treatmt., recycling rates.
5. Natural disaster	.....	.....	.....

Source: Hammond, et at., 1995: 14)

both geographically and socially, so there is somewhat less danger of group masking. Also the resources for collecting the kind of disaggregated data which policy makers could require are available in the Netherlands, which is to say, that similar resources might not be available in many other countries. Finally, given the use of targets, the relationship between target groups and themes, there appears to be a real commitment to using PSR indicators in policy making. This does not eliminate problems caused by multiple causality, but with the commitment of government, the indicators and relationships within the framework can be adjusted if need arises.

United Nation Commission on Sustainable Development

Using the twin monitoring agencies Development Watch and EarthWatch, the UNCSD has embarked on an ambitious exercise of identifying core indicators of sustainable development. As with many UN activities, the tremendous expenditure of resources and use of expert opinion has yielded mixed results.

Of the highlights:

- The PSR framework contains 134 indicators, all matched with Agenda 21 Chapters;
- Most of these indicators do not have internationally agreed upon targets;
- Few provisions have been made to disaggregate the data; and
- The process does not appear complete.

There is a also a fair amount of imbalance in coverage of Agenda 21; none of the indicators are new and most are simple percentages. No attempt has been made to link themes and target groups as with the Dutch model, nor have attempts been made to standardize the data. In many cases, a particular subject area does not have indicators for all three of pressure, state and response. The land use change example from Table 1, is an example of on place where UNCSD has traced the process

though in one subject area, but this effort has been universal throughout their framework. It is also unclear who will be using this core set of indicators.

The UNCSD use of PSR illustrates nicely the political nature of this process of selecting indicators. This particular set of indicators is the product of Agenda 21, which in turn is itself a highly political document. The targets which have been identified are those which have been chose by a multitude of international agreements. Central to the political process then, is the need for consensus of a broad range of participants and interests. For international treaties, this tends to result in bland, yet agreeable treaties, and targets tend to reflect the lowest common denominator. These targets do not reflect any abosolute notion of sustainability, nor do they represent anyone's notion of acceptable or unacceptable.

Community Based Indicator Work

Understanding indicators has typically followed the path of dividing inititives by level which they addressed, whether it by global, national or local. The following examples will demonstrate that this is a largely spurious distinction which diverts attention away from more worthy questions. The three examples of community initiatives represent the complete spectrum of this report's indicator typology. The *Leeds Quantifiable City Model* is an example of modelling and the indicators are largely descriptive. *Sustainable Seattle* is a largely political exercise which seeks to develop a set of indicators for communication purposes. The Healthy Communities workbook *Signs of Progress, Signs of Caution* is an example of normative assessment where the development of indicators is located in a planning process. More than anything, though, these three examples are very illustrative of the ambuity which shadows the indicator process.

The Leeds Quantifiable City Model is an attempt to develop a model using a city as the system of choice. Indicators are chosen using the PICABUE (Box 2) methodology and causal relationships in the model are represented mathematically (May, Mitchell and Kupiszewska, 1996). The aims of the model are to: assess (model, in this case) current condidtions, monitor trends in condition over time; anticipate hazardous conditions; identify causal relationships and demonstrate interdependence

among indicators (Mitchell, May and McDonald, 1995: 105-6). The PICABUE methodology is a process of choosing indicators which attempts to include stakeholder participation while ensuring that the certain principles of sustainability are not overlooked. The three suggested principles include "futurity," equity and ecosystem integrity. In the process, sustainability principles are agreed upon, issues selected and indicators constructed, all with the maximum possible stakeholder participation. Indicators are then modified to incorporate the sustainability principles, system boundaries and uncertainty.

Box 2 The PICABUE Methodology

(1) Stakeholders to reach a consensus on the Principles and definitions of sustainable development that are used and the objectives of the sustainability indicators programme;

(2) Identify and select Issues of concern;

(3) Construct/select indicators of issues of concern;

(4) Augment indicators developed in step (3) by sustainable development principles identified in step (1);

(5) Modify step (4) indicators to address Boundary issues;

(6) Develop Uncertainty indicators from step (4) augmented indicators;

(7) Evaluate and review final sustainability indicators.

