National Accounts and environmentally Sustainable National Income

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Contents

- Part 1: *Tour d'horizon*
- 10 minutes for informative questions
- Part 2: More on theory
- 30 minutes discussion

Motivation and development

- **Wonderment in 1965**: Children could no longer play in the streets. This is not deducted from national income. Building a concrete playing area is accounted as an addition to national income
- 1967 Jan Tinbergen and 1969 CBS Department of environmental statistics
- 1974 thesis: *New Scarcity and Economic Growth. More welfare through less production?*
- 1986: Development of the notion of eSNI
- 1991: Article with Tinbergen: *GNP and Market Prices: Wrong Signals for Sustainable Economic Success that Mask Environmental Destruction*
- “Bicycle, bean and condom”

De vraag is niet óf Nederland onder water verdwijnt, maar wannéér

De houdbaarheid van Nederland is eindig, schrijft klimaatwetenschapper *Peter Kuipers Munneke*. De politiek moet zich afvragen voor wie ze dijken ophogen: voor de komende drie of de komende tien generaties?

≡ Menu nrc.nl›

The question is not *whether* the Netherlands will be flooded but *when*

Kim Cohen (UU)
Vrij Nederland 9 feb 2019
About possibly the year 2300

At least 2 groups of users of statistics

Everyone seems to wish “sustainability”, but without a good definition. The notion of sustainability is ambiguous. Therefor environmental sustainability.

Statistics has at least 2 kinds of clients on this topic:

- Group 1: Limits to growth.
- Group 2: Optimism on technology.

Economic statistics has a gap in information.
Statistics is not about future technology.

Information from economic science

- Our planet is threatened by a wrong belief in a wrongly formulated growth.
- The term *'economic growth'* can only mean a growth in welfare, but is often and incorrectly identified as production growth that may actually damage the environment.
- The **figure** of **standard national income (NI)** or GDP is useful for many purposes but **inadequate** for **environmental policy**.
- A figure of eSNI or eGDP is required alongside NI.

Environment from an economic perspective

- What is economic behaviour?
- All economic behaviour is directed at the satisfaction of wants. Said in another way: it is directed at (individual) welfare.
- Welfare is influenced by more factors than only production (income).
- Welfare exists in personal experience and is not measured in cardinal units.
- There are more *measurable* factors that influence welfare (work, leisure, distribution of income, ….).

Terminology (Babylon)

	State variable	*Flow variable*
System of National Accounts (SNA)	Capital	Goods and services, national income
Hueting 1969 and 1986, deliberately alongside SNA	Natural resources, (vital) environmental functions	Use of environmental functions, environmentally Sustainable National Income
Environment, "capital approach" still not in the SNA	(Critical) natural capital	Ecosystem services

Environmental sustainability

- **Use of the environment**: use of natural resources, emission of waste materials
- **Environmentally sustainable use**: maintaining the functions (*possibilities* for use) for future generations
- **eSNI** = maximally feasible production under the condition of environmental sustainability
- eSNI is an indicator for environmental sustainability and *one* of the factors that influence welfare (thus it is not an indicator for welfare)

Standards for environmental sustainability

- **Standard:** restriction to environmental use (resources, emissions) when such use causes an environmental problem, e.g. climate change, erosion, over-fertilisation
- Derived from the **literature** about **maintaining environmental functions**: biodiversity, human health, spatial availability of all functions

