ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS

Joint UNECE/OECD/Eurostat Working Group on Statistics for Sustainable Development
Second meeting
Oslo, 15-16 November 2006
Item 7 of the Provisional Agenda

CHALLENGES IN ESTABLISHING SUSTAINABLE DEVELOPMENT INDICATORS

<u>Submitted by Statistics Norway</u>[1]

1.   The impetus behind efforts to develop indicators for measuring progress toward
sustainable development is one of the results of the 1992 Rio Conference on Environment and
Development. After this conference the United Nations Commission on Sustainable
Development (UNCSD) was established and one of the tasks of this commission is to monitor
countries' efforts in developing and using sustainable development indicators.

2.   Although there is fairly wide agreement that indicators for sustainable development
should be established, a consensus regarding which indicators should be considered sustainable
development indicators has yet to be reached. The variety of indicators included in national
sustainable development indicator sets can be seen in the appendix of this paper.

3.   This paper tries to describe some of the challenges experienced by national, multinational
and international organizations in the establishment of sustainable development indicator sets.
By trying to map some of the challenges it is hoped that a better understanding can be reached
with regards to the approaches and foundations for establishing sustainable development
indicator sets.

INDICATOR SELECTION IS DEFINITION DEPENDENT

4.   Some of the first issues to arise when trying to establish a set of sustainable development
indicators (SDIs) involve what to include or exclude as indicators. Closely connected to this is
the question of the criteria for inclusion or exclusion. The answers to these questions greatly
depend, however, on the definition used for sustainable development. What is meant by or
understood to be sustainable development is very closely linked to which indicators are then
chosen.

5.   Indicators are used to measure or track a phenomenon. It is therefore necessary to define
that phenomenon before it can be decided exactly how it can be measured. Defining

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[1] Prepared by Julie Hass. Thorvald Moe has presented the official Norwegian view in a separate paper to this
meeting. See Moe (2006).

sustainability or sustainable development is not an easy task and so far, once again, there is little consensus. One reason that a definition of sustainable development is difficult to agree on is due to four different dimensions or axes of sustainable development which are embedded in that concept. If there are major differences along these four different dimensions or axes it becomes very difficult to reach a consensus since the understanding of the concept of sustainable development is too divergent to find a common ground.

FOUR DIMENSIONS OR ETHICAL AXES OF SUSTAINABLE DEVELOPMENT

6.   Hessen (2006) describes four main dimensions or ethical axes of sustainable development that are irreconcilable and are inherently embedded in the concept of sustainable development. These four dimensions are:
- biocentric vs. anthropocentric;
- local/national vs. global (scale);
- hedonism vs. asceticism ("wants" vs. human needs);
- now vs. future (time dimension).

7.   The first dimension is the dichotomy of biocentric vs. anthropocentric. At one extreme, the focus is only on human development and the biosphere is purely secondary to human development. At the other extreme, one finds the Gaia school of thought which places value on the biosphere itself and discounts the importance of humankind. This axis deals with questions regarding to which degree we include problems which today do not represent major threats to humans, such as biodiversity. The Brundtland report definition, "development that meets the needs of the present generation without compromising the ability of future generations to meeting their own needs" (WCED 1987, p. 43), focuses more towards human development but does recognize the importance of the biosphere in contributing to that development. So the Brundtland report definition of sustainable development is on the anthropocentric side of this axis, but is not at the most extreme end.

8.   The second dimension is a question of scale, that is local or national versus global. At the one extreme, it can be argued that the focus can only be at the local or national level where many policies can be made and implemented. On the other hand, it can be argued that sustainable development is at least an international issue since what we do locally influences conditions and the situation in other parts of the world due often to world trade or it can be argued that it is at a global level in the case of climate change.

9.   The third dimension of sustainable development focuses on meeting human needs for survival versus a more hedonistic perspective of fulfilling human desires or wants. Another way to look at this issue is through the concept of consumption and how consumption patterns can be related to the concept of sustainability.

10.   The fourth dimension is a matter of the time frame. Which time frame does sustainable development encompass: the present time or the future or even the long-term future? It can be argued that sustainable development needs to span both the present time, as well as the future, especially since for some may not live long enough to have a future. The Brundtland report definition encompasses both the present time ("current generation") and the future ("future generations") but the unit of time being used is "generations" with embodies a more long term perspective than the time unit of "years." It can be argued that what we do today determines the options for the future. But even this perspective contains a future focus.

11.   In very few cases will definitions or understandings of sustainable development end up at the extreme end of any of these four dimensions. However the further one is towards one extreme or the other along these four axes will make it harder to reach a consensus with those who find themselves at the opposite end. Without agreement along these different ethical axes of sustainable development it will be very difficult to converge on a set of indicators since there has not been an arrival at a common understanding of what it is we are to measure.

TWO APPROACHES TO ESTABLISHING SDIS

12.   There have been two main approaches taken towards establishing sustainable development indicator sets, a model-based approach and a policy-based approach. In a number of cases indicator sets were trying to be established before sustainable development policies had been developed by the respective governments so that the model-based approach was perhaps used first. Moe (2006) argues for a model based policy approach.

Model-based approach

13.   One of the first models used as a framework for developing an indicator set was the 3- or 4-pillar approach used by the UNCSD (UN 1996). The three pillars are social, environmental and economic. The fourth pillar is called institutional. Using this approach the UNCSD proposed about 130 indicators which were tested by a number of countries. Based on the test countries' experiences a new framework and indicator selection was developed (UN 2001) which reduced the number of indicators to 58. The UN has recently revised this list and has dropped the pillar framework since it was found that most of the indicators could be placed in more than one of the pillars so it was concluded that the usefulness of the pillar classification approach was limited at best.

14.   Following the lead of the United Nations, a number of other countries also defined sustainability in terms of its different components, whether they call these pillars, axes, dimensions, or types of capital, and often used the three categories of social, environmental and economic as the organizing framework for their indicator sets.

15.   Some of the test countries for the UNCSD set simply took the set and tested their national data availability and quality. But some test countries, in addition to testing the UNCSD set, also had their own national processes of defining and developing a set of SDIs tailored to specific national needs and characteristics. Switzerland is one of the test countries that also developed their own national conceptualizations of sustainable development and have tied the postulates of this model to each of their national SD indicators. See Hass et al. (2002) for a brief description of some other examples.

Capital model

16.   Although a number of countries mention the idea of capital in relation to their national models or approaches used for establishing national SDI sets, for example the United Kingdom, Belgium, Switzerland, and the USA, it is Norway (NOU 2005), Canada, the OECD and the World Bank that have used the concept of capital as central to their approaches.

17.   The OECD describes four types of capital in relationship to sustainable development:

- *man-made capital*, i.e. the produced means of production like machinery, equipment and structures, but also non-production related infrastructures, non-tangible assets, and the financial assets that provide command over current and future output streams.
- *natural capital*, i.e. the renewable and non-renewable natural resources which enter the production process and satisfy consumption needs, as well as environmental assets that have amenity and productive use, and are essential for the lifeless support system.
- *human capital*, i.e. the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal well-being. Thus defined, human capital encompasses education (both formal and informal) and health.
- *social capital,* i.e. the networks of shared norms, values and understanding that facilitate cooperation within and between groups. (OECD 2001, 38)

18.   Although these four types of capital are theoretically, perhaps the most robust way to look at sustainable development using a capital approach, some redefining of these categories may be necessary when actual calculations of net national income (wealth) are made. At least this was the case when Norway made calculations of its net national income. It is also interesting to observe that these four types of capital are relatively close to the four pillars used by the UNCSD.

19.   The Norwegian calculation methodology for calculating net national income (Greaker, Løkkevik and Walle, 2005) used the work by Kirk Hamilton at the World Bank (1996, 1998) as a starting point.

20.   Two main methods can be used to value capital:
- "It can be valued as the sum of the additions, minus the subtractions, made over time to an initial stock -- summing up the value of gross investments and subtracting depreciation of produced capital, for example.
- Alternatively, capital can be valued as the net present value (NPV) of the income it is avle to produce over time. This is what an investor would be willing to pay for a capital good." (World Bank 2006, page 21)

21.   In the Norwegian case, net national income (at market prices) was obtained from the national accounts and was calculated by "deducting the consumption of fixed capital from GNI [Gross National Income]" (SNA §2.182). This total number was then broken down into its identifiable component parts and the unexplained portion that is remaining is called a residual. The component parts of the net national income included calculations for the total resource rent from renewable natural resources, total resource rent from non-renewable natural resources, the return on produced assets, net income from abroad and the return on human and environmental capital. The return on human and environmental capital is given a value based on the size of the residual, which was what is left over when the various component parts that are identifiable were subtracted from the total.

22.   Natural resource assets that have market-based valuations are included in the natural resource capital calculations. For Norway these included calculations for natural assets used in connection with agriculture, forestry, fishing and fish farming, hydroelectricity production, oil and natural gas extraction, and other minerals from the mining industry.

23.   The value of the environmental capital is part of the residual and includes non-market goods and services that are obtained from the environment. These include, for example, non-

timber functions of the forest such as habitat and as a CO_2 sink. Also included in the residual are human capital and social capital. The residual is by far the largest component identified in the calculation of net national income. That the residual is the largest portion of the net national income is somewhat problematic. Trying to reduce the residual by identifying portions of human capital, perhaps by quantifying those portions related to education and health can be steps in the right direction towards reducing the size of the residual.

24. Although this indicator provides certain insights into the basis for future net national income, it is relatively weak with regards to providing information about critical natural resources or human or social resources. Although net national income, broken down by the different sources of income can be a very useful indicator it is not sufficient in and of itself as the only indicator of sustainable development.

25. The calculation of net national wealth, assumes that all the different types of capital are substitutable. For example, that oil and gas reserves can be extracted, sold and transformed into financial capital. By doing this, the assets are simply converted from one type of capital to another. This may be appropriate in some cases, but it is not possible in all cases. There are some natural resources that are critical to humankind, which cannot be substituted. Some of these critical resources include access to clean water, air to breathe, protection against ultraviolet radiation and other non-market goods and services of the environment. These are the types of critical natural resources that need to be identified and indicators developed which can adequately track the development of these resources. The calculations of national wealth do not provide enough information to adequately monitor the development of the non-market, critical natural resources or human and social resources.

