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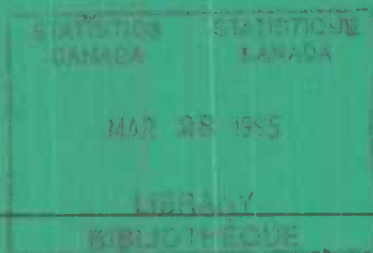
National Accounts  
and Environment Division

Division des comptes nationaux  
et de l'environnement

# Natural Resources and National Wealth

Discussion Paper  
Number 1

Document de travail  
Numéro 1



Statistics  
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## Normal Function of a National Society

THE NATIONAL SOCIETY FOR THE IMPROVEMENT OF THE RACE  
IS A NON-PROFIT ORGANIZATION INCORPORATED IN THE STATE OF NEW YORK  
AND HAS A CAPITAL OF \$100,000.00

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The National Society for the Improvement of the Race is a non-profit organization incorporated in the State of New York and has a capital of \$100,000.00. The purpose of the Society is to improve the race by the education of the people and by the promotion of the arts and sciences.

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## Natural Resources and National Wealth

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This paper is one in a series of internal discussion papers produced in Statistics Canada's National Accounts and Environment Division. These papers address topics related to environmental statistics and the National Accounts components which are currently under development.

Ce document fait partie d'une série de documents internes produits dans la Division des comptes nationaux et de l'environnement de Statistique Canada. Ces documents traitent de sujets reliés aux statistiques de l'environnement et composantes des comptes nationaux au stade de la recherche.

Discussion papers in this series are made available in the official languages in which they were written. Translated versions are not available in most cases.

Les documents de travail de cette série sont disponibles dans la langue officielle dans laquelle ils sont écrits. Les versions traduites ne sont pas disponibles dans la plupart des cas.





# Natural Resources and National Wealth

*Kirk Hamilton  
Environment and Natural Resources  
Statistics Canada  
July 28, 1989*

While resource-based goods constitute roughly 30% of Canadian exports and the production of primary commodities contributes over 10% to GDP, there is no consistent, coherent set of data on resource stocks and flows. Resources arguably form an important component of national wealth, but they are not measured in the national balance sheets. Resource depletion is not considered in measures of net national income or product. This paper offers some thoughts on dealing with these issues and some preliminary estimates of depletion figures for 1984 through 1986.

The measurement of wealth in the Canadian System of National Accounts (SNA) generally follows the work of Goldsmith [1] in the United States. The items measured are financial assets and liabilities, with the difference in total being net foreign indebtedness, and tangible assets: financial assets less liabilities plus tangible assets equals the net worth of the nation. Tangible assets are broken down into the following categories:

- residential structures
- non-residential structures
- machinery and equipment
- consumer durables
- inventories
- land.

Valuation of these assets is at market prices and therefore reflects the net value of fixed capital, i.e. gross value less depreciation.

The only non-reproducible category of asset in this list is land, which represents, therefore, a first step in the direction of measuring the endowment of natural resources. Consonant with the valuation of other tangible assets, only land in productive use for which a market price exists is measured. Crown lands and the minerals and forests which they contain are excluded - some economic data on these lands is available in the form of the value of leases and royalties, but a fuller exploration of valuation issues is required (for which see below).

What is unsatisfactory in this treatment of wealth is that it puts the calculation of the net worth of Canada on the same footing as that of Hong Kong (for example), almost completely ignoring resource endowments.

The final output of development of natural resource information would be to add the following to reproducible tangible assets in the national balance sheet:

- agricultural land
- non-agricultural land



- minerals
- energy
- fish
- forests.

This is clearly only one of many possible classifications of natural resources.

The objective in this paper is to delineate the methodological issues involved in making natural resources a portion of the tangible assets in the national balance sheet: major issues include valuation, depletion, and the underlying data and procedures required to deal with natural resources on a sound theoretical basis within the national balance sheets as well as other portions of the SNA.

An important question in all of this is the relationship between environmental change and national wealth - a consequence of including living resources in the wealth accounts is that the ability of the natural environment to support these resources then becomes one of the determinants of wealth.

The resource figures which will end up in the National Accounts are only the peak of a broad pyramid of information: economic, technological, and physical. The component parts are described in what follows.

