Beyond GDP

Measuring progress, true wealth, and the well-being of nations

International Conference, 19 & 20 November 2007, Brussels

Measurement Beyond GDP

Background paper for the conference *Beyond GDP: Measuring progress, true wealth, and the well-being of nations*

Bart Wesselink*
Jan Bakkes**
Aaron Best***
Friedrich Hinterberger****
Patrick ten Brink*****

*	Current affiliation: Ecofys, Utrecht. Primary author.
**	MNP Milieu en natuurplanbureau, Bilthoven. Contact: jan.bakkes@mnp.nl +31.30.274 3112
***	Ecologic, Berlin.
****	SERI Sustainable Europe Research Institute, Vienna.
*****	Institute for European Environmental Policy, Brussels.

November 2007

Available at www.beyond-gdp.eu

Abstract

Policy makers and the general public would benefit significantly from improvements in our ability to assess the well-being of people and the health of nature. Being able to discern and measure progress more comprehensively than with GDP per capita is a key prerequisite for improved decision making. Since the early 1990s, a broad range of indicators have been developed to assess our progress, many of them developed in the context of helping to achieve the objective of sustainable development. More recently, attention has been paid to improving our ability to measure well-being and happiness. These new indicators and measurement approaches both challenge and complement the traditional economic indicators that continue to play a dominant role in guiding decisions.

This brief paper provides a historical and theoretical background for the November 2007 conference *Beyond GDP: Measuring progress, true wealth and the well-being of nations.* The paper suggests several lines along which the role of different indicators used by policy makers, the media and their constituencies can be strengthened. These possible ways forward include:

- **Indicator sets** – the development of indicator sets with a small number of high-level indicators with a strong signalling function;
- **Application** of existing aggregated single-number indicators in a forward-looking manner using present-day and future modelling capacities;
- **Satellite accounts** – improvement and implementation of the Integrated Environmental and Economic Accounting (SEEA) system, including environmental asset accounts. For example, increasing application in official statistics of Genuine Savings at the national level; and
- **Risk assessment** – including economic risks of ecological decline in economic outlooks – even if they cannot be quantified and monetised with certainty.
- **Quantitative and qualitative surveys** of emerging concepts like quality of life, life-satisfaction, well-being, happiness.

In this paper, we also introduce the policy cycle as a framework to show how different indicator approaches can serve, or be tailored for, specific phases of the policy cycle. The paper primarily uses environmental indicators as illustrative examples of the various indicator types, but the same arguments extend to social and economic indicators as well. Using the policy-cycle framework reveals the key strengths of each indicator approach and points to a way forward where multiple measurement approaches, complementary to GDP, can be relied upon for improving measurement and decision making.

Table of Contents

Introduction

GDP

GDP—gross domestic product—combines in a single figure the total market value of all final goods and services produced within a country's economic territory during a given period. It is the most frequently used indicator of market activity and the change in GDP over time is the principal indicator of economic growth. GDP lies at the top of the entire System of National Accounts, and its methodology is rigorously defined and standardised, enabling international comparison and aggregation. (For a good recent overview see Lequiller and Blades, 2006.)

Given the implicit link between market growth and elements of well-being (e.g. levels of employment and consumption), GDP has often been regarded as a proxy indicator of human development and well-being. However, the relationship between economic growth and social welfare is not straightforward. Since soon after its inception, the interpretation and use of GDP as a proxy of social welfare has received much criticism, including from some of the most well-known thinkers in economics. (e.g. Nobel laureates Kenneth Arrow, Simon Kuznets, Daniel Kahneman, Robert Solow, Joseph Stiglitz, Amartya Sen and Muhammad Yunus). GDP is limited in that it does not include a number of factors that determine peoples' and nature's well-being, such as the value of non-market goods and services (e.g. ecosystem services, unpaid labour, and leisure) or distributional issues. Finally, GDP focuses on current economic activities or flows, rather than on the developments in natural, economic and social capital assets, which are important from a long-term perspective. (van den Bergh, 2007).

Blind spots in the system of national accounts and the GDP metric are one thing. But in fact, the use of GDP to indicate more that it has been designed to indicate reflects a market growth focus that is no longer representative of the EU's ambitions and time horizon. (See for example 'Europe in 12 lessons. Lesson 1: Why the European Union?' http://www.europa.eu/abc/12lessons/lesson_1/index_en.htm). Nevertheless, expectations and information about the growth of GDP per capita have a large influence on decisions made by private and public agents.

An important means of overcoming some limitations of GDP is through the adoption of a more inclusive well-being framework. The academic literature on such frameworks is extensive, including such approaches as *sustainable development* (e.g. United Nations, 1987), *genuine wealth* (Arrow et al., 2004), *capabilities* (e.g. Sen, 1993) and *happiness* (e.g. Layard, 2005). What all these approaches have in common is that they extend beyond conventional economic and financial considerations to incorporate additional values and goals.

