Water Accounts with Policy: Analysis and Application of Water Accounting

Regional Training Workshop on the System of Environmental-Economic Accounting with a Focus on Water Accounting

26-30 September 2016
Putrajaya, Malaysia

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Environment, Energy and Transportation Statistics Division

Statistics Canada

Outline

- Why integrated environment – economy data
- Application of water accounts to policy making
- Water accounts and policy: Some examples

Why integrated environment – economy data

"Major efforts should be made to augment the capacity to collect and analyse environmental data and information and to integrate it with economic data…."

-§8.49, Agenda 21 (Outcome document of the United Nations Conference on Environment & Development Rio de Janerio, Brazil, 3 to 14 June 1992)

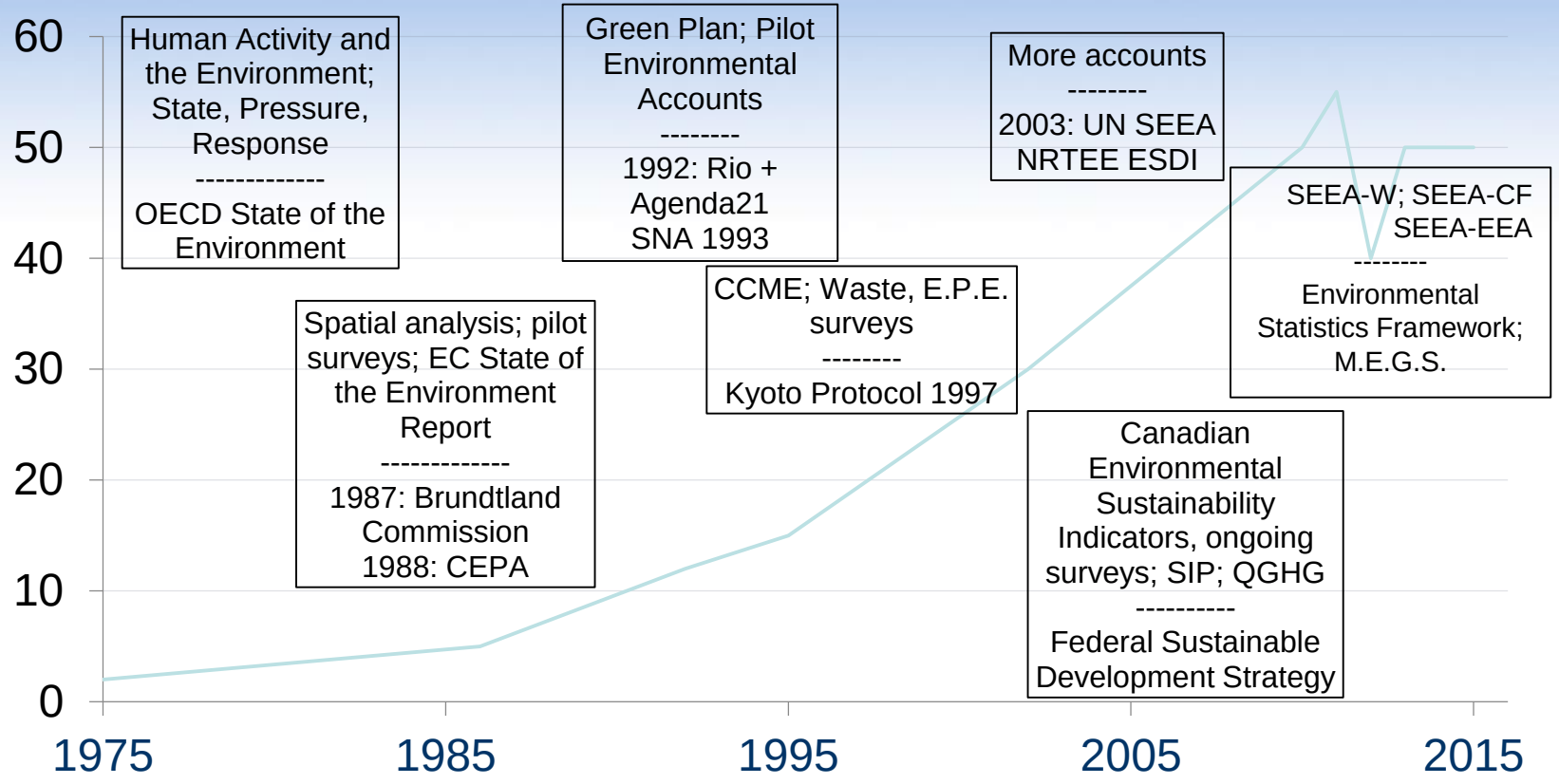
Why integrated environment – economy data

"Lack of integrated water data is a systematic impediment to informed decision making related to the sustainable use of water resources. Data are needed to provide information not just about water quantity, both on the surface and underground, but also about its quality, social and economic relations as well as environmental dimensions."

Conclusion from Session 6.4 "Data for All"

5th World Water Forum, 2009

40 years of environmental statistics at Statistics Canada



Why integrated environment – economy data

A – Because it is interesting?

C – Because life is increasingly complex?

D – Because we can?

E – Because everything is connected ?

F – Because it is informative?

G – Because resources are becoming scarce?

H – Because we have to?

I – Because we owe it to future generation?

J – All of the above?

Application of accounts to policy

- Can accounts really inform policy?
- Will policy take accounts into account?

Policy analysis and application of water accounts

- Physical asset accounts are important tools for asessment of the economic situation
  - Physical asset accounts for water show how **many water resources** a country owns, and to which extent these are available for economic use via extraction.
  - They also show how the **stocks evolves over time**, and how it is affected by economic activities, for instance, how much have been extracted and how much has been added to the available stocks by new discoveries.

- Analysis of national security, self-sufficiency and commercial conditions
  - The asset accounts for water are useful for analysis of **national security**, self-sufficiency or the commercial conditions within all economic sector.

Statistics Canada Statistique Canada

Energy

Electric power statistics, July 2016

Data on electric power for July are now available upon request.

Continue reading ➜

Coal and coke statistics, July 2016

Monthly data for July on the production and export volumes of coal by coal type and use are now available. Data are available at the national level and by coal-producing province.

Continue reading ➜

Natural Resource Asset Accounts

Canada's natural resource wealth, 2013

Text | CANSIM tables | Related information | Previous release | PDF (9 KB)

Released: 2015-03-26

The value of Canada's natural resource assets stood at $744 billion in 2013, down 13% from 2012. This followed a 29% decline a year earlier.

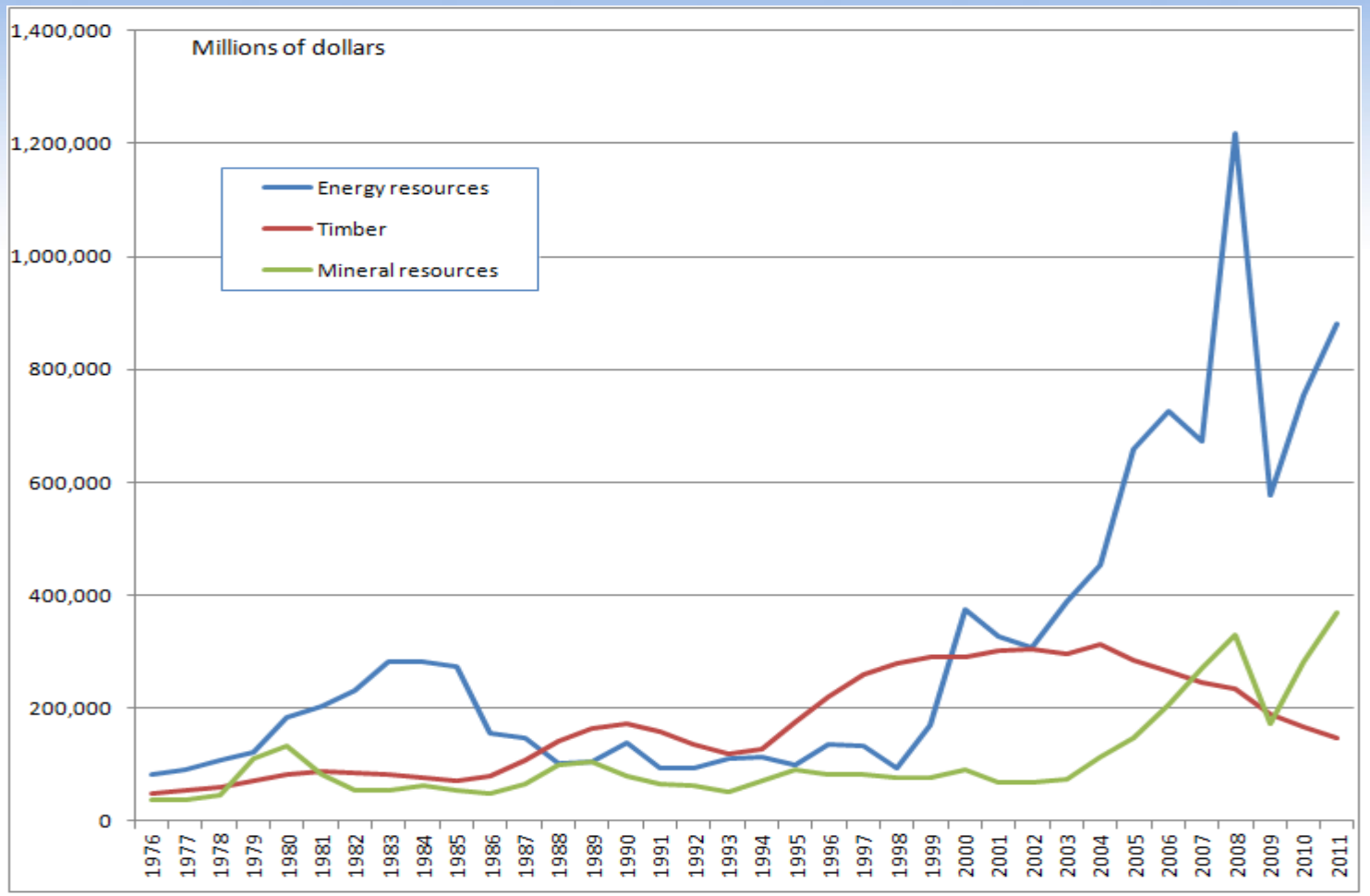
Energy resources accounted for 66% of the value of all natural resource assets in 2013, followed by minerals (19%) and timber (15%).