26. If a weak sustainability perspective is adopted then the capital approach very adequately allows for the substitutability of one type of capital for another.[2] If however, a strong sustainability[3] perspective is adopted, the issue of critical levels of capital and non-substitution needs to be dealt with. One way of doing this is to simply supplement the national wealth indicator with some additional indicators that focus specifically on the non-substitutable, critical assets.

27. Also needed as part of the capital approach, is the notion of national savings (which may be thought of as the flip side of consumption). If a nation consumes more during one year than we have reason to believe can be sustained over time, this consumption may be characterized as not sustainable.

28. Norway has used the capital approach with a strong sustainability perspective in establishing its sustainable development indicators set.[4] One of the key indicators in this set is the national net income / national wealth indicator. Another key indicator is the savings indicator, which is adapted specifically for the Norwegian situation and is defined as the petroleum adjusted savings. The other indicators included in the national SDI set were chosen to reflect the condition of critical elements of environmental, social and human capital. There are

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[2] "An implicit assumption in the constant capital rule (CCR) is that all forms of capital are substitutable for each other. On this rule, known as the *weak sustainability* (WS) rule, any one form of capital can be run down provided 'proceeds' are reinvested in other forms of capital." (Pearce and Atkinson, 2002, p. 5)

[3] "Those who believe in the non-substitutability of natural capital support *strong sustainability* (SS). (Pearce and Atkinson, 2002, p. 5)

[4] See "Indicators for Policies to Enhance Sustainable Development." Norwegian Ministry of Finance, Oslo: 2005.

indicators of biodiversity, acidification, climate change, freshwater and marine ecosystems, education levels, life expectancy, social exclusion and the viability of future public finances.

29.   Canada has also used the capital approach in establishing their set of indicators. Again a strong sustainability approach was used and critical eco-systems and human capital were identified as needing specific, physical measures as indicators. In the Canadian approach, however, no indicator of national wealth (net national income) or savings was included.

Policy-based approach

30.   The second major approach being used to establish SD indicators uses the sustainable development policy documents developed by the politicians as the starting point. More specifically, these policy documents are used to define "sustainable development." Once the definition has been established, the indicators are then chosen so that they are in alignment with the policy statements. If there are specific numerical goals or targets mentioned in the policies then these targets and goals are used to a large extent to define specific, relevant indicators.

31.   Using the sustainable development policy documents are on the one hand, clear starting points, however, the policy statements in these documents may not be crystal clear. The ambiguities in the policy statements can require a fair amount of interpretation in order to understand the meanings and to make them into concrete, measurable indicators.

32.   Once the policy documents have been analyzed and the definition of sustainable development has been clarified, it is then necessary to identify the different policy relevant topics or themes. This may or may not be an easy task depending on the clarity found in the sustainable development policy documents. These themes are then used as the starting point for the selection of indicators which will provide relevant information that is connected to specific policy statements.

33.   United Kingdom has used a policy-based approach for both the establishment of a sustainable development indicator set and subsequent revisions. The UK has had three iterations of SD policy and indicator cycles. By having a connection made between the policy statements and the indicators, clarity in the policy statements has increased. Initially there were some mismatches between the indicators and the policy areas. Due to the lack of information or data sometimes indicators are chosen which were relevant to the policy area but which do not pertain specifically enough to a stated policy. In one case, an indicator was chosen which provided relevant background information but was not exactly correct in terms of the stated policy. When the indicator was presented it was assumed that the policy goals were being shown in the indicator. This however was not the case. The indicator was showing something different from the policy statements. This mismatch between policy goals and indicators caused confusion since the public looked at the presentation of the indicator and simply assumed that this was the policy goal. By learning from this type of error and by having this close connection between the policy statements and indicators, the UK has improved both their sustainable development policy, as well as the indicators which track their progress.

34.   The European Union has also used a policy-based approach to establish sustainable development indicators that are relevant to EU sustainable development policy. One challenge in this work has been to identify the sustainable development strategy since this strategy was not presented in a single, coherent document, but was rather spread across several documents. This made it more complicated to arrive at a clear definition of sustainable development as

determined from policy statements. It also showed the development of thinking regarding sustainable development policy, since certain aspects of sustainable development had been "left out" of the earlier statements. Specifically, it was the international component of sustainable development that was added in one of the later policy statements.

35.   This policy-based approach allows for an iterative development process, which can improve both the policy statements regarding sustainable development and their related indicators over time.

STRENGTHS AND WEAKNESSES OF THE TWO APPROACHES

36.   The use of indicators, whether it is to monitor government policy or production processes, is based in the perspective or mind-set that what you measure, you can manage. One very common pitfall of this approach is that one can end up managing *only* what is measured. In that case, it is very important be sure that the correct "things" are getting measured and therefore included as indicators. For these reasons, amongst others, which indicators are chosen as sustainable development indicators can be of utmost importance in terms of ensuring future sustainability.

Model-based approach

37.   When a model-based approach is used, sustainable development is defined by the model. What is to be included and excluded is determined by the definitions of the model. A model is, generally speaking, a theoretically robust approach which does not change to any great extent over time. The definition of sustainable development may also be more comprehensive, but that of course depends on the model. These are all positive aspects to a model-based approach. One of the negative sides to this approach is the risk that the indicator set will be less politically relevant and will not be used in connection with implementing any policies regarding sustainable development. The model may also have its limitations, since in the quest to quantify sustainable development through the use of indicators certain assumptions are made when the indicators and related calculations are defined.

Capital model

38.   The capital approach was successfully used in Norway to establish a national sustainable development indicator set (NOU 2005). During the expert committee's deliberations it was concluded that sustainable development and the related indicators need to particularly encompass an intergenerational, long-term perspective. The concept of capital has an inherent long-term component which has been explained as follows:

> Because of their long lifespan ...different types of capital provide one of the main mechanism through which generations are connected to each other... Different types of capital have different characteristics and degrees of persistence, but share the common feature that they build-up and are restored slowly, while they can be dissipated quickly if not used sustainably.
> (OECD 2001, p. 38-39)

39.   The starting point for the Norwegian SDI work was the calculations for net national income (NNI), but the weaknesses inherent in those calculations and the strong sustainability

perspective that certain types of capital cannot be substituted, led the experts to augment that indicator with additional indicators that would compensate for those inherent weaknesses.

40.   The starting point for Canada, on the other hand, was the conceptual framework of capital (Smith 2006) and not a single monetary indicator.[5] In the Canadian case, the concept of capital has been used to identify the types of indicators needed to keep track of the condition of the critical eco-systems, however they do not include any monetary indicator for national wealth or national savings.

Net national income (or national wealth) calculations

41.   Although net national income (NNI) or national wealth calculations are often considered indicators *of* sustainability, whereas sets of indicators are merely providing information regarding conditions *for* sustainability, due to the weaknesses inherent in the calculation of net national income/national wealth, NNI (or national wealth) cannot be the only indicator for monitoring a nation's sustainable development.

42.   Even though the calculations easily allow for the substitution of one type of capital for another which is a major strength of this approach, it was not possible to include the concept of critical resources or threshold levels which are needed in some of the natural and social assets when one is espousing a weak sustainability perspective. For this reason, it is important to supplement the NNI indicator with a set of other indicators, which provides information regarding these critical resources. This is a weakness of this indicator if it is used as the sole indicator of sustainability. However, the weakness of this particular indicator does not invalidate the capital approach. This weakness needs to be dealt with simply by providing additional information (indicators) that fills this gap or weakness.

43.   One of the other main criticisms of NNI (national wealth) as an indicator of sustainability is that the sum of national wealth over all nations does not necessarily result in a sustainable world[6] or globe. NNI has a very narrow, national focus (although there is net income from abroad included in the national wealth calculations). Although there have been calculations of national wealth made for regions and different constellations of nations (see The World Bank, 2006).

International comparability

44.   The advantage of having a single indicator of sustainability allows for direct comparisons between countries and regions. The work by the World Bank (2006) shows that these types of calculations, can provide some insights regarding the situation for sustainable development in different countries and regions.

Critical resource indicators

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[5] "The basic premise put forward in the framework (Smith, Simard and Sharpe, 2001) was that society must account for those economic, environmental and human assets that are necessary to sustain a healthy society and economy, now and in the future. Collectively, these assets represent the nation's capital stock. It is this stock, the authors argued, that must be maintained if development is to be sustainable." (Smith, 2006)

[6] World is used to refer to a more anthropocentric perspective and globe is used to refer to a more biocentric perspective.

45.   Although the starting point of the Norwegian capital approach was net national income (or national wealth), this is not sufficient for monitoring sustainable development at a national level when adopting a strong sustainability perspective (non-substitutability). Indicators which are related to national savings (or consumption), critical natural resources such as water, clean air, protection from ultraviolet radiation, and biodiversity, critical human resources such as health, education, and social inclusion, and indicators related to international relationships between countries, all need to be added to obtain a robust set of national level sustainable development indicators. In the Canadian approach no decomposition of net national income was attempted monetarily, instead critical eco-systems were identified and physical indicators were proposed for monitoring the status and development of these systems.

Policy-based approach

46.   When a policy-based approach is used, sustainable development is defined by political documents. What is to be included and excluded is determined by the statements made in the political documents. The focus is very much on the political statements, goals and plans presented by the politicians. There is a high correspondence between the indicators and the political relevancy. This is a particular strength of the policy-based approach. Another strength of this approach is that indicators can be created for multinational or geographic regions for which there is a policy document and a political cooperation, for example the European Union or the Nordic Council.

47.   For selecting indicators there needs to be no major discussions regarding the definition of sustainable development although some questions about this may arise when trying to interpret the political documents. It is also a possibility that the political statements will not provide a comprehensive or theoretically robust definition of sustainable development. Another problem is that the political statements and policies can and most likely will change over time and in particular, when there is a change in the party or parties leading the government. This may in particular lead to a change in the definition of sustainable development and the corresponding indicators. This instability of the indicator set, can lead to problems when trying to track long-term trends since establishing the data required for the indicators can be costly and take time to establish. There may even be a risk that sustainable development would substantially disappear from the political agenda.

48.   Of course, the instability of the definition of sustainable development, may make it easier to change the definition and the corresponding indicators when our understanding about sustainability evolves.

