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AN ANALYTICAL FRAMEWORK FOR SUSTAINABLE DEVELOPMENT INDICATORS
- SOME INITIAL CONSIDERATIONS

<u>Submitted by Statistics Sweden and Defra, United Kingdom</u>[1]

OBJECTIVE

1.   In establishing the Working group on Statistics for Sustainable Development (WGSSD) the aim was to articulate a broad conceptual framework for sustainable development measurement. Whilst the starting point for this work was considered to be the concept of capital, the group would also consider other approaches to the extent that the capital approach was found insufficient from a conceptual standpoint.

2.   Beyond whether or not capital meets the conceptual criterion – however this may be defined – a further criteria should include practicability and applicability to the context of sustainable development monitoring, policy evaluation and statistical systems.

3.   A strong enough case has not yet been made that a capital approach is sufficient either conceptually or practically.

4.   The objective of this paper is to give some initial consideration to the need for a conceptual statistical framework that could under-pin sustainable development indicators, and which would allow linkages between economic, environmental and social policies to be analysed in order to address long-term political targets. Two issues will ultimately need to be addressed, the fact that there is a policy context to sustainable development, and to determine the most practicable statistical system that might be developed.

5.   For the statistical framework there is the case for giving further consideration to using an accounting framework, but it needs to be one that is more strongly rooted in existing statistical systems and more closely policy-oriented than a capital approach.

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6.   The paper will discuss some of the issues that have been considered in the steering committee and in the working group, and how these could be treated in a framework. Finally in respect of a capital approach some early experiences in Sweden on capital frameworks illustrate the difficulties and suggest the need for a more pragmatic approach.

LIMITATIONS

7.   A first premise is that a statistical framework should not have the intended purpose of pointing to which questions belong to sustainable development policy and which do not. Nor is it realistic to suggest that it is possible to set absolute targets on when sustainability is met. It is not clear that any framework can answer these questions - neither a capital-based approach nor a policy-oriented approach. Such questions should be left for scientists, researchers, policy makers and public opinion to debate and decide, as has been stated in many governing documents on sustainable development.

CONCEPTS

8.   The concepts outlined here of an analytical sustainable development framework will have as a main focus activities as recorded through the System of National Accounts (SNA), allowing for time series of indicators to be constructed.

ACTORS

9.   The most important concept is that of *actors*, be they governments, industries,or people acting individually or collectively.

10.   The international classification of economic activities used as a basis for the SNA serves as a basis for accounts that also cover environmental and social issues. Different industries, the public sector, and households are identifiable. It is also possible to use the system for sub-national, sectoral or international analyses, on the premise that the data quality is intended to be sufficient for such disaggregation. However, it is recognised that at present the SNA does not cover cover actions that have no economic significance.

LEVERS

11.   The second most important concept is what *levers* cause the actors to behave as they do - influencing a particular problem or contributing to solving it. Here the *costs of measures and costs for damages* are of importance, as well as other levers such as legal systems, taxes and subsidies. The SNA is an over-arching structure, but the satellite perspective makes it possible to look in more depth for those economic levers which relate to a particular issue.

12.   A statistical framework for sustainable development would ideally describe the pressure, state and responses arising from the actors' activities, in relation to sustainable development policy targets. An example of this indicator model as formulated from an environmental perspective can be seen in Figure 1.

13.   It would thus be possible to use this approach for broad research on underlying causes and effects of varying levers, by comparing between years, actors, nations or by going deeper into the underlying data.

14.   From the experiences with the System of Environmental and Economic Accounts (SEEA), referred to below, we can see that the driving forces, pressure and response variables for environmental issues have come directly from data where it has been possible to relate back to specific actors. The state and the impact variables are seen more as the result or outcome of a particular policy.
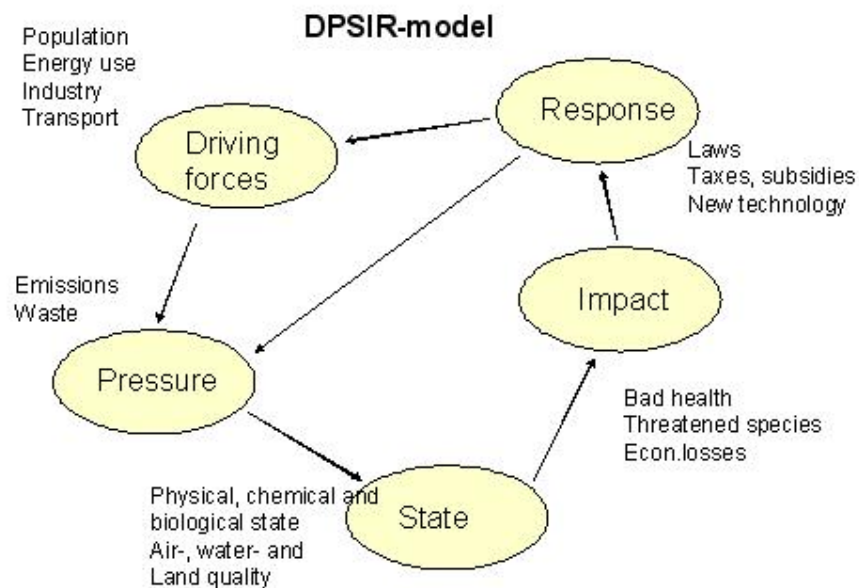

Figure 1. DPSIR-model. Environmental-economic indicator model.

