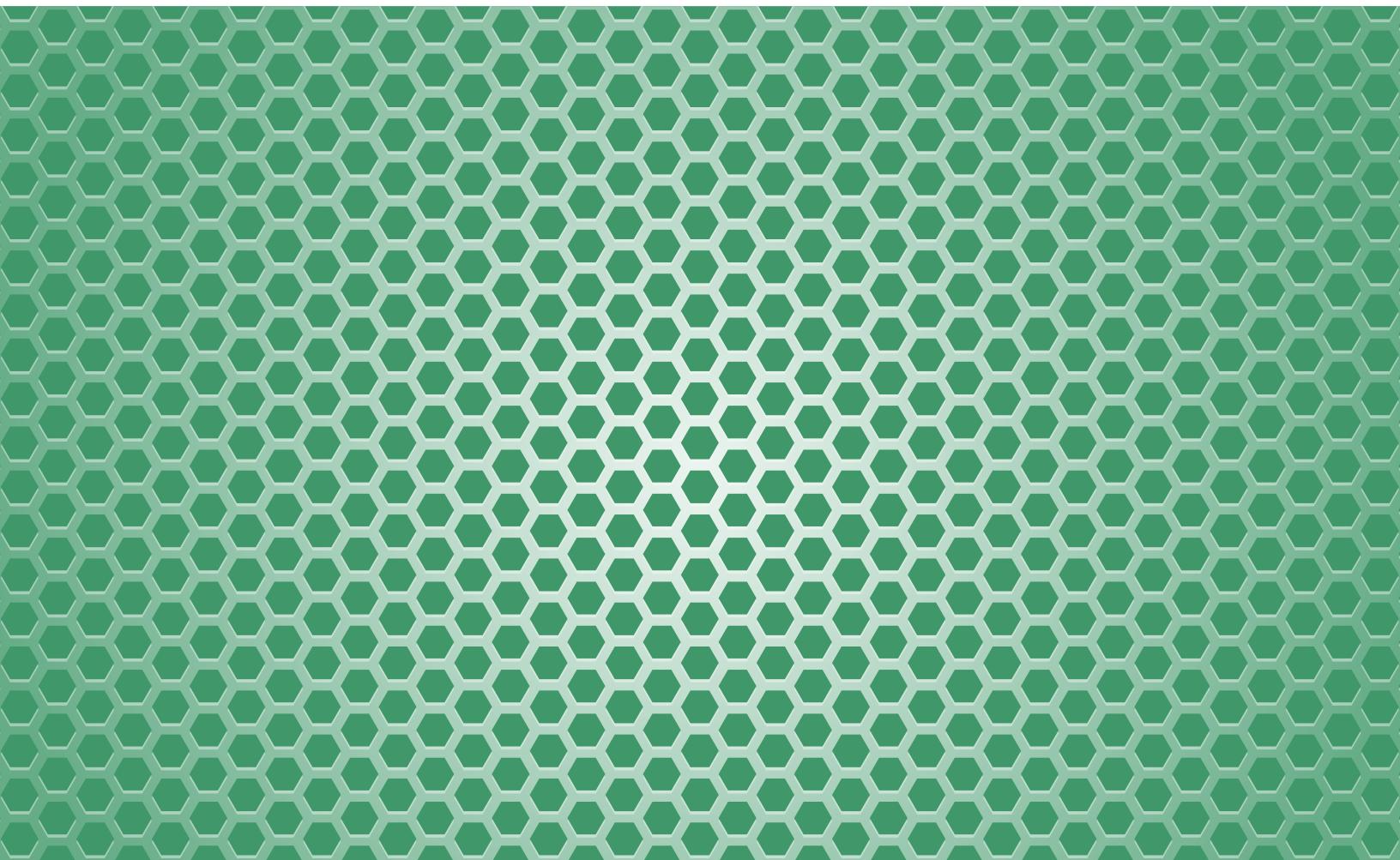


Sustainable Development Indicator Framework for Africa and Initial Compendium of Indicators



United Nations
Economic Commission for Africa

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Acronyms and Abbreviations

ACCNNR	African Convention on the Conservation of Nature and Natural Resources
ACGS	African Centre for Gender and Social Development
ACNNR	African Convention on Nature and Natural Resources
ACS	African Centre for Statistics
ADF	African Development Forum
AEIN	Africa Environment Information Network
AEO	Africa Environment Outlook
AEO-DWG	African Environment Outlook Data Working Group
AfDB	African Development Bank
AMCEN	African Ministerial Conference on the Environment
AMU	Arab Maghreb Union
APCI	Africa Productive Capacity Initiative
APRM	African Peer Review Mechanism
AU	African Union
AUC	African Union Commission
CAADP	Comprehensive Africa Agriculture Development Programme
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
COMESA	Common Market for Eastern and Southern Africa
CSD	Commission on Sustainable Development
CSO	Civil Society Organization
DALY	Disability-Adjusted Life Year
DPSIR	Driving Force-Pressure-State-Impact-Response
EAC	East African Community
ECCAS	Economic Community of Central African States
ECOLFOOT	Ecological Footprint
ECOWAS	Economic Community of West African States
EIA	Environmental Impact Assessment
EPI	Environmental Performance Index
ERA	Environmental Risk Assessment
ESA	Environmental Security Assessment
ESIA	Environmental and Social Impact Assessment
ESI	Environmental Sustainability Index

EVI	Environmental Vulnerability Index
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FSSDD	Food Security and Sustainable Development Division
GBO	Global Biodiversity Outlook
GDP	Gross Domestic Product
GDS	Genuine Domestic Savings
GEF	Global Environment Facility
GHA	Greater Horn of Africa
GEO	Global Environment Outlook
GNP	Gross National Product
GPI	Genuine Progress Indicator
GRICS	Governance Research Indicator Country Snapshot
GSTC	Global Sustainable Tourism Criteria
HDI	Human Development Index
HDR	Human Development Report
ICPD	International Conference on Population and Development
IDRC	International Development Research Centre
IEPI	International Environmental Performance Index
IGAD	Intergovernmental Authority on Development
IISD	International Institute for Sustainable Development
IUCN	International Union for Conservation of Nature
JPOI	Johannesburg Plan of Implementation
MA	Millennium Ecosystem Assessment
MDGs	Millennium Development Goals
NAPA	National Adaptation Programme of Action
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
NPCA	NEPAD Planning and Coordinating Agency of the AU
NSO	National Statistical Office
OAU	Organization of African Unity
OECD	Organization for Economic Cooperation and Development
PAES	Partnership for African Environmental Sustainability
PRAIS	Performance Review and Assessment of the Implementation System-UNCCD
PRS	Poverty Reduction Strategy
PRSP	Poverty Reduction Strategy Paper
REC	Regional Economic Community
REDD	Reducing Emissions from Deforestation and Forest Degradation
SADC	Southern African Development Cooperation
SC	Sustainable Consumption
SD	Sustainable Development
SDIFA	Sustainable Development Indicator Framework for Africa
SDRA	Sustainable Development Report on Africa
SEA	Strategic Environmental Assessment
SEEA	System of Integrated Environmental and Economic Accounting
SLM	Sustainable Land Management
SNA	System of National Accounts

SP	Sustainable Production
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNCSD	United Nations Commission on Sustainable Development
UNDESA-DSD	United Nations Department of Economic and Social Affairs - Division for Sustainable Development
UNDP	United Nations Development Programme
ECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UNICEF	United Nations Children's Fund
UNSC	United Nations Statistical Commission
UNWTO	United Nations World Tourism Organization
WI	Wellness Index
WFP	World Food Programme
WHO	World Health Organization
WRI	World Resources Institute
WSSD	World Summit on Sustainable Development
WWF	World Wide Fund for Nature
WWI	Worldwatch Institute

Glossary of Key Terms

Economic transformation: The change in the structure of an economy over time from a subsistence economy, through industrialization, to an industrial or even post-industrial society (Oxford Dictionary).

Environmental Security Assessment (ESA): The critical analysis of environmental change and its impacts as they interact with and affect the socioeconomic and political well-being, attitudes, and peaceful coexistence of the population within a geographically defined area (e.g. community, region, nation, transportation corridor, or ecosystem) (PAES).

Environmental sustainability: Management of natural resources and the environment that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

Human capital: The sum of knowledge, skills, and know-how possessed by the population, including the institutional infrastructure of the country, as well as the social capital – the level of trust among people in a society and their ability to work together towards common goals (World Bank 2005).

Human security: The protection from sudden and harmful disruptions in the patterns of daily life – whether in homes, jobs or communities (UNDP 1994).

Natural capital: The sum of non-renewable resources (including oil, natural gas, coal, and mineral resources), cropland, pastureland, forested areas (including areas used for timber extraction and non-timber forest products), and protected areas (World Bank 2005).

Produced capital: The sum of machinery, equipment, and structures (including infrastructure), including ur-

ban land, which is not considered to be a natural resource (World Bank 2005).

Programme: Organized set of activities with defined objectives and investments to be achieved in the framework of relevant policies and plans of a community, nation, or region (PAES).

Social sustainability: Social sustainability refers to the continuous betterment of human well-being and welfare through access to health, nutrition, education, shelter, and gainful employment, as well as through maintenance of effective participation in decision-making within and across generations. (Adapted from Maler and Munasinghe 1996).

Strategic Environmental Assessment (SEA): “A systematic, ongoing process for evaluating at the earliest stage, the environmental quality and consequences of alternative visions and development intentions incorporated in policy, planning or programme initiatives to ensure full integration of relevant biophysical, economic, social and political considerations.” (OECD 2005).

Sustainable development: Development that “meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Commission 1987).

Value addition: The processing of raw materials and agricultural produce for export and domestic consumption that result in additional value for the commodity over what has been required to produce it from the previous stage of production (SDIFA).

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The report was prepared by a team led and guided by Isatou Gaye, Chief of the Environment and Sustainable Development Section of ECA/FSSDD. The ECA team that contributed to the report included Charles Akol, Alessandra Sgobbi and Nega Emiru.

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1. Introduction

In recognition of the strategic positioning of Regional Commissions to link global consensus with national priorities and concerns, the World Summit on Sustainable Development (WSSD) mandated Regional Commissions to foster sustainable development through promoting the balanced integration of the economic, social and environmental pillars of sustainable development. Furthermore, General Assembly Resolution 58/218 of 23 December 2003, as reaffirmed by Resolution 59/227 of 22 December 2004, requests Regional Commissions to take action to ensure the effective implementation of, and follow-up to, the outcomes of WSSD.

In keeping with these mandates, in the 2004–2005 biennium, ECA launched the Sustainable Development Report on Africa (SDRA), as one of its flagship publications, which it produces together with sister United Nations agencies, and regional and subregional organizations. As at the time of drafting this report, three issues of the SDRA had been produced. The first was produced in the 2004–2005 biennium under the theme “*Managing Land-Based Resources for Sustainable Development*.” The second was produced in the 2006–2007 biennium with the theme “*Five-Year Review of the Implementation of the World Summit on Sustainable Development Outcomes in Africa (WSSD+5)*.” The third issue of the SDRA was produced in the 2008–2009 biennium under the theme “*Sustainable Consumption and Production (SCP) for Sustainable Growth and Poverty Reduction*”.

The SDRA is intended to be an important medium for monitoring and assessing sustainable development in Africa and is, among other things, aimed at promoting a balanced integration of the three pillars of sustainable development. The report consists of two parts: the first provides an assessment of the status of sustainable development in the region using indicators that cover the social, economic, environmental pillars of sustainable development, and the institutional dimension; the second focuses on Africa’s development challenges and priorities, with an emphasis on promoting sustainable growth and development the region.

The process of development of SDRA I included the compilation of indicators from a wide range of international sources, which were in some cases complemented by indicators from national sources. However, because of the paucity of data, Part I of subsequent issues of the SDRA was largely descriptive.

In order for the SDRA to become an important medium for monitoring and assessing sustainable development, and the authoritative source of information on sustainable development in Africa, the report should provide relevant, robust and quality analyses of priority sustainable development issues. There was therefore a need to identify a set of indicators cov-

ering the social, economic, environmental pillars, and the governance dimension of sustainable development agreed upon by member States and partners, that could be consistently used to assess the status of sustainable development in the region. Such a sustainable development indicator framework for Africa was deemed necessary to enable an integrated assessment of the different dimensions of sustainable development in a manner that is responsive to Africa's priorities and specificities.

In November 2010, ECA commissioned the development of a Sustainable Development Indicator Framework for Africa, which was discussed at a multi-stakeholder workshop in March 2011.

1.1 Objective

The main objective of the report is to present the sustainable development indicator framework for Africa and its initial compendium of indicators, covering all the pillars and the governance dimension of sustainable development, with a view to serving as a tool for systematically measuring and tracking progress on sustainable development at the regional level and, more specifically, for conducting the assessment of Part I of the fourth issue of the SDRA.

As a step towards achieving these objectives, this Framework seeks to provide the policy and institutional context for developing sustainable development indicators. It clarifies the conceptual underpinning; defines linkages among the economic, social, environmental and governance dimensions of sustainable development; systematically organizes and arranges indicators; outlines their basic characteristics; sets criteria for selecting them; and proposes guidelines for refinement and updating.

1.2 Methodology

The process of developing this sustainable development indicator framework was divided into three phases.

First, a consultancy study was commissioned to prepare a draft Sustainable Development Indicator Framework for Africa and Compendium of Indicators. This entailed a review of the literature on sustainable development and indicators to help identify relevant and appropriate

indicators that could be adapted at the Africa level, as well as interviews with experts from international, regional, subregional and national institutions. The draft strategy and compendium of indicators was peer-reviewed, internally and externally.

In the second phase, the revised strategy was presented and thoroughly discussed at the Workshop on Sustainable Development Indicator Framework for Africa, organized by ECA in collaboration with AUC, AfDB, UNEP and UNDP.¹

The workshop took place on 10 and 11 March 2011 in Addis Ababa, Ethiopia, and was attended by more than 100 policymakers and experts from planning, finance, economic, social, and environment ministries, national statistics experts, and agencies of ECA member States. African regional and subregional organizations represented included the Economic Community of West African States (ECOWAS), the Economic Community of Central African States (ECCAS), the Common Market for Eastern and Southern Africa (COMESA), the Southern Africa Development Community (SADC), the East African Community (EAC), the Intergovernmental Authority on Development (IGAD), the Arab Maghreb Union (AMU), the African Union Commission (AUC) and the African Development Bank (AfDB). Also represented were civil society organizations (CSOs), United Nations agencies and development partners.

Overall, the workshop emphasized the critical role that comprehensive and agreed upon sustainable development indicators play, not only in tracking progress towards sustainable development, but also in facilitating the identification of strengths and weaknesses in the implementation process. The workshop underlined that by developing a Sustainable Development Framework for Africa, the continent was for the first time taking full charge of the development of meaningful and relevant indicators for sustainable development in the region. The meeting agreed on a proposed Sustainable Development Indicator Framework for Africa and enriched the suggested compendium of sustainable development indicators. The workshop adopted action-oriented recommendations for effective use and further improvement of the indicator set. It also underscored the need for harmonized approaches, and for capacity-building of relevant actors at the national and subregional levels.

¹ The outcomes of the workshop can be accessed at: <http://new.uneca.org/rio20/WorkshopSDIFAfrica1011March2011.aspx>.

