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Climate Change and Indicators of Sustainable Development

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Outline

1. CSD Indicators of Sustainable Development
2. Indicators of Sustainable Development as framework for climate change indicators
3. Climate change related CSD indicators
4. Major area of future work: Climate change indicators on technology transfer

CSD Indicators of Sustainable Development: Purpose and origin

- The CSD indicators serve as reference for countries to develop national indicators of sustainable development.
- The importance of indicators for making informed decisions concerning sustainable development has been recognized in Agenda 21.
- The United Nations Commission on Sustainable Development (CSD) mandated the development of Indicators of Sustainable Development in 1995.
- The first and second edition were published in 1996 and 2001, after extensive testing by many countries around the world.
- The CSD indicators were reviewed 2005-2007 by experts from countries and international organizations.

CSD Indicators of Sustainable Development: Publication

- The third edition has just been published.
- Detailed methodology sheets for each indicator available online.
- Methodology sheets will be updated regularly.
- http://www.un.org/esa/sustdev/natlinfo/indicators/isd.htm

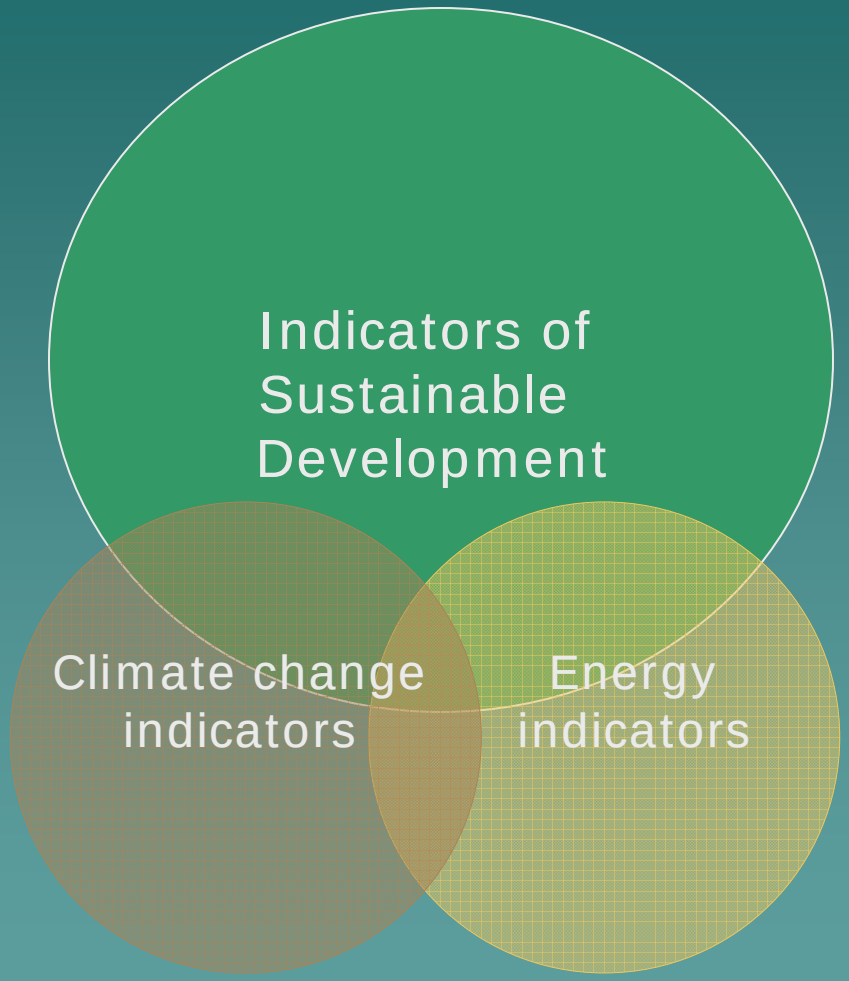
CSD Indicators of Sustainable Development: Main features

- The CSD indicators consist of 96 indicators of sustainable development, of which 50 are regarded as core indicators.
- The CSD-ISD are organized in 15 themes with 44 sub-themes.
- Indicator themes:
  - Poverty
  - Governance
  - Health
  - Education
  - Demographics
  - Atmosphere
  - Land
  - Oceans, seas, coasts
  - Freshwater
  - Biodiversity
  - Natural hazards
  - Economic Development
  - Global partnership
  - Consumption and production patterns