For example, an indicator such as per capita potable water consumption can be modified to reflect the principles of futurity, equity and environmental integrity (Mitchell, May and McDonald, 1995: 117). For futurity the indicator relates water consumption to the stock limit of renewable water resources. The equity indicator would relate the demand for potable water to ability to pay and the environmental integrity indicator would relate water extraction to potential impacts of hydrobiological resources. This modification process of indicators is not unlike the transformation which is undertaken to fill the Pressure-State-Response framework, where a single indicative issue is measured from three different, but closely related perspectives.

With PICABUE, there has been some attempt to recognize the difficulties of sytem modelling, namely, syste~~m~~ boundary definition and uncertainty. Here uncertainty is expressed by relating indicators to estimated resource stocks or threshold limits and data confidence. This method of addressing uncertainty would do little to clear up the lack of past data, chaotic relationships or indeterminancy so much as it produces a tacit agreement among stakeholders about the ranges that certain indicators should remain within.

The models which are produced will start the process of testing and solidifying the causal relationships in the system, and will eventually, begin to clear up some uncertainty. The indicators dervied by this model will be used for monitoring and testing purposes, and may not be tied to any

policy process. Users of this model are, for the time being, university researchers, with the expectation that research results will be tested in other locations, with future applications in policy making.

Sustainable Seattle[1] aims to provide a "report card" of the sustainability of the city. This is quintessential state of the environment reporting at the community level. While Sustainable Seattle does not use predetermined categories found in the PSR framework and other political assessment approaches, it still contains many of the trappings of a political assessment. Instead, the indicators reflect the broad subsystems, economy, environment, society of the larger "whole" system.

The aim of the project is to create a set of indicators which provide information for a number of tasks. Overall, the set functions as a communication tool and is used as an information tool for policy making and business, for education about sustainable development and as a unifying mechanism for non-profit and volunteer organizations.

The project describes itself as a volunteer network and civic forum that seeks to "address, promote and investigate issues related to sustainability." In many cases the indicators chosen are quite unique to the Seattle region, while others reflect fundamental concerns which could be found in virtually any community. For example, Sustainable Seattle uses wild salmon as an indicator of overall watershed health. In addition to being an indicator of ecosystem integrity, wild salmon can be linked to tourism, recreation and food production (the economy) in the Seattle region.

Sustainable Seattle is viewed to be a political assessment for a number of reasons. The product of this process is a set of indicators, which neither reflects a model, nor is specifically part of a policy process. The indicators are chosen through a civic forum on the basis of consensus. While the range of potential users, from educators to policy makers and the business community is quite diverse, there are no mechanisms to ensure that the twenty or so indicators which have been chosen are specifically relevant to the user's needs.

The Healthy Communities workbook[2] guides the user (community) through a process of assessment, planning and goal setting which best reflects normative assessment. One could argue that there is not much difference between Sustainable Seattle and Healthy Communities. Both are based on the principle of community participation and the indicators chosen reflect the normative values of that community. Where Healthy Communities differs is in the process of choosing indicators. Sustainable Seattle chooses indicators and then uses that information to inform policy, whereas Healthy Communities engages in community reflection and planning and then chooses indicators to measure progress towards those goals. The process of choosing goals and indicators is designed to be as inclusive as possible so as to reflect the values of the community.

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[1] See the Sustainable Seattle WWW site at http://www.scn.org.

[2] See Eric Hellman. 1996. *Signs of Progress, Signs of Caution.* Toronto: Ontario Healthy Communities Coalition.

All three community initiatives can be compared according to the characteristics of the indicators typology in Table 2.4. It is worth noting that none of the three approaches use any methods of combining indicators to give an idea of overall well-being, but all three engage in whole system modelling or assessment. All three projects acknowledge that the community needs to be linked to the outside world, but little is done by way of indicators to reflect that understanding.

Conclusion

In some ways, the indicator initiatives discussed in this section represent both a historical and conceptual evolution of indicators. For the purposes of this report, this section provides a quick way to compare the differences between IDRC's efforts and the efforts of other organizations. Table 2.5 provides a summary of the indicator initiatives discussed here in addition to their strengths and weaknesses.

Among the more general conclusions which one could draw about this sample of indicator initiatives is that there is a fair amount of political assessment being done using indicators. While for policy makers, this is undoubtably good news, it is troubling that the PSR format follows the same general approach as the SNA, which has failed to provide a reasonable and accurate assessment of wellbeing. In the next two sections, we will see that IDRC has not engaged in much political assessment in the past, and there is little reason to suspect that it will in the future.