Figure 1. Three philosophical views on wellbeing

Resources as inputs or **means** for an individual's choices for well-being Associated indicator: GDP	**Capabilities**: the freedom to achieve valuable doings and meanings Associated indicator: Human Development Index	**Happiness** as ultimate outcome (**end**) of quality of life Associated indicator: Happiness

adapted from Robeyns (2004)
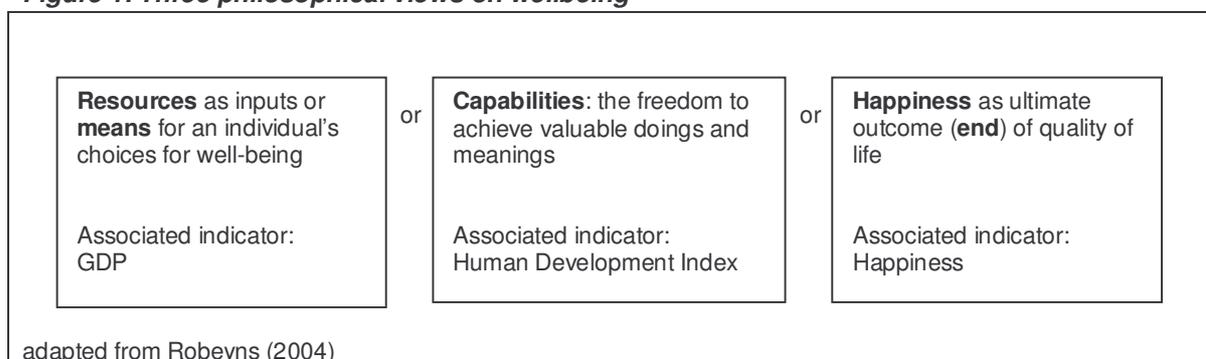
Indicators beyond GDP

Several measures have been developed that can act as complements to GDP and related economic indicators. For example, for a recent review see Matthews (2006); and from a sustainable development perspective, Hak et al. (2007). These indicators can be grouped in many different ways, for example: by the issue areas they cover or by the way the indicators are constructed.

In this paper we introduce a different approach: the policy cycle as a framework to explain how different indicator approaches (e.g. aggregated single number indicators, indicator sets, and satellite accounts) are used in different phases of the policy making process. The policy cycle is a simplified model of the policy development process that might be useful for conceptualising the various steps and possible points where information can influence the process. Though we focus in this paper on the environmental domain, the framework is also applicable to other policy fields. After explaining the different roles of different indicator approaches, we will search for avenues to improve the position of indicator approaches in policy making 'beyond GDP'. We start, however, by presenting a short summary of different indicator approaches, focusing largely on the environmental domain. The indicators or indicator sets are not described individually, given the extensive information available via publications and online (see the References and Websites section at the end of this paper).

A *broadened concept of 'capital'*
"Capital " is used to describe a stock (physical, monetary or intangible) from which anyone can extract a revenue or yield. Different kinds of stocks can be distinguished: natural, human, social, financial (see, for instance, Porritt, 2005 or Gehmacher et al. 2006). Natural capital is required to maintain a functioning biosphere and supply resources to the economy and dispose of its wastes and numerous studies show how this capital is being degraded (e.g. Millennium Ecosystem Assessment, 2005). Human capital provides knowledge and skills to create manufactured capital and operate it but we see an increasing substitution of human capital by natural capital. Social capital refers to relations and creates the institutions that provide the stable context and conditions within and through which economic activity can take place but social capital is observed to be in decline (e.g. Putnam, 2000). It can be investigated in the process of learning (as in the OECD Program 'Social Outcomes of Learning') but also as a factor of economic development.

So we can differ between five forms of capital: natural capital, manufactured capital, financial capital, human capital and social capital which are linked with each other in a manifold way. The World Bank simplified this by grouping its wealth calculations into produced capital, natural capital and intangible capital. The latter comprises assets such as human capital, the quality of institutions, and governance (World Bank, 2005). The stocks and flows of these different kinds of capital are interconnected and interdependent and recent research highlights the importance of understanding these interactions in order to understand the connections between major global trends and changes in the quality of life (e.g. Steffen et al. 2004).

Different indicator approaches described

Indicators can be grouped in many different ways. We have chosen to simply distinguish two main groups: aggregated single number indicators and indicator sets. We will describe these approaches in brief.

Aggregated single number indicators

Adjusted economic indicators
These include elements normally outside the economic accounting frameworks; this is often called 'green accounting' and includes fairly diverse approaches like the genuine progress indicator, the Index of Sustainable Economic Welfare, Adjusted Net Savings and Sustainable National Income.

Composite indices
Composite indices are derived from weighting underlying indicators and combining them into a single dimensionless number. Examples are the Human Development Index and Environmental Performance Index, but also business approaches in ranking social and environmental performances of companies. *Figure 1* illustrates the popularity of composite indices that rank or assess countries according to some measure. Not only the quantity of indices, but also the variety of issuing institutions, have grown sharply (UNDP/ODS, 2006).

Aggregated non-monetary indicators
Physical indicators like Net Appropriation of Primary Productivity or Mean Species Abundance have gained in popularity. More so than the previously mentioned indices, these indicators relate to concrete and appealing physical measures. The Ecological Footprint also comes in this category, providing an appealing if crude connection between consumption and resource use.

These approaches are appealing as communication and awareness-raising tools, but are not frequently used in policy processes. Reasons for this are: they include choices for weighting monetisation that are inevitably open to debate; they do only indirectly relate to concrete policy tools; and they are not always sensitive enough to monitor progress or to show trade-offs. For example, regarding the footprint, trade-offs between moderating consumption versus improving production technology and improving possibilities for low-income countries to import to the EU. The construction of indices has typically been taken forward by the research community and promoted (or developed) by NGO-based think tanks. These frontrunners can explore new, sometimes uncertain, methods not yet acceptable for public-sector application.

On the other hand, social aspects are more often measured in non- monetary terms such as the number of employed/unemployed people or employment hours per person and year. These are widely used in policy and can be further differentiated according to age, gender, qualification etc. Opportunity lies in properly including the large informal sector of household production and other unpaid activities in the calculation of both employment and GDP (see, for example, Schaffer and Stahmer 2005). Another example is the work ability index (see http://www.ttl.fi).

