Natural Capital Measurement at Statistics Canada

Current Status and Untapped Potential

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Overview

- Background for the study
- History of measuring natural capital at Statistics Canada
- Current status of StatsCan's efforts
- Gaps and analytical opportunities
- Research agenda

Linking Natural Capital & Productivity

Project Objectives

- Shed light on how different measures of productivity affect our understanding of the relationship between the economy & environment.

- Explore linkages between changes in natural capital and different economic productivity measures, with a specific focus on the forestry sector.

Project Partners

- University of Ottawa
- Natural Resources Canada
- Environment Canada
- OECD
- The Forest Products Association of Canada (FPAC)
- The Social Sciences and Humanities Research Council (SSHRC)
- Shell
- Industry Canada
- Midsummer Analytics
- The Centre for the Study of Living Standards (CSLS)
- Individual academics

& -- Research Projects

- Sectoral Data & Provincial-Level Analysis
  - Environmentally-adjusted measure of MFP for pulp and paper
  - 1971-2012 data for BC, Ontario and Quebec
- Facility-level Data & Analysis
  - Decompose water and GHG emissions in productivity measures using Mill-level data from 2005-2013
- Forest Sector Carbon Management
  - Incorporating landscape, forest products, and operational carbon management and accounting into firm-level productivity.
- **Natural Capital Measurements at Stats Can**
  - Undertaken by Midsummer Analytics
- Partial and Total Factor Productivity Measures for Resource Industries in Canada
  - Undertaken by CSLS

-- Ongoing work…

- Expanding to other sectors
- Further development of NKP measures and indicators

- Project Website: www.sustainableprosperity.ca/nkp

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History of natural capital measurement at StatsCan

- Program has been in place since the 1970s
- Early efforts focused on developing measurement framework
  - The well-known "Pressure-State-Response" framework was a StatsCan innovation
- *Human Activity and Environment* was first statistical product
  - This compendium is still being produced today – it is one of Canada's last remaing "state of the environment" style reports
- Natural capital accounting program began in early 1990s with funding from Mulroney/Charest "Green Plan"
- Environmental survey program expanded during late 1990s and 2000s
- Today, 10 regular surveys and a well-established natural capital accounting program
  - One of the largest such programs in the world (but still tiny compared with economic and social statistics)

Natural capital accounts

- Natural Resource Assets Accounts
  - Measure physical extent and monetary value of minerals, fossil fuels, timber and land assets
  - The value of these resource assets is included on a quarterly basis in the National Balance Sheet Account
    - Canada is the only country to have such data
    - It reveals some interesting facts: governments (who are the legal owners of Canada's natural capital) only collect 25% of resource rent – extraction companies get the rest
- Material and Energy Flow Accounts
  - Measure the flows of greenhouse gases, energy and water
  - Use the framework of the input-output accounts, permitting environmental data to be easily integrated into economic models (most of which have I-O tables at their core)
  - Permit calculation of:
    - Resource productivity/intensity measures
    - Demand-based measures
    - Decomposition estimates

Environmental surveys

- Waste Management Industry Survey
- Households and Environment Survey (plus Energy Use Supplement)
- Survey of Environmental Goods and Services
- Survey of Environmental Protection Expenditures
- Industrial Water Survey
- Agricultural Water Survey
- Survey of Drinking Water Plants
- Farm Environmental Management Survey

Special studies relevant to natural capital

- Hazardous Waste Management Industry Survey
- Water Asset Account
- Trends in climate-related variables
- Ecosystem accounts
- Natural Resource Reserve Index

Gaps – Natural Capital Accounts

- Natural Resource Asset Accounts
  - Physical Timber Asset Account
  - Marine Resource Asset Account
  - Water Resource Stock Account
  - Monetary Land Account
- Physical Flow Accounts
  - Air pollutants other than greenhouse gases
  - Non-hazardous solid wastes
  - Sewage
  - Hazardous wastes
  - Nutrients
- Environmental Activity Accounts
- Ecosystem Accounts

Analytical opportunities – Natural Capital Accounts

- Natural Resource Reserve Index
- Assess the distribution of natural resource wealth
- Measure multifactor productivity including natural capital
- Studying the drivers of decoupling

Gaps – Environmental surveys

- Frequency – most are only done every second year (or less)
- Measuring household vehicle energy use
- Measure environmental protection expenditures for the whole economy and not just certain sectors
- Measure environmental protection expenditures for the whole economy and not just certain sectors

