

UNEP AND THE CSD PROCESS FOR SUSTAINABLE DEVELOPMENT INDICATORS

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Introduction

The adoption of Agenda 21, the global action plan for sustainable development, at the United Nations Conference on Environment and Development (UNCED), the Rio Earth Summit, in 1992, was a high point in international efforts to address the challenges of planetary sustainability. It called for new levels of cooperation and collaboration at the international level, among them the development of indicators of sustainable development. This paper explores the ways in which the international community, and particularly the United Nations (UN), organised to respond to this mandate, as seen from the perspective of the United Nations Environment Programme (UNEP, now UN Environment) and the UN System-wide Earthwatch. I had been named by UNEP to coordinate Earthwatch in early 1992, after serving in the UNCED secretariat and contributing to the drafting of Agenda 21, so I was directly responsible to oversee the implementation of this mandate, becoming task manager responsible for Chapter 40 of Agenda 21, Information for Decision-making, in reporting to the UN Commission on Sustainable Development (CSD). This is the story of how an international civil servant, with a broad responsibility but essentially no resources, responds to such a challenge at the science-policy interface. A separate paper describes in parallel the intellectual history of the evolving concept of indicators of sustainable development (Dahl, Chapter 3, this volume).

The Earthwatch coordination function was itself quite unique in the UN system. It originated in the UN Conference on the Human Environment in Stockholm in 1972 (UN 1973) which named the environmental assessment part of its action plan "Earthwatch", and became the responsibility of UNEP. It was reinforced by UN General Assembly resolutions, mentioned explicitly as a coordination function in Agenda 21, and confirmed by the Advisory Committee on Coordination made up of the heads of all UN agencies. Yet it was a function without clear definition and not answerable to anybody beyond UNEP management, leaving room for considerable creativity in carrying out its responsibilities. It could convene meetings of all relevant parts of the UN system, and took advantage of the emerging Internet to use its web site as a principal means of information sharing (www.un.org/earthwatch/ and archival web site at <http://yabaha.net/dahl/earthw.html>). With broad responsibility for environmental assessment at the global level, it covered data collection and management including global observing systems,

environmental assessments and reporting, scientific advisory processes, and the whole science-policy interface. Indicators were a logical part of this mandate.

The organisations of the UN family, like many institutions, do not like to be coordinated, especially by an upstart like UNEP. It is a bit like naming yourself an orchestra conductor, inviting musicians to join you, trying to convince the players to play a single work together, and setting the rhythm, in the hope that they will produce something harmonious. Building trust and respect is important, with a focus on showing everyone's efforts in a good light, providing strategic vision, and identifying areas where many see the advantages of cooperation. It helped that the UN System-wide Earthwatch Coordination office was so small (myself and a half-time secretary) and thus represented no threat of empire-building.

The indicators agenda

With respect to indicators, the mandate from Rio was clear (Boulanger, Chapter 9). Chapter 40 of Agenda 21 states: "Indicators of sustainable development need to be developed to provide solid bases for decision-making at all levels and to contribute to a self-regulating sustainability of integrated environment and development systems" (UN 1992 §40.4). "Within the organs and organizations of the United Nations system and relevant international organizations, data-collection activities, including those of Earthwatch and World Weather Watch, need to be strengthened" (UN 1992 §40.8).

Institutional capacity to integrate environment and development and to develop relevant indicators is lacking at both the national and international levels. Existing institutions and programmes such as the Global Environmental Monitoring System (GEMS) and the Global Resource Information Database (GRID) within UNEP and different entities within the system-wide Earthwatch will need to be considerably strengthened. Earthwatch has been an essential element for environment-related data. While programmes related to development data exist in a number of agencies, there is insufficient coordination between them. The activities related to development data of agencies and institutions of the United Nations system should be more effectively coordinated, perhaps through an equivalent and complementary "Development Watch", which with the existing Earthwatch should be coordinated through an appropriate office within the United Nations to ensure the full integration of environment and development concerns.

(UN 1992 §40.13)

This development watch was never created, but Earthwatch interpreted its responsibility as including all the dimensions of sustainable development.

Assembling the principal stakeholders

The first step was to identify the key stakeholders and experts who could contribute to the process of indicator development, both in the United Nations itself and in the scientific community. The World Resources Institute (WRI) started the process by organising a Workshop on Environmental Indicators in Washington, D.C., 7-8 December 1992, bringing together 21 indicator experts from international organisations (FAO, OECD, UNDP, UNEP Earthwatch, UN University, World Bank), national governments (Canada, Japan, Mexico, Netherlands, USA), and research institutes and universities in Argentina, Canada, England, India, and USA. The

workshop concluded on the importance of focussing on the needs of policymakers; the needs of developing countries; developing a minimum set of indicators, not more than 3 or 4 in terms of composite indicators; and the need for rapid development of candidate indicators (Tunstall et al. 1994). Some of the experts present, including Albert Adriaanse of the Dutch Ministry of Environment, Allen Hammond of WRI, Jeff Tschirley (FAO), Manuel Winograd, and myself, continued in the indicators process in varying capacities. This was a first opportunity to share concepts and experience, with background papers from the participants, and opportunities to plan future cooperation. It marked the beginning of a community of sustainable development indicator practitioners.

