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**Sustainable Development Framework
for Science and Technology Research:
Social and Cultural Dimensions**

by

Sherri Torjman and David Minns

**For the Prime Minister's Advisory Council
on Science and Technology**

February 2005

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Purpose of this Framework

This paper describes the core elements of a sustainable development framework for science and technology research. While the framework is concerned generally with sustainability, it seeks to identify more specifically the indicators of the *social impact* of any given research initiative.

The framework has been developed with a focus upon research in science and technology. However, its application has been tested for relevance to social areas such as poverty reduction and social economy initiatives.

The paper is divided into three sections. Section 1 sets out the assumptions and key concepts that guided this work. Section 2 describes the proposed research framework, including the three major phases of research projects. Section 3 focuses upon social objectives, indicators and targets along with the associated economic, environmental and cultural factors embedded in the social domain.

The second section, in particular, explores the three major phases through which any research project should proceed and discusses how to embed notions of sustainability within each phase. Together, these individual phases embody one of the core principles of sustainable development. They describe how the process of integrated decision-making should be moved ‘upstream’ in order to apply, as early as possible, a lens of sustainability.

I. Assumptions and Key Concepts

This sustainable development research framework is based on several assumptions and key concepts. The assumptions relate to the definition of research and the presence of a supportive context. Key concepts embedded in this work include sustainable development, its cultural dimension, the notion of indicators, the pathways approach to achieving social objectives and the concepts of direction and scale intrinsic to evaluation.

Assumptions

a. Definition of research

There are three major types of research. Research can be *fundamental* in nature with a primary focus upon the development of scientific knowledge. It can be *applied* research, which

basically packages scientific knowledge to create an emerging technology to target a need. Research can also be *developmental* in nature in which an emerging technology is advanced to be potentially competitive in the marketplace.

For the purposes of this research framework, the term ‘research’ has been interpreted to mean ‘research and development.’ This broader concept implies that there is an application dimension to the research.

From the viewpoint of science and technology, application pertains to investments in technology development and commercialization, which may include the generation of new scientific knowledge. From a social perspective, the application component refers, for example, to initiatives related to the social economy, poverty reduction and community development.

Another assumption is that the proposed research framework is both generic and specific. It is generic in that the overall categories of any given research project – whether in the economic, social or environmental domains of sustainable development – can apply to all investments. While these general domains of the framework hold across the board, the specific objectives and results of a given initiative and its associated indicators will change, depending upon the primary nature and purpose of the effort.

But while each research project is considered unique, the identified objectives and specific targets need not be altered substantially for every research project. There are clusters of initiatives to which this framework would apply, such as investments in greener technology or in the social economy. It is therefore not necessary to devise a new framework for every research project – but rather to develop a few generic frameworks that would be appropriate to clusters of investments.

The importance of formulating a broad list of generic indicators from which a specific subset is selected has been recognized and applied elsewhere as well. The Centre for Sustainable Development at Ghent University in Belgium, for example, notes explicitly in its work the need for general and specific indicators. The Centre has devised a list of basic indicators for sustainability from which stakeholders then select those indicators relevant to their needs.

It should be noted that this process of engaging relevant stakeholders in making decisions about appropriate objectives and indicators is generally recognized as a positive and essential practice in applying the concept of sustainable development. Stakeholder engagement is seen as one way to sort through the complexities and multiple factors involved in selecting appropriate objectives and associated indicators. Stakeholders typically include representatives from various levels of government, the private sector, the voluntary sector, educational institutions and individual citizens.

Finally, the illustrative examples presented in this framework focus primarily upon individuals and groups within the population such as Aboriginal Canadians, new Canadians or persons with disabilities. But the social objectives identified here can apply as well to larger communities and regions; the specific indicators and associated measures of progress would change depending upon the intervention.

b. Supportive context

Investment in respect of sustainable development assumes the presence of a supportive context. From a broad perspective, there is a need for appropriate policy in two major areas.

One policy stream involves fiscal instruments that provide incentives for research and development in greener technologies and for the commercialization of these technologies. These policy initiatives support both the supply side (availability of appropriate or encouragement of emerging technologies) and the demand side (sufficient market for developed technologies poised for commercialization) of the equation, respectively.

Fiscal instruments refer to measures that act as incentives or disincentives for certain investments or behaviour. Incentives can take the form of grants, subsidies, tax deductions, tax credits and capital cost allowances. Disincentives include taxes, user fees, fines and other penalties on the investment or behaviour being discouraged.

A second stream of policy initiatives involves support for direct investment in various social measures that seek to reduce poverty and promote well-being. These include initiatives that focus, for example, upon income redistribution, education and training, early childhood development, health care, affordable housing, community capacity building and the social economy. It also incorporates efforts to improve the physical and social design of neighbourhoods.

Key Concepts

a. Sustainable development

This research framework was shaped by the concept of sustainable development. This concept was defined in *Our Common Future*, the landmark document of the World Commission on

Environment and Development (commonly known as the “Brundtland Report”) as development that meets the needs of the present without compromising the ability of future generations to meet their own needs [World Commission 1987].

The ultimate goal of sustainable development is to improve the *quality of life* for all members of a community and, indeed, for all citizens of a nation. The framework developed for this paper assumes that improved quality of life is the implicit goal of any research investment – whether in the economic, social or environmental domains.

But sustainable development involves not only the substantive goal of a better quality of life. It also implies the use of a certain methodology to attain that goal. It is based on a process of *integrated decision-making* in which economic, social and environmental agendas are seen as intrinsically linked and are considered over the full life-cycle of the application – from ‘cradle-to-grave.’¹

The unique contribution of the concept of sustainable development is that it moves beyond economic indicators as the sole barometer of achievement to include measures of environmental and social well-being. The proposed research framework embeds these intrinsic relationships. While it builds in placeholders for economic and environmental objectives and associated indicators, it is concerned primarily with social objectives, indicators and targets, and with related cultural indicators.

Finally, as noted, sustainable development implies the need to move ‘upstream’ this integrated thinking. The assessment of potential economic, social and environmental impact must be carried out at the earliest possible time.

In fact, managing for sustainability involves far more than simply considering the results at the end of the process. While results are necessary, they are not sufficient. Results are important because it is essential to demonstrate to funders the value of their investment. But problems can arise when it is only results that matter. Limiting an assessment to what can be measured leaves out many vital issues, such as other changes or unintended consequences that may have resulted from that investment [Torjman and Minns 2004].

The relatively narrow notion of success embedded in current management and evaluation processes cannot really claim to contribute to well-being. The major impact of any investment effectively derives from its attention to more than just the project results. The other crucial dimension of this work involves the application of a sustainable development lens in which questions are asked about the potential environmental, economic and social effects of the proposed initiative.

This framework is based on the principle that managing sustainable development moves away from a sole focus on narrow outcomes. It considers, at the earliest stages of any research initiative, the possible economic, social and environmental impact. The framework then suggests that these potential effects be weighed against anticipated outcomes. Only then can a given investment be considered to be worth the time, effort and resources.

b. Cultural dimension

Recent literature and reports on sustainable development incorporate *culture* as a fourth dimension of an integrated decision-making lens. This component recognizes the important role and unique impact of culture upon any initiative, whether in the economic, social or environmental domain. This paper does not attempt to define the cultural dimension of sustainable development so much as point to its interface with the other components of this concept.

A scan of the literature on cultural indicators carried out for the purposes of this sustainable development framework found that the term is employed broadly and often inconsistently to refer to a wide range of factors.

In one instance, for example, the term ‘cultural indicators’ was used synonymously with social indicators. Factors such as employment rates and level of educational attainment were included (incorrectly in our view) within the cultural sphere. While cultural amenities may influence these areas, they lie primarily in the social domain.

In some cases, the term ‘culture’ refers to intangible factors, such as values, beliefs and practices embedded in ethnic and racial heritage. Other references consider cultural factors as equivalent to creative endeavours, such as the presence of arts, music, drama and literature within a community. Yet another interpretation of cultural factors focuses upon the vibrancy of cultural industries – e.g., number of theatres, local artists and book sales of local authors.

Still other sources view culture from the perspective of the links between creativity and the economic buoyancy of communities. This relationship derives primarily from the Creativity Index developed by Richard Florida [2002]. It basically measures the scope and extent of cultural diversity in a community, its tolerance of difference and its support for creativity and the arts. A high score on the Creativity Index is a gauge of community vitality, which in turn is seen as a vital driver of economic growth.

For the purposes of this sustainable development framework, a decision was made to employ the concept of culture as presented in the work of the United Nations Economic, Social and Cultural Organisation (UNESCO). In its consideration of the various dimensions of culture, UNESCO makes clear the distinction between intangible and tangible heritage.

The United Nations *Convention for the Safeguarding of Intangible Cultural Heritage*, which took effect in 2002, defines intangible cultural heritage as the practices, representations, expressions, and knowledge and skills that communities and groups recognize as part of their cultural heritage. Intangible heritage is expressed through language, performing arts, social practices, rituals and festive events, knowledge and practices concerning nature and the universe, and traditional crafts-manship. Intangible heritage is seen as distinct from tangible cultural heritage and its derivative cultural industries – which include publishing, music, audiovisual technology, electronics, video games and the Internet.

Intangible cultural heritage provides a sense of identity, continuity and source of inspiration that influence attitudes and lifestyles, responsiveness to educational programs and the drive to preserve a decent future for the next generation. UNESCO contends that no global commitment to sustainable development will succeed without that recognition.

In the framework developed for this paper, the intangible dimensions of cultural heritage have been embedded within the social inclusion objective. A set of questions are incorporated, as explained later, which ask about the impact of any given initiative upon cultural values and practices.

While not described in detail here, it is important to note the emerging body of literature on the role of tangible cultural heritage in building social and educational skills and in fostering social inclusion within communities [Torjman 2004; Jeannotte 2005].

One study of the impact of the arts upon learning, for example, found that students with more exposure to arts instruction had scores averaging 20 points higher than their peers on measures of creative thinking, fluency, originality, elaboration and resistance to closure [Burton, Horowitz and Abeles 1999]. Other studies have found that learning in and through art can help ‘level the playing field’ for young persons from disadvantaged circumstances. A study conducted with 25,000 students, for instance, reported that students with high levels of art participation outperformed ‘arts poor’ students on virtually every measure [Catterall, Chapleau and Iwanaga 1999].