DOES THE APPROACH MATTER?

49.   The approach would matter if substantially different results were obtained using a model-based approach or a policy-based approach. This can only be determined through an empirical analysis of a number of different indicator sets. From a brief examination of different indicator sets[7] there are many similarities. There are also differences. Whether these differences are due to national characteristics or whether they are due to differences in the approach taken in the selection process cannot be determined without additional analysis. However, some insights into this issue may be gained by simply looking at what could be considered of "core" or central

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[7] See for example Tables 1 and 2 in Hass et al. (2002) which lists different indicators by country and by topic covered and the list of indicators for OECD countries in the appendix.

importance to a specific model, such as the capital model, and the policy-based approach. Core importance in this context is meant to capture what is the essence of the approach, which if excluded, could not be called the capital model approach or a policy-based approach.

50.   Central to the capital model is the concept of capital. In a sustainable development indicator context, this means an inherent long-term perspective is taken since this it is embedded into the concept of capital. There would also need to be some type of indicator, which is based on capital such as net national income/national wealth. There would also need to be an indicator of national savings or consumption. If a strong sustainability perspective is taken (non-substitutability), these indicators would need to be supplemented by indicators which track critical natural resources, human resources and include international aspects.

51.   Central to the policy-based approach is the existence of a sustainable development policy. A policy-based approach cannot be attempted, if there does not exist a relevant policy. There also needs to be a direct policy-to-indicator correspondence. Without a high policy relevance it cannot be considered a policy-based approach.

52.   Both approaches have strengths and weaknesses. From examining the core essence of each approach, it does appear that similar sets of indicators are obtained. It also appears that the two different approaches have some specific characteristic weaknesses which need to be considered if you use one approach or the other.

53.   If using a policy approach, there is a risk that an incomplete or non-robust definition of sustainable development will be used since this definition is determined by political documents. There is also a potential that the focus will be only on issues that politicians have direct influence over. There is also a risk that the focus will be the short-term since a politician's time frame is rarely beyond the next election.

54.   If using a model approach, there is a risk that the indicators will lack political relevance. The approach may be theoretically robust but useless in practice since it may be impractical to implement. Composite indicators such as net national income/national wealth may present an overall evaluation, but it is not an appropriate way, assuming non-substitutability (strong sustainability), to keep track of certain threshold aspects and critical resources. The weaknesses inherent in this indicator require that supplemental indicators are also included in an indicator set in order to make up for these limitations.

DIMENSIONS OF SUSTAINABLE DEVELOPMENT AND THE APPROACHES TO INDICATOR SELECTION

55.   If the philosophical differences on the four axes or dimensions of sustainable development are too great, then the differences between the indicator sets becomes evident. Returning to the axes or dimensions inherent in the concept of sustainable development, we will try to identify where the major differences lie between the capital model approach and the policy approach.

56.   Both approaches assume primarily an anthropocentric perspective but with a strong sustainability perspective that does recognize the existence of critical resources. Both approaches have primarily a local/national focus since the indicator sets are primarily being made for nations, groups of nations or government units at lower than national levels. Extra efforts need to be made to include the global and international perspectives whether using the

capital model approach or a policy approach. In these ways, both the capital model approach and the policy approach have much the same starting points.

57.   One of the main differences which seems to exist between these two approaches appears to be the issue of the time frame. Inherent in the nature of capital is a long-term time perspective. The policy approach, on the other hand, can have more of a short-term focus since the policy cycles are often a matter of a few years.

58.   Another way to evaluate these two approaches is to determine what is critical to each of the different approaches and make sure that the indicator sets that are the final result of these selection processes include the core components from both of these two main approaches.

59.   The indicator set resulting from a capital model approach needs to be evaluated to be sure it includes an international or global perspective and is politically relevant. These are the two main weaknesses of the capital model approach when looking at it from the policy-based approach.

60.   The indicator set resulting from a policy-based approach needs to be evaluated to be sure it includes an international or global perspective and that it includes a long-term time frame. In addition, the issue of substitutability also needs to be included.

FUTURE DIRECTIONS FOR DEVELOPMENT OF SDIS AND SUPPORTING STATISTICAL SYSTEMS

61.   The policy approach has served as a very pragmatic way for establishing sustainable development indicator sets in many countries and regions (for example the Nordic countries, the Mediterranean countries, the European Union). In many ways this approach allowed the definition of what to measure to be determined by the political statements which then allowed for the identification of appropriate indicators to help measure the progress towards these goals.

62.   Although the policy approach has allowed some countries and multinational organizations such as the European Union to make progress in establishing sustainable development indicators, Moe (2006) argues that a policy oriented capital approach is needed in order to make progress that can be used by policy makers. The statistical systems then also need to be developed in such a way that the information required for the indicators are produced in a coordinated way.

63.   Although there are still weaknesses in the calculation methodology of national wealth, these can be improved so that this indicator of sustainability can be used reliably to make international comparisons and to monitor progress towards a more sustainable world. Just because there are weaknesses in this indicator should not hinder us from using capital as the framework and perspective for measuring and tracking sustainable development.

64.   The capital approach is, at least to economists, a long standing and well defined analytical framework for understanding the forces driving development and what may make it sustainable. From this perspective, sustainable development only makes analytical and practical sense for policy making as a long term, future-oriented framework where human welfare is the point of departure.

REFERENCES

Alfsen, K.H. and M. Greaker (2006): "From natural resources and environmental accounting to construction of indicators for sustainable development." Paper presented at IAOS Conference 6-8 August 2006 in Ottawa, Canada.

Greaker, M., P. Løkkevik and M.A. Walle (2005): *Utviklingen i den norske nasjonalformuen fra 1985 til 2004. Et eksempel på bærekraftig utvikling?* (only in Norwegian. Title translation: Development of the Norwegian national wealth 1985-2004. An example of sustainable development?) Report 2005/13, Statistics Norway, Oslo. ISBN 82-537-6789-7 .

Hass, J.L., F. Brunvoll and H. Høie (2001): Overview of sustainable development indicators used by national and international agencies. OECD Statistics Working Paper 2002/1. Paris: Organization for Economic Co-operation and Development.

Hessen, Dag (2006): Presentation at the Norwegian national conference on sustainable development on 22 June 2006. http://odin.dep.no/fin/norsk/aktuelt/nyheter/006071-210274/dok-bn.html#

Moe. T. (2006): A Policy oriented capital framework for statistics and policies to enhance sustainable development. Working paper no. 3 presented at Joint UNECE/OECD/Eurostat Working Group on Statistics for Sustainable Development, Second meeting, Oslo, 15-16 November 2006.

Norwegian Ministry of Finance (2005): "Indicators for Policies to Enhance Sustainable Development." Norwegian Ministry of Finance, Oslo: 2005.

NOU (Norges offentlige utredninger) (2005): Enkle signaler i en kompleks verden. NOU 2005:05. Oslo: Ministry of Finance.

OECD (2001): *Sustainable Development: Critical Issues*. Paris: OECD.

Pearce, D. and G. Atkinson (2002): The concept of sustainable development: An evaluation of its usefulness ten years after Brundtland. CSERGE Policy Analysis Working Paper PA 98-02. ISSN 0967-8875.

Smith, R. (2006): "Natural Capital, Ecosystem System Services and National Accounting." Paper presented at IAOS Conference 2006 in Ottawa, Canada.

System of National Accounts (SNA) (1993). UN, IMF, OECD, Eurostat, World Bank.

United Nations (1996): *Indicators of Sustainable Development. Framework and Methodologies.* United Nations' Committee on Sustainable Development, New York.

World Bank (1996), *Expanding the Measure of Wealth.* Washington D.C: World Bank.

World Bank (1998), *Estimating National Wealth: Methodology and Results.* Washington D.C: World Bank.

World Bank (2006): *Where is the wealth of nations? Measuring Capital for the 21st century.* Washington D.C: World Bank.

World Commission on Environment and Development (WCED) (1987): *Our Common Future* (Brundtland report).

Appendix A.

APPENDIX A. NATIONAL SETS OF SUSTAINABLE DEVELOPMENT INDICATORS

Country	Name of indicator set	List of indicators

Australia	Headline sustainability indicators for Australia	**State of the Environment Australia. The 24 indicators listed are from 2002 report: 'Are we sustaining Australia?'**
		
		Value 1: Living standards and economic well-being
		    1. Real gross national income per capita
		    2. Real gross per capita disposable income at June 2000
		
		Value 2: Education and skills
		    1. Percentage of people aged 25-64 who have attained upper secondary and/or higher level of qualifications at 2000
		
		Value 3: Healthy living
		    1. Disability adjusted years expectancy (DALE) at 1996
		
		Value 4: Air quality
		    1. Number of occasions where concentrations of pollutants exceeded NEPM standards for ambient air quality in major urban areas in 1999-2000
		    2. Total SO_X, NO_X and particulate emissions in 1999-2000
		
		Value 5: economic capacity
		    1. Growth in multi-factor productivity
		
		Value 6: Industry performance
		    1. Real GDP per capita in 1999-2000 (chain volume measures, 1998-1999 prices)
		
		Value 7: Economic security
		    1. National net worth, as at 30th June 2000, and per capita as at 30th June 2000
		
		Value 8: Management of natural resources: Water
		    1. Proportion of surface water management
		        1. areas with diversions within 70 percent of sustainable yield at 2000
		        2. units with abstractions within 70 percent of sustainable yield at 2000
		
		Value 9: Management of natural resources: Forests
		    1. Total area of all forest types at 1998
		
		Value 10: Management of natural resources: Fish
		    1. Percentage of major Commonwealth managed harvested wild species classified as fully or over-fished at 1999
		
		Value 11: Management of natural resources: Energy
		    1. Two indicators:

Country	Name of indicator set	List of indicators
		1. Renewable energy use as a proportion of total in 1998-1999 2. Total renewable and non-renewable energy use (includes conversion losses) in 1998-1999 Value 12: Management of natural resources: Agriculture 1. Net value of rural land (interim indicator - agreed indicator: 'Net value of agricultural land use' not yet available) at June 2000 Value 13: Gender and economic equity 1. Adult female full time (ordinary time) average weekly earnings as a proportion of male full time (ordinary time) average weekly earnings at February 2001 (seasonally adjusted) Value 14: Educational and economic equity 1. Percentage difference in the year 12 completion rate between bottom up and top socio-economic decile in 1999 Value 15: Health and socio-economic equity 1. Percentage difference in burden of life years lost due to 1. disability between bottom and top socio-economic quintile in 1996 2. mortality between bottom and top socio-economic quintile in 1996 Value 16: Locational equity 1. Percentage difference in the year 12 completion rate between urban and remote locations in 1999 Value 17: Biodiversity and ecological integrity 1. Proportion of 1. bio-geographic sub-regions with greater than 30 percent of original vegetative cover (as a percentage of 354 sub regions) at 2000 2. (354) bio-geographical sub-regions with greater than 10 percent of the sub-region's area in protected areas at 2000 2. Number of 1. extinct, endangered and vulnerable species at 2000 2. endangered ecological communities at 2000 Value 18: Climate change 1. Total net greenhouse gas emissions at 1999 Value 19: Coastal and marine health 1. Estuarine condition index: Proportion of estuaries in near pristine or slightly modified condition at 2001 Value 20: Freshwater health 1. Proportion of assessed sites which are with high in-stream biodiversity, based on macro-invertebrate community structure assessed using AusRivAs (as at April 2001) Value 21: Land health 1. Catchment condition index - proportion of assessed catchments that are in moderate or good condition in 2001
Austria	Indicators for the comprehensive assessment of sustainable	Headline indicators are in **bold**. **Sphere Man/Society:**

Country	Name of indicator set	List of indicators
	development in Austria	Nutrition: 1. **Body mass index** 2. Health behaviour 3. Sales figures for organic food 4. Food contaminated with residues of pesticides + dioxin, PCB, heavy metals and mercury Living and living space: 1. **Close social and functional mixing** 2. Housing costs relative to household income 3. Well-being in the living environment 4. Satisfaction with housing situation Health and well-being: 1. **Healthy life years at birth** 2. Self-perceived health status by level of income 3. Health care expenditure relative to GDP 4. Well-being/Health Education and research: 1. **Youth education attainment 20-24** 2. Life-long learning 3. Early school-leavers 4. Public expenditure on education and R&D as percentage of GDP International justice: 1. **Official Development Assistance (ODA)** 2. Amount of spending on central themes of Public Development Cooperation 3. Sale of selected fair trade labelled products 4. Contribution of the Clean Development Mechanism (CDM) to reducing greenhouse gas emissions in developing countries Intra- and intergenerational justice: 1. **Inequality of income distribution (top/lowest quintile)** 2. Gender pay gap in unadjusted form 3. Projected changes in age-related public expenditure on pensions and education Work: 1. **Total unemployment rate by age, gender and highest level of education** 2. Total unemployment rate by nationality and disabilities 3. Job satisfaction 4. Working climate index Unpaid work Housekeeping, childcare, and other forms of care Welfare: 1. **GDP per capita** 2. Equivalised household income 3. At-persistent-risk-of-poverty rate 4. Wealth in time Governance and participation: 1. **Level of Austrians' confidence in institutions** 2. Electoral participation 3. Number of LA21 processes 4. Creating the necessary framework conditions for sustainable

Country	Name of indicator set	List of indicators
		development 5. Environmental taxes Peace and security: **1. At-risk-of-poverty-rate before and after social transfers** 2. Sense of security 3. Crime, violence or vandalism in the neighbourhood 4. Disasters (floods, mudflows, avalanches) 5. Resource dependency Culture and art: 1. **Public expenditure on cultural activities** 2. Museum sites awarded a quality label 3. Cultural activities over the past 12 months Leisure: 1. **Satisfaction with leisure time organization** 2. **Compatibility of work and family life** 3. Leisure activities 4. Activities by associations and groups Mobility: 1. **Access of population to mobility** 2. External costs of transportation 3. Volume of transport (passenger and freight) 4. Emissions of air pollutants from transport activities Freedom: 1. **Autoritarianism index** **Sphere Environment:** Climate: 1. **Greenhouse gas emissions** 2. Projected GHG emissions up to 2020 Air: **Exceedances of the limit value for PM10** Exceedances of the ozone target value for the protection of human health Exceedanaces of the ozone target value for the protection of vegetation Exceedances of the NO_2-limit value for the protection of vegetation UV radiation: 1. **UV radiation intensity** 2. Thickness of the ozone layer Ionising radiation: 1. Gamma dose rate Energy and material flows: 1. **Energy consumption absolute and relative to GDP** (gross domestic energy consumption and final energy consumption 2. **Material input (DMC and DMI)** 3. Groundwater quantity 4. Amount of waste Landscape: 1. **Landscape changes**

Country	Name of indicator set	List of indicators

		2. **Changes in use of land (forests, grassland/arable land)**
		3. Development of specific areas for OPUL measures
		4. Development of area/length and quality of characteristic landscape features
		5. Fragmentation
		6. Surface area of managed grassland
		
		Ecosystems:
		  1. **Bird species groups and orchids as indicators of habitat quality**
		  2. Naturalness of composition of tree species
		  3. Activities to promote biodiversity
		
		Water:
		  1. **Quality of surface water (ecomorphology)**
		  2. **Bodies of running water: ecological and chemical condition**
		  3. **Groundwater quality**
		  4. Lakes: ecological and chemical condition
		  5. Substantially modified or artificial bodies of water: ecological potential and chemical condition
		
		Soil:
		  1. **Use of soil**
		  2. **Percentage of sealed land**
		  3. Accumulation of harmful substances in the topsoil or exceedance of the recommended values
		  4. Percentage of farmland with anti-erosion measures
		
		Toxic and environmentally harmful substances:
		  1. **Chemicals index**
		  2. **Consumption of specific materials**
		
		Noise:
		  1. **Noise pollution**
		  2. Percentage of population exposed to street traffic noise above the threshold levels
		  3. Percentage of population exposed to railway noise above the threshold levels
		  4. Percentage of the population exposed to air traffic noise above the threshold levels

Belgium	No national programme	Has federal and regional programmes to develop and use SDIs, but no national programme.
Canada	Environment and Sustainable Development Indicators for Canada	1. Air quality 2. Greenhouse gas emissions 3. Freshwater quality 4. Forest cover 5. Extent of wetlands 6. Educational attainment These indicators supplement traditional health and economic measures.
Czech Republic		1. Gross domestic product per capita 2. Share of government deficit/surplus in GDP; Share of government debt in GDP 3. Current account of balance of payments/GDP ratio 4. Labour productivity 5. Environmental protection expenditures 6. Public environmental protection expenditures 7. Material consumption

Country	Name of indicator set	List of indicators
		8. Passenger transport intensity 9. Freight transport intensity 10. Energy intensity of GDP 11. Total consumption of primary energy supply 12. Share of energy from renewable sources 13. CO_2 emissions per capita 14. CO_2 emissions per GDP 15. Material use of waste 16. Consumption of basic nutrients in industrial fertilisers 17. Consumption of pesticides 18. Index of common species of wild birds 19. Index of alien species of plants 20. Share of organic farming in total farmland 21. Life expectancy 22. Mortality 23. General unemployment rate 24. Registered unemployment rate 25. Employment if older people 26. Population living below poverty line before and after social transfers 27. Research & Development expenditure 28. Highest level of education attained 29. Access to the Internet 30. Total international development cooperation 31. Availability of public cultural services 32. Average duration of court proceedings 33. Corruption perceptions index 34. Coverage of the Czech Republic's territory by approved town and country documentation of municipalities 35. Regional dispersion of the employment rate of the 15-64 category 36. Civil society

Denmark	Set of indicators for Denmark	**Key indicators:**
		1. GDP per capita
		2. Decoupling illustrated by Environmental impact in relation to GDP for 4 factors:
		  2.1. Greenhouse gases
		  2.2. Runoffs of nutrients into the sea
		  2.3. Emissions of acidifying substances
		  2.4. Emissions to air
		3. Genuine savings
		4. Employment analysed by age group
		5. Average life expectancy (analysed between men and women)
		6. Gross emissions of greenhouse gases (analysed between industry, transport, households, agriculture, and waste)
		7. Numbers of chemicals which have been classified
		8. Areas of natural habitats
		9. Resource flows for 3 factors (energy consumption, drinking water consumption, waste) in relation to GDP
		10. Assistance funds as a percentage of GNI
		11. The environmental profile of the Energy sector
		12. Number of ecolabelled products
		13. Number of EMAS and ISO 14001 registered enterprises
		
		Cross sectional effort:
		
		Changes in Climate:
		1. Atmospheric concentration of CO2

Country	Name of indicator set	List of indicators
		2. Average temperatures in the world and in Denmark 3. The effect of climatical changes in Denmark measured by the start and size of the pollen season 4. CO2 per capita in the world, and by region (incl. Denmark) 5. Gross emissions of CO2, N2O, CH4, HFC, PFC og SF6 6. Gross emissions of CO2 as of GDP 7. Net emissions of greenhouse gases *Biological adversity:* 1. Governmental aquisition of land areas for nature purposes 2. Areas of natural habitats 3. Status of species and biology included in NATURA 2000 4. Attainment of goals and quality of water for Danish lakes 5. Runoffs of CO and phosphate to the sea *Environment and health issues:* • Occurrence of bronchial asthma and asthma, allergenic cold, and allergic eczema • Numbers of chemicals which have been classified • Sale of pesticides, classified as specially dangerous • Emission of SO2, Nox, VOC and NH3 • Thickness of the Ozon layer • Earth pollution clean up, made in connection with building of houses or supply of drinking water • Pesticides in water used for drinking • Beaches with low water quality, bathing not advised • Level of animal medicine leftovers in food • PCB in cod lever, cod captured in Danish territory • 4 heavy metal in Danish nutritional products • Work related injuries • Consumption of cancer developing products in the Danish industry • Danish consumption of inland resources • Development in waste and GDP • Volume of recircled waste compared to total waste • Volume of waste from 4 sectors (household, service industry, industry and construction) • Recircling of raw material in construction business • Known reserves in the North Sea as of year production • Development in areas as of nature, wood, farm land, housing and roads • Development in Foreign aid as percentage of BNI, environmental projects not included • Humans with less than USD 1 in income, in the world • Number of sickness related to nutrition products • Runoff and removal of agricultural nutritions • Number of enterprises with green accounting/environmental administration • Areas with MVJ-arrangements • Treatment frequency of pesticides on conventional cultivated areas • Numbers of and areas used for ecological agriculture • The agricultural influence illustrated by energy consumption, pesticide treatment and units of animals • Numbers of enterprises, size and specialization (harmonic and non-harmonic) • Numbers of fishing stock with spawning within safe biological limits, and numbers of fisheries administered within safe biological limits • The capacity of the fishery fleet