Definitions NI and eSNI

- Standard national income NI = sum of all added value = **production**

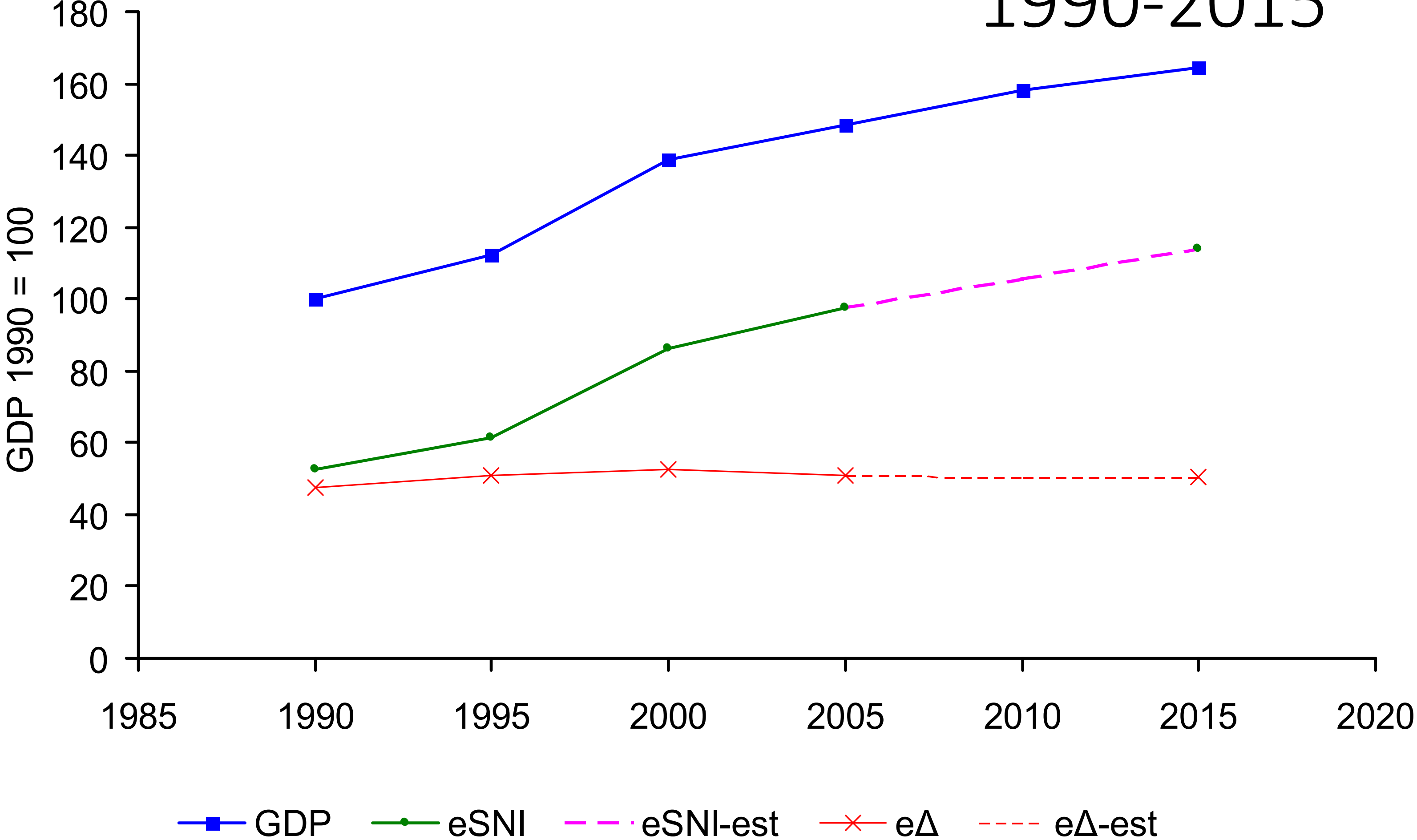
- Environmentally sustainable national income eSNI = **maximal production**, with the **technology of the year of observation**, such that the **environmental functions** - i.e. *possible uses of the not-human-made physical surroundings* – remain available for **future generations**

What matters is the distance

$e\Delta = NI - mDNI$

Ignore or reduce eΔ

NI, eSNI, eΔ= NI- eSNI, Netherlands 1990-2015



A proof of concept

	1990	*1995*	*2000*	*2005*	*2010*	*2015*	*per year*
GDP	100	112.2	138.8	148.3	157.9	164.4	2.00%
eGDP = eSNI	52.6	61.3	86.2	97.4		114	3.10%
Distance	47.4	50.9	52.6	50.9		50.4	0.20%
%	53%	55%	62%	66%		69%	1.10%
eFootprint	1.9	1.8	1.6	1.5		1.4	