At the community level, the arts have been found to foster social cohesion and community identity by promoting multicultural understanding [Azmier 2002: 4]. They provide opportunities for sharing the various forms of diversity that comprise a community. “Through cultural festivals, pre-

sentations and exhibits of art, it is possible to display and recognize different historical and cultural backgrounds as well as other forms of social diversity” [Azmier 2002: 4].

The arts and culture are also being seen increasingly as way to foster local identity in a world culture dominated by mass media. Around the world, “people turn to culture as a means of self-definition and mobilization and assert their local cultural values. For the poorest among them, their own values are often the only thing that they can assert” [World Commission on Culture and Development 1996].

In summary, the cultural dimension of sustainable development is embedded with its three other components. It is linked to the environment through natural heritage; to the economy through cultural products that both generate revenue and create a ‘magnet’ for attracting knowledge workers; and to the social dimension by fostering knowledge and skills development as well as social inclusion.

c. Indicators

This research framework involves the use of indicators to assess progress in pursuit of stated objectives. Indicators provide information on the current status of a given factor at a certain point in time. They enable both the documentation of the existing state of affairs and the determination of whether these circumstances have improved or declined.

An extensive range of indicators has been developed throughout the world for various purposes. In fact, the volume and variety of indicators available for measuring economic, social and environmental status and progress are almost overwhelming. While a recent literature review of frameworks for macro-indicators describes 37 sets of indicators and composite indexes, it notes that: “Literally hundreds of sets of indicators and composite indices on economic and social well-being have been developed throughout the world” [Sharpe 2004: 6].

Our challenge was to identify the social indicators that appeared to be most appropriate to this research investment framework. An analysis of the wide range of lists found that there was no single set of measures that readily could be applied for this purpose. The process of selecting relevant social objectives and associated indicators is described more fully below.

Another challenge in developing this research framework arose from the fact that the term ‘indicator’ is often used generically as though all indicators are conceptually equal. It became increasingly apparent in the course of this work that there are different levels of indicators, with distinct purposes.

Some indicators, for instance, reflect the status of an issue at a larger scale or broader level of aggregation – e.g., community, nation or the world. Others are appropriate for determining the *results* of an individual research project. The unemployment rate, for example, measures the broader problem that the specific job creation initiative is trying to address. Number of jobs created, by contrast, is an appropriate result for an individual project.

In addition to the ‘levels’ issue, there are other distinctions to be made among types of indicators. The OECD is one notable source that makes this distinction. In its work *Society at a Glance*, for example, the OECD identifies three main types of indicators. These relate to context, social status and societal responses.²

The research framework developed here similarly recognizes that not all indicators are of equal status. It makes a distinction between indicators in their various roles as outcomes, outputs and targets.

For the purposes of this framework, ‘outcomes’ refer to the ultimate distinction or desired objectives that any given research project seeks to achieve. The indicators typically used to signify outcomes are ‘large’ measures such as unemployment rates, crime rates or GDP. They are generally measures of macro performance even though they may apply locally or to a targeted geographic area.

An individual effort in itself is unlikely to affect the broader measures that outcome indicators typically represent. A single project can contribute only in its own unique – but relatively limited – way to the achievement of a specified outcome. An individual project produces ‘outputs’ or specific results in respect of a given outcome. The selection of appropriate outputs is determined by applying a pathways approach, described below.

But any research project should seek not only to produce outputs or results to show that it is moving in the right direction. It also must identify its targets – i.e., the level or extent of results it seeks to achieve within a designated period of time. Precise targets are determined in relation to specific outputs. Targets are identified through decisions as to what is *desirable* (both according to relevant literature and relative to other groups) and what is *possible*, depending upon available resources and skills.

In effect, the outputs represent the steps in the desired direction. The targets reflect a measure of scale – how quickly and within what period of time a given effort intends to proceed to realize its potential.

But this research framework moves beyond a distinction between outputs, out-comes and targets. It also incorporates notions of quantitative and qualitative indicators.

Quantitative indicators refer to factors that can be recorded in precise terms because they can be counted or measured in some way. They include, for example, a percentage change in the wage gap between men and women, a rise in literacy scores, an increase in total income or a reduction in greenhouse gas emissions.

Qualitative indicators, by contrast, are factors that are not readily measured. They reflect the actual or potential impact of a certain action or intervention. The fact that they cannot be counted does not make them any less important than quantifiable indicators. Intangible or qualitative factors reflect broader well-being in significant ways.

This framework also incorporates a qualitative dimension by encouraging the application of a sustainable development screen at the earliest possible (planning and design) phase in which questions are asked about the potential economic, social and environmental impact of a proposed project. While these questions often can be answered only through qualitative responses, they nonetheless provide essential information in determining appropriate pathways of action.

Social assistance (commonly known as ‘welfare’) recipients who increase their self-sufficiency by accumulating assets, for example, actually may reduce their income security by being disqualified from that program. A simple counting of increased assets would not reveal this larger problem. A small town that welcomes the economic investment of a big box store may count as positive the injection of new funds. But it inadvertently may result in many small store closures with a net result of no overall economic improvement [Torjman and Minns 2004].

The ‘big’ questions are important to ask *before* determining the routes or pathways to the desired objective.

d. Pathways approach

Another concept embedded in this framework is that there are several different routes or pathways that may be employed to attain a desired objective. The pathways are founded upon the basis of both research and practice evidence, which establish links between a certain action and a likely result. This general point can be illustrated through specific example, such as poverty reduction.

Say, for instance, that the overall goal of a research and development project is to reduce poverty. This outcome may be achieved by enhancing the knowledge and skills of an identified group of individuals in an effort to promote their employability. While the immediate result is not

necessarily a reduction in poverty, substantial evidence points to the positive correlation between educational attainment, occupational status and level of income. Higher levels of education are linked, on average, to better jobs and in turn to higher levels of income. This evidence means that enabling the acquisition of knowledge and skills is considered to be one of the most important pathways to effect a reduction in poverty.

If this particular pathway toward a poverty reduction outcome were selected, then a desirable output or result in respect of this objective might be the number of individuals who increased their level of education or acquired new or upgraded skills. The actual level of educational attainment will vary depending upon the purpose of the project.

If the work focused upon high school dropouts, the long-term unemployed or homeless persons, for example, then improved literacy skills might be the relevant measure. If, by contrast, the effort sought to upgrade the skills of those who became unemployed as a result of technological change, then the desired outputs might focus upon retraining efforts. The target in this example might be the number of persons who increase their level of knowledge or skills within a designated period of time.

There are other ways to reach the desired outcome of reducing poverty. The initiative may focus upon creating jobs for the unemployed or linking them to existing work opportunities. In this case, the outputs or results of the effort would be number of jobs created or individuals placed in these jobs. The target would be a specified number of new jobs or persons placed in paid work within a designated time frame.

These pathways are concerned primarily with individuals or households. Two other routes to reducing poverty are also possible. One is to focus upon employers in the private, government and voluntary sectors to encourage them to pay decent wages. Another is to ensure that various income security programs deliver benefits that are higher than poverty levels and that households potentially eligible for these programs are aware of their existence.

There is considerable work under way in the US (and emerging in Canada as well) to encourage employers to pay a 'living wage.' This amount is higher than minimum wage and reflects the fact that most employees of working age support other family members – typically children or older parents. A living wage is intended to exceed basic poverty-level incomes, which effectively result from minimum wage jobs.

In this case, the outputs of the effort would be the number of employers who increased their wages in recognition of the living wage factor. Specific targets could include, for example, the numbers of employers who raised their wages, the level of increase and the time period within which these changes took place.

Yet another way to reach the desired outcome of reducing poverty is through income redistribution. Unlike the other efforts, which would be undertaken at a community or local level, this kind of intervention involves policy work at national or provincial levels.

A poverty initiative can seek to increase the level of benefits paid to low-income households through programs such as the Canada Child Tax Benefit, the Canada Pension Plan disability benefit or provincial social assistance. The target might be a certain percentage increase relative to a recognized standard (e.g., Statistics Canada's low income cut-offs). Alternatively or in addition, an effort might seek to reduce the level of taxes paid by low-income households.

These specific examples focused upon poverty reduction are intended to illustrate a general point embedded in this framework: The same outcome (e.g., reduced poverty) can be achieved through several different pathways – i.e., education and training, employment, wage increases or benefit increases. *The specific outputs selected for any research project and the associated targets in both degree and time will vary depending upon the selected pathways.*

Because different routes may be taken toward the ultimate destination or desired outcome, there is growing recognition of the need for individual projects to articulate the rationale for the pathway they have chosen to pursue. In fact, evaluation models currently being developed around complex themes refer to this task as the articulation of the 'theory of change' that underlies the specific actions [Fulbright-Anderson, Kubisch and Connell 1998].

The pathways approach assumes that there is evidence – in the form of research and/or practice – to support a certain expected chain of activities and the associated measures that have been selected as barometers of success. But two caveats are in order at this point.

The first caveat is that the development of a theory of change implies a logical and consistent sequence of events. A rise in educational attainment will lead to a better job. An increase in wages will reduce inequities among various groups. While these sequences are the most likely, they are not always guaranteed. Other intervening or unexpected variables, such as family illness, sudden layoff or change in residence, might affect the trajectory of a designated set of actions.

The second caveat is the fact that the consistent presence of two variables together does not necessarily imply a causal link. It is possible that the two factors are correlated – or typically found together. In the case of social investments, in particular, it may not be possible to prove causal links with certainty. In fact, in many cases, two factors that frequently are linked actually influence each other in complex ways. The challenge in the social domain is the fact that causal links are not absolute.

This problem is made clear in the literature on the links between poverty and health. There is a vast body of evidence, for example, which shows a link between poverty and poor health. Persons with lower incomes tend, on average, to have poorer health.

But while poverty is linked to, or correlated with poor health, poverty does not necessarily always cause poor health. For some people, the relationship may work in the opposite direction – i.e., their poor health is responsible for their poverty because they are unable to put in sufficient hours to earn a reasonable income or even work at all.