Table 2.4. Quantifiable Cities, Sustainable Seattle and Healthy Communities by Defining Characteristics.

Characteristic	Quantifiable Cities (OSM)	Sustainable Seattle (PSA)	Healthy Communities (NSA)
Context/Conceptual Framework	model	assessment according to categories of economy, environment and society	defined by the process of setting community goals
User	researchers	educators, policy makers, business and non-profit sector	community
Indicators	at key points of model	chosen by consensus to represent broad categories	chosen to measure progress toward goals; or from template
Values	sustainability principles	consensus based	according to goals
Level	system-community	community	community

Ordering	indicators--research/ testing	indicators--policy making, business development, education, institutional linking	assess---plan--set goals--- choose indicators
Product or process?	product	product	process
Goals	no	no	yes
Combining indicators	no	no	no
Assessment of indicators	as model is developed further	every year	as goals change

Another useful conclusion of this section is the discovery that grouping indicators by level, is not necessarily a helpful process. With the typology developed here, three different, yet community oriented community indicator initiatives have prodeced examples of all three indicator classifications. There has been a general tendency in the literature to group indicator work according to the level which it addresses. We now know that this may not be a helpful distinction.

With these example in mind, IDRC may now have a better idea of what sorts of indicators it does not want to produce, namely those which emerge as a result of political assessment. Realistically as well, it is hard to picture IDRC engaging in the sort of indicator set development so which the United Nations system is committed.

Table 2.5. Summary Table: Popular Indicator Work

	What is...	Who Uses/Develops	Advantages	Disadvantages
SNA	method of national accounting; leads to GNP	all nation-state members of the United Nations	long history of data collection; widely accepted	GNP a poor indicator of progress; aggregation masks groups; undervalues certain activities (environment, gender)
Total Economic Valuation	attempt to correct deficiencies in GNP	researchers	Corrects undervaluation inherent to SNA	Not widely accepted; data difficult to collect; no consensus on method as yet.
HDI	attempt to correct deficiencies in GNP by measuring adjusted GNP, life expectancy and schooling as measure of progress;	United Nations Development Program	representative of human wellbeing reporting needs?	data problems make comparison between countries and over time impossible; large incongruities between North and South

UNDP Gender Indices	attempt to correct gender masking of HDI by creating measures of women's progress	United Nations Development Program	too early to say: indices are only two years old and not yet fully developed	multiple flaws in methodology and assumptions.
PSR	integrated economic, social and environmental system	national decision makers, United Nations	manageable: effective communication tool	too simple, does not account for multiple causality; useful in homogenous units only
Community	whole sytem approach at community level: varies in method	varies from researchers to educators, decision makers, etc to users of planning process	shows range of approaches from OSM to PSA and NSA across one level.	false distinction for understanding indicators

III. IDRC's Work On Indicators, 1976-1996

There is a tendency to think of IDRC's work on indicators by whatever individual projects are most familiar. Since there is no indicator program, *per se*, individual projects have not added up to a large impact on IDRC's thinking. Contrary to common understanding, IDRC has engaged in a substantial amount of indicator work, much of which differs considerably from the initiative discussed in the previous section. This section will serve to illustrate the richness of IDRC's experience with indicators by engaging in a baseline analysis. These projects can be understood in conjunction with the typology developed in the first section, and this has been done here using one large project and a program which makes use of indicators.

IDRC has been developing and using indicators since 1976, but since the Earth Summit in 1992, IDRC's profile has changed rather dramatically. In the first fiscal year after Rio, average funding per project doubled, and the focus shifted from health indicators to indicators of sustainability. The other significant trend involves the emergence of the Micro Impacts of Macro Adjustment Policies (MIMAP) program which has emerged as IDRC's most coherent block of indicator related work.

Generally, the level of funding committed to indicator work has exceeded CAD$ 1 million per year since the Earth Summit. For this reason, comparisons are made between pre-Rio (1976-1992) and post-Rio (1993-1996) profiles. This baseline will show the trends which have been outlined above. Funding for indicator work has increased from FY1993 onward, and average funding per project has nearly doubled. Specific discussions have been divided into three categories. The distribution of projects and funding and the average funding levels of projects are discussed according to region, type and level. *Region* is the simplified categories of Latin American and the Caribbean, Africa and the Middle East, Asia, Regional and Global. *Type* groups indicators in the categories of environmental, economic, social, health and information. *Level* refers to the target group which the project and the indicators are trying to affect. For instance, macro refers to indicators which address policy concerns; meso level work targets institutions, project monitoring, technological monitoring and capacity development - in essence, anything which helps along a process, but is not immediately linked to community or policy development. Meso level work tends to help the "do-ers" to increase their capacity to address community or policy concerns. Micro level work addresses community needs explicitly.