During the third phase, following the workshop, the sustainable development assessment framework and the related sustainable development indicators were further revised on the basis of continuous exchanges with partners and experts, and bearing in mind data availability constraints. The Sustainable Development Indicator Set for SDRA IV was thus finalized.

It is important to note that this document represents the starting point rather than the conclusion of the work of ECA and its partners on measuring progress towards sustainable development in Africa. Through the production of subsequent issues of the SDRA and further consultations with member States and experts, the indicator set will be tested at the national, subregional, and regional levels in order to draw lessons, and then improve, refine and update the selected indicators in coverage and quality.

1.3 Outline of the report

The report comprises seven chapters and is organized as follows: Chapter 2 provides the background and context to the report; Chapter 3 summarizes the key concepts of sustainable development; Chapter 4 discusses sustainable development indicators and indicator frameworks; Chapter 5 discusses key criteria for identifying and selecting relevant sustainable development indicators; Chapter 6 presents the proposed themes, sub-themes and monitoring indicators for the sustainable development indicator framework for Africa, as adopted for inclusion in SDRA IV; and Chapter 7 concludes by charting the way forward and the strategy for monitoring and updating the sustainable development indicator set for future issues of the SDRA.

2. Background and Context

The question of measuring sustainable development (SD) has been an issue of considerable debate since the Brundtland Commission Report brought the concept of SD to the global scene in 1987. In its seminal publication, *Our Common Future*, the Commission defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Sustainable development is understood to involve the attainment of three related objectives: economic growth, social well-being and equity, and protection of the environment in an integrated and balanced manner, which necessitates the existence of responsive and well-functioning institutions.

It is fair to say that in Africa, as in the rest of the world, the notion of sustainability is not new. Human beings have harmoniously coexisted with nature for millennia, despite their dependence on/depletion of natural resources for survival. In Africa, it is believed that most of the destruction of species and ecosystems took place during the colonial period, and particularly in the post-World War II years of corporate greed and weak natural resource governance. “Over the past 50 years, humans have changed the ecosystem more rapidly and extensively than in any comparable period of time in human history” (Millennium Ecosystem Assessment 2005). These rapid shifts include irreversible vegetation cover loss, water scarcity (quantity and quality), soil degradation and fertility loss, and an overall erosion of the natural resource base upon which many Africans depend for their livelihood. Along with pervasive poverty, rising population, frequent natural disasters, and a low technological base, these shifts are also the sources of Africa’s high vulnerability to climate risk. Climate change and variability is undermining every effort Africa makes towards sustainable development and at the same time exacerbating political tensions and instability (ADF VII, 2010).

The notion of sustainability postulates that used natural resources need to be replaced by an equal amount (quantity and quality) to offset depletion. It is, however, interesting to note the different perspectives on the origin of sustainability or sustainable development, which influences the work on indicators. Keiner (2006) wrote that “sustainable development was born in 1713 in forest sciences when Carlowitz called for a balance between timber growth and lumbering”. Others attribute the origins of sustainable development to the founder of ecology, Ernst Haeckel, who wrote about ecology as a science and basis for social systems and argued for the need for society to adapt itself to the state of balance in the natural world (Ramphal, 1992).

The idea of sustainable development may even go back to ancient Greece and Aristotle, who wrote that property that is communally owned (water, air, forest, among others) is the least cared for. Individuals tend to take good care of resources they own. Communal prop-

erty often becomes “nobody’s property” as individuals are eager to exploit it but not to assume responsibility for replacing it. Garrett Hardin’s essay “The Tragedy of the Commons”, published in 1968, captured worldwide attention as the best expression of Aristotle’s concern. Diamond (2005) attributes the collapse of great human civilizations to mismanagement of common property (the environment). However, the extent to which particular common property will be subject to the “tragedy of the commons” depends on culture, institutions, and common property management regimes. For example, Ostrom (1990) argues that users of common property resources have, in various places around the world, sustainably managed those resources through local institutions and self-regulation that clearly defined individual and group rights and obligations. Indeed, Africa has a long and proud history of well-functioning indigenous community governance and regulatory institutions, although these are under serious threat today because of political developments and perspectives that ended up concentrating power in the centre.

In Africa, one of the earliest concerns for the environment, an important pillar of sustainable development, was expressed in the 1900 London Convention for the Protection of Wild Animals, Birds and Fish in Africa, which sought to prevent the indiscriminate destruction of wildlife (NEPAD, 2003). The other landmark agreement was the African Convention on the Conservation of Nature and Natural Resources, adopted in Algiers in 1968 by the then Organization of African Unity (OAU). The Convention called for “the conservation, utilization and development of natural resources, particularly soil, water, flora and fauna resources, based on scientific principles” to meet societal needs (NEPAD, 2003). The Revised African Convention on the Conservation of Nature and Natural Resources (Maputo Convention), under the auspices of AU and adopted in Maputo in 2003, addresses continent-wide issues ranging from sustainable management of land and soil to water, air and biological resources and seeks to integrate conservation and better environmental management strategies into social and economic development aspirations. The AUC, through its MEAs-Multilateral Environmental Agreements Project, is developing a practice manual to promote ratification of this Convention. Despite these efforts, the current environmental problems Africa is grappling with suggest that the two landmark conventions have yet to be implemented (AU, 2012).

In addition to lessons learned from past efforts to promote sustainable development, the New Partnership for

Africa’s Development (NEPAD) provides the broad framework for development of indicators. A key objective of NEPAD is “placing Africa on a path of sustainable growth and development” through eradicating poverty, building peace, and conserving the integrity and diversity of its ecosystems, most notably its forest resources. Centred on “African ownership and management”, NEPAD calls for a new partnership between Africa and the international community and the enhancement of the continent’s integration in the global economy and trade based on “transformation from a raw materials supplier to one that processes its natural resources”. NEPAD makes clear that African countries will be responsible for restoring and maintaining peace, preventing and managing conflicts, enhancing democracy and human rights by “developing clear standards of accountability, transparency and participatory governance”. Restoring and maintaining macroeconomic stability, revitalizing and extending the provision of education, technical training and health services, and promoting the role of women in social and economic development are the other measures that African countries are committed to taking. Monitoring progress towards achieving the NEPAD goals has so far been done through compartmentalized traditional and sectoral indicators.

At the global level, as members of the United Nations, all African countries have a responsibility for the implementation of Agenda 21, the Statement of Principles for the Sustainable Management of Forests, and the Johannesburg Plan of Implementation (JPOI). Under the banner saving the earth, Agenda 21 and subsequent declarations and action plans to implement it called for a major shift in the priorities of governments and individuals in the way business is conducted on a daily basis, including the way we live, eat, move around and communicate, in order to show concern for the environment and sustainable and responsible use of natural resources. The United Nations Commission for Sustainable Development (UNCSD), which was established to monitor and follow up the implementation of Agenda 21, has developed a comprehensive list of indicators, which provide both the foundation and scaffolding for this African SD indicator framework and compendium of indicators.

In addition to Agenda 21, the three flagship global environment conventions – the United Nations Convention on Biological Diversity (UNCBD), the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat

Desertification (UNCCD) – and the Millennium Declaration and Millennium Development Goals (MDGs), to which all African countries are signatories, impact heavily on the form and content of the indicators. Many African countries are now signatories of the Stockholm Convention on Persistent Organic Pollutants (POPs), the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, as well as the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer, which have been considered in the development of the Framework.

The CBD aims to enhance the conservation of biological diversity, ensure the sustainable use of its components, and promote the fair and equitable sharing of benefits derived from that use. Most African countries have formulated national biodiversity strategies and action plans to assist them in applying the Convention at the country level. These strategies and action plans remain largely unimplemented, however (Ejigu, 2001).

In 2002 the Conference of Parties (COP) to the CBD agreed on biodiversity targets to be achieved by 2010 in order to bring about a significant reduction in the current rate of loss of biodiversity (biomes, habitats and ecosystems, species and populations, and genetic diversity at the global, regional, and national levels (UNCBD Secretariat). The targets included:

- (a) reducing major threats to biodiversity, in particular, invasive alien species, climate change, pollution, and habitat change;
- (b) maintaining ecosystem integrity to enhance human and ecological well-being; and
- (c) protecting traditional knowledge, innovations and practices.

At the recently convened Nagoya Biodiversity Summit (October 2010), the Parties agreed on specific targets that include:

- (i) “to at least halve and where feasible bring close to zero the rate of loss of natural habitats, including forests”;
- (ii) to conserve “17 per cent of terrestrial and inland water areas and 10 per cent of marine and coastal areas”;
- (iii) Governments to “restore at least 15 per cent of degraded areas”; and
- (iv) to make special efforts to reduce the pressures on coral reefs.

Each country is committed to setting national targets based on the Strategic Plan in accordance with national priorities and capacities. Progress made towards achieving these targets and tracking trends of the state of environment in Africa are monitored through the regular publication of the Global Biodiversity Outlook, as well as the Africa Environment Outlook (AEO).

Almost all African countries have formulated National Plans of Action to Combat Desertification (NPACD) within the context of UNCCD, whose primary objective is to combat desertification and mitigate the effects of drought, mostly in Africa, through the rehabilitation, conservation and sustainable management of land and water resources, thereby leading to improved human and ecosystem well-being (UNGA, 1994). The Parties to the Convention have developed a ten-year strategic plan (2008-2018), which calls for expanded sustainable land and water management policies and practices, better preparedness and adaptive measures to reduce human and ecosystem vulnerability to drought and climate variability.

Strong political commitment and unity of purpose have been demonstrated in addressing climate change issues under the UNFCCC, particularly during the preparation for and since Copenhagen. The primary objective of the Framework Convention, which was issued alongside Agenda 21 in 1992, is the “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system” (UNGA, 1992). Africa has the lowest per capita emissions, but it is the region most vulnerable to climate risk. Because of the high dependence of African economies on natural resources, the impact of climate change runs across all sectors and spatial levels. Some “projections show that by 2020, in some African countries, yields from rain-fed agriculture could be reduced by up to 50 per cent” (IPCC 2007), while “between 75 million and 250 million people in Africa are projected to be exposed to increased water stress due to climate change (IPCC 2008). Climate change and variability pose a huge challenge to Africa’s sustainable development aspirations. The African common position on climate change, set out in the Nairobi Declaration on the African Process for Combating Climate Change, which is one of the building blocks for developing SD indicators, includes:

- a) “mainstreaming climate change adaptation measures into national and regional development plans, policies and strategies”;

- b) “ensuring adequate adaptation to climate change in the areas of water resources, agriculture, health, infrastructure, biodiversity and ecosystems, forest, urban management, tourism, food and energy security and management of coastal and marine resources”; and
- c) “moving Africa towards low-carbon development”.

From the outset, African countries embraced the Millennium Development Goals (MDGs) set by the United Nations General Assembly in its Millennium Declaration of 2000, which provide a globally accepted framework for poverty reduction, and social and environmental well-being. For almost a decade, national poverty reduction strategies (PRS) have replaced medium-term development plans as tools for guiding and managing the economic and social development of many African countries. These PRS strategies have embraced the specific goals enshrined in the MDGs, notably, eradicating extreme poverty and hunger, achieving universal primary education and gender equality, and ensuring environmental sustainability, which this SD indicator framework study has to capture and reflect. In the areas of economic growth and addressing environmental issues, however, implementation of these strategies has been poor, which has prompted some countries to launch five-year development and reconstruction plans.

This report and compendium of African SD indicators builds upon those efforts, while ensuring that the indicators reflect specific macroeconomic and sectoral conditions, as well as the policy and institutional concerns of the continent. Most African countries share common problems, such as:

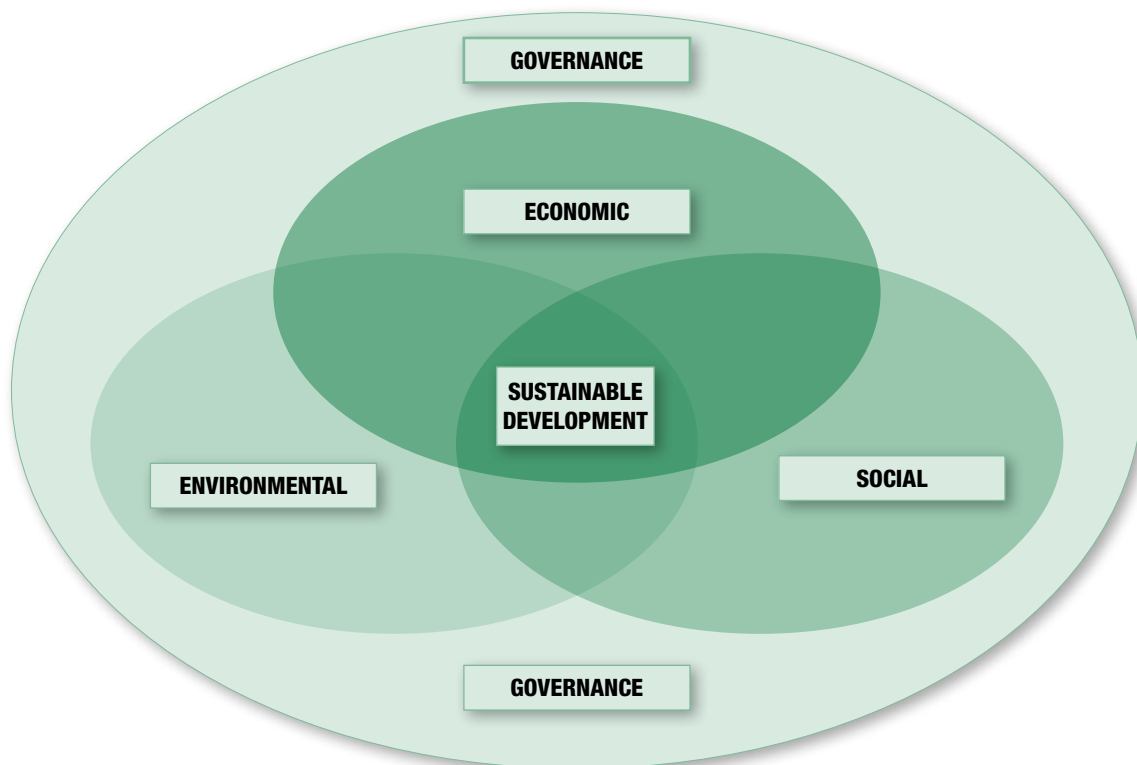
- (i) dependence on natural resources for livelihoods and exports;
- (ii) pervasive poverty and food insecurity;
- (iii) soil, land degradation and biodiversity loss;
- (iv) prevalence of armed conflict or insecurity;
- (v) low literacy rates;
- (vi) high incidence of HIV/AIDS and malaria;
- (vii) high vulnerability to drought and climatic variability;
- (viii) low technological input; and
- (ix) fragility of the democratic process.

While making sufficient allowances for variation in development contexts and policies, this SD indicator framework is an attempt to fill critical gaps by developing a comprehensive set of indicators that span all dimensions of sustainable development and, at the same time, show interlinkages.

3. The conceptual underpinning of sustainable development indicators

Since sustainable development became so prominent on the global scene, various attempts have been made to define and redefine it or identify an alternative development paradigm. Enormous efforts have also been made to schematize sustainable development and represent the integrated and balanced nature of its three pillars: economic growth, social well-being and environmental protection.

