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## **MEASURING SUSTAINABLE DEVELOPMENT: COUNTRY EXPERIENCE**

Prepared by Statistics Canada

1. This paper presents Canada's experience in capital-based sustainability accounting and recent efforts to improve the policy relevance of environmental indicators and statistics.

### **I. INTRODUCTION**

2. This paper presents Canada's experience in capital-based sustainability accounting<sup>1</sup>. It also describes work-in-progress and related initiatives to improve environmental statistics and sustainable development indicators. Finally, it provides an overview of current efforts to improve policy relevance, in the context of the national sustainable development strategy.

### **II. CAPITAL-BASED SUSTAINABILITY ACCOUNTING IN CANADA**

#### **A. Background**

3. Since the 1990s, Statistics Canada has played a significant role in the development of a conceptual framework for sustainable development based on the expanded notion of capital and the System of National Accounts (SNA) as the underlying statistical framework.

4. Statistics Canada operationalized the capital approach with the establishment of the Canadian System of Environment and Resource Accounts (CSERA), an information system focusing on the environmental component of the sustainable development framework. The CSERA comprises three broad elements: Natural Capital Asset Accounts, Material and Energy Flow Accounts and Environmental Protection Accounts<sup>2</sup>. Accompanying the CSERA was a fairly articulated set of summary indicators and detailed statistics that quantify the relationship between economic activity and the environment—greenhouse gas emissions, water and energy use, natural resource wealth, land use and environmental protection expenditures.

5. There have also been recent efforts to extend the application of the capital approach by constructing a measure of human capital for Canada. In 2008, research findings allowed the

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<sup>1</sup> The opinions expressed here are those of the author and should not be taken to represent the official position of Statistics Canada.

<sup>2</sup> Statistics Canada, "Econnections: Linking the Environment and the Economy," Catalogue No. 16-200XKE, 2000, Ottawa.

development of a measure of human capital for the country over the period 1970 to 2007. The estimates of human capital focused on the use of income-based approach<sup>3</sup>. Some examples of preliminary research findings are summarized below:

(a) Aggregate human capital rose at an annual rate of 1.7% in Canada from 1970 to 2007, primarily due to the increase in the number of individuals in the working age population aged 15 to 74 and rising educational level of the Canadian population. The growth of human capital in constant prices was slower than the growth of produced assets;

(b) The aging of Canadian population has a negative effect whereas higher educational levels have a positive effect on the growth of human capital;

(c) The value of human capital exceeds the value of produced capital. However, the ratio of human capital relative to produced capital declined over time.

## **B. Environment accounts and indicators today**

6. Presently, Canada has regular time series reporting with respect to the following environment and resource accounts: physical and monetary accounts of key natural resource assets (energy, minerals and timber); energy use, intensity and greenhouse gas emissions accounts covering all economic sectors.

7. The natural resource stock accounts conform to the SNA balance sheet structure, presented as a reconciliation account (opening stocks, closing stocks, annual variations). The monetary natural resource stock accounts are currently used to present an expanded measure of national wealth that includes Canada's natural resource assets. The resulting indicators find their applications in the monitoring and management of Canada's natural wealth, helping to answer questions such as: What is the economic value of natural assets? Are we maintaining total wealth (produced and natural) over time, both in total and per capita? To what extent are we substituting produced assets for natural assets? Related indicators such as annual depletion of mineral reserves, harvest of timber stocks and total natural resource base also provide information on the management of natural resource stocks and their use in the economy.

8. The material and energy flow accounts track the consumption of materials and energy and the pollution caused by each industry and the final demand sector. The flows are linked to the SNA Input-Output (I-O) tables via the use of common classification systems for industries and products. Linking physical measures to the I-O accounts allows the detailed estimation of resource intensity and waste production characteristics of economic activities. Currently, the most detailed accounts are the time series accounts on energy use and associated greenhouse gas emissions.

9. In 2005, Statistics Canada began the Canadian Environmental Sustainability Indicators (CESI) initiative in collaboration with two key federal policy departments (Environment and Health). Three environmental indicators have been identified for CESI reporting, namely:

(a) The air quality indicator which tracks Canadians' exposure to ground-level ozone;

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<sup>3</sup> Statistics Canada, Micro-Economic Analysis Division, "Human Development and its Contribution to the Wealth Accounts in Canada," unpublished research paper, 2008, Ottawa.