Indicators of Sustainable Development as a framework

- Climate change is a sustainable development issue.
  - Indicators of Sustainable Development provide a natural framework.
- Existing sustainable development indicator sets are a useful point of departure for the derivation of climate change indicators.
  - It helps to recognize the important linkages between climate change and other sustainable development issues.
- Linking climate change indicators to sustainable development indicators increases coherence among indicator sets.
- It also helps to avoid duplication of efforts.
- Thematic, policy-oriented frameworks, used in most national sustainable development indicator sets as well as for CSD indicators, are very flexible.

Indicators of Sustainable Development as a framework



Climate change related CSD indicators

- Many CSD indicators are directly or indirectly related to climate change.
- Due to the cross-cutting nature of climate change, these indicators are placed in various themes and sub-themes.
- They utilize a variety of data sources:
  - National accounts, business statistics, geographical information systems, administrative data, surveys, census, estimations, expert assessments (carefully reviewed).
- The following tables are based on work-in-progress.

Climate change related CSD indicators
Climate change mitigation

- Theme: Atmosphere

Sub-theme	*Indicator*	*Climate change link*
Climate change	CO_2 emissions	CO_2 is the main GHG, indicator broken down by (UNFCCC) sector
	GHG emissions	All six major GHG
Ozone layer depletion	Consumption of Ozone Depleting Substances	CFCs and HCFCs contribute to global warming

Climate change related CSD indicators
Climate change mitigation

- Theme: Land

Sub-theme	*Indicator*	*Climate change link*
Land use and status	Land use change	Major driver of CO_2 emissions; LULUCF is separate sector in UNFCCC
	Land degradation	Major cause of emissions from LULUCF
Forests	Percentage of land covered by forests	Major carbon sink, deforestation major source of CO_2 emissions
	Area under sustainable forest management	Sustainable managed forests have enhanced and longer carbon absorption potential
Agriculture	Area under organic farming	Lower emissions of N_2O, CH_4, and CO_2

Climate change related CSD indicators
Climate change mitigation

- Theme: Consumption and production patterns

Sub-theme	*Indicator*	*Climate change link*
Energy use	Annual energy consumption, total and by main user category	Energy conservation important element of most climate change strategies
	Share of renewable energy sources	Lower/no CO_2 emissions
	Intensity of energy use, total and by main economic activity	Energy efficiency important element of most climate change strategies
Transport	Energy intensity of transport (Energy per km)	Major factor for increasing emissions; fuel switching not considered
	Modal split of passenger transportation	Public transport generates lower emissions
	Modal split of freight transportation	Railway and inland waterways generate lower emissions

Climate change related CSD indicators
Climate change mitigation

- Theme: Consumption and production patterns

Sub-theme	*Indicator*	*Climate change link*
Waste generation and management	Waste treatment and disposal	Recycling and incineration have no significant emissions; emissions from landfills depend on management
	Waste generation	Waste reduction and reuse have lowest emissions and most sustainable development benefits
Material consumption	Domestic material consumption	Fossil fuels important component of DMC
	Material intensity of the economy	Measures progress of overall eco-efficiency

Climate change related CSD indicators
Climate change adaptation/vulnerability

- Theme: Natural hazards

Sub-theme	*Indicator*	*Climate change link*
Vulnerability to natural hazards	Percentage of population living in hazard prone areas (separated by hazard)	Drought, floods, landslides, cyclones are associated with climate change; earthquakes, volcanoes, tsunamis are not
	Human and economic los due to natural disasters	

- Theme: Land

Land use and status	Land degradation	Land degradation is both cause and consequence of climate change
Desertification	Land affected by desertification	Important negative impact of climate change

Climate change related CSD indicators
Climate change adaptation/vulnerability

- Theme: Biodiversity

Sub-theme	*Indicator*	*Climate change link*
Species	Change in threat status of species	Global warming major risk factor
	Abundance of invasive alien species	Global warming may lead to increase in IAS
Ecosystem	Proportion of terrestrial area protected, total and by ecological region	Effective protection of ecological regions limits negative impacts of climate change on ecosystems and species