Direct measurement of well-being, happiness and quality of life
The concepts of well-being and quality of life, to which the European Strategy for Sustainable Development refers, enable an integrated view of material and immaterial values as well as objective and subjective components of prosperity. They include very different fields, such as work, health, education, housing conditions and social relations. Two main approaches for operationalizing and empirically measuring quality of life/well-being/happiness have been developed: the Scandinavian 'level of living-approach' and the American 'quality of life' research.

Figure 1. Number of composite indices measuring country performance
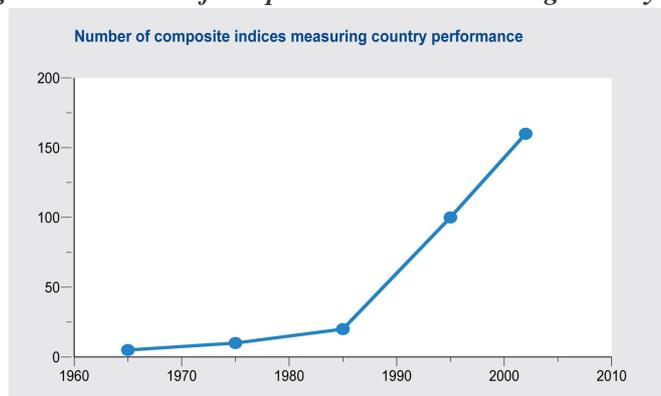
UNDP Office of Development Studies, 2006
The indices cover a diverse set of issues including competitiveness, governance,
social aspects, human rights, environment and security.

Indicator sets

Since the early 1990s, governments and institutions like the European Commission, UN and OECD have developed tools to promote and monitor policies on, for example, innovation, environment, social issues and sustainable development. Important lines of development have been:

- *Sustainable Development policies:* an approach that tended to deliver results in large sets of indicators, which over time have developed into smaller core sets of ten to fifteen 'headline indicators' for actual use in policy processes (Pinter et al., 2005). International organisations such as OECD, along with the Commission's Joint Research Centres, are actively researching and discussing the use of reduced sets of core indicators as well as composite indicators (http://farmweb.jrc.cec.eu.int/ci/ and OECD, 2005). Similarly, the UN secretariat has been continuously reviewing its original broad set of indicators for the Commission on Sustainable Development and recently reduced its set to 50 core indicators, part of a larger set of 96, organized along fourteen policy-oriented themes such as poverty, land and education (http://www.un.org/esa/sustdev/natlinfo/indicators/). Eurostat manages a set of sustainable development indicators, related to policy objectives and conveniently arranged to allow for headline indicators as well as variables showing the underlying dynamics.

- *concrete thematic policy targets* -- for example as reflected in the UN's Millennium Development Goals indicators and the European Union's structural indicators, which are used to monitor progress on the Lisbon Agenda.

- *the need to evaluate trade-offs between thematic policies.* This approach is typical for the EU's Impact Assessment procedure, where a large list of categories or topics and their associated indicators provides a provisional 'pick list' for assessing the impacts of concrete thematic policy proposals. (European Commission, 2005/2006)

In general, the rapid development of information and communication technologies along with the increasing emphasis on national and international initiatives on sustainable development has boosted the development of sets of indicators in the past 10 years (Pinter et al., 2005).

Ongoing debates at the science-policy interface

There is extensive literature and ongoing work to bring forward both the pros and cons, and the limits, of the previously mentioned approaches. The debates include issues like:

- valuation techniques (Lawn, 2005);
- practicality of theoretically attractive concepts in guiding policy making (Alfsen et al., 2006),
- measuring the amount of nature we have left untouched; and
- an "insurance factor" for the knowledge we do not yet have about the forms of natural capital we do not know enough to value (Donella Meadows, 1998);
- taking into account, at the same time, economic, social and environmental variables (Distaso, 2007);
- the limited explanatory power of indices applied in policy practice (Böhringer and Jochem, 2007).

Such debates need to be linked to the needs of users such as Commissioners, parliamentarians and journalists. With this in mind, we examine a policy-oriented approached through introducing the *policy cycle framework*, in the following section,. This framework shows that some indicator approaches are better suited than other to specific phases of the policy cycle.

The policy cycle as a framework

How are the different progress indicators discussed in the previous chapter related to policy making? A well-known model for framing subsequent steps in policy making is the policy cycle (Brewer and Deleon, 1983*).* Figure 2 shows the sequence of steps in the policy cycle and the associated indicator approaches as listed below (read clockwise, starting at number 1).