Without in-depth analysis, it is not possible to locate each project according to the indicator typology proposed in the first section. However, some very general conclusions about IDRC's indicator work in relation to this framework can be made. Until recently, there has been very little work which assesses both the human and ecological systems simultaneously. Often, one or the other has been assessed. Very often, modelling has been used, particularly in health and economic projects. Furthermore, there has been very little work which could be described as political assessment. IDRC is simply not engaged in the business of developing aggregated sets of indicators which reflect a process of political consensus. Typically, IDRC work is tied to a process or research/policy question which the project is attempting to address. Again, though, readers should be cautioned that these are impressions rather than hard analysis, which would only be possible through a project by project review. For purposes of illustration, two activities, Assessing Progress Toward Sustainability project and the Micro Impacts of Macro Adjustment Policies program (MIMAP) are discussed in relation to the indicator typology.

Method

Projects were identified using keyword searches in IDRIS and RADIUS. IDRIS allows keyword searches for titles, abstracts and macro thesaurus descriptors. RADIUS was used primarily to confirm the data and obtain funding levels. A small number of projects, which could not be found via keyword searches were identified by word of mouth. It is expected that other projects may be identified at later stages in the research process, but it is expected that the overall findings will remain unchanged.

General Trends in Indicator Work at IDRC

In the first fiscal year after the Earth Summit (FY1993), the average funds committed per year jumped to well over CAD$1,000,000 from about CAD$300,000 previously. Graph 1 shows the upward trend in funds committed by year from low pre-Rio levels to a peak of just under CAD$3,500,000 in FY1993, then levelling off to just over CAD$1,000,000 per year. On average, IDRC funds more projects per year since FY1993 than before (five per year since FY1993, approximately two per year, previously), although the average number of projects tends to fluctuate on a yearly basis.

The average funding level of projects also show fluctuations on a yearly basis, but in the long run, IDRC's funding level per project has risen. The four largest IDRC projects have all occurred in the post-Rio period.

There are two simple and plausible explanations for IDRC's increased funding. First, in FY1993, there was a dramatic increase in funding which corresponded with the information mandate in Agenda 21 handed down at the Earth Summit. IDRC's status as a new Agenda 21 agency undoubtedly led to this increase. Also, there has been a rise in general interest in indicators and issues of accountability, which might attest to the persistence of this trend after FY1993.

IDRC's Indicator Work by Type

Both allocations by funding and by number of projects reveal a stark contrast between pre- and post-Rio allocations. The pre-Rio indicator portfolio was dominated by health projects, with environmental projects being virtually absent. In the post-Rio period, though, environmental and socio-economic indicators have been dominant, while health indicator projects are far less common.

The relative decline of health indicator projects could possibly be traced to reorganizations of the Health division during that time. It is possible that once the Ecosystem Health Program Initiative becomes operational, allocations for health indicators will increase again. The ascendency of environmental indicators is likely traced to the Earth Summit, and IDRC's designation as an Agenda 21 agency. The relative increase of socio-economic indicators in the post-Rio period is attributable to the coherence of the MIMAP (Micro Impacts of Macro-adjustment Policies) Program Initiative. As a response to the lingering debt and adjustment crisis, MIMAP has implemented a large research program in South-east Asia, accounting for not only the relative rise in socio-economic indicators, but also the relative rise in concentration of work in Asia.

Typically, environmental indicator projects in the post-Rio period are quite large, nearing an average of CAD$400,000 per project. On the whole, the average size of projects in funds has risen for all types by at least 25 percent over average pre-Rio levels.

IDRC's Indicator Work by Region

Give the fact that indicator projects come from a wide range of programs at IDRC, it is not surprising that there have been shifts in regional focus between the pre- and post-Rio periods. However, except for the unusually large average project size of "regional" projects in the post-Rio period, the average size of projects has been relatively stable over regions and over time.