The United Nations also needed to define how it would take the indicators agenda forward at the interface between science and policy. I organised together with Peter Bartelmus of UNSTAT (UN Statistical Division) the UNEP/UNSTAT Consultative Expert Group on Environment and Sustainable Development Indicators in Geneva on 6–8 December 1993 (UNEP/UNSTAT 1993) with 20 organisations represented from inside and outside the UN system. We invited Bedřich Moldan, first Minister of Environment in the Czech Republic, a vice president of the Commission on Sustainable Development, and Director of the Environment Center at Charles University in Prague, to chair the meeting, as he was a scientist, diplomat, and policymaker. He continued to be a key player in the development of indicators, and we have collaborated on many occasions. Some other experts who remained with the core group continuing after this meeting included Jan Bakkes of RIVM (Rijksinstituut voor Volksgezondheid en Milieu) and John O'Connor of the World Bank. The meeting consulted on a process leading to a common framework for a set or sets of indicators and elements of a work plan on environmental indicators and indicators of sustainable development for national and international use. After the meeting, UNEP and UNSTAT tried to maintain the consultative group as an informal network to continue discussion on indicators. By July 1994, there were 35 members in the list, but it proved difficult to sustain networking on the different issues identified.

One outcome of the meeting was the recognition that a scientific process was needed to stimulate research on sustainable development indicators in support of the intergovernmental process. Professor Moldan was also active in the Scientific Committee on Problems of the Environment (SCOPE) of the International Council of Scientific Unions (ICSU, now the International Council for Science). He therefore organised a SCOPE project in collaboration with UNEP to develop highly aggregated indicators of sustainable development (1994–1997) with a scientific committee in which I participated.

The process that went ahead focussed mostly on biophysical, social, and institutional indicators. Despite the efforts of Peter Bartelmus at UNSTAT to link the CSD indicators to the development of a System for Integrated Environmental and Economic Accounting (SEEA) (UNSTAT 1993), no real connection was made. His significant effort *Towards a Framework for Indicators of Sustainable Development* (Bartelmus 1994) could not overcome the basic dichotomy of monetary accounting versus physical indicator development. Bartelmus contributed to the development of green accounting, and the UN Statistical Division maintained a programme to compile environmental statistics and indicators, but without real cooperation with the CSD indicators work programme.

Inter-agency coordination

As part of the effort to implement Agenda 21, the UN created an Inter-Agency Committee on Sustainable Development (IACSD) to coordinate efforts within the UN system and to allocate responsibilities as task managers for the chapters of Agenda 21 in reporting to the Commission

on Sustainable Development (CSD). As Task Manager for Earthwatch, I frequently served as UNEP representative on the IACSD, and soon became Task Manager as well for Agenda 21, Chapter 40: Information for Decision-making, continuing until 2001. This included preparing the Secretary-General's reports to the CSD when chapter 40 was on the agenda (UN 1995).

At a more technical level, the UN System-wide Earthwatch Coordination function of UNEP could logically initiate consultations on a coherent approach to this mandate, as well as providing guidance and coherence to the larger effort to use science for decision-making in the UN system, and to assess and improve scientific advisory processes. The Earthwatch web site linking the efforts of all the UN system partners became a primary tool for communications and coordination, with a special section on indicators. Earthwatch also contributed to the development of the Global Observing Systems, and supported the Integrated Global Observing Strategy Partnership with the space agencies that led to the creation of the intergovernmental Group on Earth Observations (GEO).

After the Rio Earth Summit, and following on from the successful working parties of experts from within and outside the UN system that had contributed to preparing Agenda 21, we initiated an annual inter-agency Earthwatch Working Party from 1994 to 2002 to which all the UN agencies and relevant scientific bodies were invited to send experts. Indicators and the data systems to support them became part of the agenda. The First Meeting of the Earthwatch Inter-Agency Working Party (Geneva, 1–2 June 1994) brought together representatives of UN-Habitat, UNCTAD, UNDP, UNDP/PCSD (now UNDESA), UNFPA, UNHCR, UNSTAT, UNEP, FAO, IAEA, IOC, UNESCO, WHO, and WMO. It adopted terms of reference for Earthwatch and agreed on the modalities for continuing cooperation. With reference to the proposal in Agenda 21 for a "Development Watch" parallel to Earthwatch, the meeting recommended that Earthwatch be expanded to include the information requirements for assessment and reporting on sustainable development (UNEP 1994). This provided a mechanism not only for inter-agency coordination on indicators work, but also for sharing responsibility for the necessary supporting infrastructure of data collection and reporting from which indicators could be derived. While UNDP and others continued to discuss a possible Development Watch in the UN system for a few years, it never took off.