- *Problem recognition* -- The phase of problem recognition is well served by summary indicators, which act as strong signals or flags that raise awareness and "stick" in the minds of policy makers, politicians and the general public. Examples of such indices are WWF's Living Planet Index, which shows the rapid degradation in the planet's natural ecosystems and the World Bank's Genuine Savings indicator, which shows how depletion of natural capital or insufficient investment in education erodes macro-economic savings. The recent calculations of the World Bank and the Chinese government on the cost of pollution in China, at about 5.8 per cent of the country's GDP, send a similar message (World Bank, 2007).
- *Investigating problems and identifying solutions* -- Forward-looking applications of indicators are important to investigate future developments in the problem at stake and can serve as a baseline for the next phase of identifying possible solutions. At this phase in the policy cycle, the specificity of the indicators employed typically increases, from macro (such as GDP) to meso (such as sectoral emissions of greenhouse gases) to policy areas (such as biodiversity decline specified per pressure factor).
- *Concrete policy proposals* -- When it comes to the next policy phase of concrete policy proposals and the analysis of their impacts, cost-benefit analysis plays an important role. CBA allows comparison between different categories of costs and benefits of a policy proposal (see *textbox*). The identification of the magnitude of a policy's net benefits or net costs helps determine whether to go forward with implementation. Alternatively, impact assessments typically use a selection of non-monetary indicators (covering social and environmental aspects) tailored to evaluate the impact of specific policy proposals (European Commission, 2005 and 2006).
- *Monitoring and evaluation* -- Finally, indicator sets serve to monitor and *evaluate progress of policies*. In EU policies, such indicator sets are reported in periodic progress reports and reviews of policy instruments. Examples of these are the structural indicators that monitor progress towards the targets of the EU's Lisbon Strategy.

The cost–benefit ratio as an indicator

Cost–benefit analysis (CBA) is an economic technique widely applied to decision-making, which attempts to quantify and compare the economic advantages (benefits) and disadvantages (costs) associated with a particular project or policy for society as a whole. The appeal of CBA is that allows comparison of the different categories of costs and benefits with one another as well as the aggregation of these into a single number, the cost-benefit ratio. Difficulties in applying CBA to environment-relates issues include (i) how to quantify natural resources (like biodiversity or services like clean water), (ii) how to estimate their value in monetary terms, and (iii) whether and how to discount future costs and benefits to their present values. In addition, it can only be applied for specific initiatives, not for a country or a region as such. A recent overview of the state of the art is provided by Pearce, Atkinson and Mourato, 2006.

Figure 2 underscores that different indicator approaches serve different phases of the policy cycle. For example, as mentioned earlier, while the ecological footprint is a powerful tool for awareness raising about the off-site implications of everyday consumption, it is not the tool of choice for monitoring over time. Note that the different indicator approaches are also typically associated with different developers: institutions that work from various backgrounds in which their roles are different. This is also illustrated in Figure 2. For example, national statistical offices typically are the organisations taking care of descriptive accounting (Figure 2, step 7). Much of the construction and application of aggregated single number indicators (Figure 2, step 1 or 2) involves modelling, outlooks into the future or monetisation of non-market goods, which is most often marginal to or beyond their mandate.

Figure 2. Different indicator approaches grouped around a policy cycle
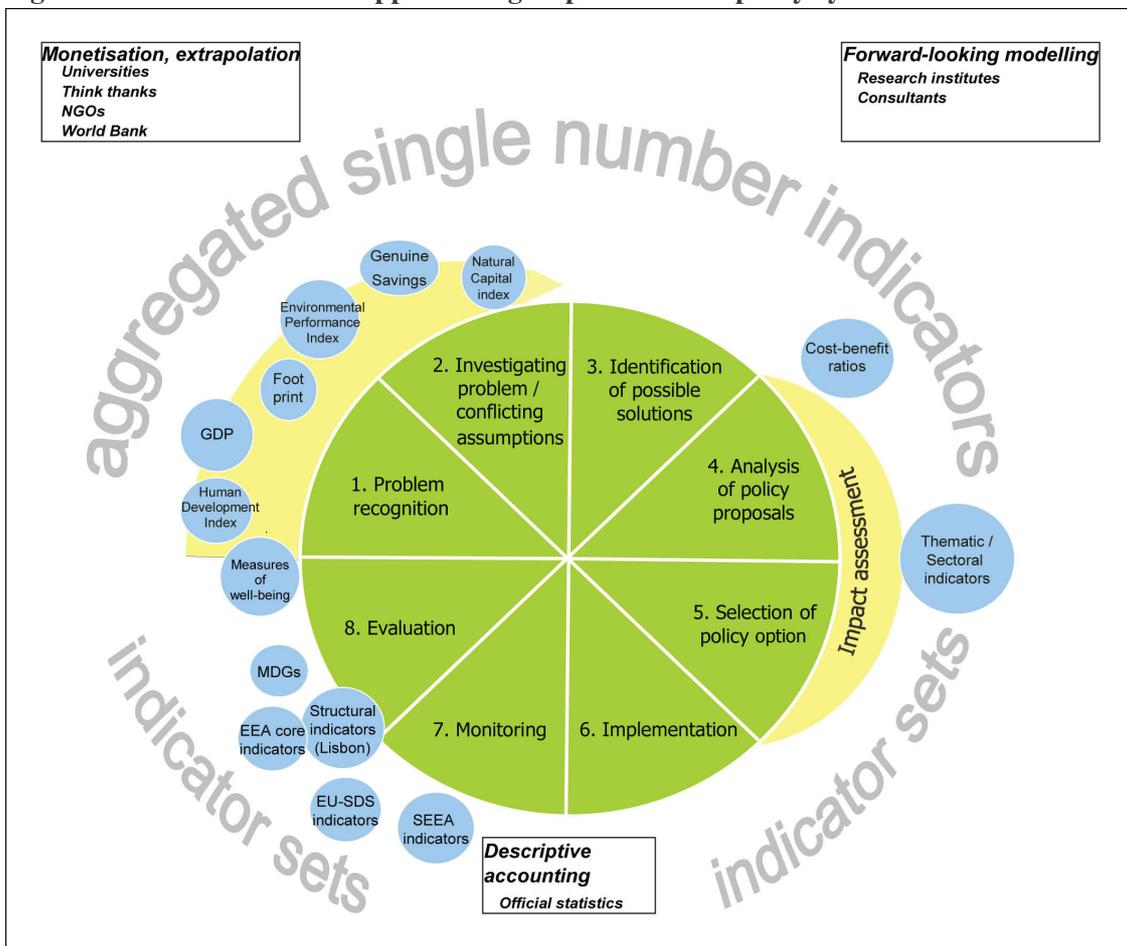
Policy cycle adapted from De Ridder et al.(Ridder W. de, 2006). Original source: Brewer and DeLeon, 1983.

