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A Preliminary Set of Climate Change Indicators of Sustainable Development

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Outline

1. Purpose of the preliminary set of climate change indicators of sustainable development
2. A framework for climate change indicators of sustainable development
3. Indicators on climate change mitigation
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5. Indicators on climate change financing and technology

Purpose

- Indicator set presented here is preliminary
  - It is more an intermediate step than a final product.
- When completed, the set could serve as a reference set for countries.
  - It is not a ‘blueprint’.
  - It aims at facilitating national work on indicators.
- The set is mainly based on an assessment of the relevance of the CSD indicators for climate change.
  - Assessment of other indicator sets and work on identifying additional indicators is incomplete.
  - Some gaps remain.
  - Coverage of some issues is incomplete.
- Assessing national indicator sets could provide very useful information.

Framework for climate change indicators

- Different frameworks are possible for climate change related indicators of sustainable development.
- Indicator frameworks are important to
  - clarify what to measure;
  - guide selection of indicators;
  - address inter-linkages among issues.
- Similarity between issue-specific and general indicators of sustainable development is helpful
  - Policy-oriented frameworks dominant at national level.
- UNFCCC processes, especially Bali Action Plan, can provide some guidance for framework.
- Framework should reflect national priorities and considerations.

Framework for climate change indicators

- Possible framework: Three themes, with 18 sub-themes.
  - Themes: Mitigation; adaptation; financing and technology.
  - Selection of themes and sub-themes does not imply any stance with regard to negotiations.
  - Flexibility of framework allows for easy reorganization according to country conditions, priorities and data availability.

Framework for climate change indicators

- Theme: Climate change mitigation
- Sub-themes:
  - GHG emissions
  - Energy
  - Industry and product use
  - Agriculture, forestry and other land use
  - Waste

Framework for climate change indicators

- Theme: Climate change adaptation
- Sub-themes:
  - Temperature and precipitation changes
  - Natural hazards
  - Fresh water
  - Agriculture
  - Health
  - Coastal zones and marine environment
  - Biodiversity and terrestrial ecosystems
  - Economic development
  - Adaptive capacity

Framework for climate change indicators

- Theme: Climate change financing and technology
- Sub-themes:
  - Public or publicly guaranteed transfers
  - Investment
  - Trade
  - Technology development

Indicators on climate change mitigation

- Sub-theme: GHG emission

CSD indicator	Other indicator
Carbon dioxide emissions (total and by sector)	
Emissions of greenhouse gases (total and by GHG)	
Consumption of ozone depleting substances	
	CO2/GHG emissions per capita
	CO2/GHG intensity of the economy (total and by sector)
	Consumption-based GHG emissions

Indicators on climate change mitigation

- Main issues and challenges
  - Methodologies on indicators based on GHG emission inventories well established.
  - Data availability a concern in many developing countries.
  - Indicators on sectoral carbon intensities and on consumption based emissions require harmonized or at least compatible classifications.
    - Advances in the System of Environmental-Economic Accounting can be very beneficial.

Indicators on climate change mitigation

- Sub-theme: Energy

CSD indicator	Other indicator
Annual energy consumption, total and by main user category	
Intensity of energy use, total and by economic activity	
Share of renewable energy sources in total energy use	
	Carbon intensity of energy use
Energy intensity of transport (fuel use per km)	
Modal split of passenger transportation	
Modal split of freight transport	
	Household energy intensity (Energy use per household and/or per floor area)

Indicators on climate change mitigation

- Main issues and challenges
  - Methodologies on energy indicators are generally well developed.
  - Classification problems for intensity indicators.
  - Treatment of intermediate goods, domestic and foreign.
  - Current energy investments have impact on future emissions.
  - Proxy indicator could be used if data for use of transport modes is not available.

Indicators on climate change mitigation

- Sub-themes: Industry and product use; waste

CSD indicator	Other indicator
Material intensity of the economy	
Domestic material consumption	
Generation of waste	
Waste treatment and disposal	
Wastewater treatment	
Ambient concentration of air pollutants in urban areas	

Indicators on climate change mitigation

- Main issues and challenges
  - Material use indicators cover goal of dematerializing the economy, but depends on overall structure, not just the industrial sector.
  - Many aspects covered by GHG indicators.
  - Sectoral energy indicators also relevant.
  - Management of waste treatment is important, not just mode (especially for landfills).
  - Air pollution often complement to GHG emissions.