Indicators, of course, are only useful if the data are available to calculate them, and many indicator projects fall short because of this. Everyone was also conscious that proposals for indicator methodologies needed to be accompanied by data collection systems. The UN system agencies mobilised to address many of these supporting challenges both individually for indicators within their areas of expertise and collectively through Earthwatch.

In my function as Coordinator of the UN System-wide Earthwatch 1992–2000, I organised or co-organised many UN inter-agency meetings, participated in the CSD expert groups on indicators, represented UNEP in the scientific efforts of the SCOPE projects on indicators, and was often a major session speaker at the meetings, even replacing the Director of the UN Division for Sustainable Development (UNSD) in chairing one of their expert group meetings. With my frequent stays in New York for the CSD and other events, I was fully integrated into the UNSD team in providing secretariat support to the meetings and writing the reports when necessary. However, by 2000 UNEP lost interest in Earthwatch coordination and I was moved to other responsibilities before retiring in 2002. This did not, however, affect my involvement in indicators in the SCOPE project and elsewhere.

Preparing the CSD indicators work programme

The UN Division for Sustainable Development (UNSD) in the Department for Policy Coordination and Sustainable Development (UNDP/PCSD, later the Department of Economic and

Social Affairs – UNDESA) initially led by Joke Waller-Hunter, was the secretariat for the Commission on Sustainable Development (CSD). It had lead responsibility for the programme on sustainable development indicators.

When the CSD first met in 1993, there was considerable interest in indicators, but when the second session in 1994 considered suggestions for a CSD work programme to implement the Agenda 21 recommendation for indicators of sustainable development, there was some opposition from developing countries. They feared that such indicators would be used as a tool for green conditionality in development financing and to control what they were doing. Support for the programme came from OECD and other countries working on indicators.

Meanwhile, the UNDSO began preparations for the indicators programme (see Table 23.1 for chronology). A Task Force on Indicators for Sustainable Development was established

Table 23.1 Brief chronology of the CSD work programme on indicators

<i>Dates</i>	<i>Organiser</i>	<i>Title</i>	<i>Location</i>
7–8 December 1992	World Resources Institute	Workshop on Environmental Indicators	Washington, D.C.
6–8 December 1993	UNEP, UNSTAT	Consultative Expert Group on Environment and Sustainable Development Indicators	Geneva
22–23 September 1994	World Bank	Workshop on Indicators of Sustainable Development	Washington, D.C.
9–11 January 1995	UNEP, SCOPE Costa Rica, Belgium	Workshop on Indicators of Sustainable Development for Decision-Making	Ghent, Belgium
14–15 February 1995	UNDSO	1st Expert Group Meeting on Indicators for Sustainable Development	New York
28 April 1995	UN	3rd Commission on Sustainable Development approved work programme	New York
25–26 July 1995	UNDSO	2nd Expert Group Meeting on Indicators of Sustainable Development	New York
15–17 November 1995	SCOPE, UNEP, Germany	2nd Scientific Workshop on Indicators of Sustainable Development	Wuppertal, Germany

(Continued)

Table 23.1 (Continued)

<i>Dates</i>	<i>Organiser</i>	<i>Title</i>	<i>Location</i>
19 January 1996	UNSD/UNEP	Meeting on Common/ Compatible Systems of Access to Data	New York
6–8 February 1996	UNSD	UN Expert Meeting on Methodologies for Indicators of Sustainable Development	Glen Cove, Long Island, New York
23 September 1996	UNSD, UN System-wide Earthwatch	3rd Expert Group Meeting on Indicators of Sustainable Development	Geneva
24 September 1996	UNSD/UNEP	Workshop on Information for Sustainable Development and Earthwatch	Geneva
September 1996	UN	<i>Indicators of Sustainable Development Framework and Methodologies published</i>	
20–22 November 1996	UNSD, Belgium	Second International Workshop “Launching the testing of Sustainable Development”	Ghent, Belgium
23–24 October 1997	UNSD	4th Expert Group Meeting on Indicators of Sustainable Development	New York
19–21 January 1998	SCOPE, Czech Republic	4th International Workshop on Indicators of Sustainable Development	Prague
7–8 April 1999	UNSD	5th Expert Group Meeting on Indicators of Sustainable Development	New York
7–9 December 1999	UNSD	International Workshop on CSD Indicators of Sustainable Development	Barbados
25–28 September 2000	UNSD, UNEP, Canada	International Expert Meeting on Information for Decision Making and Participation	Aylmer, Quebec

