

Chapter 1.

Introduction

"The population explosion, poverty, ignorance and disease, the pollution of our surroundings, the stockpiling of nuclear weapons and biological and chemical agents of destruction are all parts of a vicious circle. Each is important and urgent but dealing with them one by one would be wasted effort." (Indira Gandhi, Stockholm Conference 1972)

1.1. Context

Bringing together great global issues at the United Nations: peace and security, freedom, development and the environment¹²

Since the creation of the United Nations, the world's peoples have aspired to make progress on the great global issues of peace and security, freedom, development, and environment. At the end of World War II the primary focus was on peace, which was sustained globally throughout the cold war but broken locally in many places. From the 1950s, the aspiration of freedom was expressed in the struggle to end colonialism and oppression, and later to extend human rights. The success in attaining national independence was followed in the 1960s by a focus on economic development to provide the basic necessities for the poorest two thirds of the world and higher standards of living for all. In the 1970s, global values for nature and the environment emerged, as illustrated by the United Nations Conference on the Human Environment held in Stockholm in 1972.

Peace and security, freedom, development and the environment remain prominent aspirations, and it has long been acknowledged that they are closely interlinked (Table 1). High-level panels and commissions, major documents, and global conferences have made a moral and pragmatic case for them. Insufficient development progress can threaten peace and security and vice versa. Reduced freedom can threaten peace and vice versa. Development provides the capacity to sustain nature's life-support systems, but can also threaten them, in turn setting back development. The concept of "sustainable development" brought together development and the environment.

Table 1. Sustainable development - bringing together great global issues at the United Nations

Global issues	United Nations Report / World Commission	Year
Freedom and development	Brandt report, Independent Commission on International Development Issues	1980
Peace, freedom, development	Palme Report, Independent Commission on Disarmament and Security Issues	1982
Peace, environment, development	Brundtland Report, World Commission on Environment and Development	1987

Source: Authors' elaboration.

Sustainable development objectives have been widely defined along three dimensions: "economic, environmental and social" or "ecology, economy and equity".

The origins of the concept of sustainable development

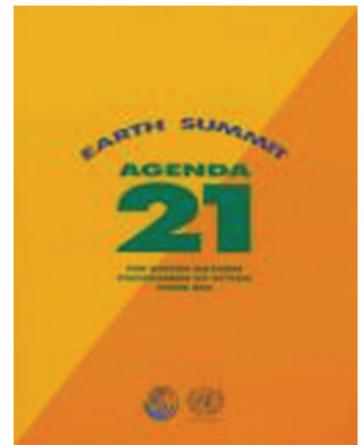
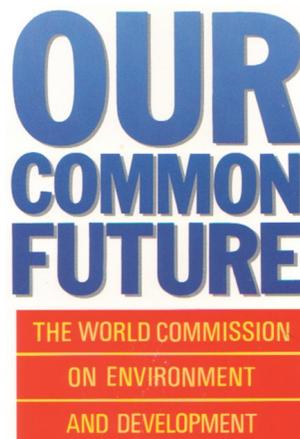
The concept of sustainable development has a very long history in science. For example, in 1713 Hans Carl von Carlowitz referred to "sustainable yield" (*nachhaltiger Ertrag*) in the context of sustainable forestry management.¹³ Especially since the late 1960s, there has been a large amount of scientific literature on sustainable development issues. Natural and social scientists highlighted a series of sustainable development issues and recommended integrated policy action in many areas, e.g. on development, poverty, hunger, employment, equity between generations and countries, gender equality, environmental pollution, resource scarcity, and on the means to achieve policy objectives in these areas, such as technology, finance, capacity-building and trade.

The Brundtland report¹⁴ of 1987, entitled *Our Common Future*, defined the concept of sustainable development as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The report built on earlier scientific perspectives on the interdependence of society and environment pioneered by the International Union for Conservation of Nature (IUCN). The report also illustrated the fact that conflicts can arise from the pre-emption of development options or from environmental degradation, and that conflict is also a major cause of unsustainable development. The concept of sustainable development was subsequently adopted by Governments at the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, or "Earth Summit" as it is more commonly known. The resulting *Rio Declaration on Environment and Development* (known as the "Rio Principles"¹⁵ and the global action plan *Agenda 21*¹⁶ included many goals and targets, some of which informed the Millennium Development Goals (MDGs) a decade later.