ACCOUNTING

15.   For the economy, the system of national accounts gives a detailed picture of the linkages between production and consumption activities, including investments and capital formation. The system is designed so that the economic actors can be distinguished in the form of an internationally harmonised classification system of both production activities and of consumption of goods and services. It can also describe the trade of goods and services between countries. The SNA provides a good statistical basis for many sustainable development issues, even though some of the definitions used need to be handled with caution in the light of specific policy.

16.   Since the 1990s, much work has been undertaken on creating a satellite system to the SNA. This System of Environmental and Economic Accounts (SEEA) links environmental issues in the form of use of natural resources, as well as the emissions of unwanted substances to air, water and as waste generation, to the economic actors (in particular through so-called hybrid flow accounts, which link physical environmental information to the different actors in the economy). The system also includes a finer description of the standard SNA so that economic transactions with particular relevance to environment can be identified. (See fig 2). In the accounts, the national uses of resources, environmental pressure, employment, economic results are all tied together through economic actors, the government, households and non-governmental organisations.
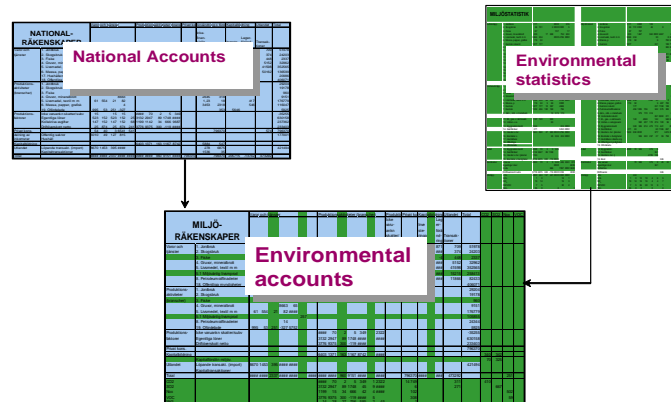
Environmental accounting

Figure 2. National accounts and environmental statistics go into the environmental accounts.

ADDING SOCIAL STATISTICS

17.   On the social side, as an example of how this might be approached, an extensive framework for measurement of welfare was developed in Sweden in the 1970s. It is based on a yearly survey that goes out to individuals. It covers several distinct areas such as economic resources, social networks, political power, health, working conditions, victimisation (See e.g. Vogel, 2003).

18.   This broad social information system is not integrated with the SNA or the SEEA, but it is possible to connect the information through the working place, for the employed part of the population. Sweden has collected these types of information in two pilot projects and linked it to the economic actors in the SNA (Mir 2004:1, SCB 2006). For the people that could not be connected to a work place, aggregates showing the social data for young people, for elderly people, for the unemployed and the general population were also shown.

19.   The OECD promotes health accounting (see e.g. OECD 1998a, 1998b, 2000) as a means to obtaining internationally comparable data in a satellite accounting system to the SNA. This initiative may also serve as a basis for analysing underlying indicators on health policy.

FRAMEWORK

20.   A statistical system for sustainable development analysis would need to comprise economic, environment and social data. It would allow for international comparisons, as well as for regional breakdowns of data. There is a strong basis for arguing for pragmatism and that this statistical system could be built around a sustainable development satellite system to the National Accounts.

21.   Looking at the indicators proposed for the follow up of the Swedish Sustainable Development strategy, most of the information can be tied to an accounting system. To take an example, the national emissions of carbon dioxide, the environmental taxes and the Gross National Income can be connected, so that the industries and activities that cause the emissions and generate the value-added can be identified by using the SEEA hybrid accounts. This connection can be further expanded to show the economic levers for the actors to reduce emissions.

22.   Thus many sustainable development indicators can be tied to the accounts. Those that cannot, for example, describe a state of the environment such as the temperature rise, air quality or chemicals in breast milk. However, the policy responses for dealing with these problems can be included as costs. In order to fully reflect these issues the satellite system would need to be designed so that these costs could be identified.

