



Messung von Nachhaltigkeit

Hintergrundpapier für einen

DIW Workshop

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Berlin, Juni 2003

1 Project Background

The workshop “Measuring Sustainability” is part of a DIW research project on “Sustainability and Economics“, which is funded by the BMBF (German Federal Ministry of Education and Research). This survey project consists of several workshops on economic and related sciences approaches to sustainable development and a questionnaire on “Economics and Sustainable Development”. The first three workshops are “Intergenerational Justice and Sustainability” (15th & 16th May), “International Institutions for Sustainability” (12th & 13th June), and “Measuring Sustainability” (3rd & 4th July).

The project is motivated by the observation of a scientific divide in economics. One indicator of this divide is the fact that the concept of sustainable development is still being ignored by many mainstream neoclassical economists. As an alternative line of research the merger-movement of “Ecological Economics” has formed. It investigates various aspects of sustainability and consists of many different scientific approaches, joined by their frontiers with mainstream neoclassical economics. Also, in general, the theoretical and methodological contribution of economics to sustainable development (SD) seems to need further elaboration. The survey project thus aims to identify both, pressing research needs and promising lines of economic research. It also aims to identify concepts that may bridge the gap between economic approaches (e.g. evolutionary economics) and provide a multi-dimensional mindset to overcome the current constellation of “schools of thought”. The project is based on an integrative concept, which we have labelled “Sustainability Economics” (SE). The key features of the Sustainability Economics concept are:

- a) A comprehensive approach encompassing the ecological, economic and social dimensions of sustainability,
- b) the development of economic methods and concepts that deal with problems of sustainability,
- c) a strengthening of policy-orientated economic approaches for sustainability,
- d) an integration of sustainability concepts of general economics (such as sustainable finance) into the environmental economics SD debate,
- e) and an identification of “bridges” between different economic “schools of thoughts” by means of studying integration and disintegration processes in general science and exploring venues of interdisciplinary approaches.

2 Expert Questions

The **overall objective** of the present workshop is to identify elements of a *research agenda* of Sustainability Economics related to the field of Measuring Sustainability. It should include *policy issues* as well as *methods*. Therefore, we would like to ask you to address the following general questions in the concluding session of the workshop:

- What is your contribution in the field of Measuring Sustainability?
- Which other contributions seem promising to you?
- Which topics would you suggest to put on the research agenda of Sustainability Economics?

The workshop has been organized into four sessions: (1) welfare-related approaches to measuring sustainability, (2) satellite accounts, (3) systems analytic approaches and (4) measuring social and economic sustainability. Before we present the expert questions for these four sessions, we would like to introduce a number of **cross cutting issues**, which we would ask you to bear in mind.

- How are different approaches to measuring sustainability related to different notions of sustainability? We think, for example, of strong, weak and critical sustainability or intra- and intergenerational equity or environmental and three dimensional sustainability.
- How are different approaches of measurement related to each other? In particular, which ones complement each other or are mutually exclusive?
- Can elements of economic theories (Which strands of economics?) provide a unifying framework for methods of measurement or sets of indicators? Do other sciences provide such frameworks?
- Do hierarchical systems of sustainability objectives provide adequate frameworks? To which requirements do such systems have to correspond to?
- How are different approaches suited for diagnosis and forecasting of sustainability, and for policy formulation?
- Which general criteria (such as openness, suitability for communication, ...) are required for methods of measurement?

- Should methods of measurement be problem-oriented, and how do they have to be modified according to the problem under investigation? Are different approaches appropriate for different regions or different sectors of the economy?
- What parts of cause-effect chains are (or should be) represented in different approaches to measuring sustainability?
- Is the distinction important between necessary and sufficient conditions for sustainability? Can they be represented by welfare-based indicators and physical indicators respectively?
- How can international linkages (cost caused vs. cost borne) be taken into consideration?
- How can uncertainty, irreversibility, time lags, non-linearities be taken into account?
- What are the implications for measurement if ecological economics is taken as a point of departure? In particular, what is the significance of
 - o alternative basic assumptions such as bounded rationality
 - o alternative research approaches such as evolutionary economics
 - o the inclusion of ethical principles?
- What division of labour and what kind of cooperation seems appropriate between statistical offices and research institutes in this field of research?

SESSION 1:

“Welfare-related approaches to measuring sustainability” is a term we have chosen to characterise methods which use some weighting scheme (usually valuation) in order to aggregate diverse information.