Reconnecting science and policy towards a global sustainable development report

It is important to note that the policy framework itself emerged with little science.¹⁷ There were only two scientists on the World

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Commission on Environment and Development¹⁸ and little science was present in Rio in 1992.¹⁹ Ten years later at the World Summit on Sustainable Development in Johannesburg, there was some scientific presence. In contrast, scientists were among the most prominent groups at the side events of the United Nations Conference on Sustainable Development (known as “Rio+20”) in Rio de Janeiro in 2012.

The increasing presence of science at United Nations meetings on sustainable development is also due to the efforts of academies of science and individual scientists to reconnect science and technology with the policy on sustainable development. For example, in 1995 the United States National Academy of Sciences created the Board on Sustainable Development, which sought to make the concept of sustainable development manageable and measurable by focusing on a minimal sustainability transition over two generations until 2050. It chose three normative goals that had emerged at the top of the agenda of global conferences: meeting the human needs of the nine billion (expected by 2050), while preserving the life-support systems of the planet, and reducing hunger and poverty. The results were published in a report, entitled *Our Common Journey*²⁰ in 1999. It was the first comprehensive global sustainable development report, albeit with a developed country perspective as a starting point. The report argued for action on what we already know and for creating a “sustainability science” for what we needed to know.

The Division for Sustainable Development of the United Nations Department of Economic and Social Affairs (UN DESA)²¹ in collaboration with 178 scientists produced a series of reports in preparation for Rio+20 in 2012. The study was prepared under the project “Sustainable Development in the 21st Century (SD21)” and was financed by the European Union. It documented the range of perspectives among scientists on sustainable development issues, with a view to identifying common ground, especially in the areas of energy, land-use, agriculture, food security and cities, as well as in sustainable development scenarios.²² The study also included a review of implementation of *Agenda 21* and of the *Rio Principles*.

Despite these and other efforts, to-date there exists no comprehensive, authoritative global sustainable development report that would bring together the range of existing assessments, review global progress and future pathways in a truly integrated way, taking into account the range of perspectives of scientific communities across the world. This is despite the policy prominence

and the existence of many topical assessments (see chapter 2).

Rio+20's call for a Global Sustainable Development Report

In 2012, the Secretary-General's High-level Panel on Global Sustainability in its final report in preparation for Rio+20 detailed the importance of basing sustainable development policy-making on the best and most up-to-date evidence, and in this regard also recommended a *global sustainable development outlook* which would bring together assessments across sectors in an integrated manner.²³

The recommendation was considered by Rio+20.²⁴ In its outcome document, Rio+20 decided to establish a universal, intergovernmental High-level Political Forum on sustainable development (HLPF) which would, as one of its functions, “strengthen the science-policy interface through review of documentation bringing together dispersed information and assessments, including in the form of a global sustainable development report, building on existing assessments” (\$85k).²⁵

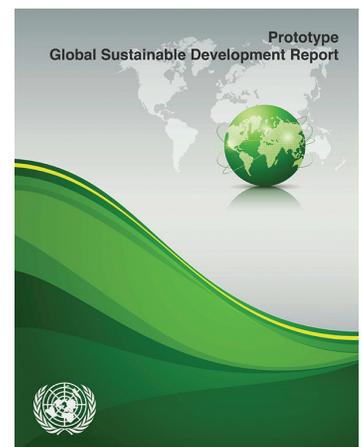
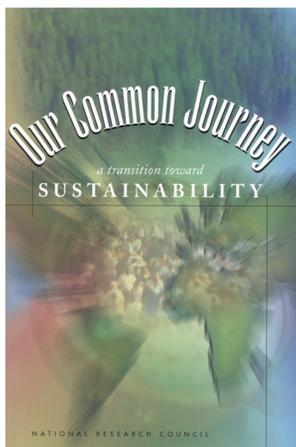
In response, the United Nations Secretary-General tasked the Division for Sustainable Development to undertake “in-depth analysis and evaluation of trends and scientific analysis in the implementation of sustainable development, including lessons learned, best practices and new challenges, and cross-sectoral analysis of sustainable development issues”. Further details were provided in the revised programme budget adopted by the United Nations General Assembly at the end of 2012.²⁶