In addition to causality, a number of factors make it difficult to gauge the impact of social interventions. The assessment of results is challenging under even the most basic of circumstances – i.e., a single program or intervention is undertaken with a particular target group in order to achieve a certain result.

For instance, a program may be initiated in which high-quality child care is provided at no cost for a designated group of teen mothers to enable them to complete their high school education. In this example, it is assumed that the successful completion of high school among those in the identified group was due primarily to the intervention – i.e., the additional supports made available to allow the young women to focus on their schooling.

It is possible, however, that other factors played a role as well. The families of several teens may have provided some assistance to ensure their success. The attention that the young women received just by virtue of being involved in the program – the ‘placebo effect’ – may also have played a role.

While it is impossible to control for these other factors, it may be feasible to determine their relative importance. One way is to ask participants to identify the factors that actually made a difference in helping them complete their high school. Such an in-depth assessment is costly and impractical to carry out in every case. At the end of the day, an assumption must be made about the role that the additional supports played in achieving the desired outcome.

e. Evaluation

There are several important features to this research framework. First, it makes clear the fact that the assessment of progress toward the achievement of desired objectives begins at the earliest possible – planning and design – phase of the research effort. Second, the work is monitored on an

ongoing basis and progress is benchmarked against similar or previous efforts. Information is fed back regularly into the process.

A third key feature of this research framework is the distinction it makes at the evaluation phase between direction and scale. An assessment of effectiveness is carried out to determine whether the project has moved toward the realization of its stated objectives – i.e., it has moved in the right *direction*.

The desired outputs must be defined in a general sense because they are an expression of the *direction* in which the work should proceed. It is then important to build in a sense of *scale* of the work – by how much or how quickly the potential outcomes are likely to be achieved if the results of the work are broadly applied. Both dimensions, direction and scale, are essential components in evaluating any given research project.

Thus the concept of sustainable development, which seeks to ensure the well-being of future generations, is concerned not only with movement in the right direction. It is also concerned with the ability of the effort to achieve its objectives at a level and pace sufficient to offset, if not reverse, the unsustainable impacts of economic growth.

Ideally, targets should be set at a scale sufficient to offset or compensate for market impact, it is important at the same time to ensure that these targets are realistic and feasible. If they are seen as too much of a ‘stretch,’ there is a danger that the group or community responsible for a given research project could get discouraged in its ability to achieve the goal. Alternatively, the researchers could start shifting their activities in order to claim (possibly inappropriately) that the target has been achieved [Torjman 2000].

II. Components of the Framework

Major Features

As noted, there are three major types of research: *fundamental*, *applied* and *developmental*. The research framework developed here applies more appropriately to applied and developmental work. The framework embodies the following key features. It:

- incorporates the core components of sustainable development
- requires integrated decision-making among economic, social and environmental objectives

- is intended to be modified as it is applied to investments in specific domains
- builds on work that has been carried out internationally, nationally and locally on the development and use of indicators. (For the purposes of this paper, the specific focus is upon social indicators. The framework holds places, however, for economic and environmental indicators.)
- assumes that the research project should proceed through a process that involves three key phases – planning and design, application (implementation or commercialization) and assessment
- applies a sustainable development lens at the earliest possible point in the research project – i.e., the planning and design phase of the work
- sets out at the planning and design phase of the research project clear objectives to be achieved from economic, social and environmental perspectives
- considers these objectives to be synonymous with desired outcomes
- employs social objectives, in particular, that are consistent with one or more of the key objectives set out by the Organisation for Economic Co-operation and Development (OECD) and the United National Development Programme (UNDP)
- identifies clearly at the planning and design phase the specific outputs or results in pursuit of the identified objectives by applying an evidence base
- involves regular monitoring, at the intermediate or application phase of the research project, of progress toward desired results with continual benchmarking against similar efforts
- feeds back into the research project the information attained through monitoring in order to adjust the work relative to progress against targets
- assesses at the evaluation phase of the research project the effectiveness of the research effort in terms of both direction and scale
- shares broadly – both within and outside the specific effort – the lessons learned at the evaluation phase of the research to influence the design of future projects.

Phases of Research Projects

For the purposes of this sustainable development framework, any given research project evolves through three major phases: planning and design, implementation and evaluation. These three phases, presented together in Figure 1, are described more fully below.

During each phase, it is assumed that information is fed back into the process so that the research project effectively becomes a living system. The plans change on the basis of information that is continually being collected and assessed to determine progress against stated objectives.

a. Planning and design

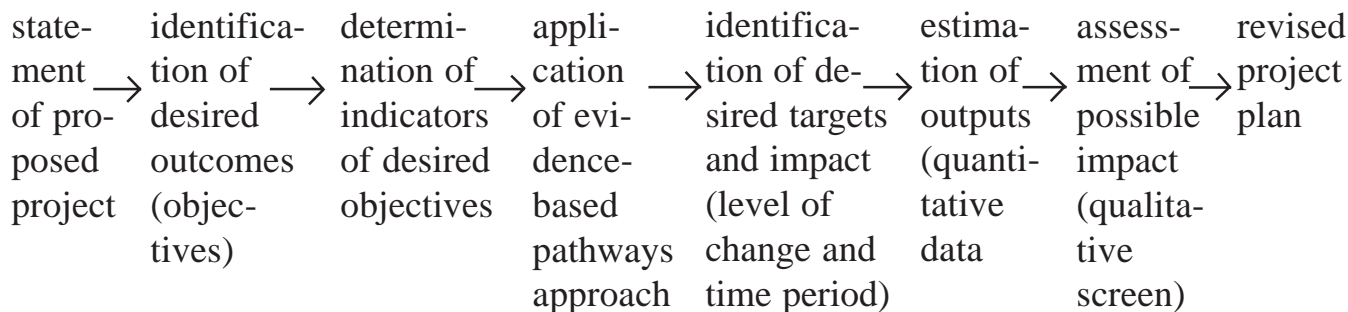
It is at this earliest stage of the work, the project planning and design phase, that a sustainable development lens is applied. Questions are asked about the potential economic, social and environmental impact of any given activity and about possible consequences assessed from both quantitative and qualitative perspectives.

The framework assumes that the project planning and design phase of the work involves eight key steps (see Figure 2). These are to:

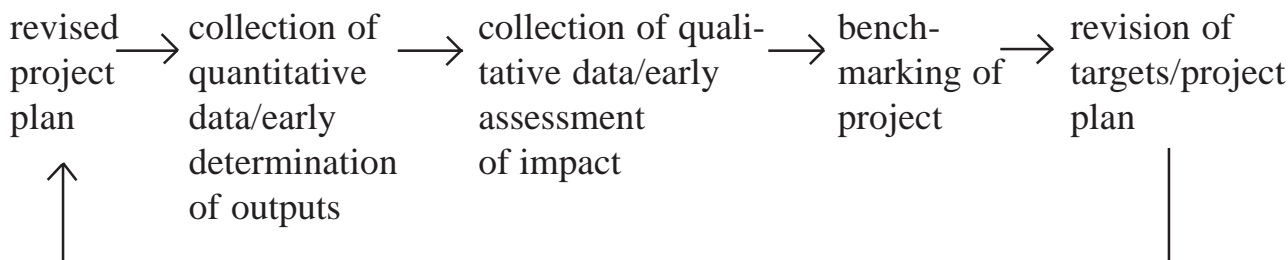
- develop a plan for the proposed project
- identify the desired outcomes of the work or the destination that the project seeks to achieve. From the perspective of this framework, these desired outcomes can be understood as the equivalent of desired objectives – i.e., the objective of any given research project is to achieve a desired outcome.
- determine the general indicators of the desired objectives. This determination should be made on the basis of evidence derived from research and/or practice. The application of social indicators, in particular, is described below.
- apply an evidence-based pathways approach to help determine the possible results
- identify the desired targets and impact (this identification involves both the level of desired change and the time period within which this change is to be achieved)
- estimate the likely outputs or results from a quantitative perspective

FIGURE 1: FRAMEWORK FOR R&D PROJECTS

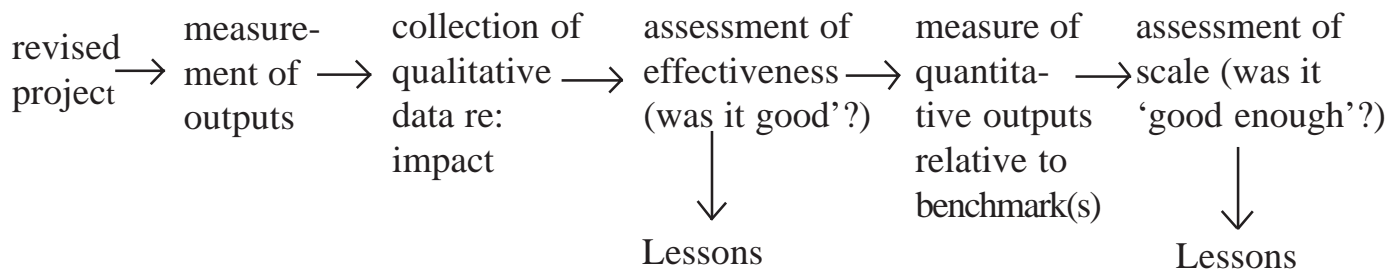
1. PROJECT PLANNING AND DESIGN



2. PROJECT IMPLEMENTATION AND MONITORING



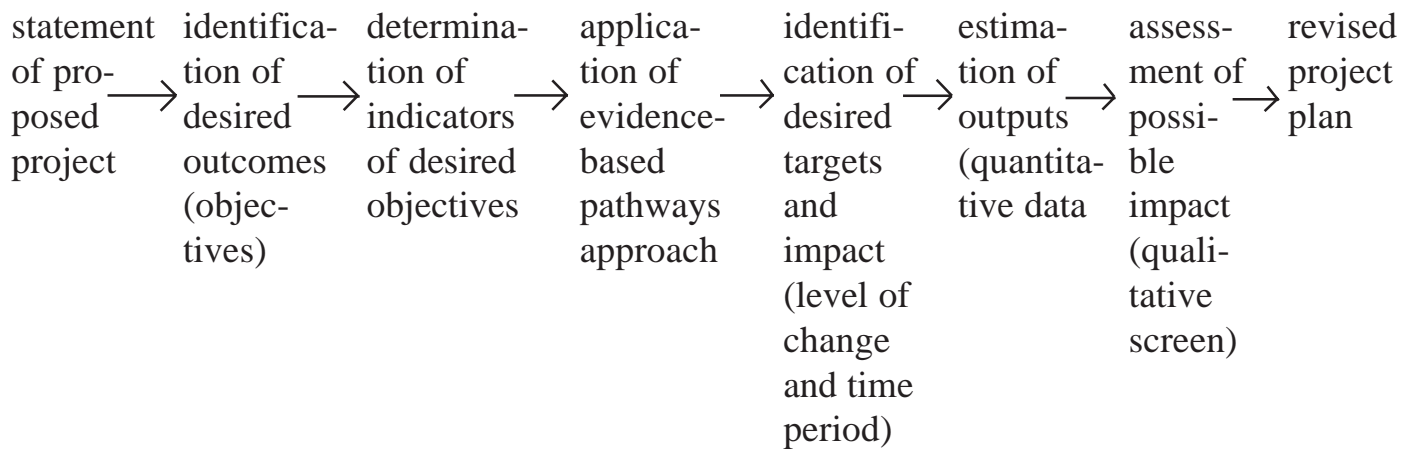
3. PROJECT EVALUATION



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FIGURE 2: PROJECT PLANNING AND DESIGN