### Valuation

The issue of valuing resources in the SNA is intimately connected to price, technology and the state of knowledge of the natural environment. Only those things which have been discovered and which may be exploited profitably at current prices and with available technology can be considered resources for the purposes of national accounting.

For *exhaustible resources* such as minerals the question of valuation is fairly straightforward. The market value of any capital good is the present (i.e. discounted) value of the stream of net returns expected from its use; the same principle should apply to valuing a given stock of resource. The net return on resource production is arrived at by deducting from output values the operating costs (labour and intermediate goods), the costs of exploration and development, and capital consumption.

Determining the time stream of net returns from the resource base is more complicated: the rate of return and the rate of extraction can both vary over the life of the resource; present value calculations would have to rely on projections of these rates. A pragmatic alternative is to assume optimal production. As Hotelling [2] showed, the present value of net returns from production of an exhaustible resource is maximized if the rate of increase over time of the rate of return is equal to the interest rate (assuming extraction costs are independent of scarcity). Under optimal production, therefore, the present value of net returns for the resource stock in question is equal to the per-unit net return times the number of physical units of stock.

The number of physical units of the resource to be used in this calculation is just, as noted previously, that portion of the resource base which may be exploited profitably at current prices and technology. This is generally termed the *reserve* in mineral statistics. The *ultimate resource* is an inherently probabilistic estimate of the total resource which is likely to be discovered. As prices increase and technology decreases production costs, portions of the resource base become part of reserves - the opposite may happen as well, when prices fall.

For *living resources* the situation is less clear-cut. As long as harvesting is less than the rate of natural growth the resource will not be exhausted. Valuing the resource base could be done in at least three ways:

- a. Calculate the present value of a constant stream of net returns equal to the current net return.





- b. Calculate the present value of a constant stream of net returns equal to the net return on the maximum sustainable yield (MSY) of the resource. The maximum sustainable yield is the highest growth rate achievable by a population of optimal size exploiting a given environment.
- c. Determine the size of the total stock which is capable of profitable exploitation (which is a function of the size of individuals) and treat this analogously to a mineral deposit, i.e. calculate the net return per unit times the number of exploitable units. The difference compared with minerals, of course, is that the stock which may be profitably exploited will vary over time as individuals grow, age structures change (e.g. forests may become over-mature and less valuable), environmental conditions change, as well as the usual possibilities of varying prices and exploitation technologies.

There are problems with approaches (a) and (b). Using current rates of exploitation to value the stock is arbitrary and may lead to wide year-to-year fluctuations in resource value estimates. With regard to using maximum yield, Fisher [3] points out that for any non-zero discount rate the optimal rate of exploitation will be less than the MSY - determining the MSY is itself a non-trivial problem.

Approach (c) is pragmatic and possesses the following logic: in the case of non-living resources, the net result of theoretical arguments and practical considerations was that the market value of a resource could be represented as the net return on extracting all of the commercially exploitable resource today; for living resources this corresponds to *harvesting* all of the commercially exploitable resource today.

A word needs to be said about the treatment of agricultural land as a resource. This land has an endowment of nutrients and organic matter which may be sustained or depleted by agricultural practices. Similarly, the soil may be eroded or salinized by some combination of natural and human activities. The market price of land should reflect its quality, i.e. its ability to produce food profitably, so at one level there is no problem in the treatment of agricultural land in the balance sheets. Rather than being sold, however, it may be the case that some parcels of land are simply taken out of production when they degrade. This suggests that it may be necessary to adjust the balance sheet items for agricultural land to reflect a decline in value of land which has been taken out of use.

It should be clear that in this treatment of the valuation of natural resources within the SNA there has been no attempt to alter the precepts of national accounting. The attempt instead has been to represent resources within the existing framework of market values for assets which have a market price. This excludes a key environmental resource, water, and other items lying outside the market system such as the aesthetic and amenity value of wilderness and wildlife.

### **Depreciation and Depletion**

Within the existing SNA there are both gross and net measures of national income. Net National Income deducts from the gross measure the depreciation of fixed capital assets - it is related, to paraphrase Hicks [4], to the notion that you should only consider as income that amount which is in excess of what is required to maintain your net worth.