1.2. Prototype United Nations report

Prototype report to support deliberations on the scope and methodology for the Global Sustainable Development Report

Since 2013, the United Nations Division for Sustainable Development has worked on the present “prototype” report that could illustrate a range of potential content, alternative approaches and various means of participation, in order to support Member States' deliberations on the scope and methodology of future editions of the Global Sustainable Development Report. An Executive Summary of the prototype report was presented by the United Nations

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Undersecretary General for Economic and Social Affairs at the inaugural session of the HLPF on 24 September 2013.²⁷ Following further review and consultations, the present prototype report was presented at the meeting of the HLPF under the auspices of the Economic and Social Council in July 2014.

Substantive starting point: assessments at the global, regional and national levels

The prototype report has made use of existing scientific research and in-depth studies from a wide range of sources, including the large number of scientific contributions for Rio+20. It considered hundreds of assessments, including 57 international assessments, 69 national sustainable development reports, 125 flagship publications of the United Nations system, 23 outlook reports prepared by intergovernmental organizations and more than 1,000 academic articles and think-pieces. In particular, it has considered the following: international scientific, topical assessments (e.g. IPCC, IPBES, GEA, GEO, IAASTD); SD21 project studies; the Sustainable Development Solutions Network (SDSN); Sustainable Development issue briefs, official submissions and other inputs for Rio+20; the Future Earth Initiative; science policy briefs on sustainable development by Academies of Science and others; institutional reports; and government-sponsored research on sustainable development.

1.3. Participation and consultations

The present report is the result of a collaborative effort of scientists, experts, United Nations staff and selected government officials. Hundreds of contributors and reviewers from 46 countries have supported the Report, including 57 United Nations staff from 21 entities, 35 government officials, 2 major groups, 161 named academics and scientists, inputs from 178 experts that had participated in a Division for Sustainable Development project in preparation for Rio+20,²² and an international team of young scientists and research students from several universities.

United Nations system effort

The United Nations Division for Sustainable Development led the preparations of the Global Sustainable Development Report. It reached out to scientific communities and to colleagues in the United Nations system to provide focused inputs to the report. As of 1 July 2014, 21 United Nations entities had joined the effort (Box 1).

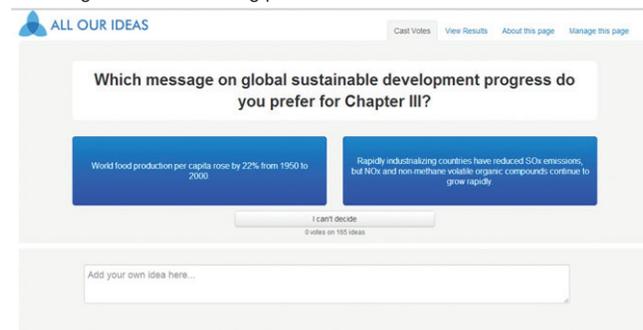
Participating scientists and crowdsourcing

In view of the limited time available for the preparation of the present report, UN DESA first approached scientists in the aforementioned initiatives, scientists suggested by United Nations partners, and major scientific groups, notably the International Council for Science (ICSU) and the International Social Science Council (ISSC).

A multilingual crowdsourcing platform developed by Princeton University was used to collect even wider views from thousands of scientists across the world.²⁸ A special effort was made to reach the younger generation of scientists. Inputs were made in English, Chinese and Spanish. In the future, a much wider range of languages might be used. Key messages and findings of the report were crowdsourced rather than decided by United Nations staff or

selected scientists. Social and natural scientists were encouraged to make their voices heard on the United Nations website until the end of 2013.²⁹

Multilingual crowdsourcing platform



It is anticipated that a longer period will be available for the preparation of future editions of the Report. Governments might consider various models for the selection and engagement of scientists.