In the pre-Rio period, the largest proportion of funding was allocated to Latin America and the Caribbean (LAC). Smaller amount, ranging from half to one-third of that proportion were allocated to "global," Africa and the Middle East and Asia. The smallest allocation went to "regional" projects. In contrast, the post-Rio period is much more balanced. Of the regions, only Africa and the Middle East (AME) has received the smallest allocation, although those regional interests are likely represented in both "regional" and "global" funding allocation.

By itself, funding allocation by region tell us very little except that LAC's allocation has fallen relative to everyone else's except for AME's. However, as we will observe from the section on type, the relative fall of LAC corresponds with a decline in health projects, while Asia's relative increase is because of MIMAP activities.

IDRC's Indicator Work by Level

IDRC has a strong tradition, in both pre- and post-Rio periods of allocating a substantial portion of its funding to project addressed at the macro (or policy level). Typically, policy oriented indicator work has been 50 to 60 percent of all projects and 40 to 50 percent of all funding. Macro level projects have generally been many in number, but smaller in funding.

On the other hand, in the post-Rio period, funding and number of projects addressing the micro (or community level) has doubled. Meso level (institutional, capacity building, technology development, monitoring) indicator projects have virtually disappeared.

Community level indicator work is likely the product of the ongoing process of determining IDRC's mandate to work with Southern partners and develop priorities based on those priorities. On the other hand, the disappearance of meso level work can likely the result of less work which combines indicators with technology development or capacity building. This is not to suggest that capacity building, institutional development and similar activities have fallen by the wayside, only that those activities do not currently appear to include indicators.

General Conclusions

IDRC's work in indicators has changed in significant ways since the Earth Summit. Specifically, in absolute terms funding for all aspects of indicator work has increased dramatically. In relative terms, funding for socio-economic indicators has increased relative to health indicators; funding for global, regional and Asia has increased relative to Latin America and the Caribbean and there has been a

strong increase in the funding of indicator work which addresses the community level.

One should be careful to treat these results with caution. It should not be assumed that indicator work is representative of IDRC programming as a whole. Because indicator work is not specific to any one PI (or even the former Divisions), indicator projects tend to be developed in isolation and across a number of administrative units. Without central coordination, indicator funding does not reflect general trends regarding type, region or level which one might across IDRC. Even within projects, indicators are usually part of a process, so it is difficult to estimate what proportion of that project's resources are used in support of indicator activities. In short, the figures presented here are estimated, and likely do not represent IDRC's activities as a whole.

Locating IDRC's Recent Indicator Work: An Example of Two Recent Approaches

IDRC has done work on indicators on a variety of different subjects, from health to environment, encompassing different levels of interaction, from policy to community. The indicator typology developed in the first section is a useful way to discuss very different projects by comparing a set of characteristics. The Micro Impacts of Macro Adjustment Policies (MIMAP) program and the project *Assessing Progress Towards Sustainability* represent opposite ends of the indicator spectrum. MIMAP uses econometric modelling and socioeconomic indicators to test and monitor policy changes at the macro level and the effects at the micro level. *Assessing Progress Towards Sustainability* (APTS), on the other hand, starts with a process of assessing human and ecosystem wellbeing, proceeds to planning with the purpose of strengthening local communities in negotiation with national decision makers. Indicators are developed once the planning process has chosen community based goals to measure progress towards improved wellbeing.

Table 3.1 has been developed to compare the two projects on the basis of the characteristics created in the indicator typology. The two approaches illustrate the differences between modeling and normative assessment. APTS is a process oriented approach which ties the interests and goals of the local community to its indicators. In many ways, this project was designed to counter the trend of choosing indicators which are not concretely tied to any one process. The approach developed by this project are broadly applicable to all three levels - community, institutional and national - with tools designed to address each. Theoretically, community based assessments could be aggregated into national assessments. The tools used for institutional and community assessment have been tested in the field with enough success to demonstrate that normative assessment is a viable alternative to modeling or political assessment. The project provides a complete package for developing indicators including a tool, The Barometer of Sustainability, which combines indicators using performance scales to assess overall well-being. The project uses whole system assessment; or assessments which utilizes notions of human and ecosystem well-being. The Barometer is such an effective way of combining indicators, that it could be used in the PSR framework to combine indicators, but in the context of this project is aids in normative assessment.