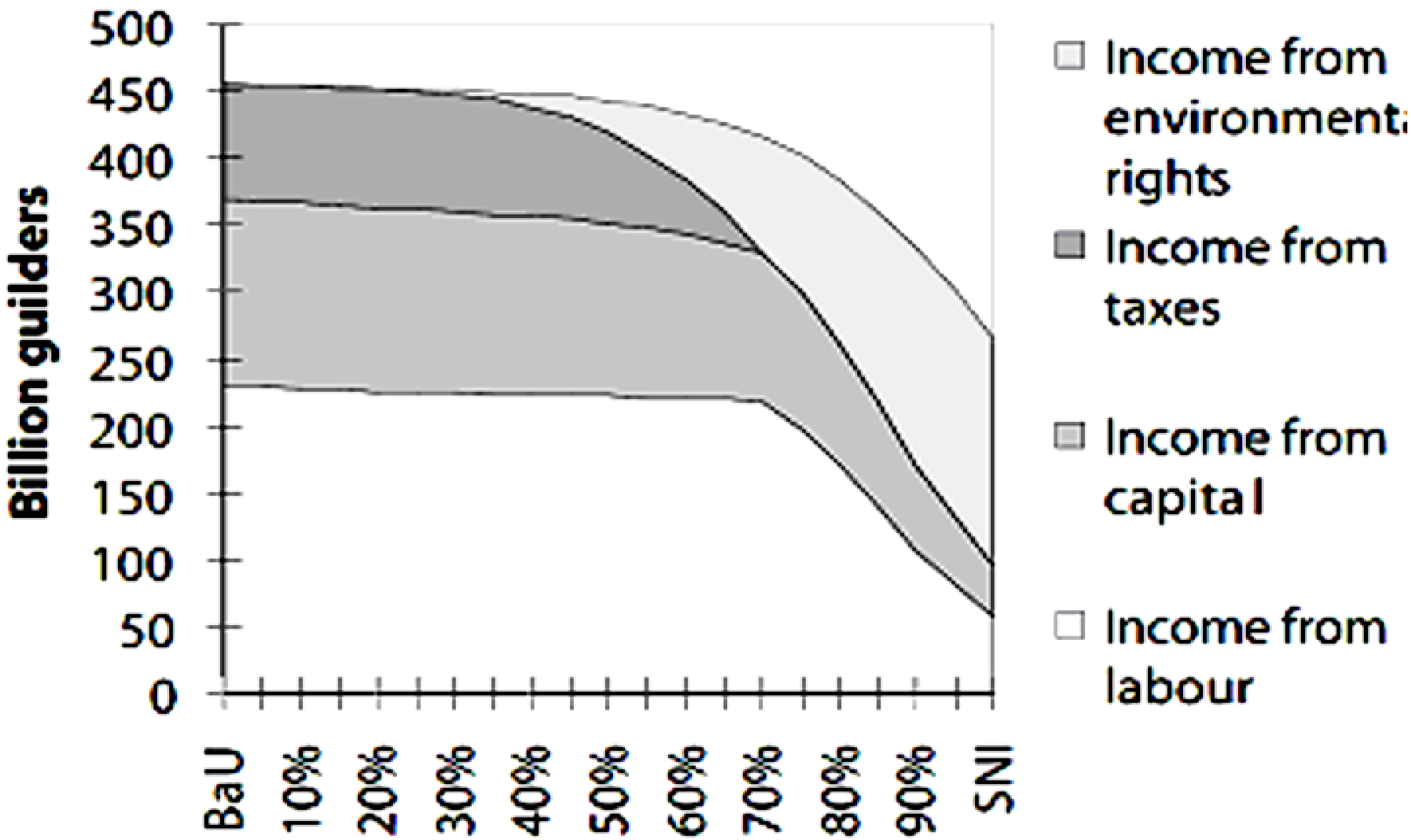
Hueting & De Boer (2019). eΔ ≈ NNI – eSNNI. eFootprint = 100 / %