Box 1. United Nations entities that have supported the production of a prototype global sustainable development report

As of 1 July 2014, the following 21 United Nations entities had joined the effort:

- Convention on Biological Diversity (CBD);
- United Nations Department of Economic and Social Affairs (UN DESA);
- United Nations Economic Commission for Latin America and the Caribbean (ECLAC);
- United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP);
- United Nations Economic and Social Commission for Western Asia (UN ESCWA);
- United Nations Economic Commission for Europe (UNECE);
- Food and Agriculture Organization of the United Nations (FAO);
- International Labour Organization (ILO);
- International Maritime Organization (IMO);
- International Atomic Energy Agency (IAEA);
- Office of the High-Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (OHRLLS);
- United Nations Convention to Combat Desertification (UNCCD);
- United Nations Environment Programme (UNEP);
- United Nations Educational, Scientific and Cultural Organization (UNESCO);
- United Nations Conference on Trade and Development (UNCTAD);
- United Nations Industrial Development Organization (UNIDO);
- United Nations Framework Convention on Climate Change (UNFCCC);
- United Nations Population Fund (UNFPA);
- United Nations Human Settlements Programme (UN-Habitat);
- World Food Programme (WFP);
- World Bank.

The International Monetary Fund (IMF) participated as an observer.

Source: Authors' compilation.

Expert group meeting



Expert group meetings and consultations

Box 2. Expert group meetings in support of a global sustainable development report

In addition to informal consultative meetings and briefings, the following expert group meetings have been organized in support of a global sustainable development report:

- High-level Expert Group Meeting for the Global Sustainable Development Report - Engaging National Assessments (Beijing, China, 12-13 December 2013);
- Expert Group meeting for the Global Sustainable Development Report - Future directions and formalization of network of scientific contributors (Dubrovnik, Croatia, 21-22 October 2013);
- Expert Group Meeting on the science-policy interface (New York, USA, 5 September 2013);
- Expert Group Meeting on the evolution of assessments for sustainable development (New York, USA, 3-4 September 2013);
- Expert Group Meeting for the Global Sustainable Development Report - Case studies of the Climate-land-energy-water-development Nexus (Stockholm, Sweden, 29-30 May 2013);
- Expert Group Meeting on innovative ways of measuring sustainable development progress (Lund, Sweden, 26-27 May 2013);
- UN DESA-ICSU-ISSC meeting on Sustainable Development Goals (New York, USA, 201-21 March 2013);
- OSEMOSYS scenario modellers meeting (New York, USA, 29 March 2013).

Source: Authors' compilation.

In 2013, a series of expert group meetings and consultation meetings were organized to support the preparation of draft chapters and to explore informal networks of scientific contributors for future reports (Box 2). The meetings differed greatly in terms of content, focus, and meeting participants. One of these meetings resulted in the *Dubrovnik Declaration*, which provided a “regional perspective on science-policy interface for a sustainable future”.³⁰

1.4. Objective and scope

Objective

This report is a United Nations publication that brings together findings of scientific assessments, as input for policy deliberations at the HLPF and beyond. It is designed as a prototype version of a future Global Sustainable Development Report, which is expected to support the work of the HLPF. The prototype report aims to support the deliberations of Governments in 2014 on the scope and methodology of the future report, in line with the United Nations General Assembly resolution A/RES/67/290 on “*Format and organizational aspects of the High-level Political Forum on sustainable development*” of July 2013. It is intended as a technical, analytical and descriptive contribution to the global debate on sustainable development that digests, synthesizes and draws out policy implications of relevant scientific and social scientific research.

The present report aims to bring together science and policy-making. It is neither conceived as a scientific report nor as a political document. Instead, it is a report drafted by United Nations staff to facilitate dialogue between these two communities.³¹

Target group

The target group of the report comprises government officials, policymakers and other decision-makers at all levels.

Scope

The Report looks three generations into the past (1950-2013) and

two generations into the future (until 2050). The challenge is to learn from our trial-and-error approaches in the past, in order to achieve by 2050 a global sustainability transition, which aims to eliminate poverty and hunger; enable livelihoods; feed, nurture, house and educate more than nine billion people; secure peace, security and freedom; and preserve the Earth's basic life-support systems. The report focuses on global sustainable development, in terms of issues, impacts, institutions and technology. Aspects at the regional, national and local levels are covered where appropriate.³²

While the general Brundtland definition of sustainable development¹⁴ (quoted above) is widely accepted, more specific definitions derived from an operational translation of the principle of intergenerational equity differ greatly from each other, especially in terms of vastly different scopes. These definitions are grounded in different worldviews that ultimately arise from different sets of values. The different choices of values lead to different emphases on what is to be sustained and what is to be developed, as well as on different relevant timescales (Table 2). Most sustainable development definitions are based on elements of nature, life-support, people and economy, whereas not much work takes into account the community and society dimensions. The economic, social and environmental dimensions of sustainable development are apparent in Table 2.