<i>Dates</i>	<i>Organiser</i>	<i>Title</i>	<i>Location</i>
September 2001	UN	<i>Indicators of Sustainable Development: Framework and Methodologies</i> 2nd edition published	
10–14 May 2004	SCOPE, UNEP, IHDP, EEA	Assessment of Sustainability Indicators Workshop	Prague
13–15 December 2005	UNSD	6th Expert Group Meeting on Indicators of Sustainable Development	New York
3–4 October 2006	UNSD	7th Expert Group Meeting on Indicators of Sustainable Development	New York
2007	UN	<i>Indicators of Sustainable Development: Guidelines and Methodologies</i> 3rd edition published	
5–16 October 2008	UNSD	Expert Group Meeting on Climate Change & Sustainable Development: The Role of Indicators	New York
17–19 September 2009	UNSD	Expert Group Meeting on Institutionalizing Sustainable Development Indicators for Measuring Progress of National Strategies	Bridgetown, Barbados

consisting of Hermann Habermann (Director), Peter Bartelmus and Reena Shah from the UN Statistical Office (UNSTAT), and Joke Waller-Hunter (Director), Kenneth Ruffing, Lars Hyttinen, Mary Pat Williams Silveira, and Lars Mortensen from UNDSO. I was asked to join it as the UNEP representative at its third meeting on 21 September 1994, when we reviewed a draft list of 75 key national indicators for sustainable development including pressure, state and response indicators developed by UNDP/CSD and UNSTAT. The list as revised by the task force was presented at a World Bank Workshop on Indicators of Sustainable Development on 22–23 September 1994 in Washington, D.C., with many experts and some governments participating. After further revision based on comments received, the provisional list and an accompanying paper were presented to the Bureau of the CSD on 20 October 1994, and then circulated to agencies to invite contributions to the development of specific indicators and to participate in the work programme. A note on the results of this process was circulated to governments on 22 November 1994, and a draft Work Programme on Indicators of Sustainable Development was issued on 20 December 1994 in preparation for the third session of the CSD. The actors responsible for developing each indicator were identified, with the aim of preparing methodology sheets and producing a manual by 1996.

To unblock the diplomatic situation at the CSD, UNEP and SCOPE partnered with the governments of Costa Rica and Belgium to organise a Workshop on Indicators of Sustainable Development for Decision-Making in Ghent, Belgium, on 9–11 January 1995, as a high-level stakeholder consultation (Bell and Morse, Chapter 12). The workshop brought together representatives and diplomats from the CSD, including its President, Klaus Töpfer of Germany and Vice-Chairman, Ministers from Belgium and Costa Rica, and delegations from Barbados, Belgium, Brazil, Canada, China, Costa Rica, France, Germany, India, Namibia, Norway, Philippines, Poland, and USA. Intergovernmental organisations represented included the European Commission, European Environment Agency (EEA), EUROSTAT, OECD, UNDP, UNDP, UNEP, and WHO. The SCOPE project scientific committee chaired by Professor Moldan included Albert Adriaanse (Netherlands), Peter Bartelmus (UNSTAT), myself (Earthwatch), Allen Hammond (WRI), Donella Meadows (Dartmouth), Aromar Revi (TARU, India), and Manuel Winograd (Argentina), assisted by Philippe Bourdeau, Secretary-General of SCOPE. Non-governmental organisations represented were WWF, New Economics Foundation and IUCN. UNEP and UNDP presented a joint working paper which I drafted (Dahl 1995a), SCOPE presented the scientific issues, and options were reviewed. I represented both UNEP and SCOPE on the organising committee for the workshop and gave the closing talk on the way ahead. The workshop succeeded in building trust and confidence between the scientists and the policymakers, and it was agreed that an indicators programme that provided the tools for national governments to assess their own sustainable development according to their own criteria, and that would not be used for comparisons and rankings between countries, would be politically acceptable. We had succeeded in creating a close working relationship between science, policymaking, and government implementation for the indicators programme, with scientists who understood diplomacy and diplomats who appreciated the science. The report of the workshop (Gouzee et al. 1995) was officially submitted by the governments of Belgium and Costa Rica to the CSD at its third session in April 1995 when Chapter 40 of Agenda 21 was on the agenda (UN 1995).

To carry the planning process forward, UNDSO convened a first Expert Group Meeting on Indicators for Sustainable Development in New York on 14–15 February 1995 to finalise the work programme and get commitments from actors, mainly UN-system organisations, who would implement the work programme by further developing the indicators and underlying methodologies, and to analyse data availability.

The CSD indicators programme

The work programme on indicators of sustainable development was approved by the Commission on Sustainable Development at its third session in April 1995. The CSD praised the SCOPE results and called for SCOPE to coordinate scientific efforts on the identification of interlinkages, the development of aggregated indicators, further development of indicators, and work on frameworks.