GDP = Gross Domestic Product. NNI = Net National Income. Red: *rough estimate*

Why environmental sustainability is very cheap, "though it costs half NI"

- NI = eSNI + eΔ gives the *loss of functions eΔ (costs), that is to be avoided when one desires environmental sustainability*
- Adapting human behaviour and the size of the population to the collectively available possibilities of the physical surroundings is easily affordable, but requires sacrifices indeed.
- Bicycle, bean, condom.
- If we want it then we can start today.

Other results by the model 1: Ranking of the measures



Other results by the model 2: Shadowprices per sector

Economic-statistically calculated shadowprices for environmental sustainability could be used for **Cost-Benefit Analyses** by cities and provinces and for **investments by pension funds**.

This can contribute to the **coordination** for **data** and **policy**. Much of this work currently uses **marketprices** that are **not environmentally sustainable**. Thus there is a clear risk that such investments are **environmentally unsustainable**.

eΔ would be a target variable for the environmental agency PBL.

Information for *"Limits"* and *"Optimism on technology"*

- To impose restrictions for the environment **doesn't** mean a 'return to the Middle Ages'
- It **does** mean: A discussion on how to maintain welfare within the boundaries given by environmental sustainability
- eSNI fills the information gap, namely by providing information about environmental scarcity
- The public and policy makers can subsequently use that information
- PM. Statistics about the past can do little with expectations about technology

Are there informative questions?

(10 minutes, and then Part 2)

Repeat

- Our planet is threatened by a wrong belief in a wrongly formulated growth.
- The term 'economic growth' can only mean a growth in welfare, but is often and incorrectly identified as production growth that may actually damage the environment.
- The figure of standard national income (NI) or GDP is useful for many purposes but inadequate for environmental policy.
- A figure for eSNI or eGDP is required alongside NI.

Old and new scarcity

- ***Environmental functions*** are possible uses of the not-human-made physical surroundings
- ***Competing functions*** are scarce, and thus economic, goods
- Economic activity concerns scarcity and comprises both production and the use of the environment

The environment belongs to the subject matter of economics, thus also to economic statistics

Old and new scarcity 2

- Most ***scarcity*** is caused by the use of environmental functions for production or standaard national income (NI).
- Alternative to this: production that maintains environmental functions for future generations.
- NI is based upon marketprices.
- Shadowprices of the functions are unknown up to now.
- *This is theoretically unsolvable*.