Energy resource assets consist of coal, crude bitumen, crude oil and natural gas. After decreasing by 30% the previous year, the value of these assets fell 7% from their 2012 level to $494 billion in 2013. Declines in the value of coal resources accounted for much of this change.

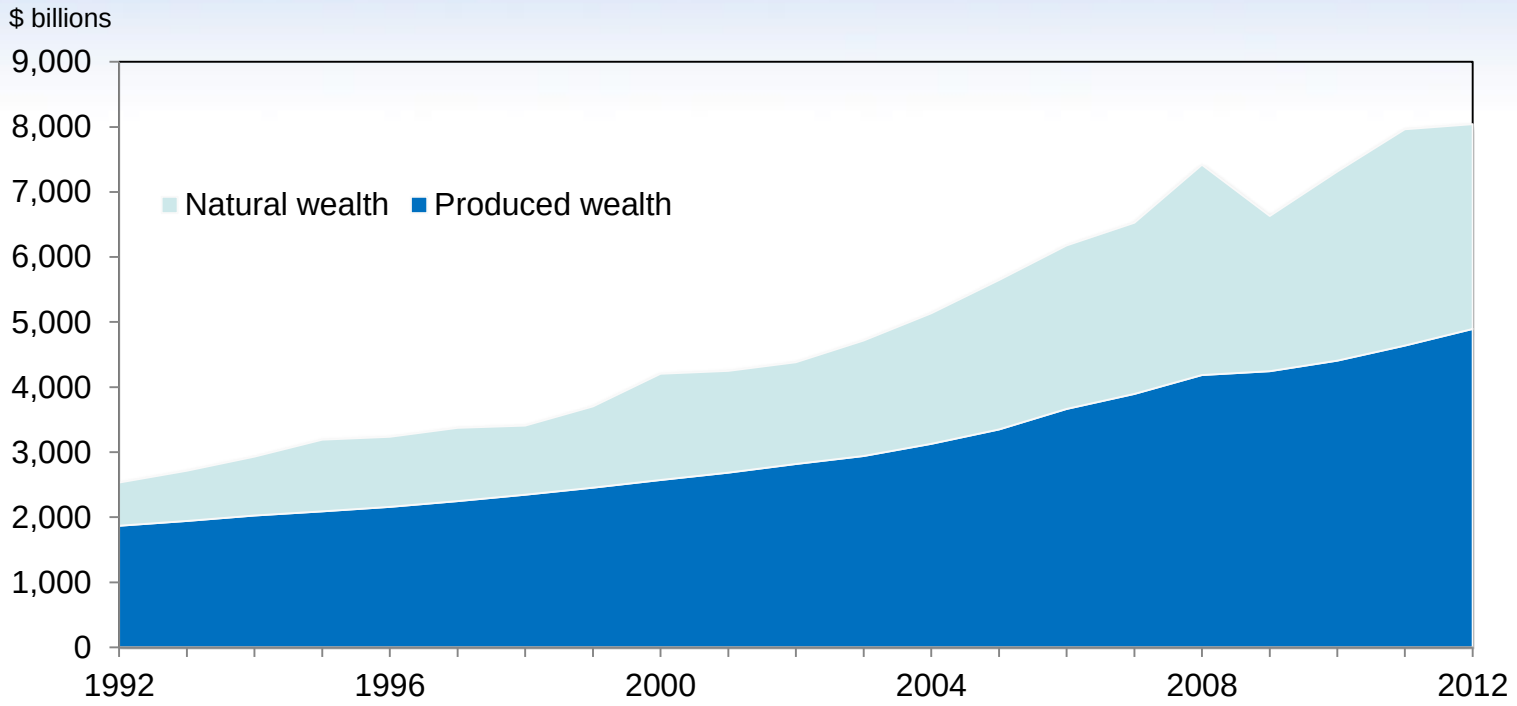
The value of mineral assets fell 38% to $138 billion in 2013, following a 31% decline a year earlier. In general, lower prices for mineral assets compared with the previous year contributed to the decline. The change in potash value was the largest contributor to the decrease.

The value of timber assets increased 9% in 2013, following a 15% decrease in 2012.