Figure 1: The dimensions of sustainable development and their interlinkages



The three pillars of sustainable development are inseparable and need to be pursued in an integrated and balanced manner. Indeed, sustainable development is a continuous process of integrating, balancing, negotiating, and managing trade-offs. In the context of Africa, good governance – encompassing institutions, decision-making processes, legislative environment and the rule of law, among others – is an important dimension of sustainable development.

Underlying the economic dimension of sustainable development is the concept of Hicksian income, and of optimal and efficient use of scarce resources to meet human needs.² This entails the shift of economic theory from the notion of efficient allocation to efficient use of resources and the emergence of three forms of wealth: natural capital, human capital, and produced capital (World Bank, 2006). The valuation of aggregate output and demand (GDP estimation) is the typical indicator used to measure economic growth. Yet the validity of this measure is increasingly questioned, as it fails to take into account investments in human capital, depletion of natural resources and damage caused by pollution.

The social dimension of sustainable development refers to people (human capital), particularly the maintenance of different cultures, diversity, pluralism and effective grass-roots participation in decision-making (Maler and Munasinghe, 1996). Intra- and intergenerational equity remains an essential aspect of the social dimension of sustainability. Social sustainability is judged by whether all citizens of a given society have access to minimum standards of living, security, human rights, basic needs and benefits, including access to affordable health and education services at the place and time they require them. Included in the social dimension of SD is the opportunity for individuals to be gainfully employed and productively contribute to society, and to receive just and fair rewards for their contributions (Reed, 1996).

The environmental dimension is concerned with the maintenance of the stability of biophysical systems through conservation, sustainable use and management of natural resources. The central issue here is the preservation of the “resilience and dynamic capacity of such systems to adapt to change, rather than the conservation of some ideal static state” (Munasinghe, 1996). “Environment”, long seen by many in its narrowest sense (reduced to the conservation of trees and flagship mammals), is now increasingly understood as a field that deals with the totality of all biophysical resources, ecosystem services and functions, external conditions and factors that affect the development and survival of all species, including human beings. It also includes the relationship between human beings and nature and how they impact one another. Environment is also increas-

ingly recognized as a critical factor for national security and political stability, and hence sound environmental management as a strategy for conflict management and building peace.

Governance is a broad concept that encompasses: institutions, policies, customs, relational networks, laws and structures governing and regulating a community and common property, rule of law, effective participation in development, transparent and accountable processes, respect for citizens and their rights, state legitimacy, access to knowledge, information and education, and political empowerment of people that foster sustainability. Policies and institutions determine who has access to natural resources and who does not, when and how such resources are utilized, and how they are managed and protected. The rights of individuals, groups, and organizations in relation to a given resource may be different and unequal but such rights have to be institutionally established if the natural resource is to be sustainably utilized. Poor governance and resource mismanagement accelerate environmental degradation, inefficiency and productivity losses, social deprivation, and build-up of grievances that may eventually result in armed conflict, as the events of the Arab Spring have shown.

NEPAD argues that “development is impossible in the absence of true democracy, respect for human rights, peace and good governance”, calling for sound economic, political, democratic, and corporate governance, including institutionalization of commitments made at various levels. In developing SD indicators, UNCSD included as institutional indicators such issues as integrated decision-making; capacity-building; science and technology; public awareness and information; international conventions and cooperation; role of civil society; and institutional and legislative frameworks. This sustainable development indicator framework for Africa, however, goes beyond these issues and includes broader governance, peace and security aspects of development to reflect concerns and aspirations of the region expressed in NEPAD.

In a nutshell, sustainable development is a continuous process of growth and improvement in living standards, quality of life, productivity, educational, cultural, and political well-being of the people while maintaining the quantity and quality of environmental resources. It can thus be understood in terms of improved economic, social, and environmental well-being; sound governance; expansion of human capabilities; freedom from hunger, deprivation, and personal threats; having enabling con-

2 Hicksian income refers to Hicks' (1946) definition of income as “the maximum value which [a man] can consume during a week, and still expect to be as well off at the end of the week as he was in the beginning”. The notion of “well off” has been interpreted to mean that consumption must be sustainable over time and that income will be equivalent to the maximum sustainable consumption. (see Brekke, 1997).

ditions for people to be creative and use their ingenuity, and free from any kind of insecurity arising from social marginalization, environmental stress, pollution, drought, and desertification. For the policymaker, sustainable development means that economic gains need to be seen in the light of the sociocultural well-being of the people and the maintenance of the integrity and diversity of nature and natural resources. Similarly, social gains and the conservation of the environment need to be seen in the light of economic benefits and costs.

Sustainable development can be seen as a movement towards an integrated and balanced short-, medium-, and long-term process of development, improvement, change and transformation at all societal levels taken in continuous steps. Indeed, the wider adoption and implementation of sustainable development is a political, economic, social, and environmental imperative in Africa. The opportunities are there for economic growth and transformation, which at the same time ensure social and environmental sustainability.

4. Sustainable development indicators: building on existing knowledge and practices

Indicators help to assess change, or the lack of change, in all dimensions of sustainable development, their dynamic co-influence, and cause-effect relationships. Sustainable development indicators need to show trends in terms of outcomes and processes, with a view to encouraging policy actions and concerted efforts from all sections of society. Sustainable development indicators help to analyse sources of unsustainability, including policies and human behaviour, to help devise measures to remove constraints and prepare the ground for achieving balanced and integrated development.

A sustainable development framework for Africa should encompass assessment of the economic, social, environmental, and governance dimension of SD as a double-pronged tool for:

- a) understanding the specific conditions and development challenges of Africa on which indicators will be based, and
- b) effectively using indicators to determine the region's progress towards sustainable development.

4.1 What are sustainable development indicators and how do they differ from traditional indicators?

Sustainable development indicators show, in an integrated fashion, the state of economic, social, and environmental well-being and changes taking place in a sector, system, institution, community, country, region, or continent. Often communicated in the form of tabular data, graphics, text, and maps, indicators provide benchmarks and help measure performance and progress over time. Sustainable development indicators also help measure the degree of sustainability (integration of economic, social and environmental objectives), how far a sector or country is from desired targets and goals, and to identify weaknesses and what needs to be done. Indicators also help to set targets, monitor implementation of plans and programmes, facilitate implementation of appropriate policy and managerial action, enable comparisons across sectors, countries or regions, and facilitate research and policy analysis by helping to identify problems. For policy decision makers, indicators are a useful communications tool for assessing and expressing the relative effectiveness of (or need for) policies and performance (political accountability). Numeric indicators often provide the most useful and understandable information to decision makers. In Africa and developing countries generally,

where there is a paucity of data, qualitative information is necessary to supplement quantitative indicators, and better understand the condition of a sector or community in order to monitor progress.

Because sustainable development is the pursuit of integrated and balanced development across sectors, places, and generations, sustainable development indicators tend to be cross-sectoral and multidimensional. Examples of such indicators include: economic growth measured in changes in GDP adjusted for environmental degradation and income inequality; the switch from leaded to unleaded fuel; the ratio of renewable to non-renewable energy used, instead of total energy consumption of a country; and the percentage of farmed land sustainably managed, instead of land area cultivated.

Indicators of sustainable development are different from traditional indicators of economic, social, and environmental progress as they are required to point out areas of strong or weak links between economic growth, social well-being, and environmental protection. For example, GDP is the universally used indicator of economic growth. However, it cannot be considered a sustainable development indicator because it treats, among other things, the depletion of natural capital or degradation of the environmental resources resulting from economic activity as income. In other words, in a traditional GDP calculation, a standing tree will have value only when it is cut and put into the production process (or when it generates economic activity). Furthermore, as GDP records all monetary transactions, activities that depreciate human capital and quality of life such as crime, divorce and natural disasters are treated as economic gain. GDP also increases with activities that pollute the atmosphere or oceans and coral reefs, and it increases further when society spends on clean-ups. Instead of GDP, the Genuine Progress Indicator (GPI), which adjusts GDP for changes (degradation or improvement) in human and natural capital, can be regarded as a sustainable development indicator.

Sustainable development indicators can measure inputs, processes, outputs, and outcomes. Input indicators measure the resources (human, material and financial) devoted to a particular programme or intervention, for example, budget earmarked, the number of workers employed, the amount of fertilizer used, and so on. Output indicators measure the quantity of goods and services produced, made available, and consumed. Because sustainable development is a process of interaction among economic, social, ecological, and institutional/political

factors, process indicators play a critical role in measuring progress towards sustainability and/or the effectiveness of programmes and policies. Examples of process indicators include: the degree of participation in development (problem identification, priority setting, envisioning and formulating a long-term strategy); gender equity, and institutional capacities, policy enforcement; and the degree of local ownership.

Indicators of sustainable development can also measure pressure factors, state/condition, responses, effects/impacts, and mitigation measures. For example, in the area of fresh water, sustainable development indicators include: water sectoral withdrawals (% m^3) – a measure of pressure on hydrological resources; water consumption per capita (m^3) – a measure of the state of water use; water availability per capita (m^3 /head) – a measure of effect/impact; and changes in the rural population with access to safe water (%) – measuring the effectiveness of the policy response to mitigate the problem of low access to safe water.

For sustainable development indicators to be useful for decision-making, it is critical that the underlying data be accurate, reliable, and collected frequently enough to facilitate decision-making at all possible levels. In some cases the quality and accuracy of statistical data may be more important for the decision maker than the quantity or coverage. In other instances, qualitative indicators may have to be used. The information/data should also be available when it is needed. In Africa, where national statistical offices are weak, and where economic and social infrastructure is poor, the quality and coverage of primary data is often poor. Decision-making processes should thus take into account the constraints related to data availability and accuracy.

4.2 Measuring performance and monitoring sustainable development: key global and regional developments

Several institutions have launched programmes to measure performance and monitor sustainable development, aggregated mostly at the country level. Among these are:

- **Genuine Progress Indicator (GPI):** developed by Anielski and others (2001), GPI measures the overall economic well-being sustainability of a country by adjusting GDP for social costs (crime, car accidents, commuting, family breakdown, loss of leisure time, underemployment) and environmental costs (household pollution abatement, water pollution, air pollution, noise pollution, loss of wetlands, loss of farmland, depletion of non-renewable resources, long-term environmental damage, ozone depletion, and loss of old-growth forests). GPI has yet to be accepted and practiced worldwide (Anielski and others, 2001).
- **Genuine Domestic Savings (GDS):** traditionally measured savings and investment are income-based measures that take into account the depreciation of physical capital and exclude natural and human capital. Developed by the World Bank, GDS seeks to capture changes in all capital forms: physical capital (generated by applying human skills and know-how to natural capital); human capital (stock of capabilities productive capacities of individuals acquired or inherited) and natural capital (natural resources and ecosystem services) (World Bank, 2006).
- **Ecological Footprint:** developed by the Global Footprint Network, it seeks to measure sustainability by calculating the human consumption requirements of the Earth's surface through aggregating the quantities of energy and renewable resources – minerals excluded – that a society (at any level from country to community, household, sector or business) consumes. This consumption is then converted into a common unit of area: the area of productive land and sea required to supply the same resources and absorb the carbon dioxide from fossil fuels³.
- **Human Development Index (HDI):** developed by UNDP, HDI measures national progress through the indexation of three socioeconomic indicators: longevity, knowledge, and standard of living. It is often considered an alternative to GDP, although not yet universally accepted by the scientific community and domesticated at the national level. It entails considerable investment in national statistical offices to enable them to generate the data required to develop the index.
- **Environmental Sustainability Index (ESI):** prepared by the Yale University Center for Environmental Law and Policy (YCELP) and the Center for International Earth Science Information Network (CIESIN) of Columbia University, ESI seeks to measure sustainability by using the environment as an entry point and gauging the ability of nations to protect the environment through tracking “natural resource endowments, past and present pollution levels, environmental management efforts, and the capacity of a society to improve its environmental performance”. The measurement focuses on five issues: environmental systems; reducing environmental stresses; reducing human vulnerability to environmental stresses; societal and institutional capacity to respond to environmental challenges; and global stewardship.
- **Governance Research Indicators Country Snapshot (GRICS):** developed by the World Bank, GRICS appraises how “governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them by focusing on six dimensions of governance: voice and accountability; political stability and absence of violence; government effectiveness; regulatory quality; rule of law; and control of corruption”⁴.
- **Global Sustainable Tourism Criteria (GSTC):** developed by the World Tourism Organization (WTO) and the Partnership for Global Sustainable Tourism Criteria (GSTC Partnership), GSTC offers a framework to guide emerging practices in sustainable tourism and help businesses, consumers, governments, non-governmental organizations, and institutions of higher learning to ensure that tourism helps rather than harms local communities and the environment.

In addition to the above, laudable efforts have also been made by various organizations to craft tools for monitoring progress towards or retreat from sustainable development, including:

³ http://www.footprintnetwork.org/en/index.php/GFN/page/basics_introduction/.

⁴ http://info.worldbank.org/governance/wgi/sc_country.asp.

- **The Barometer of Sustainability:** developed by the World Conservation Union (IUCN) and the International Development Research Centre (IDRC), the Barometer is based on the premise that economic growth, and social and environmental well-being are inseparable and integral parts of what the authors call the “egg” of sustainable development. One of the key features of the Barometer is a performance scale which the user can mark as desirable, acceptable, or unacceptable to ensure that ecosystem and human well-being are mutually supportive.
- **Dashboard of Sustainability:** named after a vehicle’s instrument panel and presented in visual format, the Dashboard of Sustainability illustrates the complex relationships among economic, social and environmental issues by displaying performance towards (or away from) sustainability. The Dashboard also displays the Millennium Development Goals indicator set. Among its key features are: performance evaluation with individual indicators and aggregate indices; country comparison with distribution curves and maps; comparison within country groups; and linkage analysis and scatter plots.
- **Natural resource accounts (NRA) and material/energy balances (MEB):** measure physical exchanges between the economy and the environment. Natural resource accounts record changes in the stocks of raw materials such as minerals or timber, while material/energy balances record the flows of materials and energy from the environment to the economy, through the economy, and back to the environment as pollution and wastes.

Progress towards sustainability can also be monitored through regular reporting on trends, changes in and co-influence of the economic, social and environmental pillars of sustainable development. The three key global publications used as the basis for this SD framework study are: the Global Environment Outlook (GEO), the African Environment Outlook (AEO), and the Global Biodiversity Outlook (GBO).

The African Environment Outlook (AEO) is a flagship publication of the African Ministerial Conference on the Environment (AMCEN) with the support of UNEP, its host agency. Since its first publication in 2002, AEO has become the most authoritative, influential, and valuable source of comprehensive information

on environment and development in Africa. Published every four years, AEO tracks the country, subregional and regional state of the environment, trends, threats, opportunities, and emerging issues. Some 22 countries and five subregions have produced their environment outlook reports using the AEO methodology (UNEP, 2006). With its well-developed list of themes, priority issues, lead indicators, type of indicators, and indication of sources of data, AEO is a valuable reference for work on SD indicators.

The Global Environment Outlook (GEO), a flagship publication of UNEP, is a comprehensive report on the global state of the environment, trends, challenges, and the way forward to improving environmental management. It was initiated immediately after the publication of Agenda 21, and is now in its fifth year with GEO-5 expected in 2012. One of the unique features of GEO is its use of wide-ranging data sources, and the highly participatory and consultative approach to its preparation, involving leading scientists, environmental experts and key policymakers within a well-coordinated global network of collaborating centres.