KEY STEPS



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- assess the possible impact of the effort from a qualitative perspective, taking into account economic, social and environmental impact
- revise the project plan on the basis of these answers determined from the previous two steps.

b. Implementation and monitoring

The framework assumes that the project implementation and monitoring phase of any given research project involves six key steps (Figure 3). These are to:

- implement the revised project plan
- begin the collection of quantitative data for an early determination of outputs (specific examples of quantitative data from a social perspective are presented below)
- begin the collection of qualitative data for an early assessment of the impact (specific examples of qualitative data from a social perspective are presented below)
- benchmark the project – by assessing its progress on an ongoing basis relative to similar efforts where possible (e.g., other communities) and/or relative to past performance
- feed back information into the project implementation
- revise the targets and the project plan more generally on the basis of the early results and the benchmarking process. Plans may have to change – e.g., adjustments may have to be made to the identified targets.

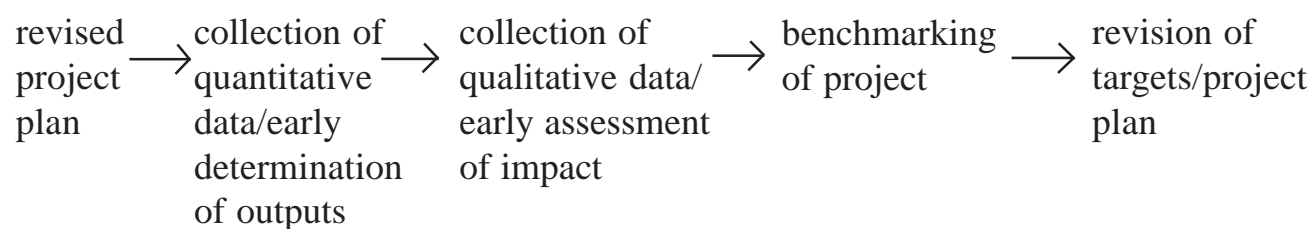
c. Evaluation

For any given research project, the framework assumes the continual flow of information within and between all stages of the work. Any research effort should correct its course on an ongoing basis relative to information regarding progress to date.

This feedback is important not just for the research project itself. The lessons derived from individual projects ideally will be shared more broadly to ensure that others can benefit from the results of the work. Governments can enable this process by providing mechanisms or venues to

FIGURE 3: PROJECT IMPLEMENTATION AND MONITORING

KEY STEPS



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exchange information. This sharing helps raise the bar of practice so that lessons as to what actions worked effectively and which did not can be incorporated into related efforts undertaken in future.

The need for ongoing feedback within the research process is based on the assumption that evaluation is important not just for accountability purposes. There is also a vital learning component implicit in this work, which leads to better quality practice when lessons are made more widely available.

This framework assumes that the evaluation phase of any given research project involves six key steps (Figure 4). These are to:

- begin the formal evaluation of the revised project
- measure the outputs or results from a quantitative perspective
- collect qualitative data on outcomes
- assess the effectiveness of the research project to determine whether the effort was considered to be satisfactory or good
- measure quantitative outputs relative to performance benchmarks
- assess scale to determine whether effort was considered to be good enough.

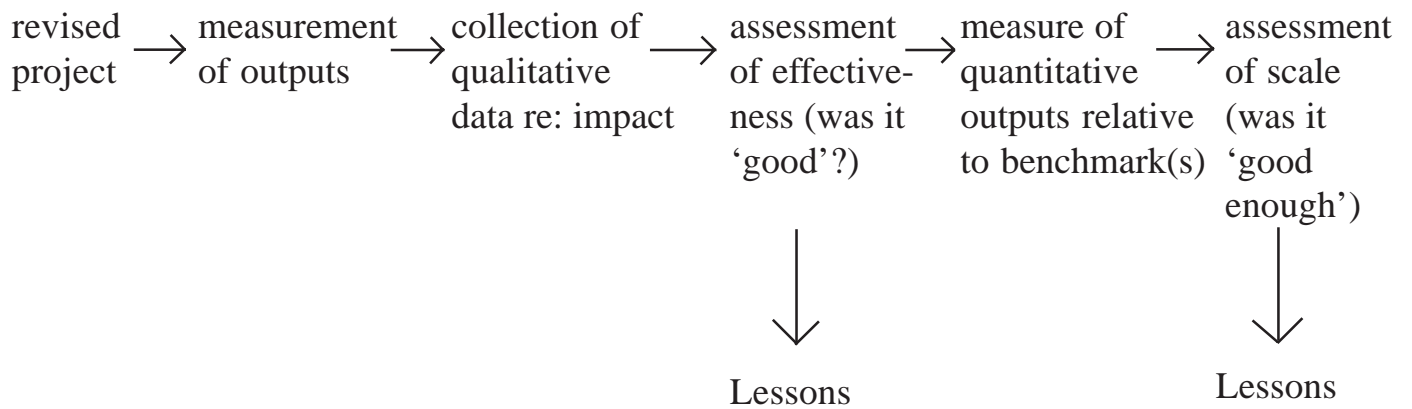
III. Social Objectives, Indicators and Targets

The task of identifying major social objectives for this sustainable development research framework proved to be complex. The key challenge arose from the fact that there is a wide range of social objectives described in the relevant literature and a seemingly endless array of social indicators [Sharpe 2004].

Another challenge was that many social objectives are linked intrinsically with economic objectives. Typical economic indicators, such as unemployment rates, are often considered to be prime indicators of social well-being. But rates of employment determine more than overall levels of income. They also reflect the degree of participation in society and thereby influence significantly its degree of social cohesion – a major social construct.

FIGURE 4: PROJECT EVALUATION

KEY STEPS



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Recent studies conducted in Europe, in particular, consider economic competitiveness and social cohesion as two sides of the same coin. The third report on economic and social cohesion published recently by the European Commission, for example, discusses the intrinsic links among employment, competitiveness and cohesion [European Commission 2004]. In fact, social cohesion is often measured in terms of employment and poverty rates – both of which are determined largely, though not exclusively, by economic factors.

It is incorrect, however, to treat economic and social agendas as synonymous. The agendas in these areas clearly overlap in several spheres, such as employment rates, income levels and poverty rates. But the ‘improved quality of life’ goal moves well beyond a simple calculation of economic performance. In fact, the concept of sustainable development seeks explicitly to include aspects other than basic economic factors.

Another challenge in determining appropriate social indicators for this research framework was the apparent confusion over the terms social cohesion, social exclusion and social inclusion. These concepts sometimes are employed interchangeably – as though they all refer to the same factors. Other times, they are used as the correlates of economic objectives, such as competitiveness. Economic competitiveness and social cohesion are being identified more frequently as factors that are unique, yet inseparable. A decision ultimately was made to select social inclusion as a major social objective, for reasons presented below.

The development of social objectives for this sustainable development framework took into account the wide range of initiatives already under way throughout the world on the identification of social indicators. For example, the work of the Global Reporting Initiative, International Finance Corporation (the private sector arm of the World Bank Group), Equator Principles and Dow Jones Sustainability Index all were examined as part of this effort to identify appropriate social indicators.

Because of the long list of possible choices, it was necessary to select the objectives deemed most appropriate for this sustainable development framework. The Global Reporting Initiative recognizes explicitly the extent of this challenge in noting that “social performance measurement enjoys less of a consensus than environmental performance measurement” [Global Reporting Initiative 2002].

There are many areas of overlap between the social indicators identified in these international efforts and the ones ultimately incorporated within this framework. These include, for example, net employment creation (e.g., Global Reporting Initiative), improvement of livelihoods and maximization of benefits to the local economy (e.g., International Finance Corporation) and socio-economic impact (e.g., Equator Principles).

However, a decision was made not to adopt in their entirety the social indicators employed by these indices. Certain international measures, such as the Global Reporting Initiative and Dow Jones Sustainability Index, are concerned primarily with the investment and management practices of private corporations rather than governments.

As a result, most of the social measures employed by these frameworks focus upon the policies related to employees and shareholders. Human resource policies deal with such issues as wages, benefits and other dimensions of employee compensation, worker health and safety, training and skills development, and diversity of the company workforce. Good practices typically are identified according to standards set by the International Labour Organisation. Indicators of good governance, such as transparency and shareholder engagement, focus mainly upon company relations with shareholders.³

Another category of measures in these international initiatives is concerned with the application of ‘negative screens,’ by which companies may gauge their ethical performance – such as child labour or exploitive images in advertising. The use of negative screens is intended to help curb these inappropriate practices.

After examining the broad scope of possible social indicators identified in the relevant literature [Sharpe 2004], an immediate decision was made to create a limited set of indicators for the purposes of this sustainable development framework. Unless the potential list is reasonable, a research project either might become swamped by measurement or simply give up on the social component in the face of onerous reporting requirements.