National wealth, Canada, 1976 to 2011

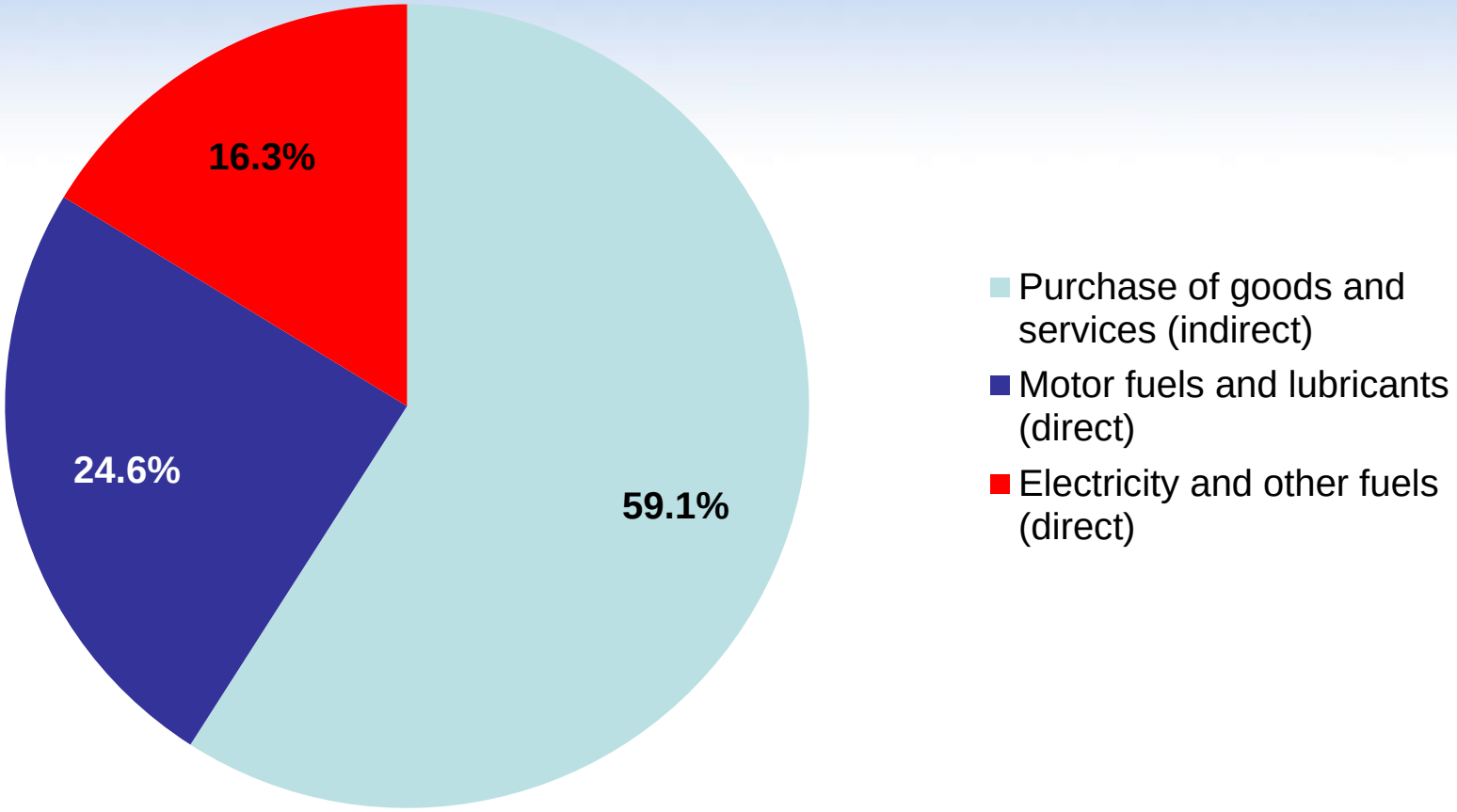


National wealth, Canada, 1992 to 2012



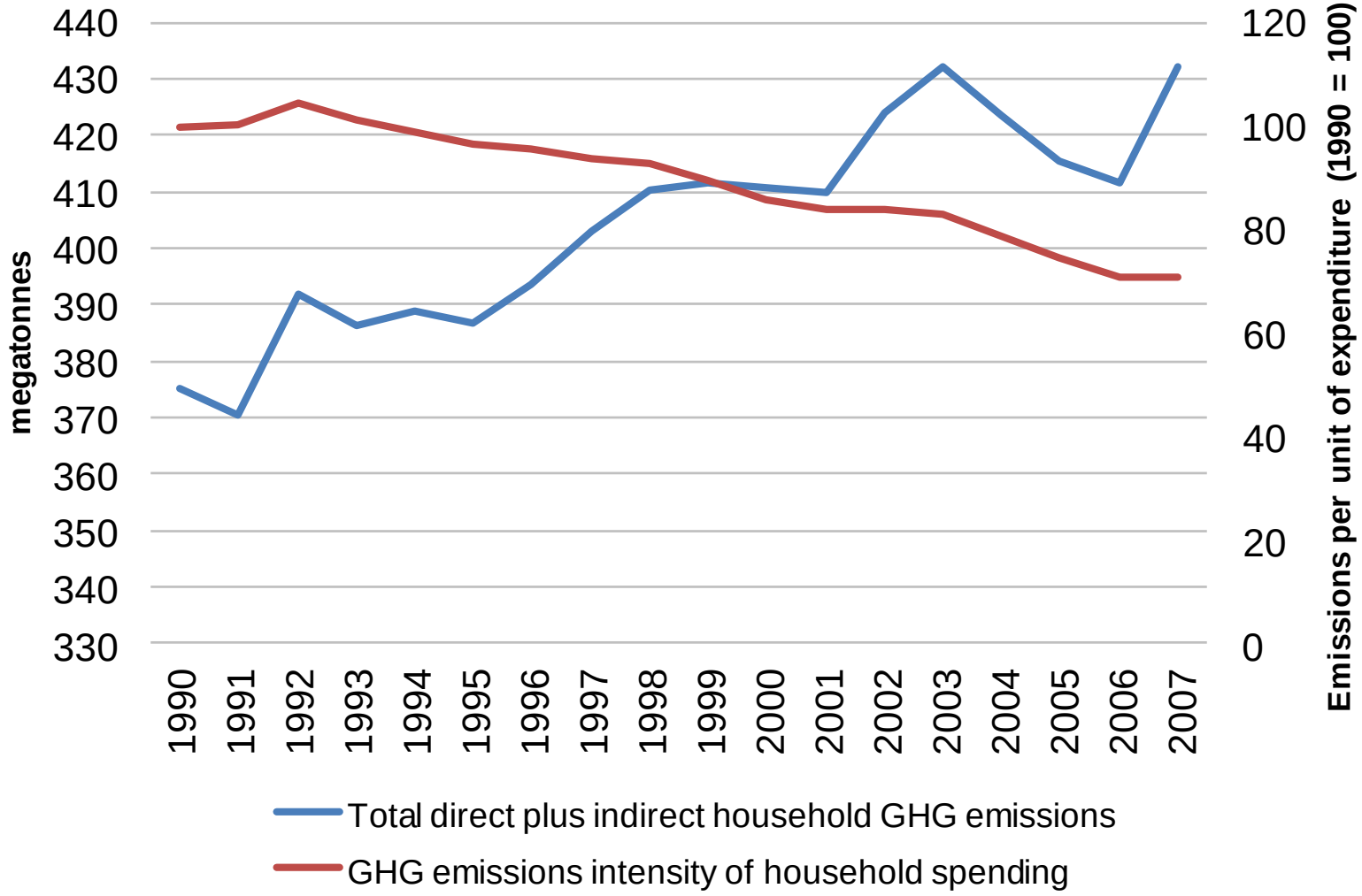
Notes: Natural wealth comprises natural resources assets and land. Produced wealth comprises produced non-financial assets.
Source: Statistics Canada, CANSIM table 378-0005

Direct and indirect GHG emissions from households, Canada, 2010

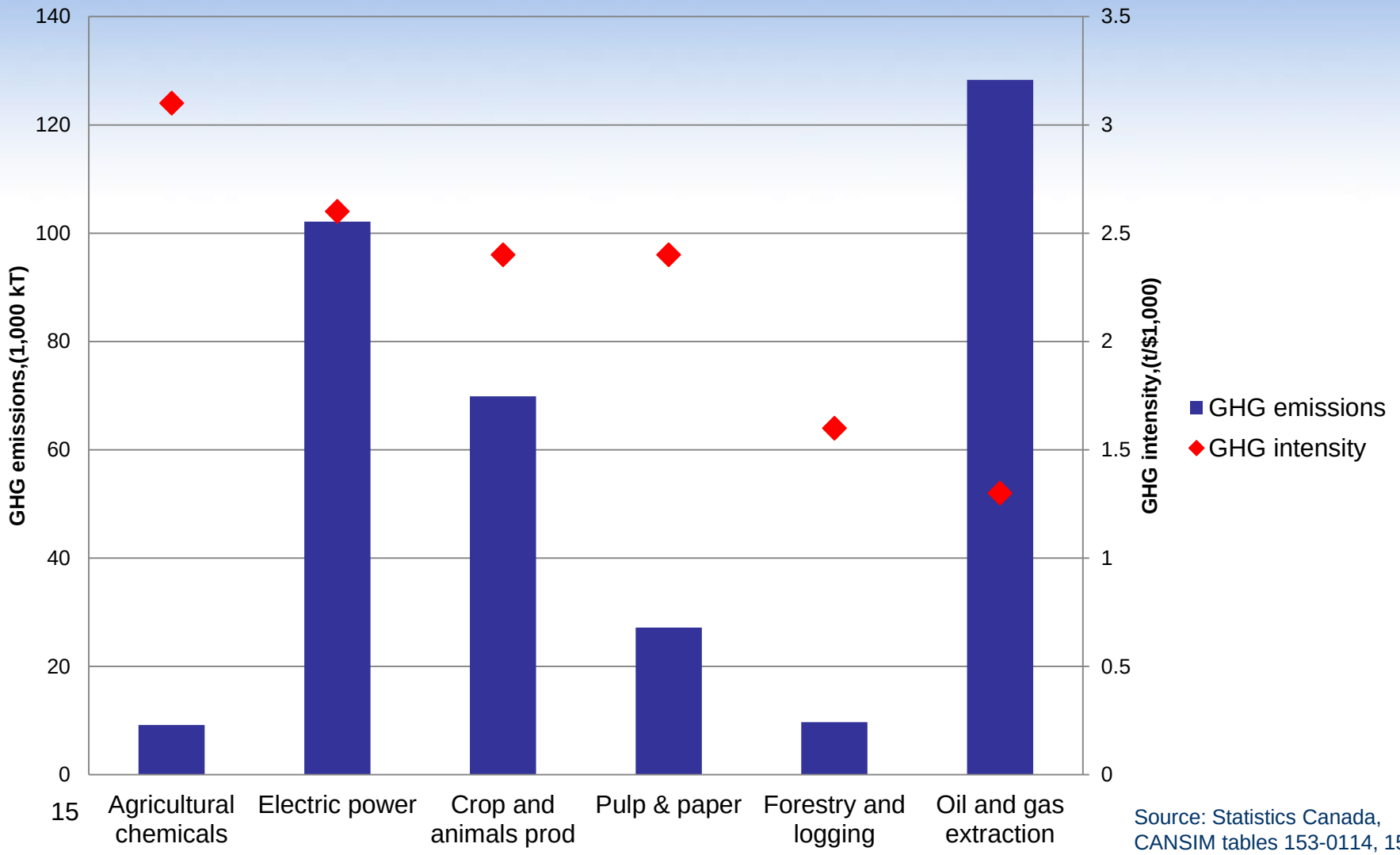


Source: Statistics Canada, Environment, Energy and Transportation Statistics, special tabulation