The Global Biodiversity Outlook (GBO) is the flagship publication of the Convention on Biological Diversity. Currently on its third edition, GBO draws upon a range of information sources to report on the status and trends of biodiversity as well as on the implementation of the Convention, and suggests strategies for overcoming obstacles facing the conservation and sustainable use of biodiversity and the fair and equitable sharing of benefits from the use of genetic resources.

The Performance Review and Assessment of the Implementation System (PRAIS), developed by UNCCD, is designed to monitor and evaluate the implementation of the UNCCD Ten-Year Strategic Plan and Framework. The PRAIS has set up 18 performance indicators and 11 impact indicators. Although requiring further refinement, the impact indicators show conditions of the livelihoods of the affected populations, conditions of the affected ecosystems, and the global benefit generated by implementation of the Ten-Year Strategic Plan.

The above performance measures and reports are valuable sources of information and indicators. Their contribution to the development of this indicator framework varies with the degree of relevance to Africa, data availability, level of aggregation, and user-friendliness. AEO is the most relevant and vital source of information for

this work, while GEO and GBO also make an important, but lesser contribution.

Since its first publication in the early 1990s, the comprehensive approach to human resources taken by the HDI has had a profound effect on the views of development practitioners, researchers, and academics about societal advancement. Ecological Footprint has also had an enormous effect on how people see their consumption behaviour in relation to Earth's resources. Undoubtedly, ESI and GRICS have played a significant role in global awareness-raising and country comparisons. However, their usefulness for development decision-making at the country level has been limited. "Rather than offering a comprehensive view of sustainable development, many of these indicators are specifically focused on the environmental dimension of sustainable development and resource management, for example Ecological Foot Print" (UNCSD, 2007). This study of SD indicators is an attempt to develop a more comprehensive, relevant, and user-friendly indicator framework.

4.3 Characteristics of good indicators

The question of what are good and/or sound sustainable indicators has been long debated. There is now growing convergence of opinion on common characteristics of good indicators that include: relevance, reliability, consistency, cost-effectiveness and availability. For example, UNCSD, in its publication *Indicators of Sustainable Development: Guidelines and Methodologies*, published in October 2007 (Third Edition), identified nine characteristics of good sustainable development indicators. They should be:

- a) Primarily national in scope,
- b) Relevant to assessing sustainable development progress,
- c) Limited in number, but remaining open-ended and adaptable to future needs,
- d) Broad in coverage of Agenda 21 and all aspects of sustainable development,
- e) Understandable, clear and unambiguous,
- f) Conceptually sound,
- g) Representative of an international consensus to the extent possible,
- h) Within the capabilities of national governments to develop, and

- i) Dependent on cost-effective data of known quality.

For example, the ECA sustainable development report (SDRA I) used the following criteria for such indicators:

- a) Ease of measurement,
- b) Availability,
- c) Usefulness,
- d) Sensitivity,
- e) User-friendliness,
- f) Reliability,
- g) Validity, and
- h) Policy relevance and cost-effectiveness.

To this, the following 5 characteristics of good indicators can be added. They should:

- Represent or cover the most important parts of the sector or problem of concern,
- Show trends over time and differences between places and groups of people,
- Be cross-sectoral: that is, the indicator addresses economic growth or decline within the context of the environment and social changes or environmental protection and social changes within the context of economic factors.
- Be consistent: that is, fully internalized, adapted and/or chosen by national organizations in light of prevailing conditions.

All the criteria listed above are undeniably important. For the purpose of this exercise, the following are deemed most relevant and have therefore been used:

- a) Relevant to sustainable development (show status, assess progress, planning and management) and addresses economic growth or decline within the context of the environment and social changes or environmental protection and social changes within the context of economic factors;
- b) Effective – provide critical information representing or covering all aspects of the sustainable development issue, sector, or problem of concern;
- c) Reliable – the information that the indicator is providing can be trusted;
- d) Understandable to non-experts, clear, unambiguous, and conceptually sound;

5 See <http://www.sustainablemeasures.com/Indicators/index.html>.

- e) Available – at the time and place needed and based on readily accessible data permitting the gathering of additional information to fill gaps, if any, in a timely manner and at reasonable cost;
- f) Show trends over time and differences between places and groups of people; and
- g) Consistent with current practices of multinational development and finance institutions and also many countries.

4.4 Sources of indicators: embracing qualitative information

One of the critical questions posed in any type of indicator development is the source of data with which to populate the selected indicators. The source of most indicators is primary data, which is usually generated from:

- Administrative records – national and local government (municipalities), ministries of agriculture, environment, health, transportation, and energy, among others; customs authorities, commercial and central banks for exports and imports.
- Field surveys and/or census – usually conducted by a statistical authority. For example, population census, household income and expenditure surveys, crop production surveys, industrial surveys, among others, are all important sources of indicators. The survey and census conducted by central statistical offices is often based on sound science and universally accepted methodology, which makes the data generated reliable. It is also possible to obtain such data on a time series basis as central statistical offices conduct periodic surveys.
- Mapping and remote sensing institutions – make available maps, satellite images.
- International organizations – climate data, terms of trade, foreign direct investment.
- Assessment studies and field research – although often one-time undertakings, studies conducted by individuals, academic institutions, research centres, civil service organizations, and in some

cases the private sector are important sources of data.

Numbers are obviously powerful tools for communicating messages and telling a story. Numbers placed on tables and graphs, for example, can tell an entire story over generations and are readable at a glance. However, in Africa, where statistical data is lacking, it is not uncommon to come across sectors and institutions whose planning and programme monitoring work has been stifled by lack of data. In these cases, every effort has to be made to supplement quantitative indicators with the use of process and qualitative indicators. Qualitative indicators are as important as quantitative indicators.

Participatory planning, policy development, monitoring and evaluation, and development decision-making in general in which the essential feedback loops are kept healthy and functional are therefore vital indicators.

4.5 Using a globally developed indicator framework and indicators

Over the past two decades, considerable work has been done on sustainable development indicators by the United Nations system and other organizations at the global level. Chapter 40 of Agenda 21 encouraged countries, governmental and non-governmental organizations to develop and identify indicators of sustainable development, harmonize efforts at the regional and global levels, and anchor development decision-making in accurate and reliable data and sound information.

In 2007, UNCSD, the most authoritative institution on sustainable development issues, published *Indicators of Sustainable Development: Guidelines and Methodologies* (Third Edition). This latest set of indicators is an outcome of “extensive testing, application, and use in many countries of the preceding two sets of indicators” (UNCSD, 2007). It identifies four frameworks:

- Driving force-state-impact-response framework. This framework shows cause-and-effect relationships, how various factors impact on one another, and helps decide which factors to focus on and which indicators to use. The pressure and driving-force indicators show processes, activities

or factors that impact sustainable development either positively or negatively – for example, climate change or property rights. State indicators show the current baseline, for example of poverty, forests and coral reefs, among others. Response indicators reflect how governments, communities and individuals react to the pressure factors. UNCSD discontinued the use of this framework because “it was not suited to addressing the complex interlinkages among issues; the classification of indicators into driving force, state or response was often ambiguous; there were uncertainties over causal linkages; and it did not adequately highlight the relationship between the indicators and policy issues” (UNCSD, 2007).

- Issue- or theme-based frameworks. Developed in recent years and most widely used, such frameworks involve categorizing and grouping indicators into various issues or themes in relation to sustainable development based on policy relevance. Such frameworks help to link indicators to policy processes and targets (United Nations, 2007), convey clear and direct messages to decision makers, and facilitate communication with and raising the awareness of the public. This approach is deemed flexible enough to adjust to new priorities and policy targets over time (United Nations, 2007).
- Capital frameworks. These frameworks are designed to “calculate national wealth as a function of the sum of and interaction among different kinds of capital, including not only financial capital and produced capital goods, but also natural, human, social and institutional capital” (United Nations, 2007). Capital frameworks facilitate identification of how development takes place and how it can be sustainable, what resources are available, and how they should be managed. Nevertheless, such frameworks may have little relevance for Africa, where there is data inadequacy, as they require all forms of capital to be expressed in common, usually monetary, terms (United Nations, 2007).
- Accounting frameworks. These frameworks are used to aggregate total goods and services produced by a country – for example, gross domestic product based on data obtained from primary sources and/or surveys (such as crop production, household expenditure). The United Nations

Statistical Commission (UNSC), the world’s most authoritative statistical institution, which developed the System of National Accounts (SNA) for estimating GDP, GNP, national savings and investment, has now prepared the System of Integrated Environmental and Economic Accounting (SEEA). SEEA takes into account depletion of the environment when estimating aggregate output and demand, and includes accounts expressed both in monetary and physical terms. According to UNCSD (2007), several countries are using the SEEA, which could be proposed as an international statistical standard. In Africa, various initiatives have been launched, including the evaluation of forest ecosystem services and functions, estimation of forest, biodiversity, and soil fertility losses initiatives in Tanzania, Uganda, South Africa, Ethiopia, and Namibia, among others. These can be a powerful entry point for greening GDP, although they have not yet reached the level of governments.

While the UNCSD work is an outcome of several years of discussion, field research, and testing of SD indicators developed earlier, the fundamental question remains whether the above theme approach is the best methodology for expressing the linkage among sectors and, in particular, the issue of integrated pursuit of economic development, social well-being, and protection of the environment in the African context. To answer this question, the approach taken in this exercise is to:

- a) conduct a broad analysis of the African sustainable development situation, concerns, needs, and aspirations;
- b) identify and adapt those indicators (developed by the United Nations system and other international organizations) found relevant;
- c) generate new indicators where gaps exist; and
- d) develop a compendium of sustainable development indicators for Africa.

5. Identifying, selecting, organizing and using sustainable development indicators

The identification, selection and organization of sustainable development indicators pose enormous challenges, and have been an issue of considerable debate for the past two decades. The UNCSD and multilateral conventions secretariats are making considerable efforts to develop and refine indicators in their respective areas from which Africa can then draw. For example, UNCCD has developed impact indicators on land degradation with a strong SD focus, which will be used to work out detailed indicators for the “land” theme. The CBD, while refining its indicator framework, has also established a programme to support countries in developing monitoring systems and indicators at national and subregional level.

Discussion of the complementarity of individual indicators and their need to be effective is required, given that each individual indicator has its limitations. There is, however, convergence of opinion on the key processes to consider, namely:

- Ensuring effective synergy of concepts and indicators,
- Clearly defining what indicators are to be used for,
- Developing conceptual frameworks, and
- Selecting indicators and determining themes, sub-themes, core and other indicators.

5.1 Ensuring effective synergy of concepts and indicators

Well-founded sustainable development knowledge is needed for the identification and selection of indicators as the type, number, and mix of indicators are determined by the underlying sustainable development concept and practices. A colossal effort has undeniably been made to translate SD concepts into concrete actions and to measure changes in this integrated process. However, many sustainable development indicators continue to be organized along sectoral or thematic lines, resulting in compartmentalization and disconnect between the sustainable development concept and the set of indicators used.

In some cases, convenience and availability seem to dictate the selection of ordinary development indicators to be used as sustainable development indicators. For example, GDP

calculated on the basis of the traditional flow approach is used as a sustainable development indicator, although the post-Agenda 21 approach calls for combining the flow and stock approaches, where the latter captures changes in the stock of natural capital (for example, increase or decrease of forest cover (deforestation)).

Because data on a country value added GDP, including non-market goods and services estimated on the basis of sustainable development accounting methodology are not readily available, many people argue that traditional GDP figures are good proxy indicators. This has led political leaders to believe that GDP growth rates reflect sustainable development achievements. This may in turn have stifled efforts to introduce and widely use green accounting methodology, despite the fact that the idea arrived on the global scene immediately following the adoption of Agenda 21.

5.2 Clearly defining what indicators are to be used for

Indicators can be used to:

- Assess overall progress towards achieving sustainable development goals through measuring: changes in a country's economic, social, environmental, and governance conditions; development constraints and opportunities; policies, plans, and programmes; interlinkages, trade-offs and/or complementarities among economic, social, environmental and governance factors; thereby, establishing benchmarks and diagnosing problems.
- Inform policies and legal and institutional reforms to promote sustainable development or remove sources of unsustainable consumption and production patterns.
- Formulate short-, medium- and long-term plans, strategies and programmes – setting priorities, articulating objectives and setting targets including national poverty reduction strategies, sectoral strategies such as sustainable agricultural and industrial development, education and health, sustainable mining practices, tourism, among others.

- Manage development – defining relationships (input–output matrices), win-wins, trade-offs; analysing economic and financial costs and benefits, establishing benchmark relationships.
- Improve governance, including enhancing decentralization and public participation, as well as democratization.
- Public communication – convey messages on achievements and success stories or failures at the national and community levels.
- Monitoring and evaluation – follow up, learning and improving using both quantitative and process indicators.
- Report performance on the implementation of global commitments the country has entered into, for example, the Millennium Development Goals (MDGs), multilateral environmental agreements (MEA), universal access to education and health services, respect for human rights, pollution reduction, conservation of the integrity and diversity of ecosystems, and others.

While the above is a list for possible uses of indicators, it is important to note that one indicator can have multiple uses. For example, national level indicators like GDP adjusted for environmental loss and income inequality can be used for all the purposes listed above. Indicators on forest degradation, soil fertility loss or improvement, use of fertilizers, among others are robust indicators at the local/community level.

5.3 Developing conceptual frameworks

Conceptual frameworks facilitate decision-making on the identification and selection of indicators. Such frameworks provide an indication of how an institution or a country conceptualizes sustainable development, its key dimensions and how those dimensions are inter-linked and influence each other, and how the issues are prioritized and measured.