To follow up this decision, UNDSO convened a second Expert Group Meeting on Indicators of Sustainable Development in New York on 25–26 July 1995 to approve an implementation plan, which was distributed on 4 August. These annual Expert Group Meetings were the principal guiding mechanism for the CSD work programme on indicators, complemented by workshops on more specific topics (Table 23.1). A roster of experts from governments, international organisations, and non-governmental organisations was developed to contribute to programme implementation. Preparation of the draft methodology sheets for each indicator

was a major inter-agency effort for the remainder of 1995, with consultations at multiple levels within and between agencies.

After running an Earthwatch Working Party 3 in New York on 17–18 January 1996, I helped to organise a UNDP/CSD/UNEP Meeting on Common/Compatible Systems of Access to Data (New York, 19 January 1996), which discussed sharing UN system information, common core data sets, and a UN system home page for Sustainable Development (UNEP 1996a), all of which would help to support the indicators process.

UNSDSD organised a UN Expert Meeting on Methodologies for Indicators of Sustainable Development 6–8 February 1996 in Glen Cove, Long Island, New York, with 48 experts from 29 governments, plus agencies and some research centres, to provide a detailed review of all the draft methodology sheets, to review country experience with indicators and discuss national pilot testing of the indicators, and to make recommendations on the further development of the programme of work on indicators. Country reports were submitted by Australia, Belgium, Brazil, Canada, China, Costa Rica, Germany, Hungary, India, Japan, Korea, Malaysia, Mexico, Morocco, Netherlands, Nigeria, Philippines, Ukraine, USA, and Venezuela. One recommendation was for the SCOPE/UNEP project to explore linkages and to develop highly aggregated indicators based on different themes of sustainability. The methodology sheets were then submitted as a background paper to the fourth session of the CSD in April–May 1996, which approved decisions supporting the programme of work on indicators.

The 3rd Expert Group Meeting on Indicators was organised by UNSDSD and the UN System-wide Earthwatch on 23 September 1996 in Geneva, Switzerland, to report on the status of the revised methodology sheets, start the pilot testing phase in a few testing countries, and prepare regional meetings in implementation of the CSD 4 decision. This was followed immediately on 24 September by the UNDP/CSD/UNEP Workshop on Information for Sustainable Development and Earthwatch (UNEP 1996b).

The first “blue book” of *Indicators of Sustainable Development Framework and Methodologies* was published in October 1996 (UN 1996). Most of the 134 indicator sheets, with details of how to calculate the indicator, were prepared by the relevant UN agencies.

The programme then moved into the three-year country testing phase. This began with a Second International Workshop “Launching the testing of Sustainable Development” in Ghent, 20–22 November 1996 with 60 participants, organised by Belgium and Costa Rica as a CSD intersessional event. Twelve countries committed to participate in the testing phase: Belgium, Bolivia, Brazil, China, Costa Rica, Czech Republic, Finland (Rosenström, Chapter 21), Germany, Morocco, South Africa, Venezuela, and UK. I introduced the indicator methodologies and explained environmental indicators. By March 1997 there were 15 testing countries, and 22 by the end of the testing phase.

One innovation was the pairing of governments between an industrialised country with more experience, and a developing country. For example, Finland paired with South Africa, Belgium with Costa Rica, Germany with Brazil, and France with Tunisia. The process itself led to more integration at the national level. In South Africa, the process stimulated closer collaboration between ministries and the creation of an inter-ministerial mechanism. Belgium had to legislate to make it possible to combine data from the Flemish and Walloon provinces and generate indicators at the federal level. In practice, most governments selected about 50 of the CSD indicators as relevant to their sustainable development, plus another 50 to cover other dimensions of their specific situation.

The UN system also organised activities in the field to help countries take up the indicators. These started with the ESCAP Regional Consultative Meeting on Environmentally Sound

and Sustainable Development, Bangkok, 26–29 November 1996 (UN ESCAP 1996), followed by the Regional Workshop for Latin America and the Caribbean, San Jose, Costa Rica, 10–12 March 1997 (UN 1997a), and the Africa Regional Capacity 21/UNDPCSD Workshop: Indicators of Sustainable Development in Africa, in Accra, Ghana, 3–6 June 1997, where I was a facilitator and speaker.

The Fourth Expert Group Meeting on Indicators of Sustainable Development in New York, 23–24 Oct 1997, reviewed the status of the testing programme and the results of the regional workshops. A major theme was harmonisation with other indicator programmes including those of UN specialised agencies and conventions. Another item on the agenda was current status and approaches to aggregation and linkages (UN 1997b).