23.   Some data would be potentially only derivable from research, and work would be also required to provide more knowledge on how to explain the interactions between the state of the economy, the environment and the social sphere.

SUSTAINABLE DEVELOPMENT STRATEGIES

24.   Sustainable development policy is being articulated in a number of countries and regions. Examples where strategies are well-established include Sweden and the UK; both countries also have well-established indicator sets.

25.   In the latest Swedish strategy the following six main areas are represented by headline indicators:
- health
- sustainable consumption and production patterns
- economic development
- social cohesion, environment and climate
- global development.

The areas are very similar to those in the EU and strategies.

26.   Under a total of 12 Swedish headline indicators are 75 other indicators, which shed light on the more specific issues that make up the overall trend.

27.   Health can be used as an example of how headline and underlying indicators may be connected in future work. The two headline indicators are 'life expectancy at birth combined with healthy life years at birth' and 'victim of violence or threat of violence'.

28.   Life expectancy is a stable and well-established overall indicator that is the result of many different trends. Beneath the headline indicator is an array of indicators that give more detail as to why the life expectancy is evolving as it is. Self-perceived health, children's wellbeing, asthma in schoolchildren, psycho-social work environment, physical work environment, smoking, alcohol consumption, obesity, exercise habits and number of people killed or seriously injured in traffic accidents. Ideally the connection between the overall indicator and the underlying indicators would be assessed. For example, how would a realisation of the planned strategy for decreasing number of accidents affect the life expectancy?

29.   Some research has been done with the help of a WHO database, following a similar idea, measuring causes of illness and relating it to 'Disability free adjusted life-years' (DALYs). This research shows the major causes for illness in Sweden and makes it possible to compare the costs for prevention activities with the benefits that can be foreseen (Allebeck et al, 2006).

30.   For the environment-economic linkage the SEEA can provide a link between the emissions of climate change gases and economic activities. The system makes it possible to see the contributions from different industries from the production side, but also to link to the consumption pattern. The system also allows for analyses of economic levers, such as environmental taxes and subsidies.

31.   The UK has built on an earlier sustainable development strategy to launch a new one in 2005. This has an overarching framework of four priority areas:
 • Sustainable consumption and production
 • Climate change and energy
 • Protecting our natural resources and enhancing the environment
 • Creating sustainable communities and a fairer world.

32.   For each priority area, a number of indicators have been identified, totally 68 indicators in all – but these consist in a total of 127 individual trends.

33.   Many of the indicators supporting sustainable consumption and production draw on data from the SEEA to provide emissions and sectoral outputs.

34.   The indicators are as far as possible directly linked to and support policy, and are arguably one of the strongest examples of where a set of sustainable development indicators have been brought into mainstream policy making – through individual links between indicators and policy and through overarching policy aims articulated in terms of taking action if indicators show trends to be going in an undesirable direction. The indicators have thereby contributed significantly to the review and communication of sustainable development.

35.   The framework behind the UK indicators is perhaps quite loose in a conceptual sense, but to a great extent the framework and logic behind the indicators have been determined by a conceptualisation predetermined by policy development. It would nevertheless be possible to map the indicators fairly robustly to a more theoretical conceptualisation.

36.   For example, there are concepts around reducing emissions, waste, material use, and degradation of the natural environment, which do not require a great deal of theorising to identify. Similar to Sweden, a key indicator is carbon dioxide emissions, which through SEEA is then disaggregated to the sectoral level and linked to the level of activity in each sector. Other emissions are similarly broken down.

LONG-TERM VERSUS SHORT-TERM ISSUES

37.   Discussions at a working group meeting in Luxembourg raised the issue that many of today's indicators are too focused on short-term issues to be regarded as sustainable development indicators.

38.   It is hard to envisage how a capital approach would be any better placed to consider longer-term issues, since it relies upon the same underlying data, and some concepts of the maintenance of capital are inherent in policy-based indicators in any case.

39.   It is of course true that all the statistics that are shown in the indicators are showing what is happening now, and not in the future. That said, there are several ways of using statistics to obtain an understanding of what may happen over time. For example, data on investments will have a large impact on what happens in the future - not only the size of the total investments of the economy will be of importance in this case, but also what type of investments. Here, there is work that needs to be done, in order to be able to describe in more detail how the incentives to invest, and how the government budget, are linked to the sustainable development strategies.

40.   Depending on how the strategies and individual targets are expressed, some indicators may lend themselves to distance to target analysis, whilst others may be more focused on changes since baselines. However, many will in essence be considering maintenance of capital through examination of 'short-term issues'

41.   For Sweden the environmental quality objectives focus on the state of the environment for the next generation, or about 25 years. The medium-term economic survey does include a forward looking time frame. For the social sphere some long-term goals are set, e.g. for traffic injuries. In some cases, such as the pension systems and demographic changes, modelling is used to project possible future outcomes of the indicators.