Complementing GDP

The previous sections explained and framed the role of a wide variety of indicators that may complement GDP in the policy cycle. Obviously, for the past sixty years a market-growth focus has shaped many of the information tools (indicators, procedures, time horizons) for day-to-day policy making. This applies to tools at the macro level – symbolized by GDP, the core system of national accounts and general equilibrium models - as well as the project level – symbolized by Cost Benefit Analysis. But meanwhile, started more recently but already for some time now, information tools have been designed and tested to illuminate the other goals of societal progress. Many of the examples in this note have been taken from the environmental domain, given the rich production of indicators and assessments in this field over the past decade and a half.

What are sensible, general directions to strengthen information that better corresponds to the present width of policy goals in Europe?

First and foremost comes application. Present-day procedures, for example in impact assessment and in reporting to legislative bodies, offer significant opportunities to go beyond a narrow, short-term economic focus. Development of strategic vision in key areas can be very well supported with the available tools. Just a recent example is the nexus of energy security, climate and air pollution/population health.

Measuring human well-being

There are many different concepts and measures of well-being, which often overlap with one another. Since the 1970s policymakers have increasingly based their decision making on a broad range of **social indicators** covering beyond economic wealth aspects like health, housing, employment, the environment, family, education, and basic human rights. Indicator systems that consist of many categories of indicators combining objective life conditions and subjective well-being are e.g. the Quality-of-life Index, the Calvert-Henderson Quality of Life Indicators, the Canadian Index of Wellbeing, and the indicator systems of UNICEF, the German Centre for Survey Research and Methodology and the Swiss Statistics.

More recently, much work has been done to directly measure quality of life, life satisfaction, well-being, or happiness (see e.g. Layard 2005, Frey and Stutzer 2005, Grimm 2006). The 'Eurobarometer' as well as the US General Social Survey ask representative samples of the Europen population for their life satisfaction. It has been shown that their results correspond with recent studies from brain research as well as economic research asking people in detailed studies for the time they spend in comfortable and uncomfortable situations. The Asian kingdom of Bhutan was the first to develop a so-called Gross Domestic Happiness indicator.

Many of these results are published in the "World Database of Happiness (see http://www1/eur.nl/Fsw/happiness). Further work is certainly needed to consolidate these concepts and measures (Clark and McGillivray, 2007).

Second—less visibly but not less important—is the avenue of linking the promising tools and concepts concretely to the information machinery that policy makers and their constituencies use. Four examples to do so come to mind (referring to Figure 2, reading clockwise starting at the left).

1. *Search for indicator sets with a small number of high-level indicators with a signalling function, including, for example, the footprint or a biodiversity indicator.*

   Earlier in this paper we noted the general trend to reduce sets of sustainable development indicators in the direction of a smaller number that still somehow reflect progress towards sustainable development or similar broad goals such as well-being. For example, a recent proposal of the UK Sustainable Development Commission (SDC)[1] calls for the introduction of three core indicators to monitor overall well-being, one for economic aspects (GDP), one for environmental (carbon dioxide footprint of the UK) and one for social (not yet defined) (UK, SDC, draft 2007).

2. *Apply key summary indicators – for example, for biodiversity or wealth of nations – in a forward-looking manner using present-day and future modelling capacities.*

   Powerful summary indicators have been developed in recent years. For example, aggregated physical indicators for biodiversity such as the Living Planet Index, or Mean Species Abundance. Or, the extended wealth estimates by the World Bank, effectively recalculating the Wealth of Nations. At the same time, systems modelling has made good progress to the point of practical application in worldwide environment-related assessments by a number of international organisations. Producing forecasts of these summary indicators along with GDP projections and bringing them more center-stage seems a logical step. It can help strengthening the information support for policy, especially for the early phases of the policy cycle.

3. *Include economic risks of ecological decline in economic outlooks, even if they cannot be fully quantified and monetised.*

   Since the mid 1990s, a new generation of quantified world-wide environment assessments has emerged, bringing almost routine, major, reports based on models and broad collaboration. These include UNEP's Global Environment Outlook reports, the assessment reports of the Intergovernmental Panel on Climate Change and the World Water Vision. GDP projections in these assessments function as proxy for economic activity and seem unaffected by the environmental problems. The net result is that protection of key resources is portrayed as decreasing GDP growth rather than protecting it. But on closer inspection, this appears as an artefact caused by the one-way modeling: economically oriented teams in these assessments hand down projections to physically oriented teams, who then create physical projections. But typically, the latter are not evaluated in terms of significance to the economy.

---

[1] The SDC is a high-level commission directly advising the British Prime Minister.

Such a 'closing of the loop' is now increasingly sought, with the Stern report being a recent example of an assessment that in fact improved GDP projections by including economic risks of environmental pressures.