Direct and indirect GHG emissions from households, Canada, 2010

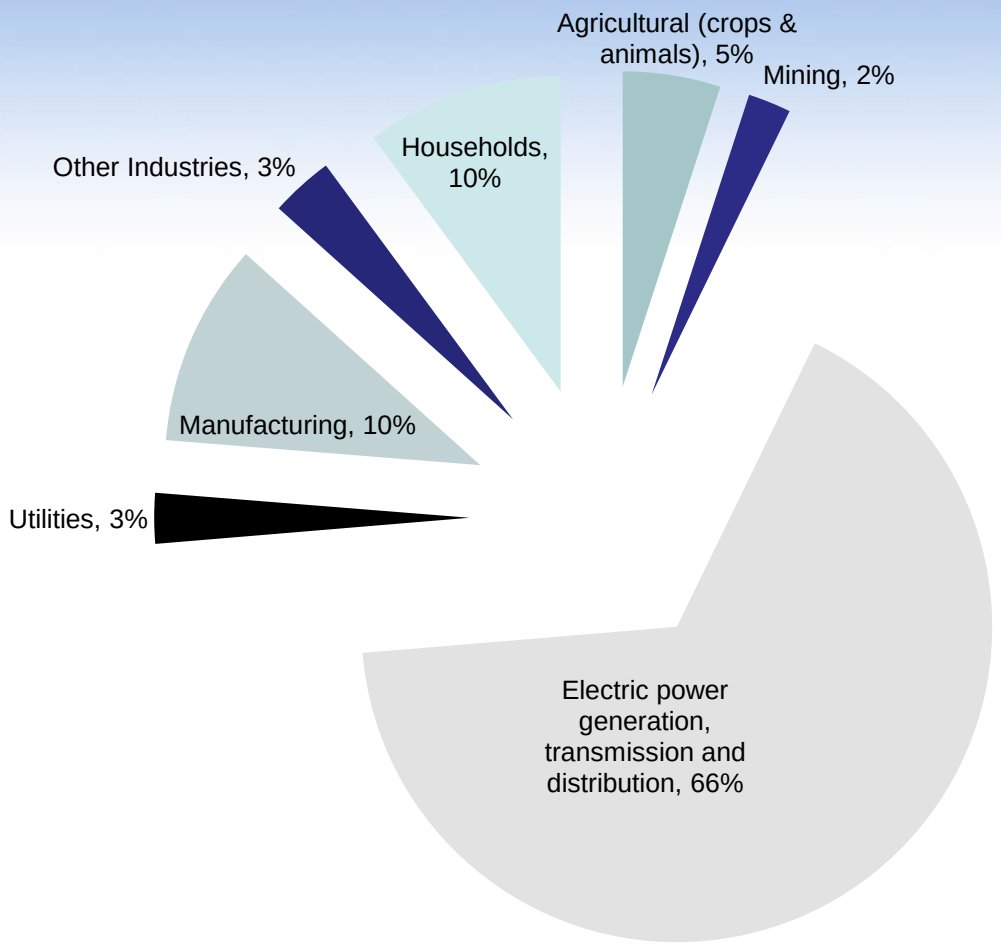


GHG emissions and GHG intensity, selected industries, Canada, 2010

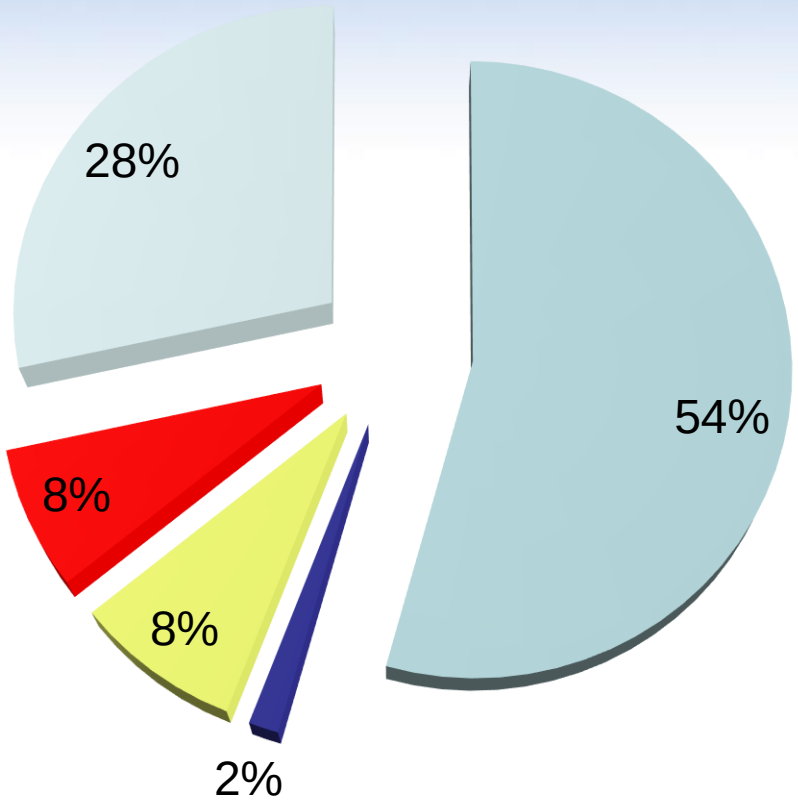


Source: Statistics Canada, CANSIM tables 153-0114, 153-0115

Water use in Canada, 2011



Water use by final demand category, 2011



- Personal expenditure (households) (4)
- Non-profit institutions serving households' consumption expenditure
- Government net current expenditure
- Gross fixed capital formation
- International exports

Table 153-0116 [1, 2, 3, 4, 6, 7, 8, 9]

Physical flow account for water use

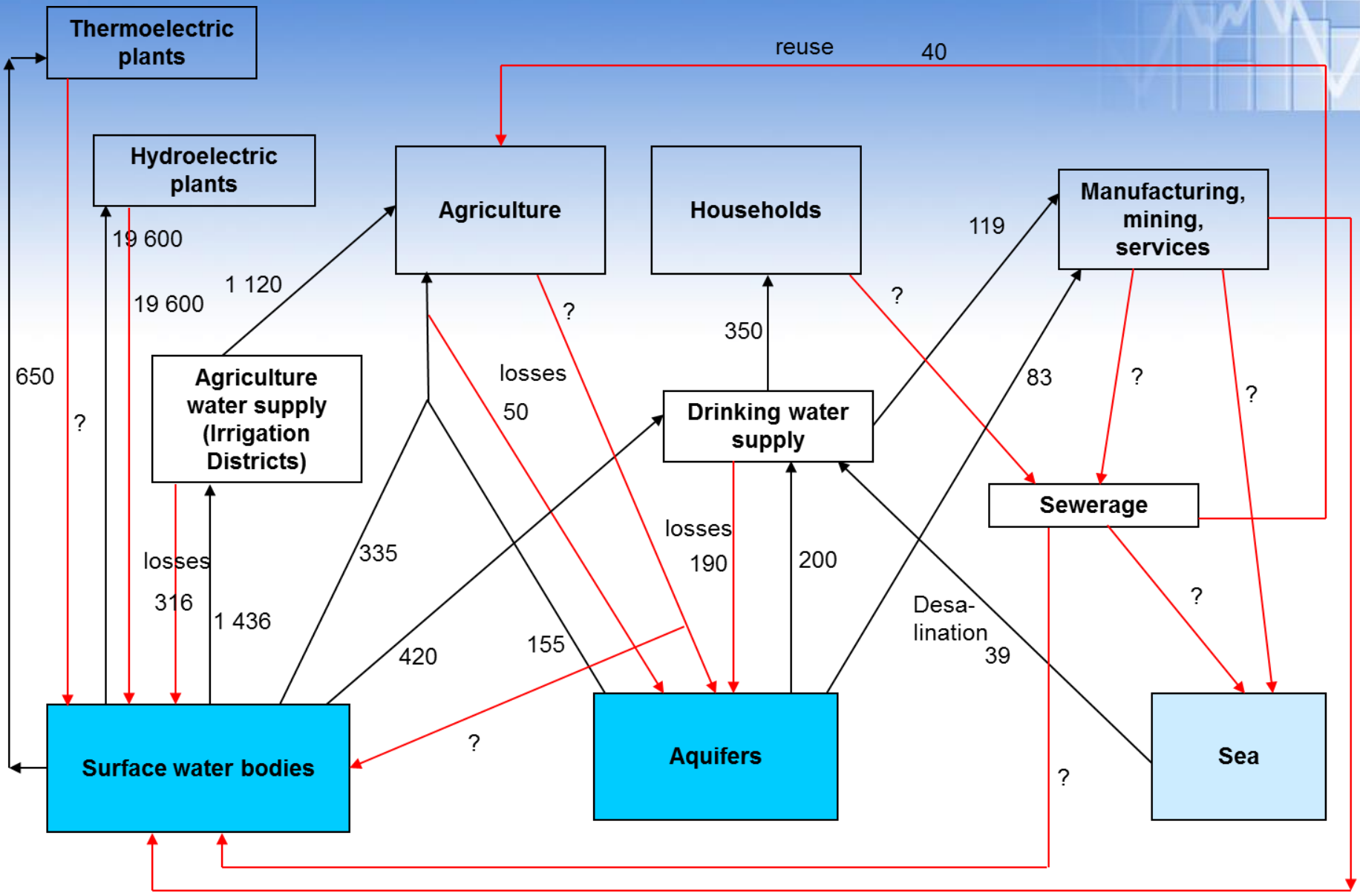
every 2 years (cubic metres x 1,000)

The data below is a part of CANSIM table 153-0116. Use the Add/Remove data tab to customize your table.

Selected items [Add/Remove data]

Geography = Canada

Sector	2009	2011
Total, industries and households	38,836,120	35,350,913
Total, industries	35,159,287	31,777,873
Crop production [BS111]	2,045,300	1,501,614
Animal production [BS112]	279,586	267,789
Forestry and logging [BS11300]	346	525
Fishing, hunting and trapping [BS11400]	..	..
Support activities for agriculture and forestry [BS11500]	..	..
Oil and gas extraction [BS21100]	293,060	349,362
Coal mining [BS21210]	20,966	33,632
Metal ore mining [BS21220]	319,054	260,066
Non-metallic mineral mining and quarrying [BS21230]	103,073	135,477
Support activities for mining and oil and gas extraction [BS21300]	9	39
Electric power generation, transmission and distribution [BS22110]	26,213,561	23,497,215


Thermoelectric plants
Hydroelectric plants
Agriculture
Households
Manufacturing, mining, services
Agriculture water supply (Irrigation Districts)
Drinking water supply
Sewerage
Surface water bodies
Aquifers
Sea
reuse
40
19 600
19 600
1 120
650
?
losses
50
?
350
?
119
83
?
?
losses
316
1 436
335
losses
190
200
420
155
Desa-
lination
39
?
?
?
?

Application of accounts to policy: Measuring the context

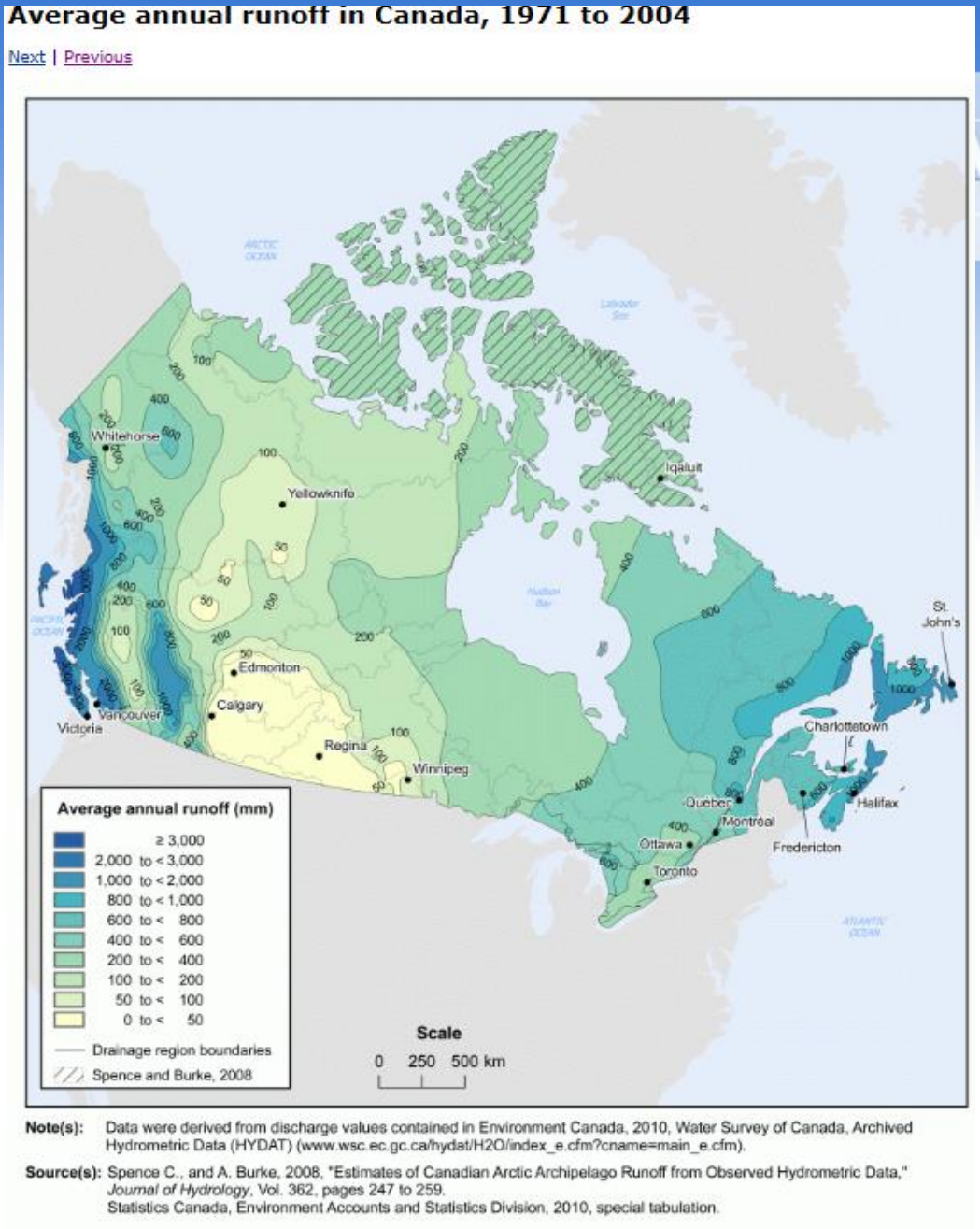
- **Renewable water asset account** (water yield) — **3,500 km³**
- **Hydro-electric power generation** — **3,000**
- **Timber productive forest land** — **500**
- **Crop requirements** — **85**
- **Total water intake** — **35**
  - *Of which thermal electric power* — *25*
    - *Of which municipal* — *5*
    - *Of which irrigation* — *2*