Country	Name of indicator set	List of indicators
		Sectors: 1. Lumber industry, renewal and planting 2. Woods with special biodiversity considerations 3. Recreational activity in Danish forests 4. Total area with forest 5. Number of product licences with environmental brands 6. Number of EMAS and ISO 14001 registered enterprises 7. Index for resource efficacy for energy and water as of GDP 8. Development of the enterprises' emission of CO_2, Nox, SO_2 and value added by the manufacturing industry 9. Number of tourist activities which participates environmental branding 10. Number of "Blue flag" beaches and harbours 11. Average distance in transport, by activity 12. Road work as of GDP 13. Private transport by means of transport 14. Industrial transport by means of transport 15. Emissions to air (CO_2, CO, PM10, Nox, NMVOCand SO_2), transport by land 16. Emissions to air (CO_2, CO, PM10, Nox, NMVOCand SO_2), inland transport by sea 17. Number of fatal accidents by means of transport 18. Average energy efficacy by private transport 19. Average energy efficacy by industrial transport 20. Average capacity efficacy and cargo for trucks 21. Energy efficacy for new private cars 22. Emissions of CO_2, SO_2, Nox 23. Gross energy consumption, actual numbers and as of GDP 24. Energy intensity, by total production and by sectors 25. Electricity and biobased heating as share of total energy 26. Renewable energy as of total energy consumption 27. Land areas used for cities 28. Share of new office buildings within a distance of 500 meters to a railway station 29. Share of buildings with biobased heating or central heating, bathroom and lavatories 30. Percentage of inhabitants in Copenhagen and Ålborg with access to green areas within walking distance of 15 minutes 31. Energy consumption for indoor heating in housing 32. Index for development of electrical and water consumption, and waste volume for private housing 33. Number of newly constructed houses for rent, by different constructions 34. Environmental consequences of governmental proposals 35. Number of schools with green flags 36. Number of guides for understanding of nature 37. Total expenditure for research and development 38. Numbers of communities with initiation of local Agenda 21
Finland	Sustainable development indicators for Finland	Finland's 34 headline indicators are listed below. There are also more than 50 additional indicators which are not translated to English. The strengths and challenges of sustainable development indicators in Finland: 1. Environmental sustainability index 2. Human development index Balance between the use and protection of natural resources: 1. Greenhouse gas emissions 2. Total energy consumption 3. Use of renewable energy sources

Country	Name of indicator set	List of indicators
		4. Proportion of endangered species by habitat 5. Use of energy and natural resources in relation to economic growth 6. Acidifying and eutrophying emissions and greenhouse gas emissions in relation to economic growth 7. Development of Finland's use of natural resources 1970-2025 (incl, forecasts) 8. Proportion of household expenditures on services 9. Nutrient load in the Baltic Sea Sustainable communities in a sustainable regional structure: 1. Relative change in population in different regions of continental Finland 2. Distance of certain services from the homes of 15-74-year olds 3. Economic dependency ratio by province 4. Service satisfaction of citizens examined by municipal class 5. Development of public and passenger car transport Citizens – well-being throughout the entire life cycle: 1. Life expectancy at birth 2. Average age of retirement 3. Occupational diseases and accidents 4. Population development by age group 5. People with low employment potential 6. Immediate placement of 9th grade students in further studies 7. Per capita alcohol consumption and deaths attributable to alcohol 8. Employment rate for immigrants and number of non-Finnish speaking schoolchildren 9. Participation of 14-year olds in social organizational work 10. Voting activity The economy as a safeguard for sustainable development: 1. Economic dependency ratio 2. GNP per inhabitant 3. Public debt in relation to GNP divided into state and municipal shares of debt 4. Number of employed unemployment rate 5. Finland's competiveness in relation to other OECD countries assessed in terms of relative costs of work unit Finland as a global actor and bearer of responsibility: 1. Appropriations for public development co-operation 2. Direct investments from Finland in other countries Supporting sustainable choises: 1. Research and development expenditures and patents granted

Country	Name of indicator set	List of indicators
France	45 indicators of sustainable development: a contribution from Ifen	THEME 1: SUSTAINABLE GROWTH 1. Module 1: "Eco-efficient" growth 1.1. CO_2 emissions and GDP 1.2. Energy consumption and GDP 1.3. Raw materials consumption and GDP 1.4. Mobility and GDP 1.5. Household waste production and income 1.6. Eco-efficiency in the agricultural sector 2. Module 2: Integrating the environment into the production structure 2.1. Energy production from renewable sources 2.2. The changing pattern of rail transport 2.3. Organic agriculture 2.4. Changes in treatment methods for household waste 2.5. Environmental protection expenditure in the French economy THEME 2: CRITICAL HERITAGE AND RESOURCES 3. Module 3: Sustainable use of resources 3.1. Production of aggregate 3.2. Changes in artificially sealed land 3.3. Changes in agricultural land uses: potential effects on concentrations of organic matter 3.4. Overfishing 4. Module 4: 4.1. Contamination of inland waters by pesticides 4.2. Biodiversity: changes in the population of common bird species 4.3. The population's stat of health and life expectancy 4.4. Proportion of young people leaving school with no qualifications 4.5. Road safety problems 4.6. Expenditure on nature protection 4.7. Maintaining and protecting heritage monuments THEME 3: THE SPATIAL DIMENSION AND THE GLOBAL PERSPECTIVE 5. Module 5: Inequality and spatial distribution 5.1. Urban sprawl 5.2. Distribution of technological risks across France 5.3. Spatial pressures induced by tourism 6. Module 6: Relationships between France and the rest of the world 6.1. France's contribution to the greenhouse effect 6.2. Official development assistance 6.3. Governance and respect for Community law THEME 7: SATISFYING THE NEEDS OF PRESENT-DAY GENERATIONS 7. Module 7: Inequality and exclusion 7.1. Gender inequalities in salary 7.2. Proportion of households living below the poverty line 7.3. Occupational hazards 7.4. Access to justice 8. Module 8: Behaviour reflecting dissatisfaction 8.1. The suicide rate 8.2. Electoral abstention 8.3. Engagement in non-governmental, not-for-profit groups 8.4. Confidence in French institutions regarding environmental issues THEME 5: THE LONG TERM AND FUTURE GENERATIONS

Country	Name of indicator set	List of indicators
France		10. Module 10: Vulnerability and adaptability to unforeseen circumstances 10.1. Energy independence 10.2. Enterprise initiatives and business failures 10.3. Expenditure on continuing education and training 10.4. Farm specialisation and crop rotation practices 10.5. Natural risks
Germany	21 Indicators for the 21st century	21 key indicators: 1. Productivity of energy and raw materials 2. Emissions of the 6 greenhouse gases specified in the Kyoto agreement 3. The proportion of renewable energy sources in overall energy consumption 4. Increase in land use for housing and transport 5. Development of the stocks of specified animal species 6. Balance of public sector financing 1. Capital-outlay ratio 2. Private- and public-sector expenditure of research and development 3. Educational outcomes for 25-year-olds and number of new students 4. Gross domestic product 5. Transport intensity and share of the railways in providing goods transport 6. Proportion of ecological agriculture and general statement on nitrogen surplus 7. Air pollution 8. Satisfaction with health 9. Number of burglaries 10. Labour force participation rate 11. Full-time care facilities 12. Relationship between male and female gross annual earnings 13. Number of foreign school-leavers who have not completed secondary school 14. Expenditure on development collaboration 15. EU imports from developing countries

Country	Name of indicator set	List of indicators
Hungary		The indicators listed was prepared for the Johannesburg summit I 2002. **Social dimension:** 1. Measures of income inequality 2. Unemployment rate 3. Level of social benefit per capita 4. Female to male wage ratio 5. Child welfare 6. Nutrition status of population 7. Mortality due to selected key illnesses 8. Life expectancy at birth 9. Population connected to sanitation system 10. National health expenditure 11. Immunisation against childhood diseases 12. The highest level of education attainment 13. Low level of education attained 14. Improvement of housing conditions 15. Household composition 16. Reported crimes 17. Population growth rate 18. Net migration rate **Environmental dimension:** 1. Emissions of greenhouse gases in Hungary 2. Consumption of ozone depleting substances 3. Consumption by chemical type 4. Air pollutants in urban areas 5. Agricultural area and organic farming 6. Use of fertilisers and pesticides 7. Forest area and its utilisation 8. Intensity of water use 9. Biochemical oxygen demand (BOD) of largest rivers 10. Quality of bathing waters 11. Biodiversity and number of protected species **Economic dimension:** 1. Per capita GDP in Hungary 2. Investment share of GDP 3. Value added by main sectors of economy 4. Inflation rate 5. Net current account 6. Foreign direct investment 7. General government gross net debt 8. Material consumption 9. Energy consumption by sectors 10. Energy use and intensity 11. Comparison of energy indicators 12. Energy production 13. Municipal waste collected and its disposal 14. Generation of industrial waste by sectors 15. Generation and disposal of hazardous waste 16. Generation and disposal of radioactive waste 17. Recycling of waste paper and glass 18. Pattern of passenger transport 19. Freight transport by mode 20. Environmental expenditures (industrial sector)