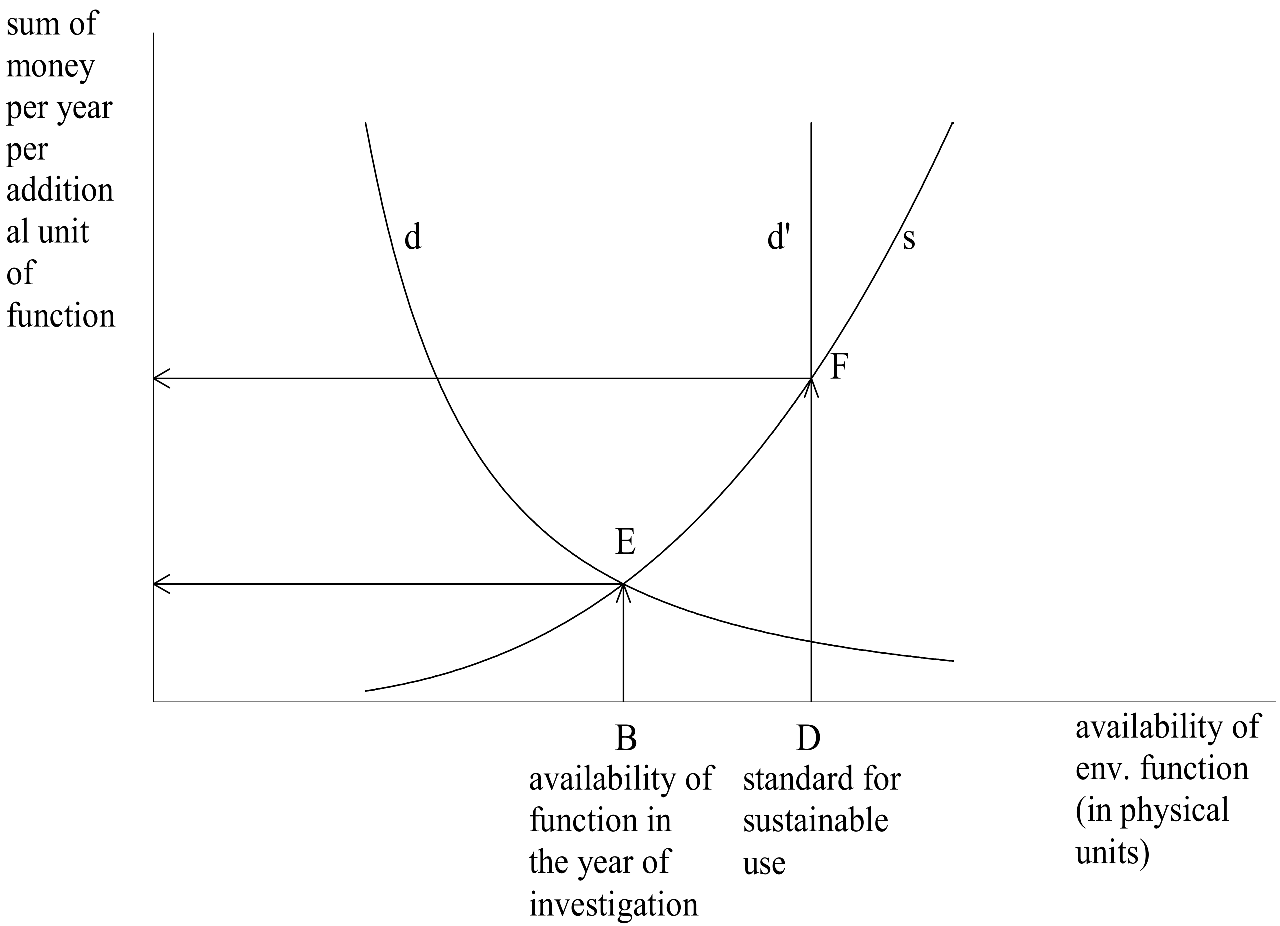
Welfare, income and environment

- Without *assumptions about behaviour* any figure of national income is meaningless (according tot *welfare economics*).
- This holds for both NI and eSNI.
- *Risk* and the *precautionary principle* are important grounds for the approach via conditionality.

Practical approach for an unsolvable problem: *conditionality* in measurement

eSNI is based upon standards for environ-mental sustainability (literature study) and upon a conditional assumption of preferences for environmental sustainability