Figure 3. Cost of environmental policy
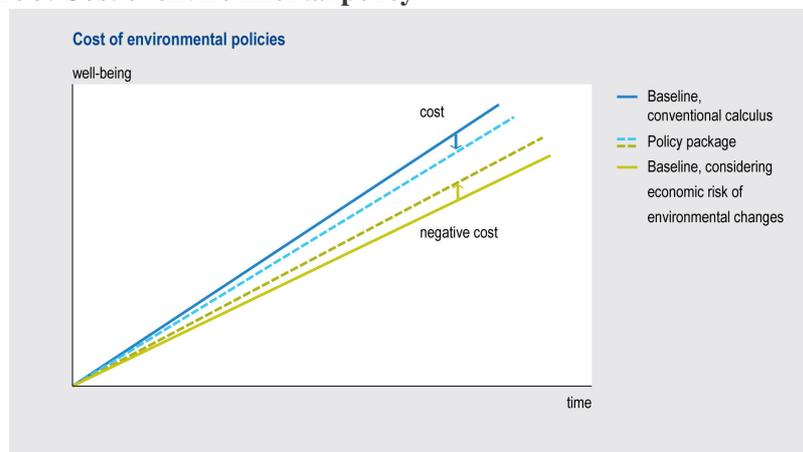
If well-being is projected into the future using GDP not considering the economic risk of environmental losses, because of one-way modelling, environmental policies will seem a burden.

4. *And finally, improve and expand the implementation of environmental asset accounts in the Integrated Environmental and Economic Accounting (SEEA) system, as these data form the basis for many indicator approaches.*

An important development in SEEA is the creation of the United Nations Committee of experts on Environmental Accounting. This committee has been installed to improve the global promotion, implementation and harmonisation of environmental-economic accounts and to pave the road for SEEA to become an international standard rather than a set of international recommendations. Repetto (2007), whose early work drew the attention to environmental accounting, pleas for a SNA review that should guarantee a full integration of natural resources into the national accounts (see text box below). Finally, the SEEA handbook (2003) includes methods to apply the World Bank's Genuine Savings and Wealth of Nations approaches. Genuine Savings seems one type of calculations that has sufficiently developed since the 1990s to now move to routine application, as well as enrichment, at the national level. These approaches monetise the wealth embedded in the economic, natural and social systems. Statistical offices can play a crucial role in applying such methods: one step beyond descriptive accounting and two steps beyond GDP.

The current worldwide use of the System of Economic & Environmental Accounting (SEEA)

It was the work of Repetto and the World Resources Institute in the 1980s that drew attention to environmental accounting. Their work coincided with the popularisation of the concept 'sustainable development'. The challenge then was to operationalise the concept of sustainable development. Revision of the long existing system of national income accounts to include environmental accounting was one of the pathways of operationalisation (Lange, 2007). The SEEA 1993 (System of Economic-Environmental Accounting) represented the first international handbook on environmental accounting. As such, it was a landmark achievement. The SEEA was reviewed in 2003. SEEA 2003 maintains three categories of accounts:

1.   physical and hybrid flow accounts
2.   environmental protection and management flow accounts
3.   asset accounts in physical and monetary terms

Most advanced industrial countries focus their SEEA efforts on pollution damage, pollution control costs and material flows within their economies, and pay less attention to natural resource depletion. Several factors contribute to this, as follows:

1.   Developing countries, in which natural capital forms a relatively large share of the overall capital, are under-represented in SNA reviews (Repetto, 2007).
2.   Some natural resources (like forests, fish and minerals) have market prices, while other resources or their services – e.g. biodiversity, landscapes or clean water – have not. Their prices must therefore be determined more indirectly by methods like willingness-to-pay (e.g. Vesely, 2007) or modelling approaches (e.g. Beukering et al., 2003). In general, many national accountants and environmentalists agree in their rejection of introducing such modelling – pricing environmental impacts into descriptive accounting of the national accounting systems (Bartelmus, 2007)
3.   Resource depletion related to consumption of a nation, e.g. increased land use and loss of nature due to rising levels of food consumption, is often related to imported products. Official statistics is often the best source for basic information, thanks to mechanisms like business registers and standard goods classifications. However, the routine information is rarely complete from a point of view of tracing impacts of production in the country of origin. Thus, special studies are typically required as well as modelling.

(Related information can be found in the conference note by Eurostat 'Accounting for the Environment - The European Development'.)

Conclusions

EU policy ambitions go beyond market transactions. Policy-supporting information should reflect this.

Environmental and social elements of well-being need to be spot-lighted, too, in the preparation and assessment of Commission policies, as well as strategic natural resources over the longer term.

The variety, quality and potency of information tools to support a balanced European policy has markedly improved over the past decade, notably so in the environmental domain. The time has come to apply this information in everyday decision making and accounting for decisions.

The various phases in the preparation of policies and reporting to the public each need different indicators. GDP certainly has a role here, but has to be complemented. A policy cycle as sketched in this paper provides an easy framework to group the various needs and corresponding tools.

The debate on strengthening the available tools, and inventing new tools, continues. Among the various possible routes, this note highlights:
• model-based projections of some of the novel aggregated indicators in the environmental domain, in order to show critical resource issues and options;
• risk-based modification of GDP projections.

Above all, this note underlines that there is no reason why the existing indicators and other tools should not be used widely and concretely in EU policy setting.