MIMAP is a collection of projects in South-East Asia countries which is attempting to create models of macro-micro interaction. The research in each country creates a unique model of the patterns of interaction, with the hope that core elements of macro-micro interactions can be discovered to create a general model. The indicators produced by this program are one of its products, along with the models themselves and any policy recommendations which are discovered. For the economics side of the model, indicators are combined by using monetary valuation, however, this program also makes

use of socio-economic variables which are not easily combined.

Table 3.1. Comparison of Two Example of IDRC Work on Indicators by System Assessment Characteristics

Characteristic	Assessing Progress Toward Sustainability	MIMAP
Context/Conceptual framework	Community assessment through "questioning approach" identifies cause and effect links according to local perception.	Use of econometric modeling to link macroeconomic adjustment policy to households and groups "that matter"
User	Local community as part of assessment, planning and negotiation process with national decision makers.	National decision makers.
Indicators	Measure progress toward community defined goals.	At key points of model Some measurement independent of modeling
Values	Indicators are tied to community assessment and goals.	Specific values identified by MIMAP program: "macro policies have to be guided by outcomes at the local level;" program advocates the setting of poverty benchmarks in each country for use in analysis.
Level	Aims to improve well-being of the community.	Aims to improve policy which will have fewer negative effects on target groups.
Ordering	Indicators are developed after assessment, plans and goals are developed.	Indicator are developed after econometric model is created, but before policy changes.
Product or process?	Process: Assessment is completed and planning priorities identified before indicators are developed to measure progress	Indicators chosen as part of modeling process
Goals	Progress toward the goals identified by the planning process.	Policy performance and/or the need for new policy.
Combining Indicators	Through performance scales	By converting to monetary value
Assessment of indicators	As needs and values of the community change.	As econometric model changes: new links or feedback loops identified; emphasis changes.

Generally speaking, IDRC has done a fair amount of indicator related work in the past, a large portion of which has been undertaken since the Earth Summit. If this trend is to continue, it may be a worthwhile exercise to begin to think strategically about indicators. The indicator typology developed in the first section allows one to quickly locate indicator initiatives relative to past work, have a good idea or the relative strengths and weaknesses of the proposed approach, and think systematically about desirable characteristics.

IV. Future of Indicators at IDRC

The purpose of this section is to discuss possibilities for future research into indicators at IDRC. *Specifically, this section will serve as the start of a discussion on where IDRC makes a unique contribution to the field of indicators and what future research problems require urgent attention.*

- How do existing programs fit into the indicator framework?
- Where does IDRC's mandate fit? What does it suggest?
- Does IDRC have a comparative advantage?
- How do we make this useful to program staff, as a cross-PI activity/tool?

Because indicators activities are not the exclusive domain of any particular Program Initiative, it may be worthwhile to explore opportunities to create a cross-PI arrangement where knowledge and methods pertaining to indicators could be consolidated. Many PIs have expressed an interest in developing or working with indicators, and past experience at IDRC demonstrates that there is likely to be a considerable amount of future work on indicators, thus the process of consolidating tools and methods to allow PIs to learn synergistically should be explored.

One of the main conclusions of this research is that indicators of all types can be grouped into a framework according to characteristics, and that there are core principles of indicators which should be addressed in any exercise.

System Assessment and IDRC's Mandate

Aside from specific projects and programs, a case could be made for IDRC's overall mandate fitting one or two of the three models. This purpose of this section is to spur discussion rather than provide a definitive account of where IDRC should direct its attentions. For the purposes of this section, IDRC's mandate has been derived from the *International Development Research Centre Act & IDRC General Bylaw*, *Empowerment Through Knowledge*, *Corporate Program Framework I & II*, and the recent Maurice Strong report, *Connecting With the World: Priorities for Canadian Internationalism in the 21st Century*. All four documents are useful for identifying IDRC's core mandate, and to show changes in IDRC's programming focus over the past five years, involving Agenda 21 and information technologies and knowledge based networks.

IDRC's Core Mandate

IDRC's core mandate has change surprisingly little over the years, while the substance of its programming has undergone shifts in focus in the past five years. Elements of the core mandate include:

- a research orientation
- focus on partnerships with the South

- a short to medium term involvement with hopes of longer term outcomes

These elements are at the heart of every program or activity at IDRC. Programs are developed in collaboration with our partners to reflect their research needs and values. Activities are then proposed by our partners, and are then fit into the various programs. In short, IDRC has broadly set the themes which will be addressed, but everything else, from programs to activities, is developed in collaboration with our partners values and needs.