The framework to be developed and used should, first and foremost, be anchored in and reflect economic, social, and environmental realities, including techno-

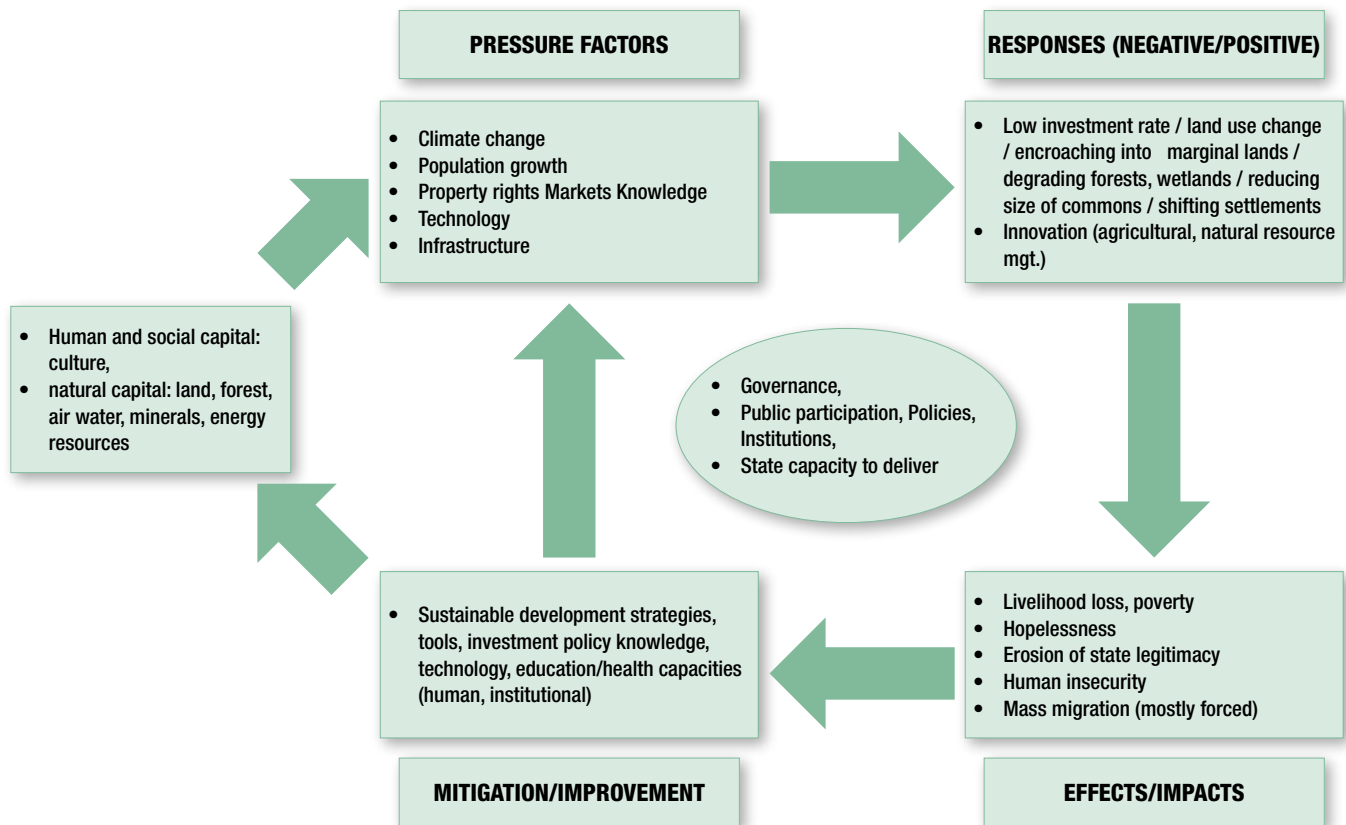
logical conditions, threats and opportunities for growth. For example, the driving force-state-impact-response framework (EEA, 1999) is relevant and powerful in facilitating and understanding cause-effect relationships, and therefore helps to bring out the impact of governance and guides decision makers as to where to focus. The diagram below illustrates a pressure-response-effect-mitigation conceptual framework, which it is proposed to use to develop the African sustainable development indicator framework in combination with the issue-theme approach. It is a modified driving force-state-impact-response framework used earlier by UNCSO.

The conceptual framework, presented below, postulates that in highly natural resource-dependent economies, which most African countries are, the way in which people use and manage natural resources for livelihoods is influenced by pressure factors: climate change, population growth, property rights, markets, knowledge, technology, and infrastructure (both economic and social).

Natural resource users and decision makers respond to these pressure factors by adopting various coping strategies at the household, community, and national levels that include: land use change; encroaching into marginal lands; degrading forests and wetlands, reducing the size of commons (grazing areas), and, at times, shifting settlements. Under conditions of technological and knowledge limitations, as well as weak governance, these responses often lead to livelihood loss, increased poverty, erosion of state legitimacy because the state is perceived to have failed to deliver goods and services needed by society, increased human insecurity, mass migration (mostly forced), and breakdown of law and order. It is at this stage that rational governments will be considering mitigating measures that include formulation of sustainable development strategies, tools, investment policy, improved knowledge, education/health, and developing human and institutional capacities, which in turn influence how people use their natural resources.

The framework also shows that governance (public participation, policies, institutions, state capacity to imple-

Figure 2: A conceptual framework tracing the economic, social, and environmental effects of natural resource use under a variety of pressure factors



ment, among others) influences pressure factors, how individuals, communities, and the state respond to these pressure factors, how and to what extent the responses impact livelihoods and social formation, and the kind of mitigating measures that can be taken. Under conditions of failed governance and weak state capacity, the manner in which individual and resource users respond to pressure factors often results in livelihood losses, erosion of coping capacities, social and economic deprivation, and displacement. On the other hand, strong political leadership and capable states have the capacity to intervene at the right time to reverse trends and enhance sustainable development.

- a) **Sustainable development indicators reflecting changes in pressure factors.** The second box above shows pressure factors that include: climate change, biophysical factors, population growth, property rights and institutions, knowledge and technology impacting the use and management of resources (land/forest, water, among others). The physical environment (topography, slope gradient and length, and climate) has a direct effect, independent of human action, on the behaviour of natural resource users. Changes in population relative to natural resources, property rights and institutions governing rights, level of knowledge and technology (including indigenous knowledge), and development of markets also influence awareness, incentives, constraints in the use of natural resources, productivity, and social relations.
- b) **Sustainable development indicators capturing responses.** It is widely recognized that environmental degradation/protection may result from responses to individual and/or collective decisions made in response to actual or perceived changes in, for instance, vulnerability to climate risk, the biophysical environment, population size, technology, institutions, market conditions, and public policy. Responses at the individual level may take the form of changes in land use, management practices, and investment. At the community level, responses may include changing the size of commons, the rules governing use and transfer of common resources, as well as the distribution of benefits. These changes in resource conditions affect productivity, livelihoods and social structures.
- c) **Sustainable development indicators capturing effects/impact.** The effects/impacts of the responses indicated above, trace the consequences of changes in natural resource use (mismanagement/degrading practices), changes in human settlements, and erosion of coping capacities. As in a typical “Malthusian” scenario, these responses result in livelihood loss, poverty, human insecurity, increased vulnerability to climate risk and natural calamities, rising covert and overt unemployment, and increased exposure to consumption risks that periodically translate into mass starvation and, ultimately, erosion of state legitimacy. Increased human insecurity is a cumulative effect of food, health, political, economic, environmental, and community insecurities (UNDP, 1994) and is generally a result of severe competition for scarce resources resulting in loss of livelihoods, lower consumption levels, erosion of coping capacities, and large-scale population movements.
- d) **Sustainable development indicators capturing mitigation measures.** Once individuals and communities have exhausted their coping capacities, the primary responsibility for changing the course of events by taking mitigation measures rests with the State. These mitigation measures can take the form of developing sustainable development policies and strategies, tools, investment policy, enhancing knowledge, education/health, building capacities (human, institutional), and expanding international development cooperation.
- e) **Sustainable development indicators capturing changes in policy, institutions and governance in general.** SD indicators have multiple uses: policy development; formulation of plans and programmes; setting development priorities; monitoring implementation of policies, plans, and programmes; meeting international commitments; comparison of countries; assessing political accountability, among others. In fact, there is a two-way relationship between policy development and indicators. Policies shape the type of indicators to be developed, while indicators inform policies about their successes and failures. It is also widely recognized that proper management and use, mismanagement and abuse of natural resources and consequent degradation are a result of individual and/or collective decisions made in response to changes in public policy or the lack thereof. Governance and public policies have thus a pivotal role to play in creating incentives to invest in land and other natural resources, strengthening institutions to innovate and sup-

ply new technologies, and creating conditions to promote livelihood strategies consistent with the goal of sustainable development.

- f) **Sustainable development indicators reflecting changes in human, natural, and produced capital wealth.** Mitigation measures taken are bound to change the quality and quantity of human, natural, and produced capital captured by aggregated indicators, for example, the genuine progress indicator or adjusted GDP for environmental loss and income inequality. Other aggregated indicators like ECOFOOT, ESI, and EPI (Environmental Performance Index) fall into this category.

5.4 Selecting and determining themes, sub-themes, core and other indicators

Two factors influence the selection and determination of themes and indicators: first, African economic, social, environmental, and governance realities, global and regional commitments, and planned actions; and second, the sustainable development concept and agenda.

Africa's overall socioeconomic and environmental situation can be described as: largely subsistence and low technological intensity agriculture; low level of industrialization; high population and urbanization growth rates; high vulnerability to climate risk; large depend-

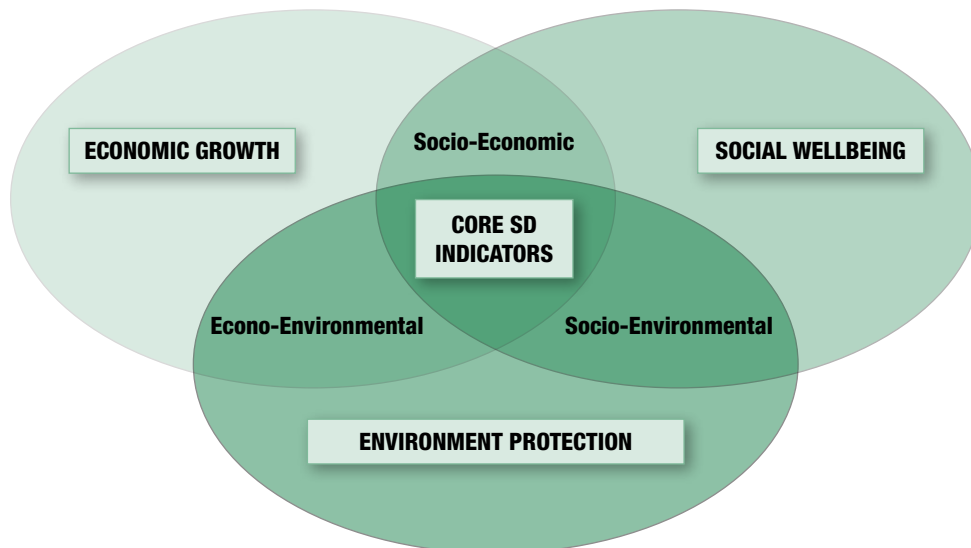
ence on biomass energy; low level of access to education and health services; severe environmental degradation; growing water scarcity; fragile States; and low institutional and technological response. It is widely reported that Africa is the poorest region of the world, with almost 40 per cent of the population living below the poverty line and one-third undernourished. Africa also faces "lack of export diversification, supply side constraints, low levels of subregional and continental trade integration, and mounting food shortages" (ECA and AU, 2009).

It is against this background that NEPAD aims "to eradicate poverty in Africa and to place African countries, both individually and collectively, on a path of sustainable growth and development and thus halt the marginalization of Africa in the globalization process" (OAU/AU, 2001). It is also against this background that Africa's sustainable development agenda and indicators need to be developed.

If sustainable development is the integrated and balanced pursuit of economic growth, social well-being and protection of the environment, the themes and core indicators will be those changes in resources, pressure factors, responses, effects/impacts or mitigation measures that reflect the interaction of the three pillars of sustainable development. Following Segnestam (2000), this is illustrated in Figure 3.

Africa's core SD themes and indicators are those marked deep green. They fall where the three pillars interact, and at the same time reflect the region's priority con-

Figure 3: Core sustainable development indicators, socioeconomic sustainability, econo-environmental and socio-environmental sustainability indicators



cerns or collective aspirations as articulated in NEPAD and the global conventions to which African countries are signatories.

The following 20 themes were chosen in light of Africa’s current development opportunities and challenges, as well as the proposed criteria described earlier:

- Economic transformation and macroeconomy
- Poverty
- Governance
- Food and agriculture
- Health and nutrition
- Social inclusion (women, youth, vulnerable groups)
- Education, training, and culture
- Demographics
- Land
- Forests
- Fresh water
- Biodiversity
- Energy
- Infrastructure, science and technology
- Natural and man-made hazards
- Climate change and variability
- Peace and security
- Oceans, seas and coasts
- Sustainable consumption and production patterns
- Global partnership for development

Table 1 shows a list of the core sustainable development themes that reflect Africa’s current development opportunities and challenges. It also shows how these themes relate to the three pillars and to the regional and global commitments African countries have entered into.

Explanation and justification for the choice of the core themes are provided below.

a) Economic transformation and macroeconomy

This refers to the call made by NEPAD to transform African economies from raw material producers and exporters to economies that process raw materials, aim for maximum value addition and diversified exports, and develop national industrial production capacity that supports the agricultural sector with technological inputs (fertilizer, machinery and tools, chemicals, among others).

In 2007 Africa accounted for only 2.7 per cent of world trade, and it remains a primary commodities exporter, with crude oil and minerals accounting for about 70 per cent of total exports, while agricultural and manufactured commodities make up the balance of about 30 per cent of total exports (ECA, 2009). The ECA Report further shows that “Africa’s share in world imports was about 2.5 per cent in 2007, and imports grew by 24 per cent the same year”. Furthermore, the structure of African imports is “concentrated in manufactured goods (68 per cent of total merchandise imports), followed by fuels and mining products (15.4 per cent) and agricultural products (4 per cent). Sixty per cent of the top ten African exporters are oil exporting countries and the ten top exporters accounted for 81.5 per cent of African exports in 2007” (ECA, 2009).

Africa’s undiversified export base, low share in world trade, and the dominance of manufactured goods in the import bill are *prima facie* evidence of the imperatives of the need to change the strategies and priorities of Africa’s development policies, including NEPAD target areas, in pursuit of the NEPAD calls for “transformation”. This transformation requires industrialization to be at the top of the African development agenda, and aiming to process the continent’s natural resources to meet the needs of the population for manufactured products. Transformation also involves broadening market size and investment capital through regional integration, and diversifying exports by raising the share of processed goods in total exports.

Transformation from subsistence and extensive agricultural practices to high productivity intensive production processes will largely depend on the industrial sector. Industrialization is not about expanding manufacturing industries, but rather transforming an economic activity or sector such as agriculture from subsistence and traditional production methods to modern (efficient, value-adding, and environment-friendly) systems of production of goods and services.

Table 1: Core SD themes for Africa and their status

Themes	SD Core Pillars			National, regional, global commitments	UNCSD theme
	Economic growth	Social well-being	Environment protection		
Economic transformation and macro-economy	✓	✓	✓	National Development Plans, NEPAD	modified
Poverty	✓	✓	✓	MDGs, NEPAD	✓
Governance	✓	✓	✓	APRM, NEPAD, MDGs	✓
Food and agriculture	✓	✓	✓	MDGs, NEPAD, CAADP	X
Health and nutrition	✓	✓	✓	MDGs, NEPAD	✓
Social inclusion (women, youth, vulnerable groups)	✓	✓	✓	Beijing Platform AU charters on women and youth	X
Education, training and culture	✓	✓	✓	MDGs, NEPAD	✓
Demographics	✓	✓	✓	ICPD, MDGs, NEPAD	✓
Land	✓	✓	✓	UNCCD, AEO	✓
Forests	✓	✓	✓	NEPAD, ACNRR, CBD, UNCCD, IPF	✓
Fresh water	✓	✓	✓	African Water Vision, CBD, Ramsar	✓
Biodiversity	✓	✓	✓	CBD, ACNRR, AEO	✓
Energy	✓	✓	✓	NEPAD	X
Natural and man-made hazards	✓	✓	✓	AU/NEPAD Disaster Risk Reduction Strategy	✓
Climate change and variability	✓	✓	✓	UNFCCC, MDGs African Common Position on Climate Change	as atmosphere
Infrastructure, science and technology	✓	✓	✓	NEPAD, JPOI	X
Oceans, seas and coasts	✓	✓	✓	CBD, NEPAD, the African Maritime Transport Charter of Durban, Abidjan and Nairobi Conventions	✓
Sustainable consumption and production patterns	✓	✓	✓	JPOI, African 10-Year Framework of Programmes on SCP, Chemicals and wastes-related Conventions	✓
Peace and security	✓	✓	✓	NEPAD	X
Global partnership for development	✓	✓	✓	NEPAD, MDGs WTO, ACP agreements, Monterrey Consensus, Paris Declaration, Agenda 21 and JPOI	✓

Industrialization also involves developing and enhancing forward, backward, and lateral linkages between agriculture and other productive sectors.