Websites

The following websites each provide an overview of indicator initiatives that aim to look wider than market-growth.
- **OECD** indicator initiatives:
  http://www.oecd.org/document/7/0,2340,en_21571361_31938349_36043527_1_1_1_1,00.html
- **United Nations** and similar organizations' indicators (system-wide Earthwatch)
  http://earthwatch.unep.net/indicators/un/index.php#worldbank
- **JRC** Composite Indicators: An information server on composite indicators
  http://farmweb.jrc.ec.europa.eu/ci/
- **IISD:** The Compendium of Sustainable Development Indicator Initiatives
  http://www.iisd.org/measure/compendium/searchinitiatives.aspx
- **OECD**: a knowledge base containing hundreds of documents on measures of progress around the world (sustainability, well-being or quality of life; all terms closely linked to progress).
  http://www.oecd.org/document/50/0,3343,en_21571361_31938349_36043378_1_1_1_1,00.html
- **Project on Human Development**: the website contains data on the country level of numerous indicators and indices, and refers to their original source: http://humandevelopment.bu.edu/index.cfm

The following websites give examples of indicators that expand economic calculus by correcting GDP for the aspects not covered by the calculus (e.g. the genuine progress indicator) or by including valuation of natural, economic and social capital assets (e.g. genuine savings).
- Measure of Domestic progress: http://www.neweconomics.org/gen/well-being_mdp.aspx
- Genuine Progress indicator: http://www.redefiningprogress.org/projects/gpi/
- Index of Sustainable Economic Welfare (ISEW):
  http://www.foe.co.uk/campaigns/sustainable_development/progress/
- Sustainable national income: http://www.insnet.org/dninu/index.rxml (in Dutch, mostly)
- Wealth of nations: http://go.worldbank.org/Y1Z2FV0IC0
- Adjusted net saving (genuine savings) http://go.worldbank.org/Y1Z2FV0IC0

Another approach is to compose a single index by weighting underlying indicators, such as the Human Development Index that is constructed from measures of life expectancy, education and GDP per head.
- Human Development Index: http://hdr.undp.org/hdr2006/statistics/indices/
- Happy Planet index: http://www.happyplanetindex.org/
- Environmental Performance index: http://www.yale.edu/epi/ and http://www.yale.edu/esi/
- Sustainable Society Index, for *the Netherlands* http://www.nederlandduurzaam.nl/
- *Canadian* index of well-being http://www.atkinsonfoundation.ca/ciw/
- Compass Index of Sustainability, for *Japan*: http://www.japanfs.org/en/view/index.html

Examples of ecological indices are:
- Living Planet Index:
  http://www.panda.org/news_facts/publications/living_planet_report/living_planet_index/index.cfm
- Natural Capital index
  http://www.mnp.nl/en/dossiers/Biodiversity/FAQs/index.html?vraag=7&title=What%20is%20the%20Natural%20Capital%20Index%3F
- Ecological footprint http://www.footprintnetwork.org/gfn_sub.php?content=footprint_overview

The following websites contain research and underlying data on happiness and social well-being:
- World database of happiness http://www1.eur.nl/fsw/happiness/
- European Values Survey http://www.europeanvalues.nl/index2.htm
- OECD/JRC 2006 workshop on measuring well-being and societal progress, background papers http://crell.jrc.ec.europa.eu/wb%20background%20papers.htm

Indicator sets containing, for example, environmental, economic and social indicators provide yet another way of complementing the single use of GDP:
- The Calvert-Henderson Quality of Life Indicators: www.calvert-henderson.com
- The EU Indicator set related to the EU Sustainable Development Strategy: http://epp.eurostat.ec.europa.eu
- The EU set of Structural Indicators, designed to monitor progress in relation to the Lisbon strategy: http://epp.eurostat.ec.europa.eu and on CIRCA: http://circa.europa.eu/irc/dsis/structind/info/data/index.htm
- UN Millennium Development Goals http://www.un.org/millenniumgoals/
- Benchmark indicators for national environmental performance in EU member countries http://www.mnp.nl/en/publications/2006/EuropeanBenchmarkIndicators.html

Information on the integrated environmental and economic accounting (SEEA) can be found on:
- http://unstats.un.org/unsd/envaccounting
- http://unstats.un.org/unsd/envaccounting/londongroup/default.asp
- http://epp.eurostat.ec.europa.eu/portal/page?_pageid=2873,63643317,2873_63643793&_dad=portal&_schema=PORTAL

References

Atkisson, A. and Hatcher, R.L., 2001. The compass index of sustainability: prototype for a comprehensive sustainability information system. *Journal of Environmental Assessment Policy and Management* 3(4), 509-532.

Arrow, K. et al., 2004. Are we consuming too much? *Journal of Economic Perspectives* 18(3), 147-172.

Bartelmus, P., 2007. SEEA-2003: Accounting for sustainable development? *Ecological Economics* 61(4), 613-616.

Bergh, van den C.J.M., 2007. Abolishing GDP. Tinbergen Institute discussion paper. TI 2007-019/3.

Beukering, van P.J.G., Cesar, J.S.J. and Janssen M.A., 2003. Economic valuation of the Leuser National Park on Sumatra, Indonesia. *Ecological Economics* 44(1), 43-62.

Böhringer, Christoph and Jochem, Patrick E.P., 2007. Measuring the immeasurable — A survey of sustainability indices. *Ecological Economics* 63(1), 1-8.

Brewer, G.D. and P. DeLeon. 1983. *The foundations of policy analysis*. Chicago, Ill. Dorsey Press.

Clark, David and Mark McGillivray, *Measuring Human Well-being: Key Findings and Policy Lessons*, Policy Brief 3, 2007, United Nations University.

Distaso, A., 2007. Well-being and/or quality of life in EU countries through a multidimensional index of sustainability. *Ecological Economics* 64(1), 163-180.

European Commission, 2005 and 2006. *Impact Assessment Guidelines* 15 June 2005 with March 2006 update and Annexes. SEC(2005)791.