Depreciation of fixed capital is also sometimes termed capital consumption, the sense being that a portion of the asset's lifetime capacity to produce has been used up, through normal wear and tear, in the accounting period in question. Depletion of an exhaustible resource is quite literally consumption of an asset, a deduction from net worth. This suggests that, at least in the case of exhaustible resources, all of the net return from their exploitation should be deducted from gross income to derive net income. All this is saying is that, in the Hicksian idiom, the measure of income should reflect the change in the balance sheet - this change is very direct in the case of extracting an exhaustible resource, owing to the valuation scheme which is suggested in the previous section.

For living resources the situation is quite different. The change in the balance sheet over any accounting



period is the result of conflicting influences: on the one hand harvesting and human-induced environmental deterioration are drawing down stocks; on the other hand natural processes both decrease the living resource (e.g. volcanic eruptions or senescence) and increase it through reproduction and growth.

For living resources, therefore, it is arguable that only when human-induced drawdown exceeds net natural increase should the drawdown in excess be treated as depletion and deducted in deriving net income. This is not as arbitrary as it may sound. The generation of income is obviously the result of human activities. The adjustment of this income to reflect changes in balance sheets should only occur when these changes result from human activities.

### Estimating Depletion

While measuring resources in the National Accounts is important from a theoretical point of view, it is worth enquiring whether in practice resource depletion numbers would be large relative to some of the main aggregates. Since measuring the actual wealth corresponding to natural resource endowments would be beyond the scope of this paper, a practical alternative is to estimate the value of depletion in the extractive sectors (mines, quarries and petroleum and gas wells) using published information.

The "other operating surplus" figures in the Input/Output tables represent gross profits from production, interest income and income from subsidies. An approximation to the net return from resource exploitation was calculated for 1984, 1985 and 1986 - since this net return is the basis of valuation for natural resources in the wealth accounts (as argued in the preceding sections), the net return in the resource sectors is by definition the measure of depletion. It is shown in Table 1.

Table 1  
Estimates of Mineral and Petroleum  
Depletion (\$ billion, nominal)

	1984	1985	1986
Surplus (extractive sectors)	23.3	22.8	13.2
Mines and Quarries	3.3	2.7	2.6
Oil and Gas Wells	20.0	20.1	10.6
CCA (extractive sectors)	5.4	5.9	6.3
Depletion (estimate)	17.9	16.9	6.9
GDP	444.7	478.0	504.6
Depletion/GDP	4.0%	3.5%	1.4%

Note: CCA is depreciation calculated by the straight line method.





In this table surplus is calculated as Input/Output other operating surplus, adjusted by the proportion of sectoral output which resource products constitute, less rental income (rental of vehicles, machinery and equipment, and other rent), plus government royalties on natural resources. Depletion is estimated as this surplus less CCA for the extractive sectors. The estimate will therefore be high to the extent that there is interest and other non-resource income included in surplus.

Table 1 goes on to present Gross Domestic Product and the ratio of estimated depletion to GDP. These turn out to be interesting years to do the estimates, since 1986 was the year of the big drop in world oil prices. Largely owing to this price change, depletion of exhaustible resources drops from 18 billion dollars in 1984 to 7 billion dollars in 1986 - this represented a drop from 4.0% of GDP to 1.4%.

These figures are only estimates of the total depletion which occurred in these years for two reasons: some income, notably interest income, is included when it should not be; and no attempt is made to evaluate the depletion effects owing to over-exploitation of living resources, degradation of farm land or environmental deterioration resulting in destruction of living resources. Nonetheless the figures are sizable, lying in the range of one and a half to four percent of GDP.

### **A Natural Resource Information System**

Having concluded the discussion of conceptual issues in resources and national accounting (for the moment at least), it is possible to sketch out the system required to turn theory into practice.

The information base required to support the introduction of natural resources into the national balance sheets is inherently complex. Natural resources are extremely heterogeneous, embracing both living and non-living components. Elements of the earth sciences, biology and engineering are required for their comprehension. Our knowledge of the state of nature is necessarily probabilistic and incomplete.