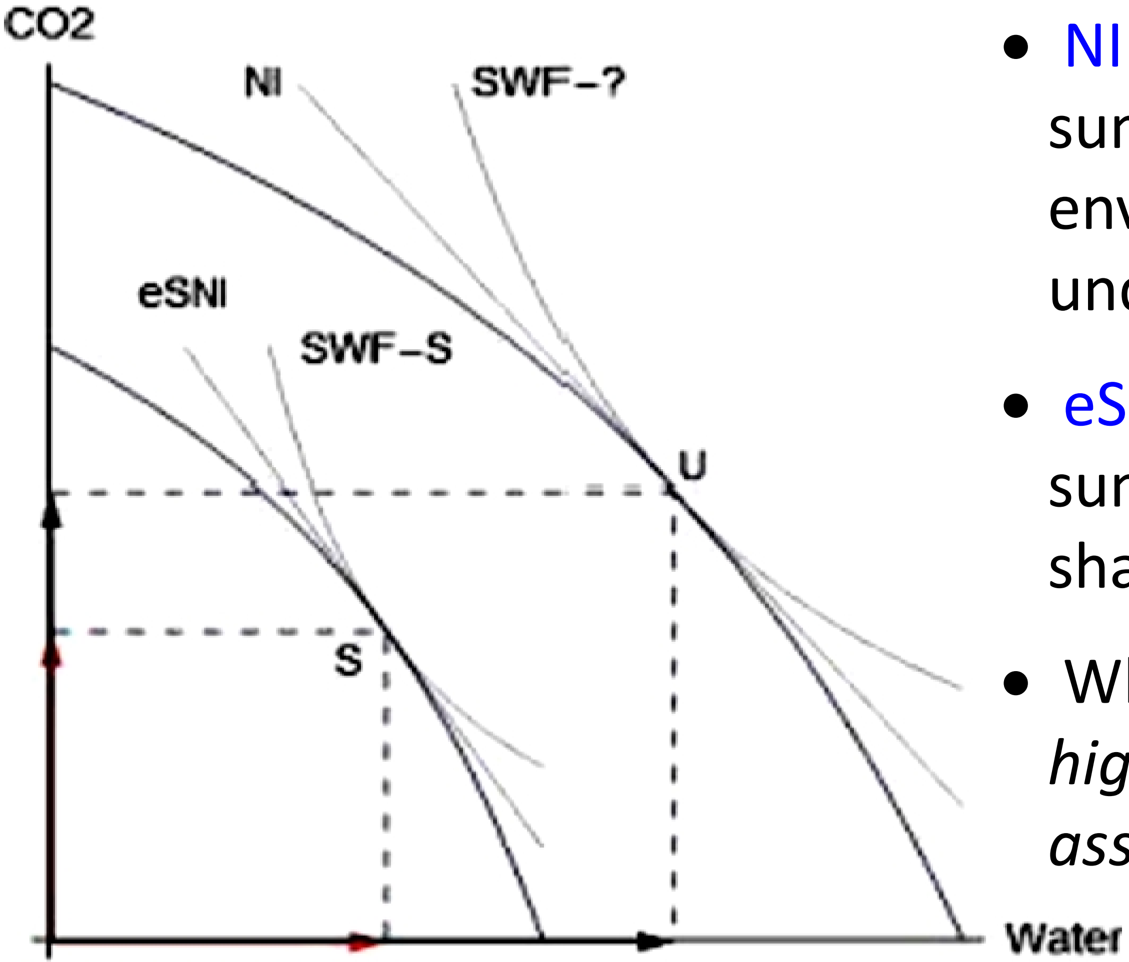
Relation ecology and economics



Conditionality of NI and eSNI

- The crucial awareness concerns the conditionality via assumptions.
- NI is correct under the condition that the preferences result into current market prices.
- eSNI is correct under the condition of preferences for maintaining environmental functions for future generations.

Social Welfare Function (SWF)
Production Possibility Frontier (PPF)