The second consideration for identifying appropriate social indicators was the presence of an underlying conceptual base. There are many existing lists of social indicators from which to choose. But rather than randomly select a group of indicators, we sought conceptual coherence by embedding them within a clear set of social objectives – i.e., a statement of goals to be achieved or desired outcomes.

Third was international recognition. A suite of social objectives employed by a widely recognized international body likely would have been subject to numerous screens to ensure its applicability to many nations. Selection rigour was deemed desirable for the purpose of the framework developed here.

Fourth, a decision was made to include social objectives intended primarily for ‘public good’ purposes rather than principally for corporate improvement. As noted, many social indicators currently in use are concerned with corporate governance and ethical practice. While these are

important components of sustainable development, the social indicators considered appropriate for this framework had to have a broader social purpose. This selection criterion does not preclude private companies from using the framework; it simply means that they will be seeking results beyond their own internal operations.

Finally, a decision was made to ensure that the selected social objectives were relevant not only to the developed world. A robust framework also had to be applicable to the developing world as well as parts of Canada considered economically marginalized and socially vulnerable – e.g., they have disproportionately high rates of poverty or homelessness.

The resulting framework developed here has only six social objectives – each of which has associated indicators. The appropriate objectives from this list of six must then be selected according to the intended purpose of any given research initiative.

These five key selection criteria led us to the work of the Organisation for Economic Co-operation and Development (OECD) and the United Nations Development Programme (UNDP). While the social objectives identified by these two organizations comprise the basis of our framework, we have slightly modified these objectives so as to avoid repetition and streamline the findings.

The work of these two organizations was chosen as a foundation for several reasons. Both are recognized internationally and are leaders in promoting the concept and practice of sustainable development. But rather than select the paradigm of just one of these bodies, it was deemed that the best approach would be to combine their unique contributions.

The OECD, in particular, is concerned with industrialized nations. Its framework of social indicators is therefore seen as relevant for application to Canada.

The publication *Society at a Glance: OECD Social Indicators* presents an overview of social trends and policy developments in developed nations using indicators from OECD studies and other sources. The indicators include information on the numbers of asylum seekers and suicides, divorce and fertility rates, low-paid employment, joblessness, days lost to strikes, prison populations, gender wage gaps, longevity, health infrastructure, and educational and poverty levels.

To help conceptualize the links among these seemingly disparate indicators, the OECD has grouped them into four broad objectives of social policy. These are: promoting equity by overcoming social or labour market disadvantages, enhancing self-sufficiency, promoting social cohesion and improving the health status of populations.

At the same time, however, a significant objective of sustainable development is to close the gap between ‘have’ and ‘have-not’ nations. Because the work of the United Nations Development Programme (UNDP) is relevant to developing nations, its objectives were considered appropriate to incorporate in this framework. The inclusion of the UNDP objectives would help make the framework more broadly applicable – not only to developing nations but also to depressed and marginalized regions of Canada.

The four OECD objectives were then compared with those represented by the Human Development Index (HDI) formulated by the United Nations Development Programme (Figure 5). The HDI is a composite measure of deprivation in three key dimensions of human life: longevity, knowledge and decent standard of living. Longevity is measured by life expectancy at birth. Educational attainment is assessed by a combination of adult literacy and the educational enrolment ratio. Standard of living is determined by real GDP per capita.

For industrial countries, however, the United Nations Development Programme has added to these three areas a fourth dimension of human life that contributes to well-being: social exclusion.

The deprivation in longevity is represented by the proportion of the population not expected to survive to age 60; the deprivation of knowledge by the proportion of the people who are functionally illiterate as defined by the OECD; the deprivation in a decent standard of living is represented by the proportion of the population living below the poverty line set at 50 percent of the median disposable income; and the deprivation of social exclusion is measured by the long-term (12 months or more) unemployment rate [Sharpe 2004: 29].

The social exclusion objective has been incorporated within this sustainable development framework as greater social inclusion.

Taken together, the OECD and UNDP work appeared to cover the scope of social concerns relevant on a global scale. The combined social objectives, along with their associated indicators, are identified in Figure 6. But even combining the indicators derived from these two bodies of work still appeared to leave out a critical dimension of human well-being – the assurance of a basic standard of living.

While the HDI includes basic standard of living as one of its three key components, it defines this dimension primarily in terms of GDP per capita. The problem with this focus is explained below. But briefly, it was felt that this framework must include a social objective concerned explicitly with extreme deprivation and that takes into account direct interventions, such as the provision of affordable housing and nutritious food.

FIGURE 5: MAJOR SOCIAL OBJECTIVES

<u>Economic</u>	<ul style="list-style-type: none"> • competitiveness • innovation 		
<u>Economic/Social</u>	<ul style="list-style-type: none"> • greater equity of outcome 	OECD	UNDP (decent standard of living)
<u>Economic/Social</u>	<ul style="list-style-type: none"> • enhanced self-sufficiency 	OECD	
<u>Social</u>	<ul style="list-style-type: none"> • improved knowledge and skills 		UNDP
<u>Cultural/Social</u>	<ul style="list-style-type: none"> • greater social inclusion 	OECD	UNDP
<u>Social</u>	<ul style="list-style-type: none"> • access to basics 		UNDP (Millennium Development Goals)
<u>Environmental/Social</u>	<ul style="list-style-type: none"> • improved human health 	OECD	UNDP
<u>Environmental</u>	<ul style="list-style-type: none"> • improved environmental health 		
<u>Environmental/Economic</u>	<ul style="list-style-type: none"> • green production 		

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This direct intervention objective was found embedded in a related UNDP initiative: the United Nations Millennium Development Goals. The latter were developed in response to an effort launched in the year 2000 to craft a concerted attack on poverty and illiteracy, hunger, discrimination against women, unsafe drinking water and a degraded environment.

Because the Millennium Development Goals focus primarily upon health and education, they are consistent with OECD and UNDP social objectives. But an additional and unique millennial goal is also identified: the eradication of extreme poverty and hunger. This goal has been included in Figure 6 as ‘access to basics.’ In our view, this particular objective is meant to imply more than an improved standard of living for all citizens. Its intent is to ensure the reduction of severe deprivation and to explicitly address poverty eradication.

In short, the work of the OECD and UNDP comprises the foundation of the social objectives employed in this sustainable development framework. Figure 5 identifies key areas of overlap and difference. The proposed framework combines the four OECD social objectives with the four UNDP social objectives but modifies slightly the categories in order to avoid duplication. It then adds the dimension included in the Millennium Development Goals not sufficiently reflected in the other two bodies of work.

Both the OECD and UNDP focus upon the socioeconomic objective of greater equity of outcome, the term used by the OECD. The UNDP calls this objective ‘improved standard of living.’ Figure 6 combines both objectives into one economic/social objective.

Self-sufficiency is listed in this framework as the second social objective. It arises from the work of the OECD. While self-sufficiency *per se* is not an objective articulated in other studies, it is identified here because of the emerging and growing body of literature on the important role of assets in ensuring economic and social well-being [Sherraden and Gilbert 1991; SEDI website].

The OECD includes measures of educational attainment under self-sufficiency while the UNDP considers educational attainment as a separate factor. For the purposes of this framework, a decision was made to list knowledge and skills development as a distinct objective in respect of the fact that educational attainment is more than just an economic imperative.

A growing body of literature and international work (e.g., the 21st Century Learning Initiative spearheaded by John Abbott in the UK) makes the case for the importance of knowledge development and learning as essential components of human well-being. Knowledge development for the purposes of employment is just one dimension of human capital investment and often overrides other crucial functions of learning.

In summary, our proposed sustainable development framework identifies six key objectives in the social area. Two of these objectives represent the interface between economic and social domains, two objectives are deemed to fall primarily within the social domain, one objective represents the overlap with the cultural dimension and the final objective embodies the interface between environmental and social components of sustainable development.

These areas of interface are important. They effectively represent the spheres of integrated decision-making “ so central to the concept of sustainable development.

Figure 6 should be understood as a broad conceptual map. The purpose of a conceptual map is to point out the possibilities. It identifies all the component parts of an issue and shows the actual and potential links among the many factors. A conceptual map can then be used to determine the precise points of focus, depending upon the specific purpose of any given piece of work.

A conceptual map can be compared to a travel map. It is used to chart the possible pathways to the desired destination. It also highlights the neighbouring areas that might be visited if there is time or in future. It helps place in context any given journey to determine the areas that have been travelled and those that remain.

But having all the possible end points identified on the same page does not necessarily mean that the traveller must go to all those places. A selection is made of the desired destination(s).

Similarly, the conceptual map presented in Figure 6 is a social universe. It presents the entire picture but is not intended to imply that every single indicator must be applied in all cases and at all times. The key is to be selective and to choose those measures that are appropriate to the desired objective(s). Every initiative or project must determine the factors that are relevant to its respective area of interest and where it can contribute best to achieving sustainable development. It can then see its unique contribution relative to all the other possible areas of intervention.

It is of interest that several of the social objectives identified in Figure 6 comprise what might be understood as ‘social infrastructure.’ While there is no single or clear definition of this term, it effectively consists of three key dimensions.

First, it refers to the *programs and services* that typically comprise the social arena in such areas as health care, education, early childhood development and supports for persons with disabilities. But the notion of social infrastructure implies more than services. It also refers to the *social amenities* that are essential to the well-being of individuals, families and communities. These include, for example, green spaces, cultural events, recreational programs and public spaces.