Indicators on climate change mitigation

- Sub-theme: Agriculture, forests and other land use

CSD indicator	Other indicator
Fertilizer use efficiency	
Area under organic farming	
Proportion of land area covered by forests	
	Deforestation rate
Area of forest under sustainable forest management	
	Area under payment for ecological services (PES) schemes
Land use change	
Land degradation	

Indicators on climate change mitigation

- Main issues and challenges
  - Further indicators on sustainable agriculture needed.
  - Biofuel indicators important.
  - Both remote sensing and land surveys needed.
  - Ongoing work on sustainable forest management important.
  - Methodologies for land degradation indicator incomplete.

Indicators on climate change adaptation

- Sub-themes: Temperature and precipitation changes; Natural hazards

CSD indicator	Other indicator
	Annual mean and variability of temperature
	Annual mean and variability of precipitation
Percentage of population living in hazard prone areas	
Human and economic loss due to natural disasters	

Indicators on climate change adaptation

- Main issues and challenges
  - For adaptation, future climate changes are most critical.
  - Extreme weather events could be included.
  - Indicator on hazard prone areas requires methodological refinement.
  - Indicator on disaster losses has high variability.

Indicators on climate change adaptation

- Sub-themes: Freshwater; agriculture; health

CSD indicator	Other indicator
Proportion of total water resources used	
Water use intensity by economic activity	
	Land productivity in agriculture
	Agriculture diversification index
	Morbidity of vector-borne diseases such as malaria and dengue
	Area in which vector-borne diseases such as malaria and dengue are endemic

Indicators on climate change adaptation

- Main issues and challenges
  - Spatial disaggregation of water indicators important.
  - Agricultural diversification important.
  - Malaria (and dengue) indicators requires effective health information systems.
  - Indicator on heat-related mortality useful.

Indicators on climate change adaptation

- Sub-themes: Coastal zones and marine environment; Biodiversity and terrestrial ecosystems

CSD indicator	Other indicator
Percentage of total population living in coastal areas	
Proportion of marine area protected	
Area of coral reef ecosystems and percentage live cover	
Change in threat status of species	
Abundance of invasive alien species	
Proportion of terrestrial area protected, total and by ecological region	
Land degradation	
Land desertification	

Indicators on climate change adaptation

- Main issues and challenges
  - Indicators related to adaptation measures (other than establishing protected areas needed).
  - Indicator on land desertification needs refinement and further work.
  - Land degradation as climate change impact may require different indicator than land degradation as climate change cause.

Indicators on climate change adaptation

- Sub-themes: Economic development; adaptive capacity

CSD indicator	Other indicator
	Economic diversification indicator
	Infrastructure investment in areas vulnerable to climate change
Proportion of population living below national poverty line	
Proportion of population using an improved water source	
Under-five mortality rate	
Gross domestic product per capita	

Indicators on climate change adaptation

- Main issues and challenges
  - Spatial breakdown of indicators is important.
  - Sustainable development increases adaptive capacity.
  - Many options to select adaptive capacity indicators from general sustainable development indicator sets.

Indicators on climate change financing and technology

- Sub-themes: Public and publicly guaranteed transfers; investment

CSD indicator	Other indicator
	Climate change related official development assistance
	Contribution to and receipts from climate change specific funds
	Climate change related FDI net inflows and net outflows
	Climate change related portfolio investment net inflows and net outflows

Indicators on climate change financing and technology

- Main issues and challenges
  - Outcome of negotiations critical for deriving indicators.
  - ODA and FDI indicators relate to CSD indicators.
  - Definition of ‘climate change related’ exists for ODA, but not for investment flows.
  - Investment flows within UNFCCC mechanisms (CDM, JI) may be easier to measure.

Indicators on climate change financing and technology

- Sub-themes: Trade; Technology development

CSD indicator	Other indicator
	Exports and imports in emission reduction certificates or similar instruments (measured in CO2 equivalents and in currency)
	Exports and imports of climate change technologies (goods and services) , at commercial and at preferential terms
	R&D in climate change technologies, domestic and in international cooperation

Indicators on climate change financing and technology

- Main issues and challenges
  - Trade is an important mode of technology transfer.
  - Technologies for mitigation quite different from adaptation technologies.
  - Definition of climate change related goods and services required.
  - Interdependence with WTO trade negotiations.
  - Technology transfer at preferential terms to be distinguished from technology transfer at commercial terms.
  - Intellectual property rights regime matters.
  - Definition of climate change related R&D needed.

Thank You

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