The framework of Table 2 is used throughout this publication, including for reporting on past progress and future scenarios. It helps link to related ongoing debates. For example, the debate on the MDGs focuses primarily on issues in the “People” cluster. The green economy debate aims to combine developing the “Economy” with preserving environmental life-support mechanisms. The discussion on the *Sustainable Development Goals* has focused on developing both “People” and “Economy”, while sustaining the Earth's life-support mechanisms. The planetary boundaries proponents suggest global goals on the Earth's life-support mechanisms. Proponents of “strong sustainability” emphasize the “Nature” cluster, as they are convinced that nature cannot be substituted or sold. Debates on the issue clusters “Community” and “Society” have typically been carried out in isolation from the other sectors, even though their interlinkages had already been emphasized in the Brundtland report.

The six areas of issues to be sustained or developed have different scopes. In fact, groups of people form communities, which in turn make up a national economy, which can be one aspect of a society, which in turn is part of and depends on nature's life-support system, which is but one element of nature as a whole (Figure 1).³⁴

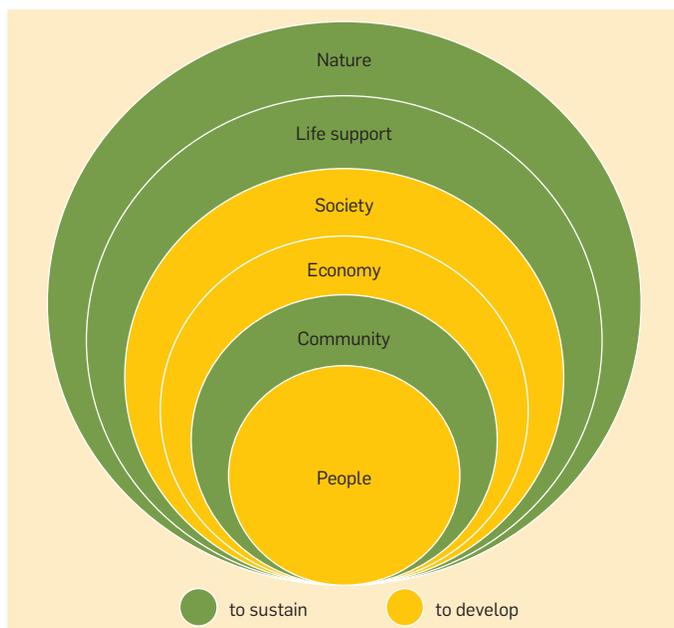
The above framework is an elaboration of the idea of “interdependent and mutually reinforcing pillars of sustainable development - economic development, social development and environmental protection”, as recognized by United Nations Member States since the Johannesburg Declaration on Sustainable Development of September 2002³⁵ (Table 3). It provides more detail, including on the level of balance between development and sustainability in each pillar. It also allows for other issues that have been suggested as “fourth pillars”, such as institutions, governance or culture. For example, the United Nations Educational, Scientific and Cultural Organization (UNESCO) Universal Declaration on Cultural Diversity, adopted in 2001, stated: “[C]ultural diversity is as necessary for humankind as biodiversity is for nature”.³⁶ Some economists have advocated that the three pillars of sustainable development should comprise interlinkages, intergenerational equity, and dynamic efficiency³⁷ - a perspective that is also captured by the framework.

Table 2. Areas and issues typically covered in definitions of "sustainable development" in the literature