FIGURE 6: ‘UNIVERSE’ OF SOCIAL INDICATORS

	DESIRED OUTCOMES	OUTCOME INDICATORS	EVIDENCE-BASED OUTPUTS (Illustrative)	SELECTED TARGETS (Illustrative)	POTENTIAL IMPACT (Illustrative)
ECONOMIC/ SOCIAL	<ul style="list-style-type: none"> greater equity of outcome (OECD) 	<ul style="list-style-type: none"> poverty rates inequality ratios real GDP per capita 	<ul style="list-style-type: none"> changes in wage levels narrowing of wage differentials 	<ul style="list-style-type: none"> close male/female wage gap over 3 years increase wages of selected target groups by 3% a year over 2 years 	<ul style="list-style-type: none"> will increases in participant wages displace other jobs? how will increases in wages affect the ability to purchase basics, such as affordable housing
ECONOMIC/ SOCIAL	<ul style="list-style-type: none"> enhanced self-sufficiency (OECD) 	<ul style="list-style-type: none"> employment rates asset levels 	<ul style="list-style-type: none"> numbers of jobs created use of EI/welfare increase in savings 	<ul style="list-style-type: none"> increase by 10% per year the number of new jobs increase personal assets of 500 households by 5% a year over 3 years 	<ul style="list-style-type: none"> will the project result in loss of jobs for some individuals? what is the impact of increased assets? (e.g., loss of social assistance)
SOCIAL	<ul style="list-style-type: none"> increased knowledge and skills (UN) 	<ul style="list-style-type: none"> educational attainment literacy/numeracy 	<ul style="list-style-type: none"> number of years of formal education improved literacy scores more workplace training 	<ul style="list-style-type: none"> ensure 100 teen drop-outs complete high school each year increase by 25% the literacy scores of 100 participants in one year 	<ul style="list-style-type: none"> are additional supports required to ensure success (e.g., child care, language training)?
CULTURAL/ SOCIAL	<ul style="list-style-type: none"> greater social inclusion (OECD/UN) 	<ul style="list-style-type: none"> participation rates crime rates 	<ul style="list-style-type: none"> participation rates in recreation programs level of voting participation in community organizations suicide rates 	<ul style="list-style-type: none"> provide recreational subsidies to 25% of low-income households per year ensure over 2 years that 30% of disabled population have access to disability supports 	<ul style="list-style-type: none"> what are the major cultural values/influences for these groups/in this community? will cultural values be respected? how will these groups be affected by the project? what groups are at risk of exclusion? what barriers must be removed to support inclusion?
SOCIAL	<ul style="list-style-type: none"> access to basics (UN) 	<ul style="list-style-type: none"> availability of affordable housing reduction of homelessness access to nutritious food 	<ul style="list-style-type: none"> numbers of decent affordable housing units numbers of homeless individuals numbers who rely on food banks 	<ul style="list-style-type: none"> expand supply of decent affordable housing by 10% in 2 years create 100 new emergency shelter spaces every year 	<ul style="list-style-type: none"> does expanded supply of affordable housing create other impacts – e.g., loss of other subsidies or supports?
ENVIRONMENTAL/ SOCIAL	<ul style="list-style-type: none"> improved human health (OECD/UN) 	<ul style="list-style-type: none"> disability-free life expectancy 	<ul style="list-style-type: none"> cancer rates asthma rates 	<ul style="list-style-type: none"> reduce toxic emissions by 5% per year 	<ul style="list-style-type: none"> do processes employed to reduce toxins create other hazards/waste?

Finally, social infrastructure incorporates elements that provide a sense of *safety and security*. The social objectives that are concerned with access to basics, greater social inclusion and improved knowledge and skills are particularly relevant to this concept.

Each of the six key social objectives identified in Figure 6 is explained below along with illustrative outputs, targets and qualitative indicators of broader impact.

a. Greater equity of outcome

Greater equity of outcome derives from the OECD list of social objectives. It lies at the interface of economic and social objectives in that its attainment as a social objective is linked intrinsically to economic achievement.

The literature on equity of outcome generally is concerned with relative poverty, income inequality, low-paid employment and inequities among groups, such as the gender wage gap. The latter refers to the fact that women earn less, on average, than men in similar employment positions and overall.

The equity of outcome objective typically comprises two key dimensions. The first is the rate of poverty within a population or a given subset of that population. This measure provides an indication of the *scope* of inequality – or percentage affected by the identified problem – across a given population.

The second dimension consists of various ratios that have been developed to determine the *depth* of inequality. An example is the Gini coefficient – a number between zero and one that measures the degree of inequality in the distribution of income in society. It can also be applied as a measure of wealth inequality.

Greater equity of outcome might be achieved through measures that affect *wages* (i.e., earnings from work) or *incomes* (i.e., total monies received from a variety of sources, including government). Possible actions to achieve greater equity of outcome include, for example, raising minimum wages, narrowing earnings differentials between designated groups and reducing income differentials through redistributive income security and taxation policy.

Each of the possible actions basically represents a different pathway toward greater equity of outcome. Specific outputs will vary depending upon the selected route. These outputs include, for instance, an increase in average wages in the population or designated target groups. Another possible output involves a narrowing of the wage differentials between various groups (e.g., men

and women) or between a particular group and the population as a whole (e.g., Aboriginal Canadians and all Canadians). A third possibility is the reduction of income differentials, which takes into account income from all sources including wages and government benefits.

Selected targets might involve a specified percentage (e.g., three percent) increase in minimum wage. Alternatively or in addition, a higher percentage (e.g., 10 percent) increase in wages might be paid to a designated group, such as persons with disabilities or female employees within a certain firm or sector. Another possibility is to close the male/female wage gap over a three-year period through annual incremental improvements to women's pay, in particular, in certain firms or sectors.

As indicated in Figure 6, one question that might be asked to determine the potential impact of this objective concerns the possible effect of a wage increase on other social objectives, such as enhanced access to basics. Improved wages would help workers pay for basic needs, such as decent accommodation (though in certain markets, such as Calgary, the availability of affordable housing is so scarce that even a small increase in wages may not relieve the housing squeeze).

Improved wages also assist in the payment of other basics, such as heating fuels. Again, however, it is possible that a wage increase could be offset by rises in the price of oil or natural gas, which would reduce or even offset the gain. It is only by asking questions about the broader context of a given effort that its true impact can be ascertained.

A potentially negative impact of a wage increase for certain group of employees (e.g., female workers) could be job loss in that firm or sector. Overall, the amount directed toward wages might remain the same if employers decide, for instance, to offset the increase in wage payouts by savings effected through job cuts or technology.

b. Enhanced self-sufficiency

Enhanced self-sufficiency is the second key social objective set out in the OECD work in particular and incorporated within this framework. It too lies at the interface of economic and social goals. Employment rates typically are employed as an indicator of status and progress in respect of self-sufficiency.

The OECD self-sufficiency indicators focus upon employment, unemployment, jobless youth, jobless households, working mothers and retirement ages. For the purposes of this sustainable development framework, a decision was made to vary somewhat the OECD indicators. The framework developed here adds another crucial dimension – level of assets. It has been incorporated

because of the growing body of literature on the vital role of assets in promoting economic and social well-being [Sherraden and Gilbert 1991; SEDI website].

Actions to provide self-sufficiency vary widely and include, for example, job creation through private business development or community economic development. A number of asset-based initiatives are under way throughout the country to help low-income households build their private savings for the purposes of education or employment. These involve individual development accounts to encourage private savings, community loan funds to provide access to capital and learning bonds to enable family savings for postsecondary education.

Possible outputs of this objective focus upon numbers of jobs created, use of income security programs such as Employment Insurance or social assistance, and level of savings among designated households. The specific outputs or results associated with the self-sufficiency objective can be classified as either positive or negative measures. Examples of positive measures include numbers of jobs created by a given initiative or increases in personal assets, such as savings. A reduction in negative measures involves, for example, movement off programs of income support, such as social assistance.

At the community level, the outputs of enhanced self-sufficiency might take the form of a reinvigorated local economy, which has restored itself after loss of a major employer or of its economic base – e.g., in fishing or forestry. It also could mean improved local governance in which citizens and representatives from diverse sectors, such as business, labour and government, come together to address major challenges or concerns.

Illustrative targets include, for instance, growth by 10 percent per year in the number of new jobs in a given community. The personal assets of an estimated 500 households could be increased by five percent a year over three years.

The qualitative questions that may be asked to ascertain the broader potential impact might focus upon the possible effects of increased assets. From a positive perspective, increased assets might lead to improved knowledge and skills if they enable individuals to pay for higher education or a specialized training program.

A negative result might ensue, by contrast, if a household on social assistance lost access to this form of income support because its assets now exceed allowable levels. (In the long run, it is desirable for most households to move off this income program – but they must be prepared to do this on a voluntary basis rather than exiting the program involuntarily. They need to move off when ready and able rather than leaving because they were deemed ineligible according to social assistance rules.)

The self-sufficiency objective is linked closely to the next social objective – increased knowledge and skills. The acquisition of knowledge and skills is a key method of achieving self-sufficiency through its clear links to higher income. But the latter is not the sole purpose of enhancing the development of knowledge and skills.

c. Increased knowledge and skills

Increased knowledge and skills represents the third social objective identified in this framework. The United Nations Development Programme includes knowledge as one of the key elements of the Human Development Index.

It could be argued that this objective is actually a component of self-sufficiency because of the proven links between higher levels of education and higher income. Consistent positive correlations have been found between educational attainment and occupational achievement, measured in both job position and associated level of income.

Increased knowledge and skills have been identified for this sustainable development framework as a separate social objective, however, because of an extensive body of literature that points to the significance of learning as a vital factor in human well-being. Knowledge development in aid of employment is only one goal of learning.

The International Commission on Education for the Twenty-First Century of the United Nations Educational, Scientific and Cultural Organization (UNESCO) refers to learning as “the treasure within.” Learning is crucial not just as a ticket to a job – but equally importantly as a “passport for life.” The Commission makes an impassioned case for learning as the heart of human and community development. Learning helps nourish intelligence, creativity, aesthetic and cultural sensitivity, spiritual values and moral responsibility.

The International Commission also sees education as the primary means of fostering a deep and more harmonious form of human development, which in turn can help reduce poverty, exclusion, ignorance, oppression and war. While learning is an ongoing process of improving knowledge and skills, it is also – perhaps primarily – an exceptional means of building relationships among individuals, groups and nations.

In fact, learning is so fundamental to human well-being that it must be recognized as a process which takes place throughout life – even at the earliest stages. The first few years of life have been

found to be critical for brain development and affect subsequent performance at school and, eventually, in the job market.