Country experience during the testing phase was reviewed at the Fourth International Workshop on Indicators of Sustainable Development, Prague, Czech Republic, 19–21 January 1998 (UN 1998a) and reported to the CSD in E/CN.17/1998/15 §21–24. It followed the workshops in Ghent, Wuppertal and Glen Cove (USA), and provided the first opportunity to share the experience of testing countries. I provided a briefing on recent developments in linkages and aggregation, including the work of the Consultative Group on Sustainable Development Indicators (see below, International Institute for Sustainable Development).

UNSD also organised a Workshop on Indicators of Consumption and Production Patterns to fill a gap in the indicators framework. The results were shared at the CSD–6 Intersessional Ad Hoc Working Group in New York, 2–3 March 1998 (UN 1998b) and published (UN 1998c). The Caribbean SIDS organised their own Caribbean Regional Workshop on Sustainable Development Indicators in Barbados, 22–23 October 1998, adapting the CSD indicators to their own situation (Crowards et al. 1998).

The Fifth Expert Group Meeting on Indicators of Sustainable Development, New York, 7–8 April 1999 (UN 1999a) reviewed the results of the national testing of indicators in 22 countries, and a study commissioned by UNSD on linkages and aggregation (Guinomet 1999), and proposed a thematic framework as more policy relevant, with a more limited core set for all countries, plus optional indicators as relevant. UNSD asked me to chair the meeting after the opening session.

UNSD convened an International Workshop on CSD Indicators of Sustainable Development, Barbados, 7–9 December 1999 upon finalisation of the testing process so that the testing countries could exchange experiences and best practices, and ensure the integration of results into the revised indicator framework and methodologies (UN 1999b). It reviewed the proposed thematic framework and core indicators.

A Progress Report on the Implementation of the CSD Work Programme on Indicators of Sustainable Development was submitted to the Eighth Session of the Commission on Sustainable Development (24 April–5 May 2000) as Background Paper No. 7 (UN 2000). The Government of Canada, UNDESA, and UNEP organised an International Expert Meeting on Information for Decision Making and Participation in Aylmer, Quebec, 25–28 September 2000, for which I prepared a background paper (UNEP 2000), and the report was submitted to CSD 9 (UN 2001f).

After consideration at a CSD Intersessional Working Group on Information for Decision-making for which I was part of the secretariat, the second edition of the CSD indicators of *Sustainable Development: Framework and Methodologies* was submitted as Background Paper No. 3 and approved at the 9th Session of the Commission on Sustainable Development in April 2001. It was published shortly after as another “blue book” (UN 2001a). It contained a new set of 56 core indicators. The CSD also considered a Report on the Aggregation of Indicators of Sustainable Development prepared by UNSD as Background Paper No. 2 (UN 2001g). The Secretary-General reported to the Commission on Information for Decision-Making and

Participation (UN 2001b) with an addendum on the CSD Work Programme on Indicators of Sustainable Development (UN 2001c), and on the Report of the Ad Hoc Inter-sessional Working Group on Information for Decision-making and Participation and on International Cooperation for an Enabling Environment (UN 2001d). The CSD also acted as the preparatory committee for the World Summit on Sustainable Development (WSSD), which also considered information and institutions for decision-making (UN 2001e). However the WSSD outcome document only made a few brief references to indicators at the national level.

The next few years saw a number of regional meetings focussed on implementation of the indicators. The ECLAC Seminar on Sustainable Development Indicators in Latin America and the Caribbean, Santiago, Chile, 29–30 November 2001, analysed and exchanged regional experiences on the construction of sustainability indicators, discussed the obstacles to implementation and strategies for overcoming them, and started a regional network of sustainable development indicators (UN ECLAC 2001). For SIDS, there was a Resource Persons Meeting on Using Information in Decision-Making for Sustainable Development in Small Island Developing States, St. Lucia, 27–28 May 2003; a Training Workshop on Methodologies, Tools and Best Practices for Managing Information for Decision-making on Sustainable Development in Caribbean SIDS, Trinidad and Tobago, 27–31 October 2003; and a Regional Caribbean Workshop on National Sustainable Development Strategies and Indicators of Sustainable Development, Castries, St. Lucia, 14–15 January 2004 (UN 2004a). ESCAP organised a workshop on National Sustainable Development Strategies for Asia and the Pacific which included a component on indicators of sustainable development, Bangkok, Thailand, 29–31 October 2003 (UN ESCAP 2003). The UNDSO held an Arab Regional Workshop on National Sustainable Development Strategies (NSDS) and Indicators of Sustainable Development, Cairo, Egypt 12–14 December 2004 (UN 2004c).

In 2004, the Secretary-General reported to the CSD on Progress in implementing the decisions of the Commission on Sustainable Development related to improvements in national reporting and further work on indicators of sustainable development (UN 2004b).