Country	Name of indicator set	List of indicators
Iceland		An English version of the list is under development. An version in Icelandic is available on: http://www.umhverfisraduneyti.is/media/Vefutgafa_baeklings/Velferd2005.pdf
Ireland		Indicators are published, but where?
Italy		More than 150 indicators are identified. 10 priority indicators: Where is English version?
Luxem-bourg	Indicateurs de developpement durable pour le Luxembourg.	The indicators are translated by the authors. 1. SOCIAL INDICATORS 1.1. Poverty: Percentage of households with disposable income under 60 percent of the median national disposable income 1.2. Unemployment level (percent) 1.3. ODA, percent of GNI 1.4. Dependency: Population older than 64 years relative to population 15-64 years 1.5. Population growth/change 1.6. Level of tertiary education 1.7. Death according to cause 1.8. Working accidents 1.9. Average living area (house) per person 2. ECONOMIC INDICATORS 2.1. Change in GDP (percent in fixed prices) 2.2. Capital formation (percent in net and gross terms) 2.3. Structure of the economy (percent of different industries' contribution to gross value added, fixed prices) 2.4. Public debt as percentage of GDP (current prices) 2.5. Average annual inflation 2.6. Energy intensity (energy use, GDP and GDP/unit of energy) 2.7. Public and private sector's consumption of nationally produced electricity (percent) 2.8. Transport on land: Modal split = numbers of public transport journeys relative to all motorised journeys in a day (percent) 2.9. Development in agricultural income (in real terms and relative to average the national gross salary) 3. ENVIRONMENTAL INDICATORS 3.1. Degree of pollution in inland waters (percentage of rivers with high or too high biochemical or organic pollution level) 3.2. Emissions of greenhouse gases (tons of CO_2 equivalents per year) 3.3. Emissions of 2 main ozone precursors (tons per year) 3.4. Land use 3.5. Percentage of agricultural land used for organic farming 3.6. Agricultural areas under an environmental and biodiversity protection scheme and agricultural production compatible with environmental goals 3.7. State of plant health of forests/trees: percent of sick or dead trees (according to 17 criteria to measure this) 3.8. Area of protected land (percent of land under different protection laws) 3.9. Waste management (municipal waste): generated, recycled and disposed (kilos per inhabitant)

Country	Name of indicator set	List of indicators

Netherlands	Sustainability indicators	1. Social and cultural
		  1.1. Poverty
		  1.2. Child labour
		  1.3. Hunger
		  1.4. Armed conflict and terrorism
		  1.5. Human rights
		  1.6. Crime
		  1.7. Cultural differences (multicultural society)
		  1.8. Education
		  1.9. Healthcare
		  1.10. Unemployment
		  1.11. Global population growth
		  1.12. Pressure of work
		
		2. Economy
		  2.1. International cooperation
		  2.2. Pensions
		  2.3. Security of energy supply
		  2.4. Energy consumption (resource depletion)
		  2.5. Competitiveness - labour costs
		  2.6. Competitiveness - traffic congestion
		  2.7. National debt
		  2.8. Public expenditure
		  2.9. Energy price
		  2.10. Income per capita
		  2.11. Trade flows
		
		3. Ecology
		  3.1. Ozone layer
		  3.2. Availability of drinking water
		  3.3. Greenhouse effect
		  3.4. Water quality
		  3.5. Biodiversity
		  3.6. Local environment - health impacts
		  3.7. Use of space outside the Netherlands
		  3.8. Landscape quality

Norway		16 indicators of sustainable development: 1. Climate change, Norwegian emissions of greenhouse gases compared with the Kyoto target 2. Acidification, percentage of Norway's land area where the critical load for acidification has been exceeded 3. Terrestrial ecosystems, Bird Index – population trends of nesting wild birds 4. Fresh water ecosystems, rivers and lakes with clearly good ecological status 5. Coastal ecosystems, localities in coastal waters with clearly good ecological status 6. Efficiency of resource use, energy use per unit GDP 7. Management of renewable resources, recommended quota, TAC actually set and catches of Northeast Arctic cod 8. Hazardous substances, household consumption of hazardous substances 9. Sources of income, net national income per capita, by sources of income 10. Sustainable consumption, petroleum adjusted savings 11. Level of education, population by highest level of education completed 12. Sustainable public finances, generational accounts: need for tightening of public finances as share of GDP 13. Health and welfare, life expectancy at birth

Country	Name of indicator set	List of indicators
		14. Exclusion from the labour market, long-term unemployed persons and disability pensioners 15. Global poverty reduction, trade with Africa, by LDC-countries and other African countries 16. Global poverty reduction, Norwegian development assistance as percentage of gross national income

Portugal		General context:
		    GDP, energy consumption and environmental impacts
		    Direct material consumption
		    Unemployment rate
		    At-risk-of-poverty rate
		    Environmental management systems
		    Implementation of Community Law
		
		Climate change:
		  1. Greenhouse gas emissions
		  2. Surface air temperature
		  3. Rainfall
		  4. Renewable energy
		
		Air pollution:
		  1. Air quality
		  2. Exceedance of public information threshold values for tropospheric ozone
		  3. Emissions of tropospheric ozone precursors
		  4. Emissions of acidification and eutrophication pollutants
		
		Water use and water pollution:
		  1. Water extraction
		  2. Population served by public water supply
		  3. Drinking water quality
		  4. Population with sewerage and wastewater treatment
		  5. Quality of surface waters and bathing waters
		
		Land use and soil degradation:
		  1. Soil use
		  2. Population change and housing stock
		  3. Protected areas with land use plans
		  4. Organic farming
		  5. Forest fires
		  6. Coastal erosion
		
		Waste:
		  1. Waste generation
		  2. Treatment and final destination of waste
		  3. Waste recovery
		
		Noise:
		  1. Noise maps

Spain		No system of SDIs have been developed yet.

Sweden	Sustainable Development Indicators (Indikatorer för hållbar utveckling), Statistics Sweden	The full set of indicators (The 12 headline indicators are in **bold**):
		
		1. Health:
		  1.1. Life expectancy
		  1.2. Violence
		  1.3. Self-perceived health

Country	Name of indicator set	List of indicators
		1.4. Children's well-being 1.5. Asthma 1.6. Psychosocial work environment 1.7. Physical work environment 1.8. Smoking 1.9. Alcohol consuption 1.10. Obesity 1.11. Exercise habits 1.12. Traffic accidents 2. Sustainable consumption and production: **2.1. Energy efficiency** **2.2. Investments** 2.3. Transport of goods/GDP 2.4. Energy supply 2.5. Energy prices 2.6. Fuel consumption for cars 2.7. Green cars 2.8. Public transport 2.9. Radioactive waste 2.10. Household waste 2.11. Industrial waste 2.12. Environmental management systems 2.13. Ecological agriculture 2.14. Environmentally certified forests 2.15. Green public procurement 2.16. Investments in environmental protection 2.17. Employees of environmental companies 2.18. Environmental export 3. Economic development: **3.1. Employment rate** **3.2. Public debt** **3.3. Growth** 3.4. Inflation 3.5. Real wages 3.6. Unemployment 3.7. Hours worked per person 3.8. Research and development 3.9. Research 3.10. Innovation 3.11. Human capital 3.12. Continuing education 3.13. Business climate 4. Social relations: **4.1. Risk of poverty** **4.2. Demographic dependency ratio** 4.3. Distribution of income 4.4. Children at risk of poverty 4.5. Financial crisis 4.6. People born abroad at financial crisis 4.7. Regional demographic change 4.8. Long-term unemployment 4.9. Youth unemployment 4.10. People born abroad, employment 4.11. People with disabilities, employment 4.12. Sickness absenteeism 4.13. Fertility

Country	Name of indicator set	List of indicators
		4.14. Parental leave 4.15. Equal opportunity, wages 4.16. Equal opportunity, managers 4.17. Electoral participation 4.18. People born abroad, electoral participation 4.19. Trust in the media 4.20. School security 4.21. Basic requirements of the educational system 4.22. Housing overcrowding 4.23. Loneliness 4.24. Consumption of culture 4.25. Computers and broadband 5. Environment and climate: **5.1. Greenhouse gases** **5.2. Hazardous substances** 5.3. Hazardous chemicals, quantity 5.4. Temperature change 5.5. Carbon dioxide emissions from households 5.6. Nitrogen and phosphorus emissions 5.7. Ozone-depleting substances 5.8. Air quality 5.9. Traffic noise 5.10. Radon 5.11. Biodiversity 5.12. Cod population 5.13. Nature protection 5.14. Environmental taxes 5.15. Proximity to nature 6. Global development: **6.1. Development assistance** 6.2. Carbon dioxide emissions in industrialised and developing countries 6.3. Trade with poor countries 6.4. Poverty in developing countries
Switzerland	MONET	The hole set of indicators are not translated to English, only the 17 key indicators to measure progress. Meeting needs: Mental wellbeing Income Physical safety Unemployment Fairness: 1. Poverty 2. Official development assistance 3. Equality Preservation of resources: 1. Teenage reading skills 2. Public debt 3. Investment 4. Innovation and technology 5. Biodiversity 6. Developed land

Country	Name of indicator set	List of indicators
		Decoupling: 1. Freight transport 2. Passenger transport 3. Fossil fuel consumption 4. Consumption of raw materials
United Kingdom	National sustainable development indicators	68 indicators supporting four priority areas: **1. Greenhouse gas emissions** 2. Carbon dioxide emissions by end user 3. Aviation and shipping emissions 4. Renewable energy 5. Electricity generation 6. Household energy use 7. Road transport 8. Private cars 9. Road freight 10. Manufacturing sector (CO_2, NO_X, SO_2, PM_{10} emissions and output) 11. Service sector (CO_2, NO_X emissions and output) 12. Public sector (CO_2, NO_X emissions and output) **13. Resource use (Domestic Material Consumption and Gross Domestic Product)** 14. Energy supply (UK indigenous energy production and gross inland energy consumption) 15. Water resource use (Total abstractions from non-tidal surface and ground water, leakage losses and Gross Domestic Product) 16. Domestic water consumption 17. Water stress **18. Waste** 19. Household waste per person **20. Bird populations** 21. Biodiversity conservation 22. Agriculture sector 23. Farming and environmental stewardship 24. Land use (contextual) 25. Land recycling 26. Dwelling density **27. Fish stocks** **28. Ecological impacts of air pollution** 29. Emissions of air pollutants **30. River quality** 31. Flooding **32. Economic output (contextual)** 33. Productivity 34. Investment (contextual) 35. Demography (contextual) 36. Households and dwellings (contextual) **37. Active community participation** **38. Crime (vehicle, burglary and robbery)** 39. Fear of crime **40. Employment** **41. Workless households** 42. Economically inactive **43. Childhood poverty** 44. Young adults **45. Pensioner poverty** 46. Pensioner provision **47. Education**

Country	Name of indicator set	List of indicators
		48. Sustainable development education **49. Health inequality** 50. Health life expectancy 51. Mortality rates 52. Smoking 53. Childhood obesity 54. Diet **55. Mobility** 56. Getting to school 57. Accessibility 58. Road accidents **59. Social justice** **60. Environmental equality** 61. Air quality and health 62. Housing conditions 63. Households living in fuel poverty 64. Homelessness 65. Local environment quality 66. Satisfaction in local area 67. UK international assistance **68. Wellbeing** There are also 20 UK sustainable development strategy Framework indicators (marked in **bold**)
	Framework indicators in the UK sustainable development strategy	1. Greenhouse gas emissions 2. Resource use 3. Waste 4. Bird populations 5. Fish stocks 6. Ecological impacts of air pollution 7. River quality 8. Economic 9. Active community participation 10. Crime 11. Employment 12. Workless households 13. Childhood poverty 14. Pensioner poverty 15. Education 16. Health inequality 17. Mobility 18. Social Justice 19. Environmental equality 20. Wellbeing

Appendix B.