While poverty reduction-oriented development strategies are important, the attainment of sustained growth, technological transformation, social well-being, and even protection of the environment require the pursuit of a strong industrialization agenda, bearing in mind sustainable development principles. A study conducted by ECA in 2006 concluded that, while poverty reduction strategies (PRS) have resulted in “improved focus on poverty, active stakeholder participation, focusing attention on governance issues, and providing a better framework for managing aid and consistency with the NEPAD, ...the content of the PRS was found to be wanting in relation to economic growth and employment” (ECA 2010). In terms of the PRS formulation process, “there was little attention to broader national processes and political institutions, especially Parliaments, and that processes were driven in large part by the need for International Monetary Fund (IMF) and World Bank endorsement” (ECA, 2010).

Some African countries are already on the path to industrialization, made possible by well articulated economic development plans that either embraced or replaced national poverty reduction strategies as primary tools for guiding and managing national economies. With green and more environment-friendly technologies made available, Africa indeed has golden opportunities to achieve industrialization based on clean technologies, avoiding the environmental degradation that the now developed countries experienced.

Wealth generation and economic transformation are not only about enhancing produced capital, but also human capital and natural capital (vegetation cover, forests, croplands, soil fertility, water resources, and ecosystem services and functions), which remains a primary source of livelihoods to a majority of Africans).

b) Poverty

Poverty reduction is very high on the development agenda at the global level (it is one of the MDGs), regional level (NEPAD), and at the national level (national poverty reduction strategies). “Poverty rates continue to be stubbornly high in Central, East, South and West Africa, despite the impressive economic growth rates recorded in recent years” (United Nations, 2008).

“Poverty” is also a theme of the UNCSO *Indicators of Sustainable Development and Guidelines and Methodologies* (2007). The Guidelines break down poverty into income poverty (proportion of population living below the national poverty line, proportion of population living on less than \$1 a day); income inequality (ratio of share in national income of highest to lowest quintile); sanitation (proportion of population using an improved sanitation facility); drinking water (proportion of population using an improved water source); access to energy (share of households without electricity or other modern energy services and percentage of population using solid fuels for cooking); and living conditions (proportion of urban population living in slums).

In Africa, however, with much of the poverty being rural and a majority of the population deriving its livelihood from fragmented and small-sized farm plots, the incidence of poverty tends to be strongly correlated, not only with the availability and productivity of land, but also with the household capacity to cope with environmental threats (for example, vulnerability to climate risk); maintenance of ecosystem services to support subsistence agricultural systems; and also sources of individual insecurity (for example, limited access to justice). “One in five rural Ethiopian households lives on less than 0.8 ha per person, which yields on average only slightly more than half the daily cereal caloric needs per person, given current cereal production technologies used in Ethiopia” (Teklu and others, 2003). Mapping of poverty by geographical area also shows poverty to be higher in villages that are characterized by poor topography and soils, low and variable rainfall, high population density and poor market access (Elizabeth, 1997).

How people see their future and how they perceive their vulnerabilities to both human-made and natural disasters and threats tomorrow and beyond is as important as their current state of poverty. “Vulnerability” of a person can be defined “as the prospect of that person becoming poor in the future if currently not poor or the prospect of that person continuing to be poor if currently poor” (Christiaensen and Subbarao, 2004). Environmental stress and land degradation worsen both the actual and perceived vulnerability to poverty and famine both at the individual and community levels. For example, “during the severe 1984/85 Ethiopian famine, households that reported to have suffered substantially more continued to experience 2 to 3 per cent less annual growth per capita between 1989 and 1997 compared to those that suffered substantially less” (World Bank, 2005). Poverty-related sustainable development indica-

tors thus need to capture, not only the actual state of rural poverty (soil fertility loss and access to productive land), but also the extent to which people perceive the future (improved coping capacity at the individual, community, and state levels). This study argues for the inclusion of soil fertility, biodiversity loss, degradation of ecosystem integrity and diversity, among others, as indicators of poverty. The idea here is to have ministers of finance present success in reducing poverty reduction along with changes in soil fertility and biodiversity.

c) Governance

Governance, as used here, refers to policies and institutions, the rule of law, political empowerment of people, effective participation, respect of human rights, access to justice, transparent and accountable processes, an efficient and effective public sector, state legitimacy, access to knowledge and information, laws and structures governing and regulating a community, including the management and use of common property, and attitudes and values that foster responsibility, solidarity and tolerance.

Governance is an important dimension of sustainable development and impacts societal economic, social, and environmental well-being across space and generations. The notion of governance encompasses economic, political, democratic and corporate governance. In addition, NEPAD has identified and included environmental governance, state capacity to articulate societal needs and respond to them, implement policies, and negotiate bilateral economic and trade agreements. The key attributes of good governance can be summarized as follows:

- accountability at all levels,
- responsibility, including for conserving ecosystem integrity and diversity, and sustainable management of common property,
- transparency, including timely and unconstrained access to knowledge and information,
- participation,
- responsiveness (to the needs of the people and their cultural values),
- effectiveness (capacity to implement policies, rules and regulations),
- legally secure property rights,

- rule of law,
- equitable access to justice,
- institutional stability,
- responsiveness to sustainable development, including capacity to formulate policies, commit financial and human resources, and act upon the conservation of the integrity and diversity of nature.

A unique feature of governance in Africa is the authority exercised by traditional institutions, including the family system, which have played vital and effective roles in common property arrangements and use, and conflict management. While the authority of the State rests on its legal structure and enforcement, these traditional institutions have moral authority and tradition behind them, and have been effective. Thus, respect for and effective use of traditional resource management and conflict resolution mechanisms is an important aspect of good governance.

d) Food and agriculture

Despite its huge natural resource endowment, Africa faces chronic food insecurity and indeed food crisis. The quantity and quality of food produced, how it is produced, marketed, prepared, and consumed is closely related to, and a reflection of, society's economic, social, and environmental well-being. Most food production comes from subsistence agriculture characterized by low productivity, high vulnerability to climate risk, low technological input, fragmented land holdings, and high susceptibility to soil and water erosion. Today "most African countries are net food importers and the high food prices have resulted in deteriorating terms of trade for many and increased dependence on food aid" (ECA, 2009). One of the key objectives of NEPAD is to "ensure food security for all people and increase the access of the poor to adequate food and nutrition". As poor households spend more than 60 per cent of their income on food (ECA, 2009), achieving food security entails structural transformation not only of the agricultural sector but also of industry (processing and supply of farm input), economic infrastructure (transport, roads, marketing, among others), social infrastructure (extension of education and health services), as well as food culture.

It is useful to make a distinction between chronic food insecurity, which stems from structural issues such as poverty and environmental degradation, and transitory food insecurity, brought on by natural disasters or other shocks to the food system. Household food security status, a vital sustainable development indicator, is an outcome of complex interactions among poverty, employment, assets, social status, hunger, malnutrition, and the numerous and changing coping strategies households employ to ensure survival. Indeed, attainment of food security is tantamount to achieving sustainable development.

There is now growing worldwide recognition of the need to improve food security in a strategic and sustainable manner, with several initiatives launched at the level of the African Union, the United Nations, and intergovernmental organizations (regional and sub-regional levels). National agricultural investment strategies, however, remain mixed, with some countries focusing on commercial agriculture and tractorization, which threaten Africa's remaining natural forest and expose the soil to a massive use of imported fertilizers. This, despite growing evidence that small-scale focused sustainable farming systems and limited use of chemical fertilizers and pesticides are quicker routes to achieving sustained productivity increase, poverty reduction, and food security.

e) Land

This is Africa's greatest natural resource with considerable social, cultural, and historical importance. Land is the principal resource that provides for cultivation, grazing, and household energy. However, over the past several decades, prime agricultural land in Africa has been shrinking due to climate change and extreme weather events such as drought; loss of vegetation cover; distorted property rights and tenure practices; unsustainable land use and management practices; and unplanned human settlements. Degradation of land in Africa is characterized by escalating soil erosion, soil nutrient mining, declining soil fertility, agrochemical pollution and increasing tendency towards desertification. In arid and semi-arid lowlands, where extensive mobile pastoralism dominates, pastoral communities face contraction of rangeland because of conversion of large areas of range into large-scale irrigated agriculture and continuous encroachment of neighbouring sedentary farmers into the traditional grazing areas of the herders. In these areas, conflicts over scarce pasture and water have become more frequent.

Though not widespread, irrigated agriculture has also been poorly managed, exacerbating problems of flooding, siltation and salinization. Forest and wildlife resources, once a source of pride for Africa, are threatened by unsustainable and often illegal harvesting practices, tenure insecurity, population encroachment, and conflicts over land use. Compounding these problems is the recent drive to commercialize African agriculture through large land concessions, which, given weak policies and institutions, has profound environmental and social impacts, including crowding out of small farmers, monoculture practices resulting in overuse of fertilizers and agricultural chemicals, soil pollution, and increased greenhouse gas emissions.

f) Forests

Forests have a special place in Africa's economic, social, and cultural well-being. They are vital sources of food, energy, construction material, employment, local and foreign trade, as well as cultural identity. Forests also provide essential environmental services, including controlling soil and water erosion, combating environmental degradation, regulating climatic variability, conserving lakes and wetlands, and freshwater systems.

On average, forests account for 6 per cent of GDP in Africa, which is the highest in the world (UNEP, 2003). In Western, Central and Eastern Africa, where there is considerable forest cover, the contribution of forest to the economic and social well-being of people is significant. The Congo Basin in Central Africa is home to the world's second largest continuous block of tropical rain forest (UNEP, 2006), which provides critical ecosystem services and functions, including regulating the hydrological cycle in many African countries.

Areas covered by forest have shrunk by 3 per cent in Central, East, South and West Africa (ECA and AU, 2009). The forestry sector in Africa is today under serious threat arising from deficient forest property rights, weak institutions, mismanagement, lack of awareness, paucity of scientific knowledge, and low priority given to reforestation. Even where reasonable afforestation has taken place, it has at times been through exotic tree species (pine and eucalyptus monocultures), replacing indigenous forest vegetation. The sustainable management and conservation of forests are thus critical building blocks of the African sustainable development agenda.

g) Education, training, and culture

Education, as used here, refers to all formal (primary, secondary, and tertiary) and non-formal schooling (adult and community education), access to and quality of education, the effective use of educated people, including brain drain/brain gain, while training includes all vocational training and skills upgrading. Culture refers to attitudes, values (individual, family, and community), goals, and practices (art, music, language, and oral literature) that characterize Africa, including complex disaster coping mechanisms; social network and extended family system; traditional institutions for conflict resolution and common property (forest, pasture, and land) management.

Education, training and culture impact the economic, social and environmental well-being and governance of any society.

“Bridging the education gap” is one of the prime goals of NEPAD. Education is widely recognized as a basic human right and a leading instrument for promoting and achieving sustainable development. For Africa, where progress towards sustainable development involves climbing out of poverty, accelerated economic growth and technological transformation, reversing environmental degradation and ensuring ecosystem integrity, among others, education is particularly important. Education helps to improve a nation’s social well-being, including health, contributes to reduced population growth, enhances governance, creates a greater tax revenue base, and leads to a more entrepreneurial society.

NEPAD aims “to enrol all children of school age in primary schools by 2015”. Despite progress made in increasing gross enrolment ratios in the post-independence period, enrolment rates in primary school and higher education remain the lowest in the world. About 40 per cent of Africans over the age of 15, and 50 per cent of women above the age of 25 are illiterate. Gross enrolment in higher education, critical for the transformation of African economies, which was 1 per cent in the early 1960s, stands at only 5 per cent today (Bloom, Canning, and Chan, 2005).

“Reversing the brain drain” is one of the objectives of NEPAD. With the continuing flight of scientists, engineers, medical doctors, and social scientists, brain drain is among the most serious problems Africa faces today. “Africa’s share in the world’s scientific output has fallen from 0.5 per cent to 0.3 per cent and Africa as a whole counts only 20,000 scientists or 3.6 per cent of

the world total” (ECA, 2000). ECA further reports that “Africa lost 60,000 professionals (doctors, university lecturers, engineers, among others) between 1985 and 1990 and has been losing an average of 20,000 annually ever since” (ECA, 2000).

Brain drain entails huge economic, financial, material, and social cost. Losing people after two decades or more of training means not only losing an entire investment in higher education, but also endangering the economic and political systems, crushing people’s hopes, and losing the multiplier effects of training as the less qualified people who remain in the country take responsibility for training future generations. Furthermore, in order to fill the human resource gap created by brain drain, Africa employs up to 150,000 expatriate professionals at a cost of US\$4 billion a year (ECA, 2000).

h) Health and nutrition

Health, is used here as defined by World Health Organization to mean a state of complete physical and mental well-being. Principle I of the Rio Declaration states that “human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature” (UNEP, 1992). Health is both a means and an end of development. It is a cross-cutting issue that impacts every aspect of sustainable development. High prevalence of ill health, malnutrition, poverty, unhealthy consumption patterns, pollution, and environmental degradation, among others, are signs of unsustainable development.

Africa, today, faces huge challenges: average life expectancy is only 46 years. HIV/AIDS and malaria are the two leading causes of death (WHO, 2005). According to WHO, there are an estimated **5,500 AIDS deaths a day** in Africa. Of the approximately 850,000 deaths due to malaria in 2008, 85 per cent were in Africa.

i) Social inclusion

Social equity is generally understood to include fair and equitable access to resources, employment, education, and health services; full participation in the political and cultural life of a community; enjoyment and exercise of basic human freedoms; and fair and equitable access to livelihoods (food, energy, and employment) and justice. Since some of these issues have been addressed by other themes, the primary focus of the social inclusion theme is gender equity (women’s participation and empowerment), intergenerational equity (effective communica-

tion with and involvement of youth) and vulnerable groups.

In Africa, the place of women and youth is significant as both engines and beneficiaries of sustainable development. The effective participation of women and youth (social inclusion) is thus a cross-cutting issue that impacts all aspects of sustainable development. Despite progress made in the areas of education, health, HIV/AIDS, employment and participation in political and decision-making processes, “African women still experience the greatest forms of marginalization and exclusion from the benefits of recent growth recovery in Africa” (ECA and AU, 2009).

j) Energy

Africa’s energy profile is characterized by low production, low consumption, and high dependence on traditional biomass energy in the midst of a huge wealth of unexploited energy resources. Africa accounts for 5.7 per cent of the world’s energy consumption, the lowest in the world, although it has huge technical potential for renewable energy power generation, with its vast solar, biomass and wind resources. Africa’s hydropower and geothermal power remain almost untapped with a mere 7 per cent of the hydropower and 0.6 per cent of the geothermal energy potential currently being exploited. Because of its proximity to the Equator, Africa has the world’s highest average amount of solar radiation each year. A sustainable development indicator on energy would measure, not only the flow (use of renewable energies), but also the stock (the technical potential).