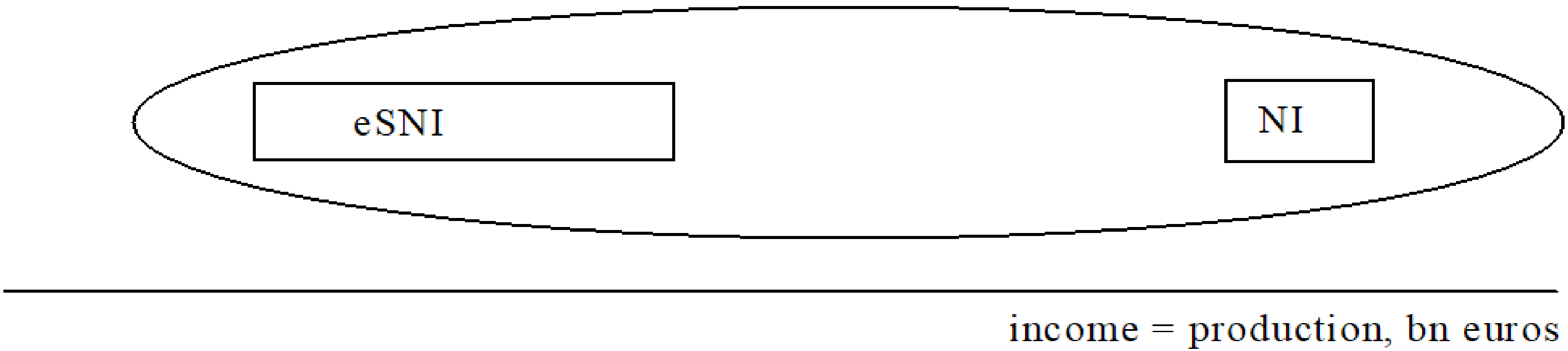
- NI in point U is a weighted sum of the use of environmental functions under market prices
- eSNI in point S is a weighted sum of the standards under shadow prices
- Whether SWF-? or SWF-S is *highest* is determined by *assumptions*

eΔ = NI – eSNI

A model: thus additional (but limited) uncertainty

- The model estimates reactions by economic agents to changes in the price ratios: this causes changes in the patterns of production and consumption.
- The shadow prices and the new level of production give **eSNI**.
- Without satisfying the conditions for environmental sustainability, including the changing prices ratios, environmental sustainability cannot be reached.

Validity versus uncertainty



- NI and eSNI use the **same raw data** but account differently
- boxes = *horizontal* ranges of error or **uncertainty in measurement**
- boxes around NI and eSNI: **technical issues w.r.t. the definitions**
- oval, eΔ:

  (i) NI is invalidly called income if preferences are for environmental sustainability,

  (ii) eSNI is only part of income if preferences are not for environmental sustainability.

CBS myth of "indisputable statistics"

Within CBS Statistics Netherlands there is a myth that CBS-statistics must be **"indisputable"**. However:

- When there is uncertainty: then do **research** to determine **how much**.
- The quality of statistics resides in the **scientific base and approach**.
- NI is disputable, namely for the application in environmental policy.

Why eSNI is unique

eSNI is the only indicator that <u>simultaneously</u>

1. is directly comparable with NI
2. shows the relation of the physical surroundings (ecology) and subjective preferences (economcs)
3. measures the distance e∆ = NI - mDNI between the current and the environmentally sustainable situation
4. shows whether we are getting closer to environmental sustainability or further away from it
5. gives outcomes per sector.

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Vaststelling van de begrotingsstaat van het Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer (XI) voor het jaar 2004

2004

nr. 125
BRIEF VAN DE MINISTER VAN ECONOMISCHE ZAKEN

Aan de Voorzitter van de Tweede Kamer der Staten-Generaal

Den Haag, 1 juli 2004

Conform eerdere toezeggingen van Staatssecretaris Van Geel en mij doe ik u het RIVM-rapport *Sustainable National Income: A Trend Analysis for the Netherlands for 1990–2000* toekomen[1]. Het rapport bevat berekeningen van het Duurzaam Nationaal Inkomen (DNI) volgens Hueting voor het jaar 2000 en een trend-

https://zoek.officielebekendmakingen.nl/kst-29200-XI-125.html

In anticipation of this, the Ministries of Economic Affairs and VROM have not budgeted any resources for future eSNI calculations. To safeguard the future of eSNI, Mr Van Geel has agreed with RIVM that RIVM will assume responsibility for eSNI calculations in the future and that it will do calculations periodically (once every five years as it currently does). This agreement will still be formally arranged. As with previous calculations, CBS Statistics Netherlands will provide the required data and the Institute for Environmental Issues (IVM, University of Amsterdam) will be involved to perform the model calculations. The Ministry of VROM will make sufficient financial resources available to RIVM to be able to pay CBS Statistics Netherlands and IVM. **RIVM will publish eSNI in regular RIVM publications such as the Environmental Balance Sheet or the Sustainability Monitor.** In accordance with the wishes of the House of Parliament, this can be done in conjunction with research into and publication of other sustainability indicators. [Our translation]

Als laatste, ik heb met Staatsecretaris Van Geel afgesproken dat hij het DNI-dossier overneemt en dat eventuele vragen over het DNI in het vervolg aan hem gericht kunnen worden.