Order of magnitude estimates based on stock and flow accounts. See Human Activity and the Environment (2010), *Freshwater supply and demand in Canada* (http://www.statcan.gc.ca/pub/16-201-x/16-201-x2010000-eng.htm) for more information.

But …

the 1% is important because flows are highly variable…

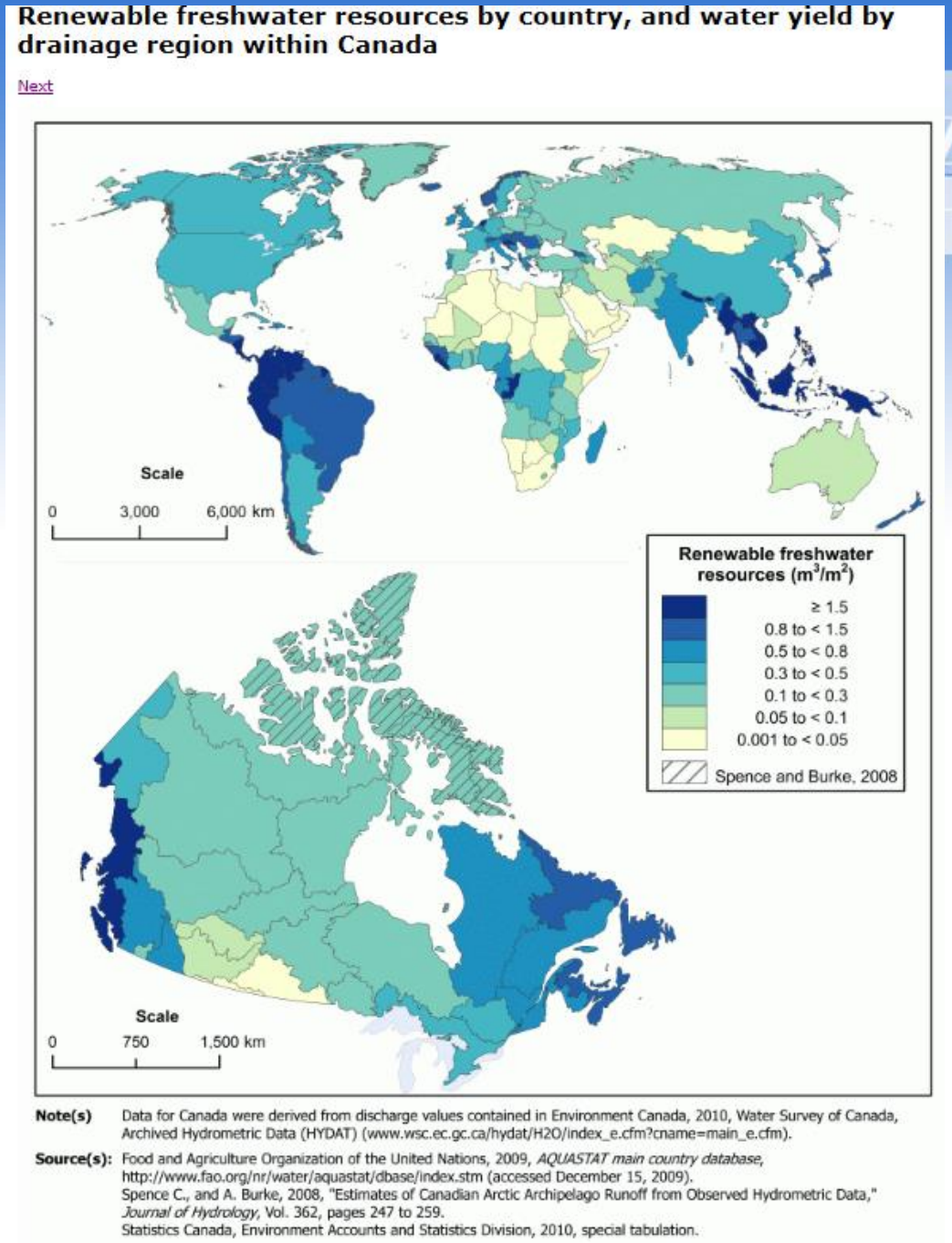
So who needs how much, where?



Human Activity and the Environment (2010), *Freshwater supply and demand in Canada* (http://www.statcan.gc.ca/pub/16-201-x/16-201-x2010000-eng.htm)

In Canada,

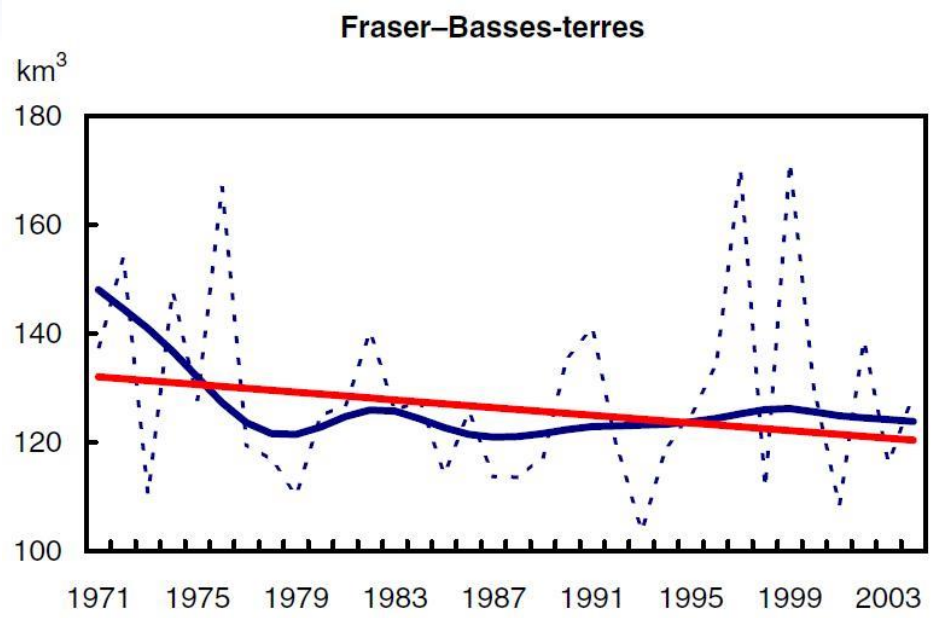
there is as much variation between drainage areas as there is between countries worldwide

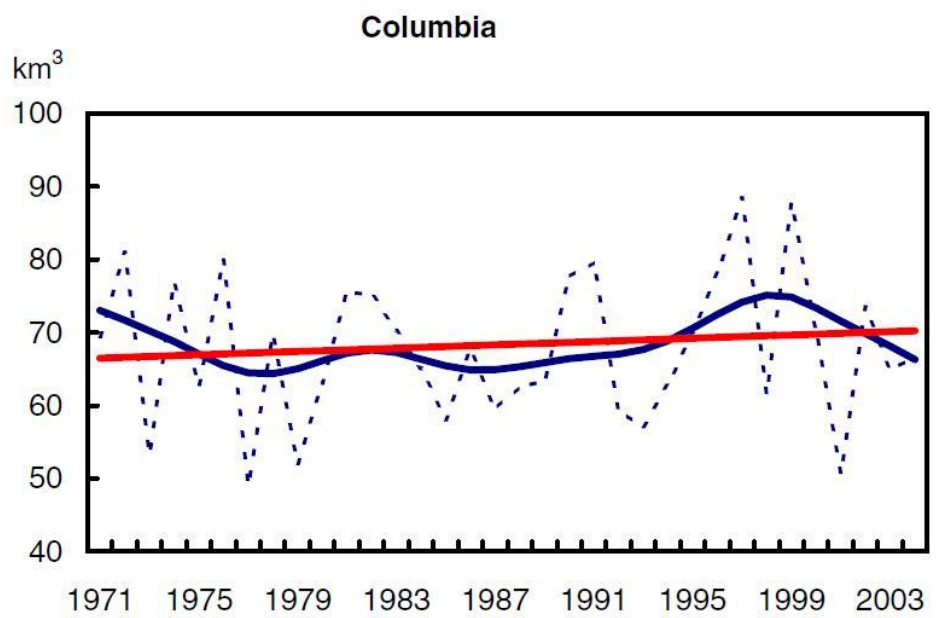


Human Activity and the Environment (2010), *Freshwater supply and demand in Canada* (http://www.statcan.gc.ca/pub/16-201-x/16-201-x2010000-eng.htm)

...and they are variable in time.