- Which particular methods exist?
- What are their strengths and weaknesses?
- Some welfare based indicators are related to the Hartwick rule or similar criteria of sustainability. Is this an advantage of such indicators?
- Which alternative methods of aggregation (e.g. by energetic units, weight) exist? Are they appropriate?
- What are advantages or disadvantages of income-based indicators or capital-based indicators?
- Does valuation inadequately imply substitution between the various components of the capital stock?
- Which are fundamental problems and which are problems of implementation of welfare related approaches? How could they be overcome?
- What is the state of the art in valuation and cost-benefit analysis? How does Germany compare internationally in this field of research?
- What is the role of different discounting schemes?
- How can risk aversion be taken into account?
- Is the avoidance cost approach (promoted by the council of advisers of the German environmental economic accounting system) an appropriate method of valuation?
- Is the Eco Domestic Product promoted by the SEEA 2000 an appropriate and feasible indicator of sustainability?
- Is valuation a language which is sometimes appropriate to communicate with certain stakeholders?
- Are welfare related and physical indicators complementary?

SESSION 2:

A variety of indicators can be organized in satellite accounts which can be viewed as an extension to existing accounting systems. In general this approach allows for great flexibility with respect to the unit of measurement and applied analytic tools.

- Which particular methods and approaches should be subsumed under the term satellite account?
- What are the strengths and the weaknesses of the different approaches? Would you prefer certain approaches?
- The concept of satellite accounts has so far mostly been applied to the measurement of environmental facts in physical units. Can this concept also be applied to the economic or the social dimension of sustainability?
- What are examples for the (empirical) application of satellite accounts to economic or social problems?
- The concept of satellite accounts allows for a variety of indicators in different units of measurement without the necessity of aggregation/valuation. Is this an advantage or disadvantage for the potential impact of this information on (political) decision makers?
- Different national and international bodies have developed broad and diverse sets of indicators for the measurement of sustainable development. How would you comment on the success of these approaches from a theoretical and from a practical point of view?
- Material flow analysis is a prominent tool for analyzing the impact of economic activity in physical terms. By measuring different materials in the same unit (weight) it applies implicit aggregation/valuation. Are there specific risks of implicit valuation or is this an unavoidable or unimportant problem?
- Are welfare related and physical indicators complementary to each other?

SESSION 3:

Under systems analytic approaches we understand primarily model based analytical tools to measure sustainability. One feature of these models is their ability to cope with secondary effects.

- Which particular (type of) models and methods exist and which are useful tools to measure sustainability from a systems analytic point of view?

- What are the respective strengths and the weaknesses of the different approaches?
- Is there an **ideal** model or class of models from a theoretical point of view? If so, can such a model be empirically implemented?
- Can we especially learn from results from the field of climate change?
- How important is the inclusion of indirect or secondary effects? What do we know about the order of magnitude of these effects?
- What is the specific role of multi-criteria analysis (MCA) in the field of measuring sustainability?
- How do integrated assessment models and multi-criteria analysis relate to each other?
- Has multi-criteria evaluation a close correspondence to the stakeholder approach in sustainable development?
- Which modelling approaches are appropriate to calculate avoidance costs according to the UGR approach?

SESSION 4:

Most of the work on Measuring Sustainability relates to environmental sustainability. In order to emphasize the importance we attribute to economic and social sustainability objectives we have devoted a special session to **measuring social and economic sustainability**.

- Should sustainability include (which?) economic and social objectives equivalently with environmental objectives?
- Should the difference be emphasized between sustainability objectives seen from an economic perspective and economic sustainability objectives?
- Is there a generally accepted notion of economic and social sustainability? In economics, between economics and other sciences?
- Can economic and social sustainability be described by sets of management rules and do these provide a scheme for organizing indicators?
- What particular methods of measurement or indicators exist for
 - o social sustainability (social capital, social resources, basic needs, social indicators, social compatibility,...) and
 - o economic sustainability (NNP, (reproducible) physical capital, human capital, productive capacity, (cost)efficiency, productivity, consumption patterns, market order,

degree of internalisation of external effects, innovation potential, attractiveness as a location, public debt, international economic relations...)?

- What are their strengths and weaknesses?
- How to deal with overlapping economic and social dimensions (e.g. income distribution)?
- How can interdependencies between economic, social and environmental indicators be revealed?](integrative indicators)?