Values	Sustainability		Linked by	Development	
	What is to be sustained?	How long?		What is to be developed?	By when?
Freedom Equality Solidarity Tolerance Respect for nature Shared responsibility etc.	Nature Earth (e.g. no anthropogenic climate change or interference with the phosphorus and nitrogen cycles) Biodiversity (e.g. no human interference, biological invasions) Ecosystems (e.g. in the oceans)	Centuries, forever Years, decades Centuries, forever	Only Mostly But And Or	People Health, life expectancy , child survival Elimination of poverty and hunger Education and skills Access to good food, housing, modern energy, clean air, water, sanitation, health care, etc. Income and employment opportunities Equity , equal opportunity, social mobility Human security (e.g. economic, food, health, environmental, personal, community and political security) Human rights (e.g. right to life and to a fair trial; freedom from torture and slavery; freedom of speech, thought, conscience and religion; freedom of movement) Well-being and happiness	Now, several years, decades Now Now
	Life support Ecosystem services (e.g. forests, grasslands, ocean fisheries, coastal zones) Resources (e.g. water, material consumption, croplands) Environment (e.g. air pollution, chemicals, tropospheric ozone, agriculture)	Several years, decades		Economy Wealth Productive sectors Consumption Economic growth , income convergence Trade , production and distribution systems Economic resilience ; national energy, water and food security Infrastructure , buildings, urbanization Scientific, technological and innovative capacities	Now, in one or more years Decades
	Community Peace Cultures (e.g. cultural heritage, traditions, traditional knowledge) Groups Places	Several years, decades		Society Effective institutions Social capital , resilient societies Legitimate States Productive regions providing opportunities Stable and happy families Intergenerational equity	Several years Decades

Note: Adapted from NRC (1999)²⁰; Kates et al. (2005)³³; and United Nations (2012)²². The listed issues are indicative of areas typically covered in sustainable development definitions. Source: Authors' compilation.

Figure 1. From people to nature



Source: Authors' elaboration.

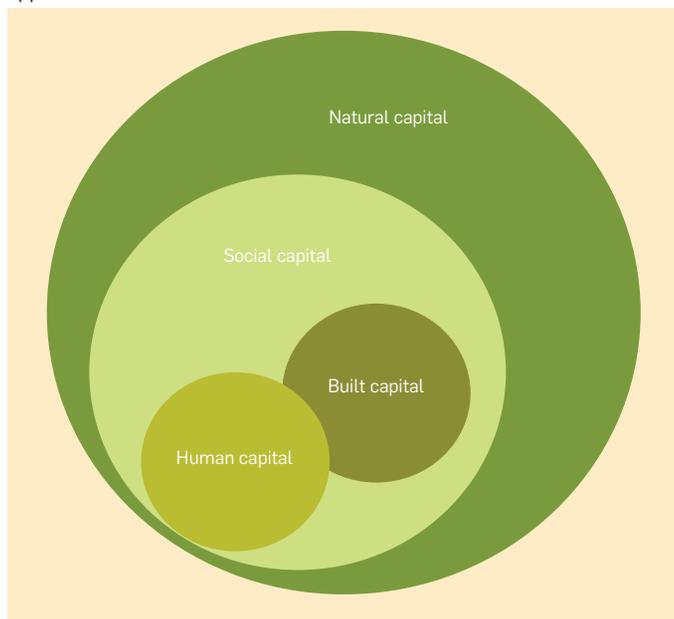
Table 3. Coverage of three pillars of sustainable development

		Social	Economic	Environmental
What is to be developed?	People	+++	++	+
	Economy	++	+++	+
	Society	+++	+	+
What is to be sustained?	Nature	+	+	+++
	Life support	+	++	++
	Community	+++	+	+

Note: The plus signs indicate the level to which each pillar is captured. +++: strong focus; ++: focus; +: related but not a focus. Source: Authors' elaboration.

Another variation of the same conceptual framework uses the capital approach. Human and built capital (the economy) is embedded in society and ultimately in nature.

Figure 2. Three dimensions of sustainable development in the capital approach



Source: Adapted from Costanza et al. (2014)³⁸

1.5. Outline

The present report maps sustainable development assessments and related processes, and highlights emerging issues identified by scientists (chapter 2); assesses sustainable development progress (chapter 3); tells the stories of future pathways towards sustainable development based on the literature, and discusses investment and technology needs (chapter 4); assesses various approaches to measuring sustainable development progress (chapter 5); identifies lessons learned from national, regional and global case studies of the climate–land–energy–water–development nexus (chapter 6); presents illustrative science digests for decision-makers (chapter 7) and suggests a number of issues for consideration (chapter 8). The report takes an integrated approach that looks at clusters of issues and their interlinkages rather than specific sectors or topics.

Background materials are available at:

<http://sustainabledevelopment.un.org/globalreport/>