A key message, therefore, is that space and time are both important dimensions to consider in a water accounting programme.





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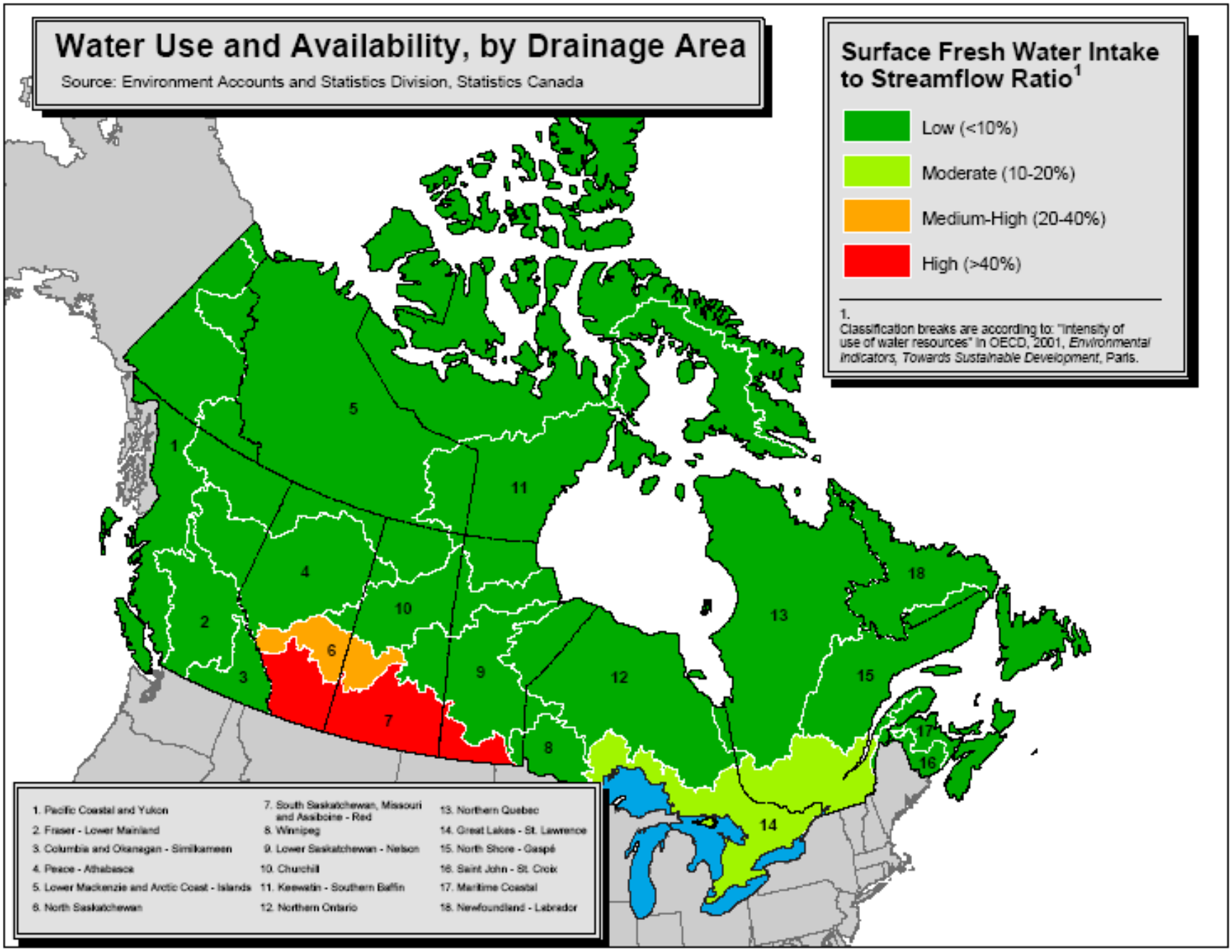
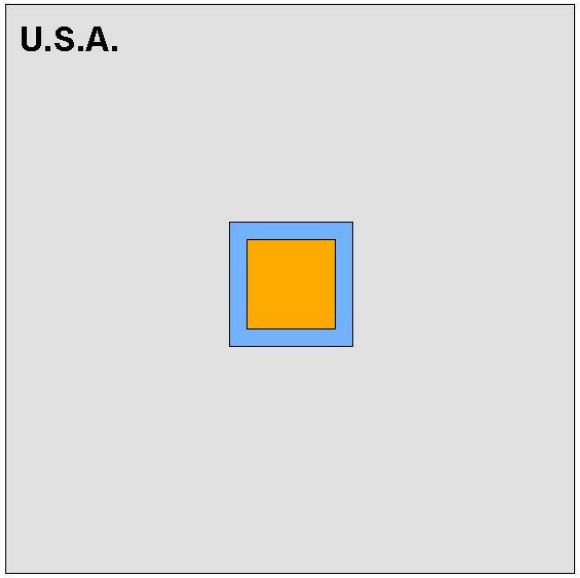

Water Use and Availability, by Drainage Area
Source: Environment Accounts and Statistics Division, Statistics Canada
Surface Fresh Water Intake to Streamflow Ratio[1]
Low (<10%)
Moderate (10-20%)
Medium-High (20-40%)
High (>40%)
1.
Classification breaks are according to: "Intensity of use of water resources" in OECD, 2001, Environmental Indicators, Towards Sustainable Development, Paris.
1. Pacific Coastal and Yukon
2. Fraser - Lower Mainland
3. Columbia and Okanagan - Similkameen
4. Peace - Athabasca
5. Lower Mackenzie and Arctic Coast - Islands
6. North Saskatchewan
7. South Saskatchewan, Missouri and Assiboine - Red
8. Winnipeg
9. Lower Saskatchewan - Nelson
10. Churchill
11. Keewatin - Southern Baffin
12. Northern Ontario
13. Northern Quebec
14. Great Lakes - St. Lawrence
15. North Shore - Gaspé
16. Saint John - St. Croix
17. Maritime Coastal
18. Newfoundland - Labrador

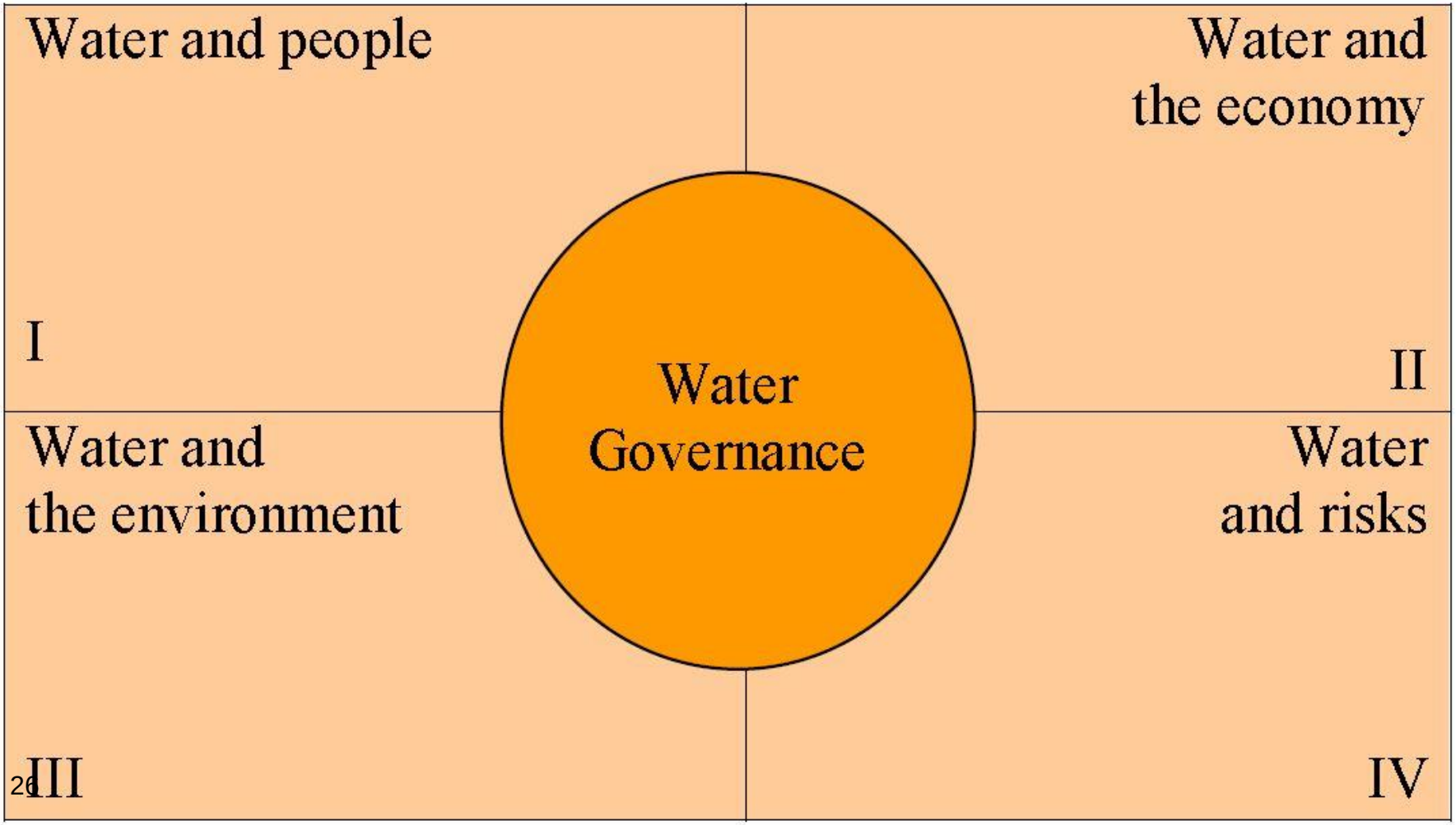
	Canada	U.S.A.
Total Area	9 978 904	9 631 418
Freshwater Surface Area	1 174 452	469 495
Urban Area	27 680	238 913