(b) The greenhouse gas emissions indicator which tracks the annual releases of the six greenhouse gases that are the major contributors to climate change; and

(c) The freshwater quality indicator which reports the status of surface water quality at selected monitoring sites across the country.

### **III. STRENGTHS AND WEAKNESSES OF THE CURRENT SYSTEM**

#### **A. Strengths**

10. One of the primary strengths of the Canadian System of Environment and Resource Accounts (CSERA) is its sound and robust conceptual and theoretical foundation. It has also been developed in coordination with international initiatives to ensure alignment, to the extent possible, with international standards and guidelines.

11. Using the capital approach, the CSERA builds on key concepts and definitions used in the SNA to articulate the linkages between environment and economic data. Physical and monetary data (market flows, asset boundaries, valuation, etc.) are compiled into a coherent framework. The CSERA provides direction with respect to environmental data collection. For example it helps in the identification and analysis of environment-related information already in the SNA but not directly identifiable, as in the case of environmental protection expenditures by governments and businesses. The CSERA framework also guides the development of new classifications as well as special industry and product aggregations. Data comparability and consistency in time series reporting add to the inherent strength of the system.

12. The CSERA demonstrates the important role played by the central statistical agency in the integration of data from various sources, harmonization of concepts and methods and coherence analysis. This role is of particular importance in the Canadian context—a federation comprising ten provinces and three territories and where control over natural resource management and environmental quality rests largely with the provincial territorial and local governments. All of the measures, indicators and statistical products go through a consistently rigorous process to ensure that the outputs meet the key elements of quality—relevance, accuracy, timeliness, interpretability, accessibility and coherence.

13. Unlike policy-based information systems, the CSERA produces measures and indicators that are consistent overtime. In addition, shifts in government policies and priorities do not affect the regular reporting of environmental accounts and statistics, thereby, ensuring the provision of high quality statistics to inform policy analysts, decision-makers and the general public.

14. The CESI initiative continues to build upon the strengths of the CSERA in the development of the air quality, freshwater quality and greenhouse gas emissions indicators.

#### **B. Weaknesses**

15. Overall, Canada's current information system based on the capital approach is far from complete. Throughout the years, a significant part of the research and development efforts has been on the environmental component of the system. The human capital component is still in the early stages of empirical development whereas the social capital component requires

significant research in terms of its conceptual development. Failure to capture and account for all non-market values and contribution to well-being for natural, human and social capital has been a common reaction among skeptics to this approach.

16. Empirically, the CSERA itself faces a number of weaknesses, most of which are linked to data gaps and limitations. Despite new data collection initiatives that helped to fill important data gaps, CSERA is still considered “data poor” in key areas like water, land and forest accounting. Given the highly decentralized nature of Canada’s governance structure related to environment and resource management, data integration is an ongoing challenge. Diverse data standards, lack of harmonized concepts and definitions and absence of statistical methodology are often encountered during the integration and compilation process mainly because the datasets are not collected for statistical purposes. Rather, a large amount of the existing environmental information is collected by policy areas for legislative or regulatory purposes.

17. Since its introduction, perhaps one of the biggest challenges in operationalizing the capital approach in Canada has been in increasing the policy uptake and buy-in. One of its biggest strengths—the ability to present aggregate, macro-level information for the entire country—has also been viewed as a limitation by policy departments whose main interest lies in regional and sub-regional information. Efforts to bridge the gap between the need for rigorous statistical measures and the information needs of policy areas continue to be an ongoing, evolving process for the national statistical agency.

#### **IV. WORK IN PROGRESS AND RELATED INITIATIVES**

##### **A. Framework for developing environmental statistics**

18. In 2008, Statistics Canada began its efforts on the Framework for Developing Environmental Statistics. This initiative aims to address data gaps and quality issues related to basic environmental statistics. It puts emphasis on quality standards and the role of the national statistical agency in ensuring the quality of datasets and the quality of the execution of statistical activities.