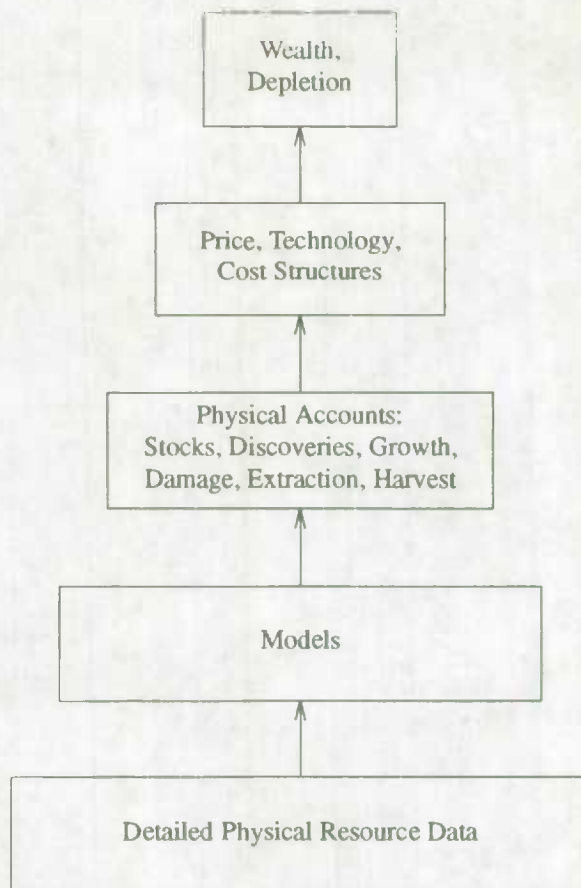
Figure 1 is the schematic of a natural resource information system designed to measure wealth and depletion in the System of National Accounts. Its foundation is a data base of natural resource endowments - this and the further elements of the hierarchy are described below.

*Detailed Physical Resource Data Base.* A considerable body of data exists on the resource base, generally in physical units. For the sake of completeness and integration with broader environment/economy information this data base should be comprehensive, covering non-market resources as well, e.g. water, measures of ultimate resources, soils and land capability. For exhaustible resources data measured should include location of deposits, type of deposit, tonnage-grade distribution, and extent (e.g. 50% and 95% resource estimates as well as reserves). Living resource data should include location, species, age-size distribution, and extent (estimated total and commercial stocks).

*Models.* For living resources some means of estimating growth, population dynamics, senescence and damage from environmental deterioration is required. The models involved may run the gamut from crude rules of thumb to sophisticated biodynamic systems. Models for estimating the probability distribution of resource extent (based on drill core samples) exist for some geologic resources.

*Physical Accounts.* On the basis of the detailed data and models or other methods of estimation, accounts of exhaustible resource reserves and commercial living resources can be constructed. Ideally, to feed into the next step, these should be stratified by extraction/harvesting technology. Exhaustible resource accounts would include opening and closing stocks, discoveries and extraction for the accounting period; living resource accounts would substitute growth, senescence and damage (split between human-induced environmental deterioration and natural events) for discoveries, and harvest for extraction. Harvest/extraction numbers linked to the Input/Output accounts would offer considerable analytical power.





**Figure 1.** The Natural Resource Information System

*Price, Technology and Cost Structure.* From price and cost structure information for each technology of extraction/harvest the net return per physical unit of resource may be measured. This "net price" when multiplied by reserves and commercial living resources gives *wealth* in the national balance sheet; when multiplied by extraction and the excess (if any) of harvesting over net natural growth for living resources it gives *depletion* for measures of net national income.

Elements of these calculations may already be performed by resource departments. The natural resource information problem is to a considerable extent one of integrating a variety of existing data.

#### REFERENCES

1. Goldsmith, R.W., The National Balance Sheet of the United States, 1953-1980. The University of Chicago Press, 1982.
2. Hotelling, H. The Economics of Exhaustible Resources. *Journal of Political Economy* 39:137-75, 1931.
3. Fisher, A.C. Resource and Environmental Economics. Cambridge University Press, 1981.
4. Hicks, J. Value and Capital (2nd edition). Oxford University Press, 1946.





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27. "La valeur du travail ménager au Canada, 1992", tiré à part de *Comptes nationaux des revenus et dépenses*, quatrième trimestre 1993.
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31. "Le Compte satellite du tourisme", tiré à part de *Comptes nationaux des revenus et dépenses*, deuxième trimestre 1994.
32. "Le système international de comptabilité nationale de 1993: son application au Canada", tiré à part de *Comptes nationaux des revenus et dépenses*, troisième trimestre 1994.
33. "Développements récents dans le domaine financier", tiré à part de *Comptes des flux financiers*, premier trimestre 1992.

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