*areas are in square km



Policy analysis and application of water accounts

Figure 1.2.1 Grouping of information about water



Policy analysis and application of water accounts

I. IMPROVING WATER SUPPLY AND SANITATION SERVICES

Policies that aim to ensure the population has access to safe water as well as to means of disposing wastewater (Targets 6.1, 6.2 and 6.3 (partial))

INFORMATION ON WATER AND PEOPLE

Information on the provision of drinking water and sanitation to the population

II. MANAGING WATER SUPPLY AND DEMAND

Policies that aim to improve water allocation to satisfy societal needs without compromising the needs of future generations or the environment (Targets 6.3, 6.4 and 6.5)

INFORMATION ON WATER AND THE ECONOMY

Information on the water cycle in nature and the economy

WATER SECURITY

III. IMPROVING THE STATE OF THE ENVIRONMENT AND WATER RESOURCES

Policies that aim to preserve/improve the quality of water resources and aquatic ecosystems (Targets 6.3 and 6.6)

INFORMATION ON WATER AND THE ENVIRONMENT

Biophysical information on water related ecosystems, the services they provide and the factors affecting them

IV. ADAPTING TO EXTREME HYDRO-METEOROLOGICAL EVENTS

Policies that aim to reduce the socioeconomic impact of water related disasters (Targets 6.5 and 6.6)

INFORMATION ON WATER AND RISKS

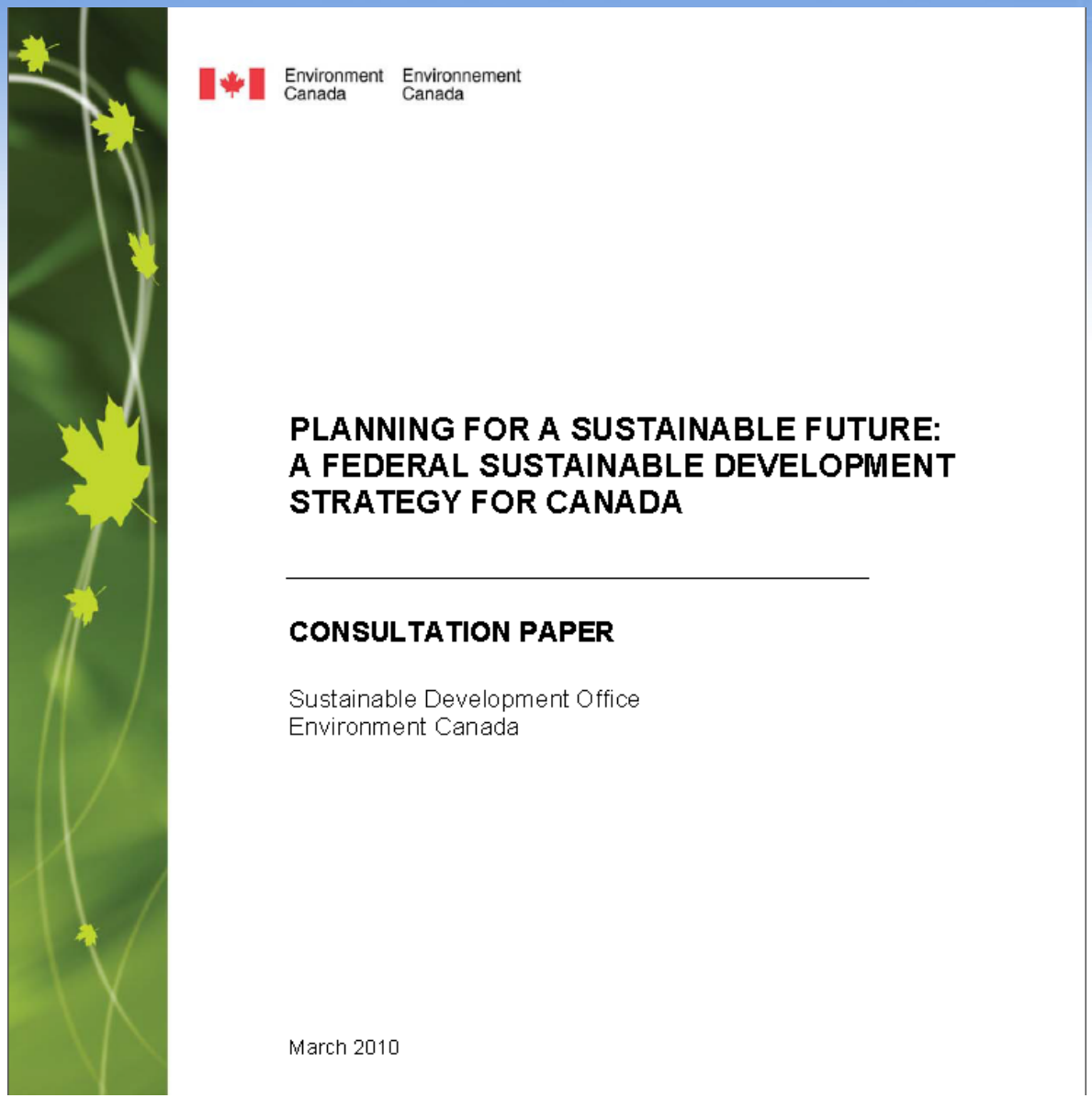
Information on extreme events related to water ecosystems and human response

Integrated Information for Integrated Policy: Indicators to monitor the post-2015 development agenda, United Nations Statistics Division, March 2015

Policy analysis and application of water accounts

Target	Statistics to inform proposed SDG Indicators	Accounts
6.3 *Water quality, watewater treatment and re-use*	**Volumes of Pollution Release: T**he release of pollutants by different economic activities (i.e. households and industry type) and the pathway of their release **Volumes of waste-water and re-used water**: Flows of wastewater between economic units and to the environment, including flows for treatment and re-use	Emissions Accounts PSUT
6.4 *Water efficiency and sustainable withdrawals*	**Water Use:** Data on Water abstraction and Final Water Use (for the economy as a whole and by industry based on ISIC) **Sustainability of withdrawals:** Data on Total Renewable Water Resources and Total Water Withdrawals	PSUT Asset Accounts PSUT
6.6 *Water-ecosystems*	**Wetlands:** Extent, condition and provision of services	Ecosystem Accounts
Target	**Contextual, policy relevant information on SDG targets**	Accounts
*Targets **6.1** and **6.2** on Drinking Water and Sanitation*	**Physical information:** Supply of water to households, generation of wastewater by households , water-system characteristics affecting households **Monetary information:** Expenditure on household water supply and sanitation, expenditures by governments and investment in fixed capital for water supply and sanitation	PSUT Combined Presentations
6.5 *IRWM*	SEEA-Water is a **tool for IRWM** by bringing together different types of water information into one framework	SEEA-Water

Examples of policy applications



Environment Canada Environnement Canada

PLANNING FOR A SUSTAINABLE FUTURE: A FEDERAL SUSTAINABLE DEVELOPMENT STRATEGY FOR CANADA

CONSULTATION PAPER

Sustainable Development Office
Environment Canada

March 2010

Examples of policy applications

4. Goal: Water Availability

Canadians manage and use water resources in a manner consistent with the sustainability of the resource.

4.1 Target: Water Availability

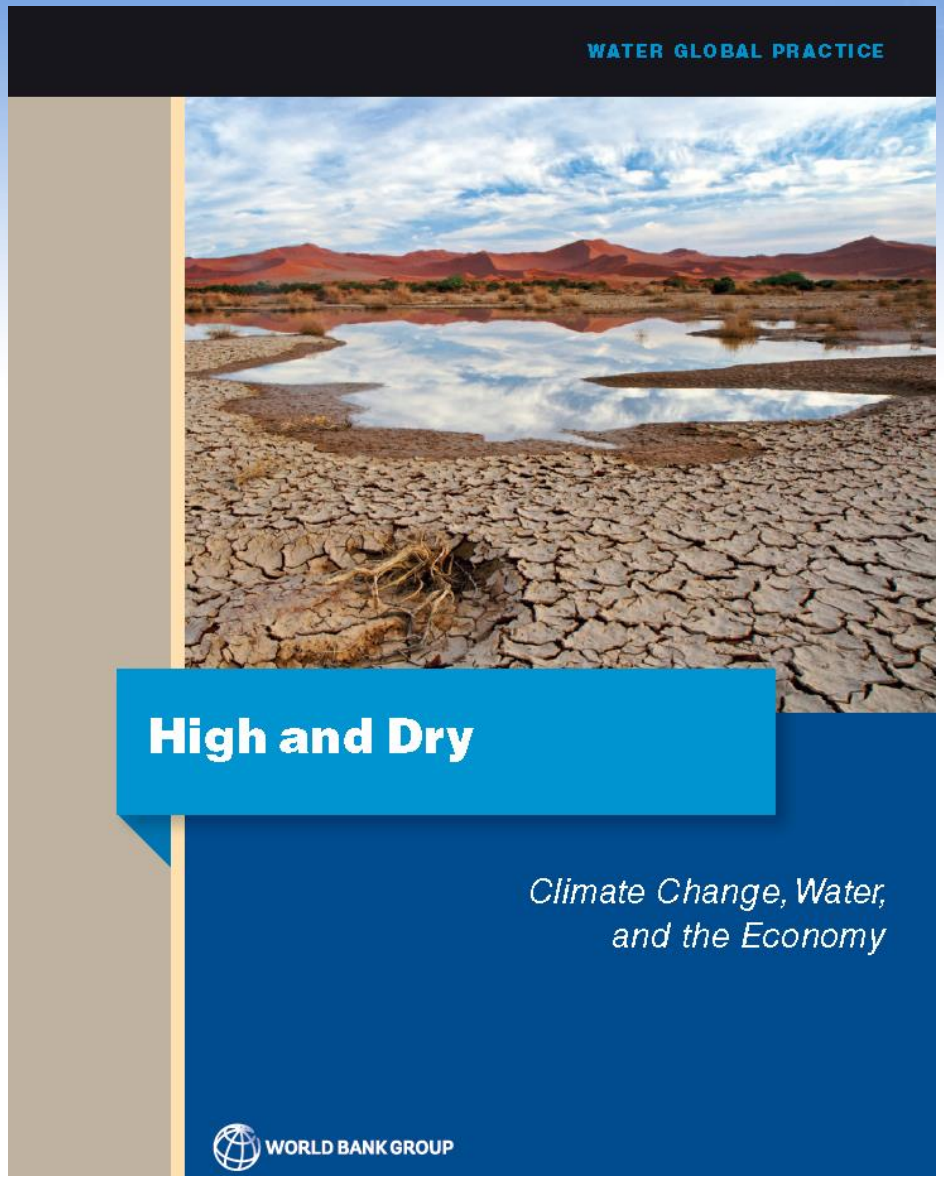
Improve knowledge of water use and availability by sub-region in Canada by 2013.