There is considerable energy wastage in the production and use of both biomass energy and electricity in Africa. Energy intensity, which measures the energy efficiency of a nation’s economy, the amount of energy used per unit of output (GDP), is generally high in Africa. Indoor pollution from the use of traditional biomass is also a serious health concern. Traditional biomass energy, used in the form of solid wood, twigs, and cow dung, accounts for over 97 per cent of household energy consumed. This excessive use of woody biomass for energy has contributed to deforestation and loss of biological diversity. For Africa, energy is an economic, social, and environmental issue. For example, improved access to modern sources of energy in the rural sector would immediately impact child welfare as mothers would use the time previously spent gathering firewood to take care of their children.

k) Demographics

Africa’s greatest resource is its people, and they are the ultimate beneficiaries of development. Population growth rates, age structure, fertility and mortality, and migration impact societal, economic, social, and environmental well-being.

Africa’s population reached one billion in 2009 and is growing at 2.3 per cent per annum. Over 70 per cent of this population, about 700 million people, are under the age of 30 (UNFPA, 2011). While the large youth population poses significant socioeconomic challenges, including increased pressure for education, health, employment, and housing, it also offers huge opportunities for innovation, economic growth, and technological transformation.

Driven by the high population growth rate in concert with significantly high rural-urban migration, Africa today has the highest urbanization rate in the world. Many African cities are poorly planned, with weak infrastructure, and can hardly cope with the increased demand for services. A significant proportion of the urban population lives in slum-like conditions, often without access to sanitation and safe drinking water, with the consequent increased risk of health problems.

l) Biodiversity

Biological diversity – or biodiversity in brief – is defined by the Convention on Biological Diversity (CBD) as “the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems”. In simple terms, biodiversity refers to the number, variety, and variability of all living organisms (species), their genes, and ecosystems. The term biodiversity includes forests, but because of the vital role forests play in African lives and social formation, it was found necessary to give special emphasis to forests and forest ecosystems.

The Millennium Ecosystem Assessment (MA) defines an ecosystem as “a dynamic complex of plant, animal, and microorganism communities and the nonliving environment, interacting as a functional unit. Humans are an integral part of ecosystems” (MA, 2003). In recent years, the conservation of nature has shifted from the earlier focus on conserving species to sustainable use of biodiversity and conserving the integrity and diversity of ecosystems. Ecosystem services and functions

include: provisioning services such as food and water; sustaining the hydrological cycle; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling. Currently, “the major cause of biodiversity loss in Africa is habitat loss, and that is likely to remain true for the first third of the 21st century” (UNEP, 2006).

Biodiversity has been a defining feature of Africa’s history, culture, economic and social organization. “Agricultural landscapes maintained by farmers and herders using locally adapted practices not only maintain relatively high crop and livestock genetic diversity, but may also support distinctive wild biodiversity” (Secretariat of the CBD, 2010). However, corporate greed combined with high population growth and policy failures have significantly altered traditional forest management practices and the rural socioeconomic fabric. “Africa and South America continued to have the largest net loss of forests in 2000-2010” (Secretariat of CBD, 2010). Reducing deforestation and biodiversity loss has a positive impact on poverty reduction, food security, energy availability, economic transformation, social well-being, and moderating the scale of climate change through enhancing the resilience of human societies and ecosystems.

m) Fresh water

Fresh water refers to all surface (rivers, streams, lakes, and wetlands) and groundwater. The quantity, quality, and availability of fresh water impact the economic, social and ecological well-being of any society. While Africa can take pride in its abundant freshwater resources, large rivers and lakes (Congo, Nile, Zambezi and Niger and Lake Victoria), it is also the second driest continent after Australia. Water scarcity has already become a major constraint to development. First, Africa’s fresh water is unevenly distributed, with close to a third of the water resources being in the Congo Basin, where less than ten per cent of the population resides. Second, an increasing number of rivers and freshwater lakes are drying up as a result of overexploitation, climate change (particularly recurrent drought and temperature rise) and siltation caused by severe soil erosion. Third, high population growth and shifting human settlements induced by war and political instability, extreme weather events, among others have placed strain on existing water resources.

It is estimated that a country needs at least 2,400 m³ per capita of actual renewable water resources for industrial development, but many African countries and all coun-

tries of the Greater Horn of Africa (GHA) region, for example, are below this threshold. This lack of water will severely constrain food production, ecosystem maintenance, access to water for drinking and domestic use, and development activities in general. Availability of water is only one aspect of the water scarcity problem: what is most crucial is efficient management of water. Indeed, there are several examples of good practices where countries with a much lower water endowment than many in Africa have successfully managed the available water resources to ensure adequate supply of water for their population and development.

n) Climate change and variability

The heavy dependence of African economies on natural resources, against the backdrop of pervasive poverty and low technological and institutional response, has made Africa the most climate vulnerable continent. The impact of climate change and climate variability is cross-sectoral, and at all spatial levels. The agricultural sector, which is a primary source of livelihood in many African countries, is sensitive to climate change and variability. Combined with poor soil fertility, pests, crop disease, and lack of access to technology, markets, and infrastructure, climate change and variability impact people’s daily lives. They influence crop choices, decisions on when to plant, what livestock to keep, where to live, settlement patterns, overall well-being, attitudes, and hopes. Years of good rainfall are associated with prosperity, while dry years are associated with adversity, deprivation, frustration, famine, and possible displacement.

Climate change and variability are manifested through a variety of phenomena, for example, recurrent/increased frequency of severe drought, flooding, changes in rainfall patterns, increasing temperatures, growing water scarcity, lowering of the water table, drying of rivers and boreholes, disappearance of lakes, wetland losses, and increased prevalence, emergence and re-emergence of diseases, in particular malaria and waterborne diseases, and increased balance of payments deficits (as most African exports are agriculture-based). In countries with coastal areas, rising sea levels threaten to cause the disappearance of landmasses, drive population displacement, and decrease freshwater availability through salinization of groundwater and estuaries. In addition to its environmental and economic impact, climate change adversely affects social structure and relationships, culture, and human security.

It is worth noting that, while fossil fuel carbon emissions in African countries remain low compared to the rest of the world, the carbon intensity of African economies is rather high. A key challenge for Africa is to reduce carbon intensity and, by doing so, facilitate a transition to a low-carbon economy. Indicators of sustainable development on climate change and variability will thus include economic, social, and environmental impacts as well as progress made in adaptation and mitigation.

o) Natural and man-made hazards

Apart from slow onset natural disasters, such as drought, several African countries face flooding, earthquake, volcano, tornado, major storm, and cyclone risks. These natural hazards affect the economic well-being, social organization, settlement patterns, and overall environmental well-being of many Africans.

p) Infrastructure, science and technology

This is a key priority area of NEPAD. Infrastructure and markets refer to the availability, ease of access, and affordability of basic transportation and communication services that enable people to move from one place to the other to perform their duties, lead a productive life, and meet the basic necessities of life, including food, shelter, water, education, and health services. It also includes opportunities to access: markets to buy or sell product; technology; research findings; networks; and means for sharing knowledge and experiences. Availability of well-functioning markets and unconstrained access to them impacts people's livelihoods, social relations and well-being, as well as their relationship to natural resources. In several African countries, local people have to walk long distances to reach a market against the backdrop of poor infrastructure, non-supportive legal and regulatory frameworks, and limited or no access to financial and other support.

Like infrastructure, science and technology are not only vital for achieving sustainable development, but also need to be kept ahead of other sectors. Science and technology, as used here, refer to enhanced understanding of science, and capacity to identify, select, adapt, and develop technology.

q) Oceans, seas, and coasts

Africa's rich marine environment includes the Atlantic and Indian Oceans, and the Mediterranean and Red Seas. The biodiversity of the coastal zones, including

grass beds and wetlands that occur around many shores, are an important source of livelihood for many Africans. They are also habitats for marine animals and sanctuaries for species, which generate valuable sources of export earnings (tourism), and provide ecosystem services and functions. Considerable oil reserves have also been discovered offshore, for example in the Niger Delta, while the coastal sand dunes and seabed sediments along the Atlantic shores of South Africa and Namibia contain commercially valuable alluvial diamonds, and shores in Mozambique are endowed with commercial titanium and zirconium minerals (AMCEN, 2009). Africa's coastal areas are also experiencing rapid urban and industrial growth (AMCEN, 2009), making pollution of oceans and cities a critical issue.

r) Peace and security

Peace is the most valuable asset for any society. Sustainable development can only be achieved in an environment of political stability, peace and security, while striving towards sustainable development can help achieve peace and stability. In many African countries, armed conflict remains a major obstacle to development. While Africa has made considerable progress in reducing border conflicts, intra-State conflicts and tensions and civil wars remain. Most African conflicts today are intra-State, but tend to spread to other countries, producing large numbers of refugees and internally displaced persons (IDPs). Africa's insecurity, political instability and conflict cannot be detached from the process of managing competition over scarce natural resources, notably agricultural land, pasture, and water. Suffice it here to mention: farm land (as in Burundi, Zimbabwe and Sudan); grazing areas (as in northern and southern Ethiopia and Karamoja in Uganda's cattle region); water (as in Southern Africa, and notably including transboundary water resources); forests/timber (as in the Upper Guinean forest belt); minerals, including diamonds, gold, and oil (as in Nigeria, Angola, and Democratic Republic of Congo); and natural disasters have displaced people and generated conflicts in the Greater Horn of Africa, the Sahel, and Southern Africa.

The 1994 Human Development Report identified economic, health, personal and community well-being, political freedom, access to food and energy, and environmental insecurity as key elements of security. The concept of security was thereby brought into contact with the level of individual citizens and communities, although, even today, national security continues to predominate in many policy discussions. At the same time,

peace has been linked to more tangible considerations such as the absence of famine, freedom from threats to livelihoods and severe income losses, physical vulnerability, displacement, health insecurity, social and political marginalization, and environmental insecurity at the individual and community levels. Peace and security impact the economic, social, and environmental well-being of citizens and merit consideration as core sustainable development indicators.

s) Sustainable consumption and production patterns

The integration and balancing of economic, social and environmental policy can be achieved either through considering the limits that the “environment” poses and the opportunity it offers (supply-side approach) or through considering the end use of goods and services (demand-side approach). A key demand-side concept is sustainable consumption. Personal and public consumption involves the use of resources to meet basic necessities of life: food, drink, clothing, travel, entertainment, shelter, among others. Consumption patterns express our way of life and behaviour. Developed countries and the wealthy in Africa tend to “overconsume” while the majority suffer from malnourishment, illiteracy, and easily preventable diseases. Sustainable consumption and production patterns promote the most efficient use of natural resources and modification of consumption patterns to reduce wastage.

Urbanization has a great influence on what and how we consume, as well as the management of the effect of that consumption (waste). About 347 million people (38 per cent of Africans) lived in urban settlements in 2005, which makes Africa the world’s least urbanized continent (UNEP, 2007). At the same time, Africa has the highest rate of urbanization, with the urban population doubling every 20 years (UNEP, 2007). Rapid urbanization and unsustainable consumption patterns, against the backdrop of low technological intake, impact considerably economic, social, and environmental well-being.

The fragility of Africa’s environment, coupled with rapid urbanization and increased consumption of energy, water and other resources, are major constraints to making significant progress towards sustainable development. For example, while the drive to increase food production quickly to meet ever-increasing demand is positive, in the absence of improved technology and farm man-

agement practices, this has led to the expansion of crop cultivation into marginal lands, including steep slopes and pastoral areas. Changes in land use patterns have resulted in decreased water access, soil and water erosion, land degradation, overgrazing and deteriorating rangelands, deforestation, and armed conflicts in some areas. In the industry sector, the call for economic transformation requires accelerated industrialization, which means increased emission of noxious substances and waste that degrade the environment, shorten life expectancy and threaten the integrity and diversity of ecosystems.

Tourism is one of the fastest growing sectors in developing countries, including those in Africa. According to WTO, between 1990 and 2007, for example, international tourism receipts in developing countries grew five times (506 per cent), much more than the growth rate in high-income countries (170 per cent). In 2007, Africa received 5 per cent of total arrivals of international tourists and 3 per cent of total international receipts. Given its geographical extension and the variety of tourism resources, Africa’s share in world tourism is bound to increase substantially. While the contribution of tourism in generating foreign exchange, boosting local economies, and supporting the conservation of natural and cultural heritage can be significant, the fast growth of tourism can also place great stress on Africa’s remaining biologically diverse habitats and indigenous cultures, the very things that attract many tourists. Sustainable tourism, a fast growing concept and practice, needs to be widely promoted to support mass tourism in Africa through: improved management of waste (reduce, reuse, recycle); reduced water usage; reduced energy use; reduced pollution (minimizing the use of harmful chemicals); purchasing environmentally-friendly products; and lowered carbon emissions.

This SD indicator framework seeks to capture both unsustainable and sustainable consumption and production behaviour and trends with a view to encouraging actions to making sustainable what is currently unsustainable.

t) Global partnership for development

Africa’s relations with the rest of the world impact positively or negatively on the economic, social and environmental well-being of the region. First, Africa is signatory to the MDGs, UNCBD, UNFCCC, UNCCD and the Basel Convention, among others. It has to meet its obligations under these conventions by developing sound national programmes and forging partnerships with the

rest of the world. Second, globalization affects all economic sectors and is a double-edged sword: it opens up market opportunities, facilitates access to information and technology but, at the same time, Africa can be victimized by the free trade that comes with globalization because of its weak domestic production base and poor infrastructure. Third, while Africa’s raw material exports are generally free from duty, exports of semi-processed and processed commodities are subject to various tariff and non-tariff barriers. Fourth, the capacity of African countries to negotiate with industrial countries, forge mutually beneficial partnerships, and benefit from the proceeds of globalization remains limited. Indeed, Africa is the lowest beneficiary of the funding opportunities created in the post-United Nations Conference on environment and Development, (UNCED) era. Lastly,

because of its geographic location, low level of technological development, and heavy reliance on natural resources, Africa is highly vulnerable to climate-induced risks caused by global carbon dioxide emissions, which do not originate from Africa.

Following further consultations and exchanges with experts and member States, the themes described above were refined and modified to take into account emerging sustainable development priorities for the region, as well as data constraints. Furthermore, some of the themes proposed in the draft framework were aggregated to better reflect the integrated nature of the assessment. The themes and sub-themes retained for inclusion in the SDRA IV are presented in the table below.