Educational attainment is the most frequently cited indicator for measuring changes in knowledge and skills. This indicator typically is defined as number of years of primary, secondary or postsecondary education. There are, however, several other possible output measures, depending upon the purpose of the initiative. These measures involve, for example, improved readiness to learn (for preschool children in particular), more years of formal education, higher literacy or numeracy scores, and number of hours and type of workplace training and upgrading.

Illustrative targets of a given effort might include, for example, ensuring that 100 teen dropouts return to school and complete their secondary education within a two-year period. Another option is a 25 percent increase in the literacy scores of 100 participants within a year.

Questions that might be asked to ascertain the broader impact of this social objective relate to the supports that may be needed to achieve the desired targets. Research programs are often set up to enhance knowledge and skills as though their acquisition automatically results in improved employment outcomes. Typically, however, additional supports are required – especially when the parents of young children are involved as targets of the effort. It may be necessary to ensure access to high-quality affordable child care or to accessible transportation in the case of persons with disabilities.

d. Greater social inclusion

The OECD and UNDP have identified improved *social cohesion* and reduced *social exclusion*, respectively, as major social objectives. Other categorizations of social indicators name *social inclusion* as a key social objective. The difficulty in trying to apply these popular concepts is the lack of clarity in the literature as to their precise meaning and relationships.

In some cases, the terms social cohesion, social exclusion and social inclusion appear to refer to a common concept – the extent to which members of a community or even a society feel that they ‘belong’ by virtue of their ability to participate in its economic, social, cultural and political life. The challenge from the perspective of this sustainable development framework was to identify the most relevant social objective and appropriate indicators in this particular domain.

Social cohesion typically is interpreted to refer to the quality and scope of participation in society. The OECD indicators for this social objective include both positive factors such as group

membership and voting, and negative factors such as strikes, drug use and related deaths, suicide and crime.

Social cohesion often is understood as a reflection of the extent and depth of social capital in a neighbourhood, region or society. Social capital refers to the relationships, networks and norms that facilitate collective action [Putnam 2000]. It has been found to contribute substantially to individual and community health and well-being. Individuals in communities and societies with strong social capital typically are more prosperous, healthier and experience less crime. Neighbourhoods with high levels of social capital tend to be good places to live and to raise children.

Harvard Professor Robert Putnam considers the social cohesion that derives from the formation of social capital to be “about as important as low income, urbanism and racial composition as a determinant of homicide prevalence. Surprisingly, social capital is more important than a state’s education level, rate of single-parent households and income inequality in predicting the number of murders per capita during the 1989-95 period” [Putnam 2000: 309].

In addition to its vital role in fostering social cohesion, significant links have been found between the presence of social capital and the capacity to learn. The OECD, for example, has noted that social capital and the networks it embodies create the foundation for learning and are essential building blocks in human capital development [OECD 2001]. Social capital has a major impact as well upon financial health. Social networks can provide job seekers with advice, employment leads, strategic information and letters of recommendation [Putnam 2000: 319].

Social exclusion is also concerned with participation. In adapting the Human Development Index to the developed world, the UN added to its three basic elements, earlier described, the concept of social exclusion. Like social cohesion, social exclusion is a concept intended to reflect the extent to which individual citizens in a society and its constituent groups, such as Aboriginal Canadians, persons with disabilities and new Canadians, are able to participate in the mainstream of a community or nation. In the developed world, such participation typically requires the protection of fundamental rights, freedom from racism and discrimination, opportunities for self-sufficiency (i.e., education, training and employment) and access to artistic, recreational and cultural events.

There are many different definitions of the concept and emerging practice of social inclusion. In some cases, it is understood as the other side of the social exclusion coin. In fact, the goals of promoting social inclusion and reducing social exclusion are often employed as interchangeable opposites.

But while these appear to have common meaning, the use of these terms is not entirely consistent. A major UK study on social indicators, for example, provides a long list of lead indica-

tors for social inclusion [Atkinson et al. 2002]. They include, for example, risk of financial poverty, income inequality, proportion of those ages 18-24 with lower secondary education and overall unemployment.

It is clear that the UK study defines the concept of social inclusion primarily from the perspective of economic well-being. But this interpretation of social inclusion is actually somewhat narrow. Participation refers not only to economic involvement but also to social engagement – in activities such as volunteering, voting and partaking in recreational activities and cultural events.

For the purposes of this sustainable development framework, a decision was made to select the term social inclusion as one of the major social objectives rather than social cohesion or social exclusion employed by the OECD and United Nations, respectively. The concept of social inclusion appeared to be more easily translated into action than the term social cohesion, in particular. Moreover, if social inclusion is, indeed, the opposite of social exclusion, it seemed preferable to use the positive or proactive dimension of this concept.

The range of actions that may be undertaken to promote social inclusion is wide-ranging and depends clearly upon the overall purpose of the project. Possible actions include, for example, the provision of subsidies to low-income households to enable children to participate in recreational activities. Measures can also be taken to recruit Aboriginal Canadians, young people and new Canadians to volunteer with and serve on the boards of local organizations. Governments, private employers and the voluntary sector can take steps to accommodate persons with disabilities. Various programs and efforts can be initiated in communities to engage youth considered to be ‘at risk.’

Outcome indicators for the enhanced social inclusion objective involve both positive and negative measures. Positive measures might entail the extent of participation in society as measured, for instance, by level of voting across the population and among certain groups (e.g., youth); participation in community organizations, recreation programs and volunteer boards; and measures of trust. These key outputs were employed in the General Social Survey on Social Engagement in which respondents were asked about the extent to which they participate in political, religious and neighbourhood activities [Statistics Canada 2003].

Negative measures include indicators that point to marginalization or ‘dropping out’ from the mainstream. Crime rates are the most frequently cited factor in this regard. Other related indicators consist of juvenile offences, suicide incidence and rates of alcohol and drug abuse.

Illustrative targets might involve the allocation of recreational subsidies to a certain percentage of low-income families in a given year. Another target might be the provision of disability supports over a two-year period to a designated percentage (say 25 percent) of persons with disabilities in a given community.

It is within the social inclusion objective that the dimension of culture becomes especially relevant. The cultural component is being considered for this sustainable development framework primarily from the perspective of the values and life practices rooted in cultural background. UNESCO has noted the vital role that intangible culture plays in shaping human behaviour.

For the purposes of this framework, the cultural dimension of sustainable development has been conceptualized as a major factor that must be taken into account at the planning and design phase of any research project. The proposed effort must ensure that it respects and, where appropriate, reflects local culture.

In short, the cultural dimension of sustainable development should be employed as a lens from two perspectives: the influence of cultural values and practices upon the research project being undertaken and the extent to which the project might have an impact upon the cultural context within which the work is embedded.

Work that may involve Aboriginal Canadians, for example, must engage them in project design and ideally in assessing its impact. A research effort focused upon new Canadians or a particular group of immigrants must be sensitive to their perception and interpretation of the work, particularly if the results affect them directly or indirectly through changes in the community. Early consideration of cultural values and traditions could alter considerably the way in which a project proceeds – if at all.

Illustrative questions regarding the cultural dimension involve, for example, the identification of groups in a community, region or nation (depending upon the scale of the project) considered at risk of exclusion. Questions also should be asked about the major cultural values and practices that shape the life experience of the identified groups and how these influences might affect the project being undertaken. It is also important to assess the likely impact of the work upon these groups.

As explained, this sustainable development framework does not include indicators that relate to the tangible dimensions of cultural heritage. The numbers of local artists, books published and theatre seats, for example, are major indicators of creativity and potential economic development. They are vital to take into account and to measure in any consideration of potential economic growth and competitiveness – objectives not directly addressed in this framework.

e. Access to basics

The access to basics social objective is not identified explicitly in the United Nations work but is clearly implied by its indicators. The Human Development Index incorporates ‘adequate standard of living’ as one of its core elements. It assesses progress toward the achievement of this goal in terms of GDP per capita – basically as a measure of the distribution of wealth throughout the population.

But there are several problems with this approach. First, GDP itself is a somewhat flawed measure in that it focuses upon economic factors as the primary barometer of societal health without taking into account key social factors.

Second, GDP counts any economic activity as good even if its impact may be environmentally or socially damaging. The economic activity generated through climate-related catastrophes, such as the ice storm, or environmental accidents, such as oil spills, all add value to the GDP. In fact, it was this very weakness of GDP that spawned the development of the broader measure known as the Genuine Progress Indicator.

A third weakness of the GDP per capita approach as a gauge of adequate standard of living is the fact that any average measure invariably masks the realities, which actually can be extreme. The problem can be particularly serious in the social domain because averages lose the details about those who struggle at the very low end of the income spectrum – i.e., individuals and households living in deep poverty and without access to sufficient food or adequate shelter.

For the purposes of this sustainable development framework, a decision was made to incorporate the concept of a decent standard of living in order to ensure that this work was relevant not only to the developing world but also to the groups, neighbourhoods and regions of Canada that experience extreme poverty. A decision was made to label this objective as ‘access to basics,’ which could readily be translated into concrete actions. Access to decent affordable shelter and sufficient food to meet minimum standards of nutrition are examples of actions that would help achieve this objective.

This addition is in line with the stated objectives of the United Nations Millennium Development Goals. It is also consistent with the directions set out in the report of the World Summit on Sustainable Development (2002), the *Istanbul Declaration on Human Settlements* (1996) and Agenda 21, the *Rio Declaration on Environment and Development* (1992) – all of which identified access to decent human habitats as a major social objective. It should be noted as well that the UK identifies housing as a separate category among its 15 headline indicators of sustainability.

Outcome indicators for the access to basics objective include the availability of affordable housing, reduction of homelessness and access to nutritious food. Illustrative outputs include numbers of decent affordable housing units and a reduction in the numbers of homeless people and the numbers of households that rely on food banks. Possible targets might involve, for example, a 10 percent expansion in the supply of affordable housing and the creation of 100 new emergency shelter spaces within a year.

A range of questions might be asked about the broader impact of actions taken in this area. Would access to subsidized housing, for instance, affect eligibility for social assistance? How would access to basics affect human health? Presumably, access to decent affordable housing and nutritious food would improve human health – the subsequent and final major social objective.

f. Improved human health

While improvements to human health clearly result from enhanced access to basics, this objective also lies at the interface of the environmental and social domains. The actions referred to in this category focus primarily upon exposure to environmental toxins and other hazards, such as excessive noise, temperature and air pressure.