The time had come to revisit the CSD indicators again, both scientifically by SCOPE and in their application by UNDSO. The UN commissioned an assessment of recent developments and activities in 2004 (Shah 2004) which was reviewed at the SCOPE/UNEP/IHDP/EEA Assessment of Sustainability Indicators (ASI) project, ASI Workshop 10–14 May 2004, Prague, Czech Republic. Another commissioned paper from IISD looked at ways forward, including experience with the CSD's role in sustainable development indicators, its general mandate and role, an overview of the CSD's indicator process, national level uptake and experience, areas of sustainable development inadequately covered in the current indicator core set, and the potential, advantages, and limitations of a common global sustainable development indicator framework (Pintér et al. 2005). It was a working paper for the next UNDSO Expert Group Meeting, restarted after six years.

The Expert Group Meeting on Indicators of Sustainable Development in New York, 13–15 December 2005, reviewed the interim revised set of indicators, the suitability of frameworks, and future areas of work (UN 2005). It agreed on a revised interim list of 99 indicators. The meeting also agreed to remove the explicit division of indicators into four "pillars" (social, environmental, economic, institutional). It further agreed to distinguish indicators into core indicators relevant for most countries, and non-core indicators that either provide additional information to core indicators or cover issues that are relevant for many but not most countries. The thematic framework was to be retained, but with modified themes and sub-themes. It also discussed other indicator frameworks under development and possible options for future work on indicators (UN 2006b §5).

The fourteenth session of the CSD in 2006 considered a background paper on Global Trends and Status of Indicators of Sustainable Development (UN 2006a). A final Expert Group Meeting on Indicators of Sustainable Development was convened in New York, 3–4 October 2006, to finalise the review process. It placed the indicators in fourteen themes: poverty; governance; health; education; demographics; natural hazards; atmosphere; land; oceans, seas and coasts; freshwater; biodiversity; economic development; global economic partnership; and consumption and production patterns (UN 2006b).

The third edition of *Indicators of Sustainable Development: Guidelines and Methodologies* was published in 2007, with 98 indicators including 50 core indicators (UN 2007). The indicators were related to Agenda 21, the Johannesburg Plan of Implementation and the MDG indicators.

While this basically concluded the CSD Programme of Work on Indicators of Sustainable Development, UNDSO did organise two follow-up meetings. An Expert Group Meeting on Climate Change & Sustainable Development: The Role of Indicators, was held in New York, 15–16 October 2008 (UN 2008), and a regional Expert Group Meeting on Institutionalizing Sustainable Development Indicators for Measuring Progress of National Strategies was organised in Bridgetown, Barbados, 17–19 September 2009, for the Small Island Developing States (SIDS) of the Caribbean (UN 2009).

Complementary processes

Alongside the intergovernmental indicators programme at the CSD, there were supporting efforts from the scientific community organised by some of the same experts assisting the UNDSO.

SCOPE projects on indicator science

As mentioned above, the Scientific Committee on Problems of the Environment (SCOPE) of the International Council for Science organised a SCOPE project with UNEP support to explore the science of indicators of sustainable development in 1994–1997. The scientific committee for the project, headed by Professor Moldan, included some of the same experts supporting the CSD process including myself representing UNEP. After the Ghent workshop addressing the policy issues in January 1995, the SCOPE project organised a second Scientific Workshop on Indicators of Sustainable Development at the Wuppertal Institute in Germany on 15–17 November 1995 (Billharz and Moldan 1996) where leading researchers considered all the key issues. I was on the organising committee, gave an opening address for UNEP, presented a paper on various concepts for indicators of sustainability (Dahl 1995b), and made the closing remarks at the end of the thematic sessions.

The first SCOPE project ended with the publication of a book on the state of the art in sustainable development indicators (Moldan et al. 1997) which was distributed to all delegations at the Rio+5 session of the General Assembly in 1997. I contributed a review of comprehensive approaches (Dahl 1997a) and examples of vector-based indicators (Dahl 1997b).

With the very rapid development of the science and practice of indicators, and their growing importance in policymaking, Bedřich Moldan with SCOPE decided to organise a second project on assessment of sustainability indicators (2003–2007) to make a scientific assessment of the remaining conceptual and methodological challenges and the need to ensure their policy relevance (Janoušková et al., Chapter 30). Papers were commissioned from many experts, 64 of whom gathered at a workshop in Prague in May 2004. The results of the deliberations were assembled in a book highlighting both what had been accomplished and the many challenges still ahead (Hak et al. 2007). I chaired the working group on conceptual challenges, co-authored

the overview chapter with Bedřich Moldan (Moldan and Dahl 2007), contributed another chapter on integrated assessment and indicators (Dahl 2007), and co-edited the resulting volume.

International Institute for Sustainable Development

One useful initiative during this period was the organisation by Peter Hardi of the International Institute for Sustainable Development (IISD) of a Conference on Principles of Sustainable Development Performance Measurement, held in Bellagio, Italy, in November 1996. Rather than considering the content of indicators, the expert group in which I participated looked at lessons learned about the processes of creating and implementing an indicators programme, and produced the “Bellagio Principles” of good practice in indicator development (Hardi and Zdan 1997) which became a standard reference.