Table 2: Themes and sub-themes selected for the fourth issue of the Sustainable Development Report on Africa

Theme	Sub-themes
Governance	Political governance
	Peace and Security
Poverty	Income poverty
	Drinking water
	Sanitation
	Access to energy
	Housing
Demographic changes	Population growth
	Urbanization
State of the economy	Wealth and macroeconomic performance
	Value addition
	Tourism and travel
Sustainable consumption and production	Sustainable consumption
	Sustainable production
Social equity	Income inequality
	Empowerment of women
	Youth employment
Education	Education level and coverage
	Adult literacy
Health and nutrition	Maternal mortality and infant mortality
	Morbidity
	Nutrition Food production

Theme	Sub-themes
Agriculture and food and nutrition security	Agricultural transformation
	Sustainability of agricultural practices
The natural resource base	Forests
	Water resources
	Land
	Biodiversity
	Mineral resources
Energy	Energy sources
	Energy security
	Energy intensity
Climate change	Adaptation
	Mitigation
	Climate change finance
Natural and man-made disasters	Vulnerability
Financing sustainable development	Domestic financing
	External financing

6. Core sustainable development indicators for Africa

The SD themes and sub-themes identified and discussed in the previous section were used as a starting point for the identification of specific indicators to track progress in the identified issues. The core sustainable development indicators are reflective of changes in the themes and illustrate the interaction of the three pillars of sustainable development. Using an Indicators Evaluation Matrix, the strength and weakness of each indicator needs to be evaluated against the following criteria:

- a) Is the indicator relevant to sustainable development? Does it show the status, help assess progress, formulate plans and help manage sustainable development? Does it address the economic growth or decline within the context of the environment and social changes or environmental protection, and social changes within the context of economic factors?
- b) Is it effective? Does it provide critical information representing or covering all aspects of sustainable development issues, sectors, or problems of concern?
- c) Is it reliable? Do we trust the information that the indicator is providing?
- d) Is it easily understandable to non-experts? Is it also clear, unambiguous, and conceptually sound?
- e) Is it available – at the time and place needed? Is it also based on readily accessible data permitting the gathering of additional information to fill gaps, if any, in a timely manner and at reasonable cost?
- f) Does it show trends over time and differences between places and groups of people?
And
- g) Is it consistent with current practices of multinational development, finance institutions and many countries? Does it facilitate comparison?

Table 3 presents the specific indicators used to track progress towards sustainable development in the themes and sub-themes identified.

Table 3: Themes, sub-themes, indicators for SDRA IV

Theme	Sub-themes	Core Indicator(s)	Other Indicators
Social equity	Income inequality	Gini index	Ratio of share of national income of highest to lowest quintile
		Poorest quintile's share in national income or consumption, percentage	
	Empowerment of women	Share of women in paid employment in non-agricultural sector (% of total non-agricultural employment)	Proportion of seats held by women in national parliaments
	Youth employment	Total employment disaggregated by age	
Education	Education level and coverage	Net enrolment ratio in primary education	Completion rates for basic education for both sexes
		Gender parity index in primary education enrolment	
	Adult literacy	Adult literacy rate, total, M, F (% of people aged 15 and above)	
Health and nutrition	Maternal mortality and infant mortality	Maternal mortality ratio	
		Mortality rate (under 5, per 1,000 people)	
	Morbidity	Prevalence of HIV total (% of population aged 15-49)	Prevalence of malaria (% of population)
			DALY
Nutrition	Prevalence of stunting	Proportion of people undernourished	
Agriculture and food and nutrition security	Food production	Food production index	
	Agricultural transformation	Value added in agriculture	Value of agricultural imports
			Value of agricultural exports
Sustainability of agricultural practices	Fertilizer use intensity (kg/Ha)		
The natural resource base	Forests	Proportion of land area covered by forest, percentage	Areas of forest designated for conservation of biodiversity
	Water resources	Water abstraction by sector	Percentage of population living in water-stressed environment
	Land	Percentage of population living on degraded land	Land tenure
	Biodiversity	Threatened species	Protected areas
	Mineral resources	Key mineral resources in Africa, % of world production and % of world reserves	
Energy	Energy sources	Wood removals in Africa	
	Energy security	Net energy imports	
	Energy intensity	Energy use intensity per \$1,000 (PPP) GDP (kg oil equivalent)	
Climate change	Adaptation	Cost of adaptation	
	Mitigation	CO2 emissions per capita	Number of CDM/REDD projects
	Climate change finance		Resources available from climate change funds and programmes

Theme	Sub-themes	Core Indicator(s)	Other Indicators
Natural and man-made disasters	Vulnerability	Human and economic losses due to disasters	
Financing sustainable development	Domestic financing	Trends in domestic revenue and private flows in Africa	
	External financing	Net official development assistance (ODA) as % of GNI	

7. The way forward

This sustainable development indicator framework and the compendium of indicators represent the first step in a long journey. Continuous improvement of the coverage and quality of indicators through testing and retesting them at the country level is needed to enhance their strength to inform policy and monitor progress towards sustainable development. It is only when the set of indicators is mainstreamed and used effectively at the country level that the work on indicators can be said to have reached maturity. It is, however, important to recognize that the development of SD indicators has no end point. More and detailed indicators will be needed as a country achieves higher stages of economic and social development.

Given the current African realities, the following principles and measures need to be considered:

a) Pragmatism

The development of SD indicators, vast and complex as it is, requires pragmatism in the identification, selection, and use of indicators. A key principle here is never to become caught up in a web of detail. It is important to focus on key policies and strategy processes and on simple and easy-to-understand indicators, to move forward with what exists but note deficiencies and develop a strategy for correcting them.

b) Formulate a strategy for continuous improvement, refinement, and institutionalization of indicators

Once indicators are developed, arrangements have to be made to pilot them, either partially or in their entirety, at the country, sector, or ecosystem level. There must also be an institutional mechanism for gradual application, monitoring application and continuous updating and refinement.

c) Put in place a participatory process for development and application

For example, validation workshops are useful mechanisms for generating interest in indicators and obtaining feedback.

d) Raising awareness on a continuous basis

Sustainable development and sustainability awareness needs to be raised and enhanced among political leaders and the public. Undoubtedly, considerable work has been done to define and popularize sustainable development, yet neglect of both the environment and the social pillars of sustainable development continue, as is evidenced by the accelerated environmental degradation and social deprivation at a time when Africa prides itself on its high economic growth rate in the midst of global financial crisis (ECA, 2009). Furthermore, despite over a decade of PRSP experience, “very few countries have tried to incorporate sustainable development issues into their PRSPs” (ECA, 2008). This requires a well-strategized and continuous process of awareness development at the community, policymaking, and legislative levels.

e) Developing a multidisciplinary mindset: transcending sectoral interests

One of the main features of sustainable development is its multidisciplinary approach. It requires decision makers to consider, for example, economic programmes in social and environmental terms, and social and environmental programmes in economic terms. There is also the challenge of managing trade-offs, particularly in the short to medium term, by placing societal interests ahead of institutional or sectoral benefits. Demanding as it may be, there is a need systematically to develop a culture of assuming collective responsibility, with multidisciplinary expertise and a culture of “us” instead of “me”. The effective use of SD indicators is heavily influenced by this culture.

f) Viewing progress towards sustainable development from the demand side

Addressing sources of unsustainable behaviour and practices, including unsustainable consumption and production patterns, is an important step in the promotion of sustainable development. It is for this reason that consumption and production patterns are treated as core SD themes and indicators to help Africa strategize, plan, and implement investment and operational activities in a manner that minimizes risks and maximizes individual, firm, sector, state, and corporate social and environmental responsibility.

g) Strong national ownership and internalization of SD indicators

While the work done at the global and regional levels by the United Nations and other institutions provides a wealth of knowledge and lays the foundation for developing SD indicators at the country level, the ultimate decision as to what indicators to use and how to organize them rests with authorities at the national level. The continuous development and refinement of indicators, their effective use, and indeed the effective integration of all dimensions of sustainable development, depend upon the commitment of people on the ground. Involvement of experts, policymakers, civil society groups and beneficiaries will help achieve national ownership of indicators, a *sine quo non* for their institutionalization and instilling collective responsibility for monitoring progress towards sustainable development.

h) Develop capacity for the identification, selection, use and continuous refinement of indicators

While strengthening and developing the capacity of national statistical offices should be at the forefront of the capacity development agenda, there is a need to consider broadening the scope to include those involved in policymaking, assessment, planning, and programme development at various levels: human resources, institutions, and policy and legislative.

7.1 Revising and updating the sustainable development indicator set

Any suggested set of indicators must be adapted to country/region-specific conditions and needs and be subject to revision and updating over time as new experience is gained and new approaches and methodologies become available. The methodologies and approaches should allow refinement of the indicator sets and collection of data for tracking changes and progress in sustainable development. Moreover, a strategy for the review and updating of the indicator set is necessary in order to address member States’ request for further work towards tailoring the indicators, collecting and analysing data from national and international sources, testing

the set at the regional, subregional and national levels, as well as facilitating the establishment of a comprehensive and agreed upon Sustainable Development Indicator Framework for Africa and Compendium of Indicators.

7.2 Rationale for revising and updating the SDRA IV set of indicators and the corresponding analysis

As countries achieve higher stages of economic and social development, the current set of indicators will require adjustment to allow emerging scope, practices, challenges, opportunities and outcomes of sustainable development efforts to be captured. Moreover, the development of new indicators provides an opportunity to take on board the latest international thinking on indicators. A strategy for revision is thus necessary in order to accommodate changes in sustainable development focus. Currently, sustainable development has become a target on a global scale and frequent revision and/or updating of the coverage and quality of indicators through testing and retesting them at the country level is necessary so that the indicators are mainstreamed and used successfully at the country level.

Thus, the SDRA set of indicators and the corresponding analysis of the status of sustainable development in Africa should be revised and updated regularly for the purpose of providing an objective, statistical picture of progress. At the same time, a core set of sustainable development indicators should be identified, in consultation with member States and other partners, and maintained over time so that trends can be meaningfully tracked and assessed.

A review of the SDRA indicators would be an important part of ECA support to member States in their efforts to develop and implement national indicators for sustainable development and know their status. During the review process, there is a need to increase the aggregation, transferability, ease and richness of the SDRA indicator set, which can be done by decreasing the number and increasing the power of the indicators that are reported. At the same time, it would be possible to show the sub-elements of the aggregated indicators for those interested in these data. Aggregation methods include the calculation of weighted or unweighted averages,

summation in accounts and balances and mathematical reduction of correlated indicators by factor analysis. Among different aggregation methods, the most commonly applied green accounting and averaging indicators are recommended.

The process of reviewing the SDRA set of indicators should incorporate the increased knowledge of and experience of sustainable development indicators gained by countries and organizations. This should be regularized as more data and tracking approaches become available. This includes research and analysis of national and global trends in indicators of sustainable development, aggregation at higher scales and a discussion with international experts, as well as validation with stakeholders and member States. This should be followed by an expert group meeting in which experts from international organizations, as well as experts from member States with experience in developing and using indicators of sustainable development participate.

As suggested by UNEP, a key component of developing an indicator set is the definition and use of appropriate selection criteria aimed at downscaling the indicators. The literature on indicators has many criteria listed for the selection of a new set of indicators, of which the following (taking into account the Bellagio Principles as adapted by the United Nations Commission on Sustainable Development) are recommended. Is it:

- National in scale
- Measurable
- Timely available*
- Relevant for measuring progress
- Simple, clear and unambiguous
- Realizable within the capacities of national governments *
- Conceptually well founded
- Limited in number, but broad in coverage
- Based on readily available data or data that could be made available at reasonable cost*
- Of known quality and capable of being updated at regular intervals *

- Selected through a participatory process
- Open to disaggregation (by sex, geography, among others), if necessary
- Responsive to policy changes?

Does it:

- Represent international consensus
- Give early warning about irreversible trends where possible?

While most of these criteria should be applied in the selection of the indicators, those marked with an asterisk (*) should be less strictly applied because of the practical realities in Africa. Moreover, the indicator set should be meaningful for charting progress on sustainable development and good predictors of the long-term state of economies, environment and society. The revised indicators must also allow wider replication of best sustainable development practices. Among others, the indicators need to address emerging challenges and opportunities, such as climate change and the green economy paradigm; enhancement and protection of the natural environment; and fairness, well-being and the big society. Essentially, biodiversity, climate change, sustainable energy, human well-being, and green economy should be priority areas and must be mainstreamed into national development policies. The revision of any indicator set must allow for this integration and alignment of initiatives to sustainable development targets.

A sustainable view of progress is one that recognizes well-being as the goal of societal progress instead of intermediate aims such as economic growth. The Big Society agenda is designed to give more power to people locally in the sense that increased well-being, stronger communities and stronger social ties are established by having more empowered communities and a society where people are more involved in social action such as volunteering. Potential indicators of people's well-being include health, level of education, inequalities in income, and the environment.

On the other hand, data availability and reliability is a serious concern. For some indicators, the availability of reliable data for a large number of countries is very poor. Moreover, for quite a number of indicators no regular updates are available as yet. Conversely, reliable and up-to-date information on progress made towards sustain-

able development and the underlying factors that influence the way society develops is of fundamental importance. Most of the sources listed above are updated annually, while the World Bank World Development Indicators are updated four times a year and UNdata is continually updated. However, this does not mean that the update will necessarily contain up-to-date, comprehensive and comparable information.

7.3 Strategy for revising and updating SDRA IV

The following strategies are recommended for revising and updating the SDRA IV set of indicators and achieving the above objectives:

- 1) Know how countries have used the existing indicators.
- 2) Initiate a series of feedback and consultation workshops with experts so that they can suggest alternative indicators or identify which indicators they consider most appropriate for highlighting and steering progress in longer-term sustainable development priorities.
- 3) Have a periodic evaluation of the indicators for dealing with emerging priorities and ideas, and for building the credibility of the sustainable development reporting process. A review could be considered every six years.
- 4) Select a new set of indicators on the basis of emerging priorities using the criteria listed above, while maintaining a set of indicators for long-range tracking.
- 5) Develop a statistical data collection and dissemination programme (action plan) and system for monitoring indicators of sustainable development at country level, as well as regular reporting mechanisms.
- 6) Promote data utilization and undertake advocacy work to convince member States to mainstream the collection and maintenance of indicators into their national policies and management information systems.
- 7) Build national capacity in the collection, processing and dissemination of indicators. This should include strengthening the capacity of national statistical offices/institutes to collect and analyse indicator statistics, update selected indicators and report them to ECA.

- 8) Update data regularly as new indicators become available from identified reliable sources (from national statistical institutes as far as possible).
- 9) Develop a systematic mechanism and database for the collection, storage, analysis and dissemination of the indicators based on a network of regional, subregional and national focal centres.
- 10) Launch an interactive indicators portal that will allow indicators to be updated as quickly as the data become available.

ECA should continue to publish SDRA every two years in order to provide extensive analyses of the indicators with relevant supplementary information, preferably from national statistical institutes. A great effort should be made to involve national statistical offices by contacting them formally with specific requests for data; the information received should be supplemented by that obtained from reliable international databases.

Since many countries lack the capacity to produce reliable and timely indicator statistics, it is recommended that national statistical systems be strengthened, starting with national statistics offices, in order to develop and improve indicator statistics at the national level. This requires sustained commitment at the highest

level of governments to strengthen national statistical systems.

Sustainable development indicators should be mainstreamed in the development and revision of concepts, definitions and methods of collecting data on indicators. The African Centre for Statistics at ECA should take a leading role in providing continuing support, as well as institutional capability, for data collection, maintenance, and documentation. This may mean organizing workshops with the objective of increasing member State knowledge in the area of collecting, compiling and disseminating indicator statistics so that participants learn new skills and acquire knowledge of pertinent statistical systems and international classifications relevant to collecting and compiling indicators. Moreover, every participant from national statistical offices, central banks and ministries must be given the opportunity to participate actively during the workshop to make presentations on the status of indicator statistics in their home countries, describing the prevailing difficulties, gaps and future improvement needs for indicator statistics. Indicator statistics should as far as possible be produced by national statistics offices.

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