Analytical opportunities – Environmental surveys

- Study differences in household environmental practices at the city level
- Prepare a regression model of household energy use
- Study the relationship between environmental protection expenditures and environmental burden in terms of resource use or pollutant emissions
- Integrate data from all water surveys to develop a comprehensive water demand account by drainage basin, which can be compared with water availability
- Study the efficiency of irrigation
- Analyse water quality data
- Study the relationship between farm environmental practices and farm income

Other major analytical opportunities

- Natural capital trends in Canada – Time for a comprehensive review?
- Green Growth in Canada

Research agenda – Ready to go

Timeframe for implementation	Research Activity	Where to carry out
Start now	Update the natural resource reserve index	Statistics Canada or external
Start now	Assess the distribution of natural resource wealth	Statistics Canada or external
Start now	Study decoupling using the *Material and Energy Accounts*	Statistics Canada or external (external researchers would require access to confidential input-output data)
Start now	Analyse the *Households and the Environment Survey* data at the municipal level	Statistics Canada or external
Start now	Build a regression model to understand the drivers of household environmental behaviour	Statistics Canada or external
Start now	Analyse the relationship between environmental protection expenditures and burdens on natural capital	Statistics Canada or external (external researchers would require access to confidential survey data)
Start now	Update the assessment of the demands for water in comparison to availability by basin	Statistics Canada or external
Start now	Assess trends in the source of irrigation water	Statistics Canada or external
Start now	Assess trends in the quality of drinking water plant intake water	Statistics Canada or external
Start now	Build a regression model to understand the links between farm characteristics and environmental management practices	Statistics Canada or external (external researchers would require access to confidential survey data)
Start now	Assess the efficiency of irrigation	Statistics Canada or external

Research agenda – Ready to go soon

Timeframe for implementation	Research Activity	Where to carry out
Start as soon as possible	Report on *Natural Capital Trends in Canada*	Statistics Canada or external
Start as soon as possible	Report on *Green Growth in Canada*	Statistics Canada or external
Start as soon as possible	Update the *Physical Timber Stock Account*	Statistics Canada
Start as soon as possible	Compile a monetary water asset account	Statistics Canada
Start as soon as possible	Measuring multi-factor productivity including natural capital	Statistics Canada or external (could be more easily done within Statistics Canada)
Start as soon as possible	Add criteria air contaminant emissions to the *Physical Flow Accounts*	Statistics Canada
Start as soon as possible	Add non-hazardous solid waste flows to the *Physical Flow Accounts*	Statistics Canada
Start as soon as possible	Add sewage flows to the *Physical Flow Accounts*	Statistics Canada
Start as soon as possible	Add hazardous waste flows to the *Physical Flow Accounts*	Statistics Canada
Start as soon as possible	Add nutrient flows to the *Material and Energy Accounts*	Statistics Canada
Start as soon as possible	Expand the scope of the *Industrial Water Survey* to include the oil and gas extraction and hydroelectric power industries	Statistics Canada

Research agenda – Some work to do first

Timeframe for implementation	Research Activity	Where to carry out
Start within two years	Increase the frequency of publication of the *Land Account*	Statistics Canada
Start within two years	Compile a monetary land account including ecosystem service values	Statistics Canada
Start within two years	Increase the frequency of the *Waste Management Industry Survey* to annual	Statistics Canada
Start within two years	Increase the frequency of the *Households and the Environment Survey* to annual	Statistics Canada
Start within two years	Increase the frequency of the *Households and the Environment Survey: Energy Use Supplement* to annual	Statistics Canada
Start within two years	Increase the frequency of the *Survey of Environmental Protection Expenditures* to annual	Statistics Canada
Start within two years	Increase the frequency of the *Industrial Water Survey* to annual	Statistics Canada
Start within two years	Increase the frequency of the *Agricultural Water Survey* to annual	Statistics Canada
Start within two years	Increase the frequency of the *Survey of Drinking Water Plants* to annual	Statistics Canada
Start within two years	Reinstate the private vehicle motor fuel use survey	Statistics Canada
Start within two years	Develop supplements to the *Households and the Environment Survey* covering water use and various waste emissions	Statistics Canada
Start within two years	Expand the scope of the *Survey of Environmental Protection Expenditures* to include the agriculture, construction, transportation and service industries and for households and governments	Statistics Canada
Start within three years	Compile a marine resource asset account	Statistics Canada
Start within three years	Compile environmental activity accounts	Statistics Canada
Start within three years	Compile ecosystem accounts	Statistics Canada

Thank you

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