IDRC and Agenda 21

In 1992, the Prime Minister handed IDRC the task of becoming Canada's lead Agenda 21 institution. The manner by which IDRC accepted this task has led to some uneven results. On the one hand, IDRC has a very strong commitment to sustainable development, but on the other, IDRC's acceptance of Agenda 21 has been less forthright. Corporate Program Framework I (CPF I) showed a hasty attempt to try to integrate the language of Agenda 21 into its approach. Seldom, has IDRC programming policy made explicit mention of specific Agenda 21 chapters, but linkages do exist. A claim of CPF I contended that all IDRC programs supported sustainable development, and thereby, Agenda 21 in some manner. The same could safely be argued for the programs contained in CPF II, although the links to Agenda 21 chapters are explicit only two-thirds of the time. An program link to Agenda 21 is explicit if at least one of the program's objectives is directly identifiable with and Agenda 21 chapter or sub-section. Typically, IDRC's programming covers about 40 percent of Agenda 21's sections in some manner. It is clear that the commitment to sustainable development is in evidence, but the links to Agenda 21 are less evident.

This is not entirely surprising. A recent survey of United Nations agencies doing indicator work in Agenda 21 subject areas revealed that global coverage was achieved in only 57 percent of the subject areas. Twenty percent had no coverage at all, and included politically difficult topics such as biotechnology and all manner of waste - toxic, hazardous, radioactive and solid. The United Nations Commission on Sustainable Development (UNCSD) is currently attempting to develop a comprehensive indicators framework along with the PSR framework.

The most important message to be drawn from this analysis is that IDRC's commitment to sustainable development, is in many ways, compatible with Agenda 21's, but is very selective as to which areas are covered. IDRC's core mandate of partnership with the South allows for sustainable development to be defined by the needs and the values of our Southern partners, which in many ways, is a more precise rendering of sustainable development than Agenda 21. IDRC's work reflects the sustainable development themes in Agenda 21, but is not an operationalization, strictly speaking, of that document.

IDRC and *Connecting with the World*

The central theme of *Connecting to the World* is that Canada, as a pioneer in information technology, is ideally positioned to deliver this knowledge to the developing world. The report asserts that

increased information access will have a positive impact on knowledge generation in the South. The report also contends that Canadian agencies such as IDRC, North-South Institute and International Institute for Sustainable Development could act as knowledge brokers to aid in developing sustainable development policy at the local level. The report suggests a target of 15 percent of ODA by 1999, a doubling of current expenditure in this area.

Aside from the greater funding emphasis, this does not appear to be anything different from IDRC's current program orientation. It is worth pointing out that the priorities of current programs were developed in collaboration with our Southern partners, meaning that the importance of information technologies and knowledge generation is readily recognized.

IDRC's Mandate and System Assessment

After identifying IDRC's core mandate of "partnerships," "research orientation," "sustainable development," "information technology and knowledge brokering," and "short to medium term involvement," the question remains: where do indicators fit into all of this? Again, it is the contention of this paper, that the choice of indicators will rest directly on the manner in which systems are assessed. Each method of modeling or assessment is useful to a certain task, something which should be kept in mind for future activities.

The discussion on system mapping developed a number of characteristics to help differentiate the three indicator models. These characteristics are discussed in the context of IDRC's core mandate in Table 4.1. The overall finding of this assessment is that IDRC, by virtue of its partner driven research orientation, uses normative system assessment to develop programs and choose indicators. This approach is consistent with a flexible framework which allows IDRC to use short to medium term interventions to affect policy or community orientations in support of sustainable development or more broadly, knowledge generation.

The core elements of the mandate tend to suggest that the IDRC may have a comparative advantage in doing indicator work which is oriented toward normative system assessment. The manner in which IDRC works with its partners, its research orientation, and its focus on sustainable development and knowledge brokering are all consistent with the kind of context specific system assessment which is consistent with NSA. IDRC does not, except for in a few cases, attempt to map whole systems, nor has it developed a Centre-wide assessment system like PSR. Instead, in collaboration with partners, needs are identified which are consistent with local value systems.

On the other hand, programs such as MIMAP make extensive use of econometric modeling. The Ecosystem Health PI, using both health and ecosystem models will tend to build upon previous IDRC models in that area (especially in the former Health Division). The use of econometric modeling is currently confined to human systems, but work has started on including environmental impacts as well. This will add a significant amount of complexity to the process. Similarly, linking human health to changes in the ecosystem is an ambitious modeling exercise.