Implementation Strategies

4.1.1 Advancing Knowledge and Communications

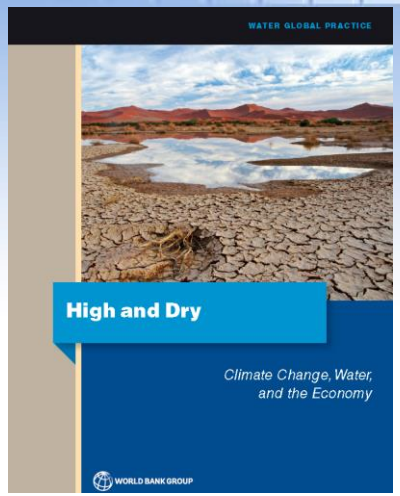
- Conduct research and survey work in order to fill in information gaps with respect to water use and availability.
  - Conduct and synthesize surveys such as the Municipal Water and Wastewater Survey (EC) and the CESI Industrial Water Use Survey, Survey of Drinking Water Plants and Agriculture Water Use Survey. (Stats Can working with EC)
  - Continue work on collection of hydrometric data through the Water Survey of Canada. (EC)
  - Continue the development and implementation of Water Availability Indicators. (EC)
  - Re-start the production of the water-use accounts to calculate water-use intensities by sector and embodied in trade. (Stats Can working with EC, NRCan)
  - Complete 15 assessments for Canada's 30 key regional aquifers and produce a national groundwater inventory to help Canadians better understand and manage underground water resources. (NRCan)
- Promote federal water conservation and efficiency as part of infrastructure funding. (EC)
  - Promote voluntary water conservation and efficiency in the public sector. (EC)
  - Promote the development of national plumbing code for water efficiency through the Canadian Standards Association's Canadian Advisory Council on Plumbing (CACP). (EC)

Examples of policy applications

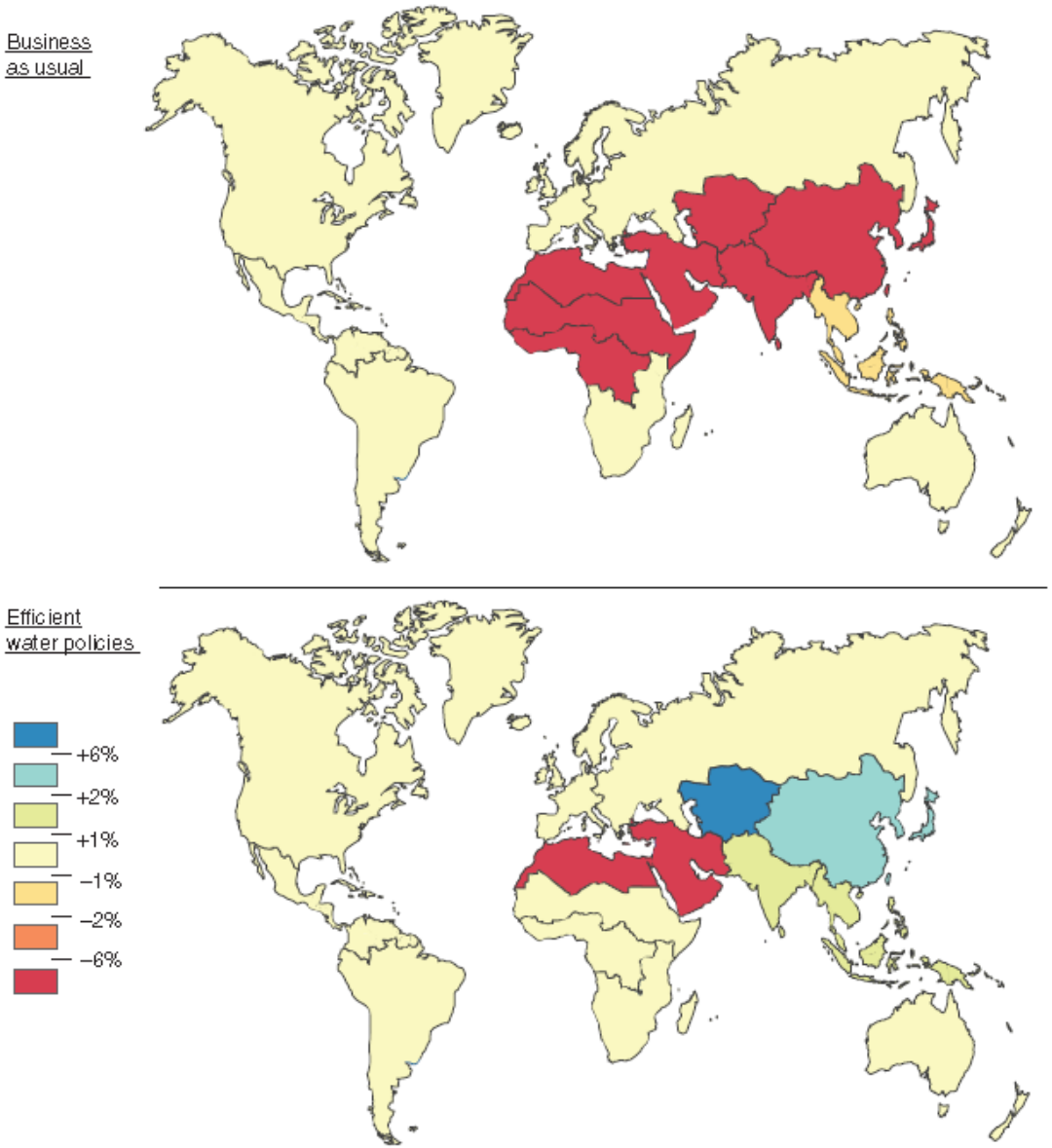


Examples of policy applications

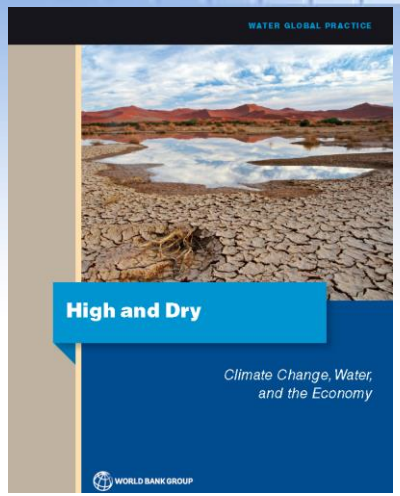
- **Smart water policy is fundamental to smart climate policy and smart development policy.**
  - While adopting policy reforms and investments will be demanding, the costs of inaction are far higher.
  - The future will be thirsty and uncertain, but with the right reforms, governments can help ensure that people and ecosystems are not left vulnerable to the consequences of a world subject to more severe water-related shocks and adverse rainfall trends.



MAP ES.1 The Estimated Effects of Water Scarcity on GDP in Year 2050, under Two Policy Regimes



Source: World Bank calculations.
Note: The top map shows the estimated change in 2050 GDP due to water scarcity, under a business-as-usual policy regime. The bottom map shows the same estimate, under a policy regime that incentivizes more efficient allocation and use of water.



Examples of policy applications

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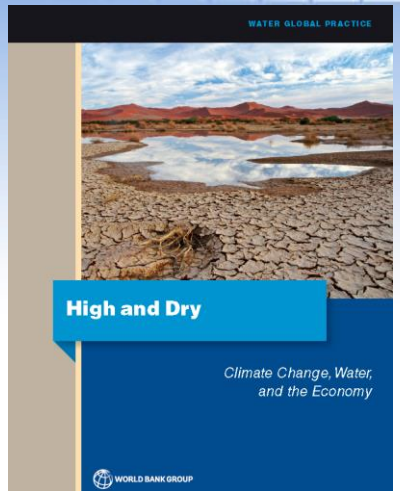

Chapter 1

Shocks and Trends: Uncertain Water Supplies Meet Unquenchable Thirsts

General policy questions that can be addressed with SEEA-W

1. Material consumption
2. Material productivity
3. Calculation of direct and indirect intensities
4. Water use analysis
5. Water policy
6. Emissions analysis
7. Environmental assessment
8. Natural resource management
9. Multi-factor productivity
10. Footprint calculations

Water policy questions in Australia

Australian Government
AusAID

1. Is water flowing to the highest value users?
2. Are water providers achieving full cost recovery?
3. Are water markets open and efficient?
4. Are water uses and the water supply infrastructure the supports this economically efficient and sustainable?
5. Is there consistency in water pricing across sectors and between jurisdictions?
6. Are environment and other public benefit outcomes being achieved?
7. What are the economic, environmental and social impact of changes in water resources allocation and use?

Source: 1994 – COAG Water Reform Framework

Discussion: Group exercise (Groups of 3-5)

1. What is the main water policy issue in your country/region?
2. Suggest some aspects of the water accounts that would be useful to address it?
3. Report:
   - The water issue you selected
   - Some aspects of the account you selected
   - Are **national/regional** data available in your country for these measures?

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Thank you for your attention

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