- Theme: Health

Health status and risks	Morbidity of major diseases such as HIV/AIDS, malaria, TB	Climate change may cause increase in areas where malaria is endemic

Climate change related CSD indicators
Climate change adaptation/vulnerability

- Theme: Ocean, seas and coasts

Sub-theme	*Indicator*	*Climate change link*
Coastal zone	Percentage of population living in coastal areas	Vulnerability to sea-level rise and cyclones
Marine environment	Area of coral reef ecosystems and live cover	Global warming one of the major risk factors for coral reefs
	Proportion of marine area protected	Effective protection of ecological regions limits negative impacts of climate change on ecosystems and species

- Theme: Freshwater

Water quantity	Proportion of total water resources used	Climate change has negative impact on water availability
	Water use intensity by economic activity	Decrease in water intensity can be part of adaptation

Climate change related CSD indicators
Climate change adaptive capacity

- As sustainable development is a major factor of a country's capacity to adapt to climate change, many more CSD indicators are highly relevant for climate change.
- Examples include:
  - Proportion of population below national poverty line
  - Proportion of population using an improved water source
  - Proportion of urban population living in slums
  - Percent of population with access to primary health care facilities
  - Adult secondary (tertiary) schooling attainment level
  - GDP per capita

Climate change related CSD indicators

- Other possible climate change indicators could be linked to CSD indicators:

CSD indicator	*Climate change indicator*	*Comment*
Gross domestic expenditures on R&D as percent of GDP	Climate change related R&D expenditures	Requires definition of climate change related
Net ODA given or received	Climate change related ODA given or received	Data on UNFCCC related ODA exists from OECD/DAC
Arable and permanent cropland	Land productivity; area harvested by crop	Agriculture is a main affected sector
Investment share in GDP	Infrastructure investment in areas affected by climate change	Adaptation requires change in physical infrastructure and its management

Technology transfer and climate change indicators

- Development of climate change related indicators of technology transfer is a major area of work.
- Critical issues and challenge include:
  - Definition of climate-change related technologies;
  - Wide range of climate change related technologies, especially in the area of adaptation;
  - Technology transfer includes flow of equipment (technology goods; embodied technologies), experiences and know-how (disembodied technologies), capacities to apply technology (finance, skills,...).

Technology transfer and climate change indicators -Possible sources

- Merchandise trade
  - Covers embodied technologies only;
  - Measured in value terms
    - May fail to capture effects of changing terms,
    - Decline of indicator value could be due to less trade or more preferential terms;
  - First proposals made in the Doha negotiations under the World Trade Organization.

Technology transfer and climate change indicators -Possible sources

- Merchandise trade (cont'd)
  - Type of proposals:
  - List approach, but lists of climate change technologies remain highly controversial;
  - Request-and-offer approach to find compromise acceptable for all,
    - HS classification at the 6-digit level could be too coarse (holds for both approaches);
  - Project approach to address concerns on dual use of technologies,
    - Would probably require use of customs rather than merchandise trade statistics.

Technology transfer and climate change indicators -Possible sources

- Trade in services
  - General Agreement on Trade in Services under the WTO includes “Environmental services”;
  - Royalties and fees excluded from GATS, but available from Balance of Payments;
  - Intra-firm trade in services is major form of transfer of know-how and experiences,
    - Foreign Affiliates Trade in Services Statistics (FATS) not widely used,
    - Inward FDI facilitates inflows of experiences and know-how,
    - Outward FDI can provide access to know-how and experiences;
  - Temporary presence abroad (e.g., studying, training) is also important for transfer of know-how and experiences.

Technology transfer and climate change indicators -Possible sources

- Current and possible future data on mechanisms related to the UNFCCC
  - Projects under the flexible mechanisms under the Kyoto Protocol (JI, CDM) often involve transfer of technology, but difficult to quantify.
  - Other modalities are possible (e.g., technology transfer fund) to ensure that technology transfer is measurable, reportable and verifiable.

Thank You

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http://www.un.org/esa/sustdev/index.html