Mede namens de Staatssecretaris van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer,

De Minister van Economische Zaken,

L. J. Brinkhorst

RIVM / MNP / PBL stopped calculation after 2008.

On this, there were neither scientific clarification nor possibility for discussion.

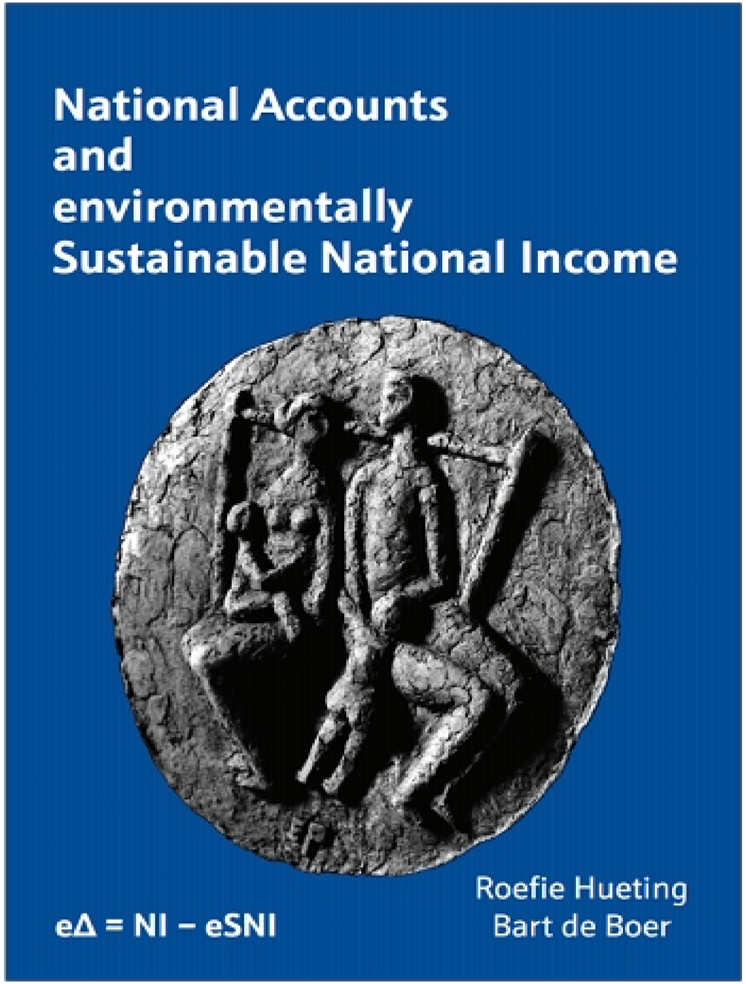
What does it cost to calculate eSNI? 5 personyears

- The base material has already been collected for other purposes. (The restart would require a larger investment before researchers develop routine.)
- Cost items are: data on environmental use, cost-effectiveness (elimination) curves, derivation of standards, construction of the model and its management, some estimation
- Spatial use has not yet been included in the environmental standards in the current calculations

Monitor Broad Welfare

- Broad welfare is a pleonasm.
- The current monitor has separate indicators on sub-topics for the environment and the Sustainable Development Goals (SDGs), while eSNI gives an integration of economics = (production *and* environment), and also gives a clear counterweight to a wrongly formulated “economic growth”.
- eSNI is not in the MBW 2019 because there are no recent figures. It is important to make this information available, also annually.
- When CBS Statistics Netherlands would not be convinced of this yet, then it would be useful to have a deeper discussion in a seminar with researchers who have studied our new book, who then can understand the analysis much better.

Book 2019



Thank you for your attention!