APPENDIX B. INTERNATIONAL SETS OF SUSTAINABLE DEVELOPMENT INDICATORS

International Organization	Name of indicator set	List of indicators and indicator themes

United Nations	Millennium Development Goal Indicators (United Nations Millennium Declaration)	48 selected indicators:
		1. Proportion of population below $1 (PPP) per day
		2. Poverty gap ratio [incidence x depth of poverty]
		3. Share of poorest quintile in national consumption
		4. Prevalence of underweight children under five years of age
		5. Proportion of population below minimum level of dietary energy consumption
		6. Net enrolment ratio in primary education
		7. Proportion of pupils starting grade 1 who reach grade 5
		8. Literacy rate of 15-24 year-olds
		9. Ratios of girls to boys in primary, secondary and tertiary education
		10. Ratio of literate women to men, 15-24 year-olds
		11. Share of women in wage employment in the non-agricultural sector
		12. Proportion of seats held by women in national parliament
		13. Under five mortality rate
		14. Infant mortality rate
		15. Proportion of 1 year-old children immunised against measles
		16. Maternal mortality ratio
		17. Proportion of births attended by skilled health personnel
		18. HIV prevalence among pregnant women aged 15-24 years
		19. Condom use rate of the contraceptive prevalence rate
		    2.19.1.1. Condom use at high-risk sex
		    2.19.1.2. Percentage of population aged 15-24 years with comprehensive correct knowledge of HIV/AIDS
		    2.19.1.3. Contraceptive prevalence rate
		20. Ratio of school attendance of orphans to school attendance of non-orphans aged 10-14 years
		21. Prevalence and death rates associated with malaria
		22. Proportion of population in malaria-risk areas using effective malaris prevention and treatment measures
		23. Prevalence and death rates associated with tuberculosis
		24. Proportion of tuberculosis cases detected and cured under directly observed treatment short course DOTS (International recommended TB control strategy)
		25. Proportion of land area covered by forest
		26. Ratio of area protected to maintain biological diversity to surface area
		27. Energy use (kg oil equivalent) per $1 GDP (PPP)
		28. Carbon dioxide emissions per capita and consumption of ozone-depleting CFCs (ODP tons)

International Organization	Name of indicator set	List of indicators and indicator themes
		29. Proportion of population using solid fuels 30. Proportion of population with sustainable access to improved water source, urban and rural 31. Proportion of population with sustainable access to improved sanitation, urban and rural 32. Proportion of households with access to secure tenure 33. Net ODA, total and to the least developed countries, as percentage of OECD/DAC donors' gross national income 34. Proportion of total bilateral, sector-allocable ODA of OECD/DAC donors to basic social services (basic education, primary health care, nutrition, safe water and sanitation) 35. Proportion of bilateral official development assistance of OECD/DAC donors that is untied 36. ODA received in landlocked developing countries as a proportion of their gross national incomes 37. ODA received in small island developing States as a proportion of their gross national incomes 38. Proportion of total developed country imports (by value and excluding arms) from developing countries and least developed countries, admitted free of duty 39. Average tariffs imposed by developed countries on agricultural products and textiles and clothing from developing countries 40. Agricultural support estimate for OECD countries as a percentage of their gross domestic product 41. Proportion of ODA provided to help build trade capacity 42. Total number of countries that have reached their HIPC decision points and number that have reached their HIPC completion points (cumulative) 43. Debt relief committed under HIPC initiative 44. Debt service as a percentage of exports of goods and services 45. Unemployment rate of young people aged 15-24 years, each sex and total 46. Proportion of population with access to affordable essential drugs on a sustainable basis 47. Telephone lines and cellular subscribers per 100 population 48. Personal computers in use per 100 population Internet users per 100 population
Eurostat	Sustainable Development Indicators	THEME 1: ECONOMIC DEVELOPMENT Level I: 1. Growth rate of GDP per capita Level II: 2. Investment as percentage of GDP, by institutional sector 3. Labour productivity per hour worked 4. International price competitiveness (Real effective exchange rate) 5. Total employment rate Level III: 1. Real GDP growth rate 2. GDP per capita in Purchasing Power Standards 3. Regional breakdown of GDP per capita 4. Total consumption expenditure as percentage of GDP 5. Net national income as a percentage of GDP 6. Inflation rate 7. Net saving as percentage of GDP, by institutional sector 8. Unit labour cost growth, for total and industry 9. Life-long learning 10. Turnover from innovation as a percentage of total turnover, by

International Organization	Name of indicator set	List of indicators and indicator themes
		economic sector 11. Total R&D expenditure as a percentage of GDP 12. Public expenditure on education as a percentage of GDP 13. Total employment growth 14. Total employment rate, by gender and by highest level of education attained 15. Total unemployment rate, by gender, by age group, and by highest level of education attained 16. Regional breakdown of employment rate THEME 2: POVERTY AND SOCIAL EXCLUSION Level I: • At-risk-of-poverty rate after social transfers Level II: • At-persistent-risk-of-poverty rate • Total long-term unemployment rate • Early school leavers Level III: • At-risk-of-poverty rate, by gender, by age group, by highest level of education attained, and by household type • Relative at-risk-of-poverty gap • Inequality of income distribution (Income quintile share ratio) • Poverty mobility (i.e. probability to enter or exit poverty) • Gender pay gap in unadjusted form • Very long-term unemployment rate • People living in jobless households, by age group • At-risk-of-poverty rate after social transfers by most frequent activity • Persons with low educational attainment, by age group • Adequacy of housing conditions THEME 3: AGEING SOCIETY Level I: 1. Current and projected old age dependency ratio Level II: 2. Projected theoretical replacement ratio (ratio between income after and prior retirement) 3. Ratio of median household equivalised income of persons aged 65+ to median household equivalised income of persons ages <65 4. Life expectancy at age 65 by gender 5. General government consolidated gross debt as percentage of GDP Level III: 1. At-risk-of-poverty rate for persons aged 65 years and over 2. Total fertility rate 3. Net inwards migration, by main age groups 4. Current and projected public (and private) pensions expenditure as percentage of GDP 5. Total employment rate by age group 6. Average exit age from the labour market 7. Current and projected public expenditure on care for the elderly as percentage of GDP THEME 4: PUBLIC HEALTH Level I: 1. Healthy life years at birth by gender

International Organization	Name of indicator set	List of indicators and indicator themes
		Level II: 2. Percentage of overweight people, by age group 3. Resistance to antibiotics (Streptococcus pneumoniae pathogens) 4. Death due to infectious food-borne diseases 5. Salmonellosis incidence rate in human beings 6. Index of apparent consumption of chemicals, by toxicity class 7. Index of production of chemicals, by toxicity class 8. Population exposure to air pollution by particulate matter Level III: 9. Healthy life years at age 65 by gender 10. Health care expenditure as percentage of GDP 11. Cancer incidence rate, by gender and by type 12. Suiside death rate, by gender and by age group 13. Percentage of present smokers, by gender and by age group 14. Work with high level of job strain/stress 15. Serious accidents at work 16. Dioxins and PCBs in food and feed 17. Heavy metals, and mercury in particular, in fish and shellfish 18. Pesticides in residues food 19. Population exposure to air pollution by ozone 20. Proportion of population living in households considering that they suffer from noise and from pollution 21. Monetary damage of air pollution as percentage of GDP THEME 5: CLIMATE AND ENERGY Level I: 1. Total greenhouse gas emissions 2. Gross inland energy consumption by fuel Level II: 3. GHG emissions by sector 4. Energy intensity of the economy 5. Final energy consumption by sector 6. Gross electricity generation by fuel used in power stations Level III: 7. CO_2 intensity of energy consumption 8. CO_2 removed by sinks 9. Share of renewable energy, by source 10. Combined heat and power generation as percentage of gross electricity generation 11. Energy intensity of manufactured industry 12. Consumption of biofuels, as a percentage of total fuel consumption in transport 13. External costs of energy use 14. Energy tax revenue at constant prices and energy consumption 15. High-level radioactive waste and spent nuclear fuel awaiting permanent disposal THEME 6: PRODUCTION AND CONSUMPTION PATTERNS Level I: 1. Total material consumption and GDP at constant prices 2. Domestic material consumption and GDP at constant prices Level II: 3. Emissions of acidifying substance and ozone precursors and GDP at constant prices, by source and sector 4. Generation of waste by all economic activities and by households 5. Municipal waste collected per capita 6. Electricity consumption per dwelling for lighting and domestic appliances