Finally, all programs require an evaluation planning element which will necessitate the development

Table 4.1 Indicators and IDRC's core mandate: assessment by system characteristics

Characteristic	IDRC's Mandate
Context/Conceptual Framework	Defined by program in consultation with partners (according to their needs and values). Definite commitment to sustainable development and knowledge generation inherent in research program.
User	Partners/Program staff: programs are defined by partners' needs and values; activities are proposed by partners.
Indicators	Defined as part of program or for evaluation of programs; defined by users (program staff or partners) to reflect program goals and needs. Many programs/activities collect own data, develop own indicators for information purposes; others, such as MIMAP use some existing indicators are part of research program.
Values	Built on partners' values and needs.
Level	Depends on program: IDRC has done a significant amount of policy and community oriented research; in addition to some institutional level research. In the future, there will be more work done on evaluation indicators at the institutional level. Anticipate a balance between policy, institutional and community level indicators.
Ordering	Program--activities--indicators process unlike organizations which choose indicators prior to any policy planning activities.
Product or process orientation	Indicators are developed as part of a program process or as part of a specific activity in support of a program. Indicators are not developed for widespread use such as many UN indicator sets
Goals	Research goals exist as part of programs; more of a "finding out" process than a physical "moving toward" process. Progress toward sustainable development achieved/measured as part of longer term goal of increasing knowledge/changing policies as opposed to any physical changes. Increasing tendency toward this with new information technology/knowledge brokering mandate.
Combining Indicators	By performance scale if at all, except in case of econometric modeling.
Assessment of indicators	Indicators specific to programs and activities; programs could change as partners' needs and context changes.

of performance indicators to chart progress toward each program's goals. Regardless of whatever indicator activities are undertaken in the individual programs, there will be a strong trend toward normative assessment for programs. Here, indicators will be developed as part of the process of planning. Ideally, the context of the program is established, goals are chosen and (at some point) activities identified. The outputs of those activities will contribute to desired outcomes and intended reach of each program. In this case, indicators are developed to reflect the values of that program,

and by definition, our partners, as well as the program's progress towards its goals. Key to this process will be the need for carefully identifying desirable outcomes and intended reach, so that some notion of good, adequate or unacceptable progress can be understood.

Where to Now?

The practical problem with working with indicators is that while core characteristics have been identified and sorted, there is no single indicators program at IDRC. All PIs will need to understand indicators for purposes of evaluation planning and some will go even further to develop or use indicators as part of their program activities. The framework which has been developed in this report will allow Program Staff to quickly locate individual initiatives and have some idea as to the strengths and limitations of each approach. Overall, this report has identified the type of work which IDRC does not engage in: the development of politically informed sets of indicators for unknown purposes. Typically, indicators are used to test and monitor the effect of research and policy changes in models or to link context, values and goals to desired outcomes in various settings.

Indicator work is a cross-PI activity which requires some sort of central mechanism to ensure that PIs are able to learn from each other's experiences in developing indicators. This is not an integral part of the program design process, such as Evaluation or Gender, both of which have their own units and mandates to assist PIs. Indicator work falls into a group of useful tools such as participatory methods which have applications in a number of PIs but are currently used on an *ad hoc* basis. For indicator work, some thought needs to be given to the ideal of physically consolidating the various reports, methods and experiences around the Centre. This could be accomplished by:

- Consolidating the documentation, methods and expertise in the Evaluation Unit. As part of its mandate the Evaluation Unit can provide dissemination support to assessment methodologies and the synergy between Evaluation planning and indicator development would be helpful. This would require a more active role on the part of Evaluation in the process of Evaluation Planning. Currently, Evaluation is developing and testing tools which would be transferred to individual PIs for their use.

- Consolidation of the documentation, methods and expertise with an individual responsible for cross-PI activities. Here, indicator work could be combined with other activities and tools such as participatory methodology. This person would function as a technical support resource centre to educate and assist individual PIs in the use of these tools. This person could also act as a focal point for informal working groups to utilize the expertise of PIs and address their needs and concerns.

- Consolidation of indicator work, participatory methods and similar tools into a publication series which would function as a stand-alone toolkit for PI staff. Potentially, this toolkit series could be marketed outside of the Centre to provide cost-recovery on the cost of publication and (possibly) development.