Frey, B., Stutzer, A., 2005, Happiness Research: State and Prospects. *Review of Social Economy* 62(2), 207-228.

Gehmacher, E., Koismayr, S., Neumüller, J., Schuster, M., 2006: *Sozialkapital. Neue Zugänge zu gesellschaftlichen Kräften*. Wien: Mandelbaum-Verlag.

Grimm, J. (2006). *Ergebnisse der Glücksforschung und was Regionen davon lernen können.* SERI Background Paper No.10

Hak, T., Moldan, B. and Dahl, A.L. (eds.), 2007. *Sustainability Indicators: A Scientific Assessment.* Island Press, April 2007.

Inglehart, R. et al, 2000. *World Values Surveys and European Values Surveys*, 1981-1984, 1990-1993 and 1995-1997 (etc.).

Lange, G-M., 2007. Editorial. Environmental accounting: introducing the SEEA-2003. *Ecological Economics*, 61(4), 589-591

Layard, R., 2006. *Happiness. Lessons from a New Science*. London: Penguin.

Lawn, P., 2006. A stock-take of green national accounting initiatives. *Social indicators Research* 70, 427-460

Lequiller, François and Derek Blades, 2006. *Understanding National Accounts*. OECD, Paris.

Matthews, E. 2006. Measuring well-being and societal progress: a brief history and the latest news. Paper prepared for the joint OECD-JRC workshop *Measuring Well-being and Societal Progress*. Downloadable from http://crell.jrc.ec.europa.eu/Well-being/papers/Matthews_Well-Being%20Measures_Milan_final.pdf

Meadows, Donella, 1998. *Indicators and Information Systems for Sustainable Development. A Report to the Balaton Group*. Hartland Four Courners, VT, USA: The Sustainability Institute. Downloadable from http://www.iisd.org/pdf/s_ind_2.pdf

Millennium Ecosystem Assessment. *Ecosystems and Human Well-Being. Synthesis*. Washington DC. Island Press. http://www.millenniumassessment.org

OECD, 2005. *Measuring Sustainable Development.* By Candice Stevens. Statistics Brief, 2005. OECD, Paris

Pearce, D., Atkinson, G. and Mourato, S.. 2006. *Cost-Benefit Analysis and the Environment. Recent Developments*. OECD, Paris.

Pintér, L., Hardi, P. and Bartelmus P., 2005. Indicators of Sustainable Development: Proposals for a Way Forward. *UNDSD Expert Group Meeting on Indicators of Sustainable development*, New York.

Porritt, J. 2005. *Capitalism as if the World matters.* London: Earthscan

Putnam, R. D., 2000, *Bowling Alone. The collapse and revival of American community*, New York: Simon and Schuster.

Ridder, W. de (ed.), 2006. *Tool use in integrated assessments* - Integration and synthesis report for the SustainabilityA-Test project. Project site: http://sustainabilitya-test.net/ Report downloadable from : http://www.mnp.nl/en/publications/2007/Tooluseinintegratedassessments-IntegrationandsynthesisreportfortheSustainabilityA-Testproject.html ;

Repetto, R., 2007. Comment on environmental accounting. *Ecological Economics* 61(4), 611-612.

Robeyns, I., 2004. De kwaliteit van het leven: drie politiek-filosofische benaderingen. *Ethiek en Maatschappij*, 7(1) 3-16. (In Dutch. For a discussion in English see Robeyns, 2006. Three models of education. *Theory and Research in Education* 4(1) 69-84.)

Schaffer, A. and C. Stahmer. Die Halbtagsgesellschaft – ein Konzept für nachhaltigere Produktions- und Konsummuster , in *GAIA*, 14/3, August 2005, pp. 229-239, oekom Verlag.

Sen, A., 1993. Capability and well-being, in: Nussbaum and A. Sen (eds.), *The Quality of Life*, Clarendon Press. Oxford, pp. 30-52.

State Environmental Protection Administration (SEPA). 2007. Media news 06-06-2007: pollution picture to brighten this year.

Smith, R., 2007. Development of the SEEA 2003 and its implementation, *Ecological Economics*, 61(4), 592-599.

Steffen, W., et al. 2004. *Global Change and the Earth System: a Planet under Pressure.* Springer-Verlag, New York.

United Nations, 1987. *Our Common Future*. Oxford: Oxford University Press

United Nations et al., 1993. *System of National Accounts 1993*: Brussels, Luxembourg, New York, Paris, Washington DC.

United Nations et al., 2003. Handbook of National Accounting -- *Integrated Environment and Economic Accounting 2003*: New York. Series F, No. 61.

UN, 2006. Economic and Social Council. Report of the committee of experts on environmental-Economic accounting. New York.

UNDP/ODS, 2006. A Survey of Composite Indices Measuring Country Performance: 2006 Update. A United Nations Development Programme/Office of Development Studies working paper.

UN Statistical Commission, 2007. Thirty-eigth session. Global assessment of environmental statistics and environmental-economic accounting. Intermediate results, 52% response rate.

Vesely, E-T., 2007. The perceived value of quantitative change in the urban tree estate of New Zealand. *Ecological Economics*, 63(2-3), 605-615

World Bank, 2005. *Where is the wealth of nations?* World Bank: Washington D.C.

World Bank and State Environmental Protection Administration, P.R. China, 2007. *Cost of pollution in China* (conference edition). www.worldbank.org/eapenvironment

WWF, 2006. *Living planet report 2006*. Gland, Switzerland.