Another outcome of the meeting in Bellagio was the creation by a small number of key indicator experts of a Consultative Group on Sustainable Development Indicators (CGSDI 1996–2005) as a virtual think-tank. Following its creation at Bellagio, it worked primarily over the Internet until IISD organised a meeting in Middleburg, Virginia, on 9–11 January 1998. Initial members were Alan AtKisson, David Berry, Gilberto Gallopin (until September 1999), Allen Hammond, Peter Hardi, Jochen Jesinghaus, Donella Meadows, John O’Connor, Ismail Serageldin, Robert B. Wallace, and myself. Three more members were added in September 1999: Edgar Gutierrez (University of Costa Rica), Yuchi Moriguchi (National Institute for Environmental Studies, Japan), and Adil Najam (Boston University). Bedřich Moldan was added in 2001 when Donella Meadows passed away.

The CGSDI’s initial focus was on approaches to highly aggregated indices of sustainable development. Based on the CGSDI discussion, and with contributions from other members, Jochen Jesinghaus created the Dashboard of Sustainability to present complex indicator data sets in an easy-to-understand graphic form, while making it possible to burrow down for the details for those who were interested. The CSD indicator set was loaded into the Dashboard of Sustainability for demonstration at a side event at CSD 9 in 2001. Trend analysis was added in time for presentation of the Dashboard in side events at the World Summit on Sustainable Development in Johannesburg in 2002, including one I organised through the International Environment Forum. With the multiplication of indicator initiatives, including more than 400 loaded into the Dashboard, and a few final exchanges on the future of indicators work, the CGSDI wound down by 2006.

The “Bellagio Principles” were updated in 2011 at a second meeting in Bellagio. The *Bellagio Sustainability Assessment and Measurement Principles* (BellagioSTAMP) revised the original Principles through a similar expert group process. The new BellagioSTAMP includes a complete set of eight principles: (1) Guiding vision; (2) Essential considerations; (3) Adequate scope; (4) Framework and indicators; (5) Transparency; (6) Effective communications; (7) Broad participation; and (8) Continuity and capacity (Pintér et al. 2012, Chapter 2).

Wider outreach

In order to clarify my own thinking on sustainable development from an integrated perspective, I wrote a book, *The Eco Principle: Ecology and Economics in Symbiosis* with my own synthesis of the issues around sustainability and the need for a systems approach (Dahl 1996). It seemed important to keep the scientific community informed of progress, so I published a paper in 2000 on recent methodological and conceptual developments in sustainability indicators (Dahl 2000) in addition to my contributions through the CSD process and SCOPE. In 2002, through the

International Environment Forum, I organised a Dialogue on Indicators for Sustainability in the Forum on Science, Technology and Innovation for Sustainable Development at the World Summit on Sustainable Development, Johannesburg, on 27 August 2002, with speakers including Bedřich Moldan, Jochen Jesinghaus from EUROSTAT/JRC, and an expert from UNDSO. My paper was on the *Usefulness of Indicators for Sustainability* (Dahl 2002). In 2006, UNESCO asked me to prepare the first of a series of UNESCO-SCOPE Policy Briefs on *Indicators of Sustainability: Reliable Tools for Decision Making* (Dahl 2006) which was distributed at the CSD. A special issue of *Ecological Indicators* on sustainability indicators that I co-edited in 2012 included my general review of achievements and gaps in indicators for sustainability (Dahl 2012).

In 2007, UNEP commissioned me to review all national reports on the state of the environment and sustainability since the Rio Earth Summit in 1992, and to prepare for the UNEP Governing Council in 2009 an overview of the environmental assessment landscape and state-of-the-environment reporting at the national level (Dahl 2008). One conclusion of this review was that 66 countries were using indicators in their national reports, a significant impact at least partly due to the CSD indicators programme.

In conclusion, it took 15 years and a variety of formal and informal mechanisms between the UN secretariat and agencies, governments and the scientific community, with the guidance and approval of the UN Commission on Sustainable Development, to evolve a policy-relevant, scientifically validated set of indicators of sustainable development. However, despite repeated requests from governments, reviews of progress, and the best efforts of the scientific community, no consensus emerged on highly aggregated indices (Dahl, Chapter 3, this volume).

A number of key experts were involved across the different processes, especially in the early years, providing both vision and coherence as the programme moved forward. While the Commission on Sustainable Development has been replaced, the progress made in its indicator programme enshrined indicators as important policy tools to move towards sustainability in many national processes. Today, with the new UN 2030 Agenda and its Sustainable Development Goals and indicators, a whole new scale of indicator activity is under way, which could well benefit from some of the lessons learned and experience acquired over the past 25 years.

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