Virtually every set of measures concerned with sustainability, including the OECD, Human Development Index and UN Millennium Development Goals, incorporates improved human health as a key social objective. The OECD health indicators, for example, relate to infant mortality, potential years of life lost, disability-free life expectancy and accidents.

Two of the most commonly employed indicators of human health are life expectancy at birth and disability-free life expectancy. The latter has been selected for inclusion in this sustainable development framework because of the low loss of life at birth in Canada relative to conditions in the developing world.

Other measures identified here deal primarily with the health effects related to the quality of water, air and soil. In addition to toxic substances in the environment, illustrative indicators include the human health impact of toxins and hazards.

Possible targets for this objective, as indicated in Figure 6, might seek a drop in toxic emissions by five percent per year or the reduction in ground-level ozone by three percent per year over three years. A qualitative question that might be asked in respect of the overall impact of this objective might explore whether the process employed to reduce toxins creates new or related problems, such as higher emissions in greenhouse gases or other hazardous wastes.

Environmental and Economic Objectives

This sustainable development research framework focuses primarily upon social objectives and associated indicators of progress. It also considers the interactions between social and economic objectives between social and cultural objectives, and between social and environmental objectives. Questions may arise, however, about the appropriate social indicators to be employed in research undertaken *primarily* for environmental or economic purposes.

The challenge in this case is to identify which of the six social objectives outlined in Figure 6 would apply and at what stage in the research project. The second component of this question is easily answered. The application of a social lens should take place as early as possible in any project – ideally at the planning and design phase in order to ensure that relevant questions regarding possible social impact are taken into consideration. This practice is consistent with the suggested flow of work outlined in Figure 1.

There is no single or ready answer to the first dimension of the question as to which social indicators would be appropriate for an environmental or economic research project. All six social objectives and their associated indicators potentially could be relevant. The challenge is to select those that best apply to the specific effort. This task ideally would be undertaken by a group of stakeholders – including not only persons interested in the work but also those potentially affected by it.

A research project focused upon the production of greener technologies, for example, might not be concerned about the potential income distributional effect of its results. But it *should* be interested in its likely impact upon human capital from the perspective of both production and consumption. Are there sufficient numbers of available workers with the required knowledge and skills to produce the technology? Do potential consumers have the knowledge and skills to use this technology? Will many consumers be excluded from employment or social participation if they cannot use or afford to purchase this technology?

The project should be interested as well in its possible impact upon social cohesion. The introduction of a new technology, whether on a local or national basis, could upset the economic base of a given community or region. It potentially could result in high job losses in a certain industry. An associated economic development strategy may be required to maintain the stability of the local economy. An environmental project should also assess its impact upon human health, which lies clearly in the social domain.

Implementing the Framework

More investigation is required to determine whether this sustainable development research framework is robust in practice and whether its use contributes measurably to the achievement of desired outputs and outcomes. But the need for additional work on certain dimensions of the framework should not impede its immediate integration into decision-making and research project management. In fact, its early application will help identify the precise areas that may require clarification or more detail. Several of these areas are identified below.

As noted, the framework sets out three clear phases through which any research project should proceed and discusses how to embed notions of sustainability within each phase. Its purpose was to point out how the process of integrated decision-making can be moved upstream in order to apply, as early as possible, a lens of sustainability.

The sustainable development research framework also distinguishes between various categories of indicators to reflect the fact that they play distinct roles. Different types of indicators are employed throughout the course of a given research project, depending upon whether they are intended to reflect the outcomes, outputs or targets of that initiative.

The framework highlights as well the importance of applying both quantitative and qualitative indicators. Quantitative indicators typically are the only measures used to assess the progress of a research effort – consistent with the conventional wisdom that if something cannot be measured, then it cannot be managed.

Yet it is frequently the qualitative indicators that provide rich and vital information as to the actual or potential broader impact of any investment. While these types of indicators are crucial from the perspective of sustainability, they have not generally been included in these analyses. More work is required around the meaning and appropriate application of qualitative indicators.

Other areas that need further exploration are the concepts of direction and scale. As noted, direction refers to the pathways taken to achieve a certain objective. Scale implies the extent or level of activity undertaken within that pathway as well as the pace or period of time within which the action is carried out.

It may be relatively clear to identify whether a specific pathway to achieve a given objective is appropriate or not. There is generally research or practice evidence to support the choice.

What is far more difficult to determine is whether the level or extent of intervention, if broadly applied, would be sufficient to make a difference relative to sustainability. From an environmental perspective, for example, the United Nations Environmental Programme (UNEP) noted at the World Summit on Sustainable Development that the scale of impact must be large enough to offset the effect of economic development [UNEP 2001].

Achieving this level of impact generally cannot be accomplished by one initiative alone but typically requires a suite of complementary actions. For instance, meeting the Kyoto goal for greenhouse gas emissions for transportation would require not only a modified fuel, such as bioethanol or biodiesel. It also must be combined with more efficient engines and changes in consumer behaviour, such as purchase of smaller vehicles or reduction in automobile usage.

Similarly, in order to meet a desired social target, it may be necessary to employ several interventions. If a problem is addressed at the community level, many different actions often must be combined to achieve a certain target. If, by contrast, a national policy effort is undertaken that has a deep and widespread impact (e.g., a substantial rise in income security benefits), then a single action alone might suffice.

From a social perspective, however, there may be serious challenges involved in trying to offset the impact of market forces. Job losses may occur as a result of a shift in the economic context of a community or even a nation driven by the pressures for increased productivity and competitiveness. A training program might be highly successful, for instance, in securing employment in local hi-tech companies for substantial numbers of participants. But a global downturn in this sector subsequently might throw several hundreds out of work – effectively reversing the impact of that training effort.

It became clear in the course of this work that additional research is required around the concept of pathways. The pathways approach embedded in this sustainable development research framework assumes the presence of different routes to achieve a desired objective. But while this approach acknowledges diverse routes, it provides no guidance as to which may be the most effective for a stated purpose.

As discussed, poverty may be reduced through any number of actions. But there is no single methodology deemed to be the best approach. Certain interventions may be more effective for specific sub-groups within a population (e.g., young people, Aboriginal Canadians or persons with disabilities) or for particular nations as a whole. For complex problems, a combination of approaches usually is the most appropriate response.

In some social areas such as child development, the literature is only beginning to tease out the relative importance of different factors – e.g., level of parental education or supports available to the family. In the social domain more generally, there is a need to identify the influence or comparative weight of various interventions rather than simply assuming that they are all of equal value.

Another factor that is not well understood relates to the interaction among the various social objectives identified in Figure 6. For conceptual clarity, they are listed as discrete entities in order to explain what each area potentially might include. But the literature also notes the strong links among these various objectives. They effectively can be seen as a hierarchy, ranging from the most basic in terms of human needs at the bottom of the list to the most sophisticated at the top. Each objective can be understood as a steppingstone to the next.

Human health and access to basics affect social cohesion. Homeless persons who have no access to affordable housing, for example, are excluded from the mainstream of society and are therefore of concern from the perspective of social cohesion. The social capital dimension of social cohesion, as explained, provides a foundation for the subsequent objective: the acquisition of knowledge and skills. Educational attainment is a clear determinant of self-sufficiency, which in turn influences equity of outcome.

Though the literature recognizes the intrinsic links among these diverse but related objectives, work is required to determine their relative effectiveness. Self-sufficiency can be affected directly, for instance, by creating additional jobs. But it also may be enhanced through social networks, which provide access to training and employment opportunities. The important economic function of social capital has already been established [Putnam 2000].

Finally, further work would help clarify the relevance to this framework of the concepts of vulnerability and resilience to which the United Nations Development Programme refers in its documents. Certain interventions may have the primary effect of reducing the vulnerability of an individual, household, community or nation while other actions are more appropriate for promoting resilience.

In the case of poverty reduction, for example, an increase in income benefits is a direct intervention, which reduces vulnerability by enabling low-income households to purchase adequate shelter and nutritious food. Over the longer term, however, it is possible that indirect measures – such as increasing the level of educational attainment in order to enhance employment prospects – is a more effective approach to poverty reduction because it builds the capacity for self-sufficiency.

This indirect measure contributes to resilience by bolstering a household's ability to stave off unemployment in future.

It is unclear at this point which actions best reduce vulnerability and which ones promote resilience. The most appropriate combination of vulnerability reduction and resilience enhancing measures must be determined.

Finally, future work would help identify the social impact and indicators associated with environmental investment, in particular. The latter typically are equated with the development of new or modified technologies. However, significant environmental impact can be attained through shifts in consumer behaviour or modifications to buildings and urban design more generally.

Despite some important questions that remain unanswered, it is still possible to begin the incorporation of this research framework into project decision-making and management. The framework advances the sustainable development agenda in at least three important ways – by articulating the phases involved in managing projects for sustainability, clarifying the process of integrated decision-making and setting out the key objectives and associated indicators within the social domain.

Endnotes

1. Life-cycle or 'cradle-to-grave' management is a key methodology of ISO 14000 for Environmental Management. It means considering the impacts of a product from resource extraction, manufacturing, use, recycling and/or final disposal. While the focus for deriving this methodology was environmental protection, the concept can and should be applied more broadly to cover all aspects of 'quality-of-life' impacts.

2. *Context indicators* illustrate the differences in national environments (e.g., national income, old-age dependency ratios, fertility rates and divorce rates) in areas of concern to social policy. *Social status indicators* provide information about social situations, such as poverty, that are a priority for policy action. *Societal response indicators* illustrate the way in which society responds through various interventions to such challenges [Sharpe 2004: 13].

3. Of the eight social measures employed by the Dow Jones Sustainability Index, for instance, seven are concerned with internal company performance. The measures include corporate citizenship and philanthropy, stakeholder engagement, labour practices, human capital development, knowledge management/organizational learning, talent attraction and retention, standards for suppliers and social reporting. Only corporate citizenship and philanthropy consider broader social impact upon the community. The version of social reporting employed by the Index merely asks whether the company has produced any public reports pertaining to its social practices - defined primarily as internal human resource management.

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