42.   For the UK behind most indicators there are policy targets that focus on particular years by which, for example, reductions in a particular problem need to be achieved – these are used directly by the policy makers to assess progress.
43.   However, the assessment in the sustainable development context is at times more challenging and uses baselines going back five and fifteen years, so even if there are only short-term targets expressed in specific policy areas, overall the sustainable development evaluation focuses on the possibility of returning to these longer-term baselines. Thus in looking back the indicators are looking forward.

44.   Even statistics that appear to be of a very short-term nature, such as surveys where people are asked to assess their own health on a subjective basis, have been shown to have a good explanation value of their future well-being (Wikman, 1991). So there is perhaps still much argument to be had about what is really meant by short-term and long-term evaluation of sustainable development, both in terms of the measures used and the policies.

COMMUNICATION VERSUS ANALYSIS

45.   Indicators are ideally meant to communicate with a broad range of people not just those with an interest in a specific policy area. Thus it is important not to give too many details, nor to become too technical. In this respect a limited number of headline indicators have proven to be effective, both from Swedish and UK experiences. That is not without recognition that there needs to be a more elaborated indicator system supporting the headline indicators. Such indicators may be used at sector level for example to flag when some underlying trends are going counter to what would appear to be happening, as reported in aggregate through a headline indicator.

46.   It is therefore important to use headline indicators carefully and to ensure that they can be subjected to more detailed analysis. In this respect the GDP measure, whilst being highly aggregated, is still an effective indicator through its connection to the SNA. For environmental issues, the SEEA has proven to have many of the same benefits in terms of being able to disaggregate. Thus, it is possible by disaggregation to use the same indicator for the nation, the region, for a particular industry, for the households etc.

47.   It is difficult to consider how a capital approach to indicators would be more effective in terms of communication and highlighting issues, save perhaps one aspect – that of being expressed in a more monetary-oriented language familiar to finance ministries (see e.g. Heal and Krisström, 2001).

THE EXPERIENCE OF TRYING TO USE A 'CAPITAL APPROACH'

48.   Sweden has, together with other nations, engaged in a long period of research to find methods on how to generate a green net national product in monetary terms (Ahlroth, 2000, Skånberg, 2001, Huhtala et al, 2001, Lange, 2003, Huhtala and Samakovlis, 2003). This means integrating information about the use and degradation of environmental assets (but not social assets) in the yearly estimate of the net national product. The results from this work were of general interest and certainly served to expand on the methods for valuation of environmental damage in many ways.

49.   However, there were several issues that were not possible to solve in an acceptable fashion. One of the problems was the inclusion of climate change. For the economic system this issue is one of the most fundamental as it concerns the energy system and how this can be moved on to a more sustainable path - a question with profound linkages to economic and social issues. The valuation of having a stable climate has never needed to be part of the ordinary description of the economic accounts, simply because it is taken for granted and it is not something that is purchased.

50.   It had been suggested to use the cost of preventing climate gas emissions as a proxy for the degradation of the asset from the economic system. However costs of preventive measures which have not yet been taken are not something which is part of the statistical system. Lacking a data source that gives a coherent picture over time means that the indicator is extremely susceptible to methodological changes, and is easily subject to manipulation. The same problems arose with other environmental issues, such that changes in the generated time-series were mainly indicating the quality in the underlying data.

51.   Considerable time and resources could be expended on finding better data sources, but it is highly questionable as to whether the cost of collecting all the data on the state of ecosystems of Sweden is worth the benefit of the generated indicators - especially since it has been proven many times that once a problem is apparent enough to be measured, the policy to prevent it should have been thought up a long time ago and so the real world moves too fast for the statistical one to be relevant. This has been the case with DDT, with eutrophication and with the expensive measures to clean up contaminated sites in urban areas.

52.   In 2005 it was decided to reformulate the research focus for this monetary valuation work, and concentrate on analysing environmental-economic issues in other forms, notably for some sectoral or some environmental objective in a particular time period, rather than as a time-series for the entire economy.

CONCLUSIONS

53.   The need for consideration of a framework based strongly on the system of national accounts is based on the idea that if the underlying statistics for the indicators can be connected by international classification standards, the analysis of linkages between society, economy and environment becomes possible. This issue is of major importance for the statistical institutions to handle, since they are the core providers and developers of such data systems.

54.   The mere linking of statistics can open up for a better understanding of the problems at hand by giving a broader view. However, there is undoubtedly a need for more research on causes and effects as statistics alone cannot identify the linkages.

55.   It is thus argued that a pragmatic approach, using tools already available, supplemented with research, would provide a more reliable path to the development of a statistical framework for sustainable development.

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