International Organization	Name of indicator set	List of indicators and indicator themes
		7. Green public procurement 8. Share of area under EU agri-environmental support in total utilised agricultural area 9. Livestock density index 10. Share of industrial production from enterprises with a formal sustainable management system 11. Enterprises with an environmental management system (EMS) <u>Level III:</u> 12. Components of Domestic Material Consumption 13. Domestic Material Consumption, by material 14. Municipal waste treatment, by type of treatment method 15. Generation of hazardous waste, by economic activity 16. Household number and size 17. Meat consumption per capita 18. Share of consumption of products with an EU or national eco-label 19. Nitrogen surplus 20. Share of area occupied by organic farming in total utilised agricultural area 21. Use of selected pesticides 22. Ethical financing 23. Eco-label awards, by country and by product group THEME 7: MANAGEMENT OF NATURAL RESOURCES <u>Level I:</u> 1. Biodiversity Index 2. Population trends of farmland birds 3. Fish catches outside safe biological limits <u>Level II:</u> 4. Sufficiency of Member States proposals for protected sites under the EU Habitats directive 5. Trends of spawning biomass of selected fish stocks 6. Groundwater abstraction as percentage of available groundwater resources 7. Land use change, by category 8. Built-up area as a percentage of total land area 9. Exceedance of critical loads of acidifying substances and nitrogen in sensitive natural areas <u>Level III:</u> 10. Change in status of threatened and/or protected species 11. Effective fishing capacity and quotas, by specific fisheries 12. Size of fishing fleet 13. Structural support to fisheries and percentage allocated to promote env. friendly fishing practices 14. Population connected to wastewater treatment systems 15. Emissions of organic matter as biochemical oxygen demand to rivers 16. Index of toxic chemical risk to aquatic environment 17. Percentage of total land area at risk of soil erosion 18. Percentage of total land area at risk of soil contamination 19. Percentage of forest trees damaged by defoliation 20. Fragmentation of habitats due to transport THEME 8: TRANSPORT <u>Level I:</u> 1. Vehicle-km and GDP at constant price 2. Energy consumption by transport and GDP at constant price <u>Level II:</u>

International Organization	Name of indicator set	List of indicators and indicator themes
		3. Car share of inland passenger transport 4. Road share of inland freight transport 5. External costs of transport activities 6. Emissions of air pollutants (particulate matter and ozone precursors) from transport activities 7. Greenhouse gas emissions by transport activities, by mode Level III: 8. Modal split of passenger transport 9. Modal split of freight transport 10. Volume of freight transport and GDP at constant price 11. Energy consumption by transport mode 12. Access to public transport 13. Freight transport prices by mode 14. Investment in transport infrastructure by mode 15. People killed in road accidents, by age group 16. Emissions of NO_X from road vehicles (petrol and diesel) THEME 9: GOOD GOVERNANCE Level I: 1. Level of citizens' confidence in EU institutions Level II: 2. Proportion of environmentally harmful subsidies 3. Number of infringement cases brought in front of the Court of Justice, by policy area 4. Administrative costs imposed by legislation 5. Voter turnout in national parliamentary elections 6. Responses to EC Internet public consultations Level III: 7. Share of major proposals in the Commission's Legal and Work Programme for which an impact assessment has been undertaken 8. Transposition of Community law, by policy area 9. Voter turnout in EU parliamentary election s, by gender, by age group and by highest education attained 10. E-government on-line availability 11. E-government usage by individuals THEME 10: GLOBAL PARTNERSHIP Level I: 1. Official Development Assistance (ODA) as percentage of Gross National Income Level II: 2. EU imports from developing countries (total and agricultural products) and agricultural budgetary support 3. Sales of selected fair-trade labelled products 4. Bilateral ODA by category 5. EU imports of materials from developing countries, by group of products Level III: 6. Total EU imports from developing countries, by income group 7. Total EU imports from developing countries, by group of products 8. Total EU financing for development, by type 9. ODA and FDI to developing countries, by income group and geographical area 10. Share of untied ODA in total bilateral ODA commitments 11. ODA per capita, in EU donors and in recipient countries 12. Contribution of the Celan Development Mechanism (CDM) to GHG emission reductions in developing countries 13. CO_2 emissions per capita in the EU and in developing countries

International Organization	Name of indicator set	List of indicators and indicator themes
MAP, UNEP, Plan Bleu	Indicators for MSSD follow-up	**I- GLOBAL FOLLOW-UP OF PRGRESS TOWARDS SUSTAINABLE DEVELOPMENT IN THE MEDITERRANEAN** The major macro indicators will be used, taking into account the usual interpretation caveats **II- THE 34 PRIORITY INDICATORS FOR MSSD FOLLOW-UP** 1. Water efficiency index (total and per sector with reference to objectives) 2. Water intensity index ratio compared to GDP and research of evaluation of Water intensity irrigated agriculture production added value compared with water demand for irrigation 3. Exploitation index of renewable water resources 4. Proportion of the population with access to safe drinking-water (total, urban, rural) with reference to MDGs 5. Proportion of the population with access to sanitation (total, urban, rural) with reference to MDGs 6. Energy intensity, total and per sector, with reference to efficiency objectives 7. Proportion of renewable energies in the energy balance sheet 8. Green house gas emission 9. Number of carbon emission reductions and amount financed in the framework of the Kyoto Protocol flexibility mechanisms by the annex 1 countries to the benefit of other Mediterranean countries 10. Motorized transport intensity in relation to the GDP 11. The proportion of road transport in terms of freight transport 12. Proportion of public surface transport (urban and interurban) 13. Proportion of non-seaside beds in total number of holiday beds 14. International tourism receipts with assessment of effective benefits for destination countries and local populations 15. Agricultural population to rural population ratio, with identification of socio economic indicators (employment, businesses) 16. Loss of arable land by desertification, erosion, salinization, artificialization and agriculture abandonment 17. Sustainable rural development programmes for underprivileged rural areas, reconciling human development and environmental protection, including biosphere reserves and natural parks (proportion of relevant department budget) 18. Proportion of agriculture quality products (identification, labelling and geographical origin, homeland products, labels, organic farming) 19. Number of cities with over 10 000 inhabitants engages in a process Agenda 21 type or in urban renewal programmes 20. Proportion of urban population with access to a decent dwelling 21. Household waste generation per capita and the number of uncontrolled dumping sites 22. Air quality in major Mediterranean urban areas, assessed via a composite index (indicator) to be defined (e.g. ATMO index) 23. Artificialized coastline/ Total coastline (0-1 km and 1-10 km strip) 24. Operational pollution from ships 25. Proportion of coastal urban inhabitants with no access to sanitation 26. Surface of protected coastal and marine areas 27. ODA allocated as percentage of OECD DAC countries donors'

International Organization	Name of indicator set	List of indicators and indicator themes
		GNP, proportion of the ODA allocated to Mediterranean countries and proportion contribution to the strategy objectives 28. EU net public financial flows to EU Mediterranean members, candidates, CARDS and MEDA countries (in absolute value and per capita) and proportion contributing to the objectives of the strategy 29. Proportion of bank credit allocated to the private sector - Existence of alternative financing systems to bank credit 30. Proportion of local government tax revenue as percentage of total tax revenues (government receipts). Proportion of government budget allocated to local authorities. 31. Public financial mechanisms to support the least favoured regions 32. Literacy rate of young people between 15 an 25 years old 33. The girl/boy ratio enrolment in primary education and high school 34. Public and private expenses for research and development in percentage of GDP III- ADDITIONAL INDICATORS FOR MSSD FOLLOW-UP 1. Regulation indexes (average flow of regulated resources compared to total flow) 2. Unsustainable water exploitation index 3. Purification rate of collected wastewater 4. Electrification rate (urban/rural) in measuring the proportion of renewable energies in the new services to isolated rural areas 5. Reduce tourism's negative environmental impact, especially coastal - indicator to be defined 6. Tourism density along the coast 7. Proportion of rural population under national poverty level 8. Arificialized land use per capita 9. Biodiversity indicator - to be defined 10. Share of surface area of posidonia in the infra-coastal zone 11. Share of regulated sanitary landfills 12. Hazardous waste production 13. Improve coastal water quality - composite indicator to be defined 14. Type 2 initiatives 15. Proportion of the EU FDI going to Mediterranean countries to the total extra-EU FDI 16. Balance of the net financial flows to Mediterranean developing countries (including workers' remittances, ODA, FDI) 17. Countries that have ratified the Aarhus Convention 18. Maintain cultural divercity - indicator to be defined 19. Implement national strategies for sustainable development - national or sectoral strategies adopted or renewed
United Nations	Indicators of sustainable development.	**CSD Theme Indicator Framework** THEME: SOCIAL 1. Percent of population living below poverty line 2. Gini index of income inequality 3. Unemployment rate 4. Ratio of average female wage to male wage 5. Nutritional status of children 6. Mortality rate under 5 years old 7. Life expectancy at birth 8. Percent of population with adequate sewage disposal facilities 9. Population with access to safe drinking water 10. Percent of population with access to primary health care

International Organization	Name of indicator set	List of indicators and indicator themes
		facilities 11. Immunization against infectious childhood diseases 12. Contraceptive prevalence rate 13. Children reaching grade 5 of primary education 14. Adult secondary education achievement level 15. Adult literacy rate 16. Floor area per person 17. Number of recorded crimes per 100 000 population 18. Population growth rate 19. Population of urban formal and informal settlements THEME: ENVIRONMENTAL 1. Emissions of greenhouse gases 2. Consumption of ozone depleting substances 3. Ambient concentration of air pollutants in urban areas 4. Arable and permanent crop land area 5. Use of fertilizers 6. Use of agricultural pesticides 7. Forest area as a percent of land area 8. Wood harvesting intensity 9. Land affected by desertification 10. Area of urban formal and informal settlements 11. Algae concentration in coastal waters 12. Percent of total population living in coastal areas 13. Annual catch by major species 14. Annual withdrawal of ground and surface water as a percent of total available water 15. BOD in water bodies 16. Concentration of faecal coliform in freshwater 17. Area of selected key ecosystems 18. Protected area as a percentage of total area 19. Abundance of selected key species THEME: ECONOMIC 1. GDP per capita 2. Investment share in GDP 3. Balance of trade in goods and services 4. Debt to GNP ratio 5. Total ODA given or received as a percent of GNP 6. Intensity of material use 7. Annual energy consumption per capita 8. Share of consumption of renewable energy sources 9. Intensity of energy use 10. Generation of industrial and municipal solid waste 11. Generation of hazardous waste 12. Management of radioactive waste 13. Waste recycling and reuse 14. Distance travelled per capita by mode of transport THEME: INSTITUTIONAL 1. National sustainable development strategy 2. Implementation of ratified global agreements 3. Number of internet subscribers per 1000 inhabitants 4. Main telephone lines per 1 000 inhabitants 5. Expenditure on research and development as a percent of GDP 6. Economic and human loss due to natural disasters