19. The first draft of the Framework paper was Statistics Canada’s initial step towards the development of a long-term process to improve data quality and the relevance of environmental statistics. The “back to basics” approach of the Framework complements other related work, including further development of the application of the capital approach in Canada. Despite the progress with respect to the environmental accounts, for example, there remains a considerable amount of data gaps and methodological improvements that need to be addressed.

20. Work is progress in place in several key areas, including water resources (availability, use, quality), settlements (land use, land conversion), energy and emission flows.

##### **B. Canada’s Federal Sustainable Development Act**

21. The Federal Sustainable Development Act became a law in June 2008, “the Government of Canada accepts the basic principle that sustainable development is based on an ecologically efficient use of natural, social and economic resources and acknowledges the need to integrate

environmental, economic and social factors in the making of all decisions by government.”<sup>4</sup> Provisions of the Act include setting and reviewing scientifically measurable sustainability targets, the plans to meet the targets, and annual reporting on the government's performance.

22. The government must establish a Federal Sustainable Development Strategy with measurable targets for protecting Canada's environment in accordance with the so-called precautionary principle<sup>5</sup>. Ideally, the more coordinated approach towards articulating sustainable development strategies would benefit the empirical work on sustainable development, particularly in the identification of a set of indicators for Canada that might ultimately become part of a “core” set for international comparisons.

## V. CONCLUSIONS AND FUTURE DIRECTIONS

23. Over the years, the application of the capital approach in Canada has been more advanced in the environment domain. A number of key environmental accounts and indicators have progressed from conceptual development to actual measurement and regular reporting. However, there remain outstanding challenges in these areas, such as the need for better coherence, harmonization of concepts and definitions, classification, etc. especially in basic environmental statistics.

24. The first round of consultations showed general support for the Framework for Developing Environmental Statistics initiative from partners and key stakeholders. The next steps in this area include the following :

- (a) High-level follow-up discussion with federal policy departments;
- (b) Development of an action plan for broader stakeholder consultations: provinces and territories are important stakeholders in this domain; and
- (c) Elaboration of framework components through an assessment of requirements and data gaps
  - (i) Option: development of a “test case” focusing on a particular environmental issue.

25. Further empirical work on the human capital component needs to be explored. Currently, academia and policy research centres have published research outcomes and there has also been some work on indicators of well-being by individual policy departments. The research focus has been on the policy agenda and not so much on statistical monitoring and measurement.

26. Future work on the social capital component would require more extensive research on its conceptual development. Canada's Policy Research Group summarizes the challenge in this area: “...efforts to harness the concept of social capital for policy and program

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<sup>4</sup> David Suzuki Foundation, [http://www.davidsuzuki.org/economy/sustainability/new\\_law\\_sustainability.asp](http://www.davidsuzuki.org/economy/sustainability/new_law_sustainability.asp) accessed August 31, 2009.

<sup>5</sup> The precautionary principle states that, “where there are threats of serious or irreversible damage, lack of scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation,” [http://www.davidsuzuki.org/economy/sustainability/new\\_law\\_sustainability.asp](http://www.davidsuzuki.org/economy/sustainability/new_law_sustainability.asp) accessed August 31, 2009.

development have been limited by conceptual ambiguities and measurement difficulties. If social capital is to become a practical concept for policy use, we need to operationalize it in a way that allows us to concretely identify what it is, explore its productive potential in achieving broader policy objectives, and identify policy levers for affecting the way it is accumulated and utilized.”<sup>6</sup>

27. Given the lessons learned to date from Statistics Canada’s experience in developing and operationalizing the capital approach, the success of future efforts to establish sustainable development measures could be summarized in the following broad headings:

- (a) Continued research and development to improve the conceptual and methodological framework;
- (b) Stronger link to policy domains in developing a set of performance metrics;
- (c) Improved outreach strategy with respect to the capital approach; and
- (d) Stakeholder engagement, including provincial and territorial governments and non-governmental organizations and international community.

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<sup>6</sup> Policy Research Group, [http://www.policyresearch.gc.ca/page.asp?pagenm=rp\\_sc\\_index](http://www.policyresearch.gc.ca/page.asp?pagenm=rp_sc_index), accessed September 8, 2009.