Climate change-related statistics overview

Regional Training Course on Climate Change-Related Statistics

27 November - 1 December 2017, Chiba, Japan

Learning objectives

Develop an understanding of:

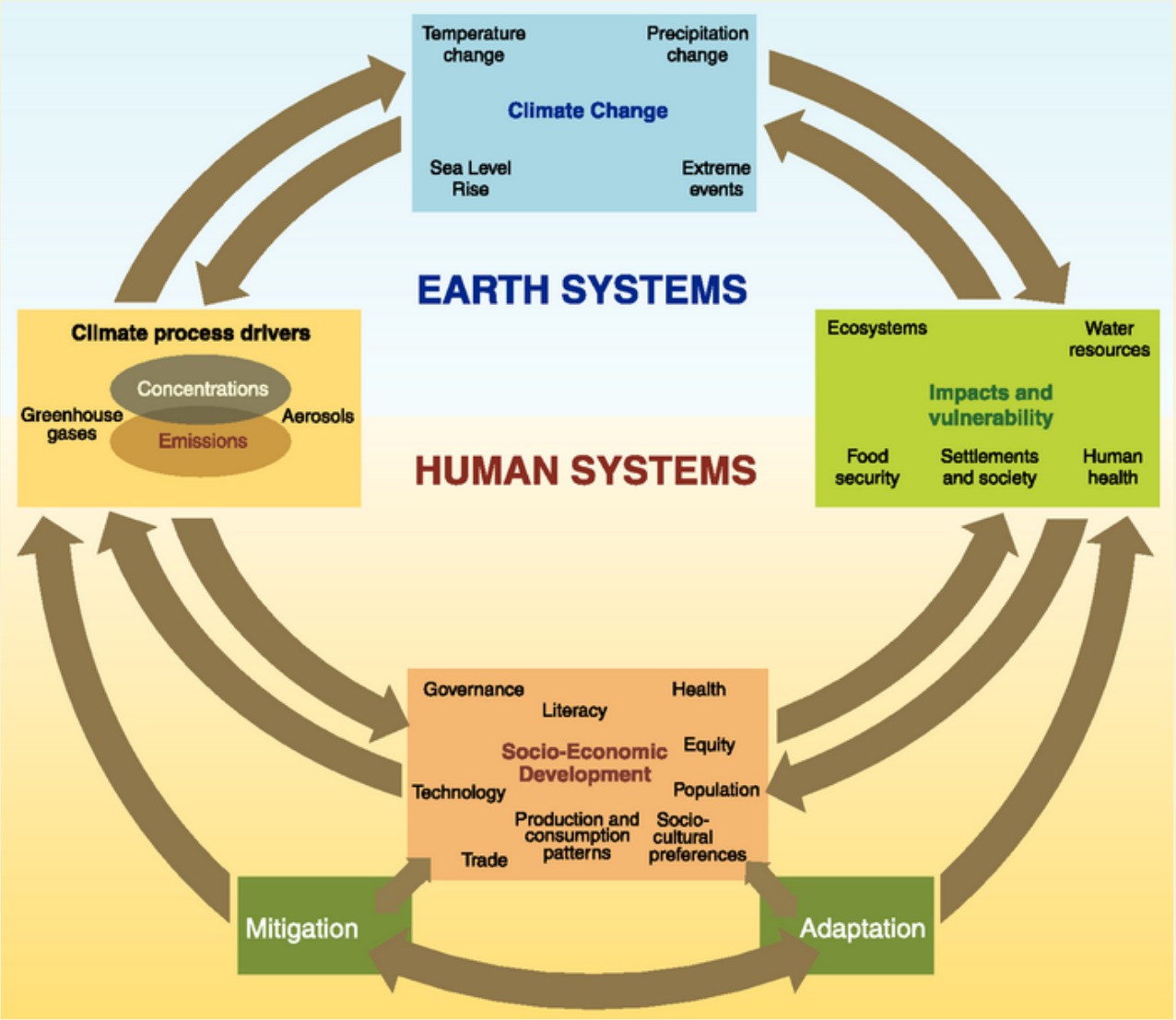
- Climate change
- Environment statistics
- Climate change statistics & climate change-related statistics
- Approaches to development of climate change-related statistics & indicators
- Needs for national data, statistics & indicators related to climate change

Climate change ...

> ... is a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods

- United Nations Framework on Climate Change (1992)
- Climate change is a complex sequence of events
- Which can be described schematically as follows
  - Intergovernmental Panel on Climate Change (IPCC)
  - Climate Change 2007: Synthesis Report

Anthropogenic drivers, impacts of & responses to climate change, & their linkages



Environment statistics: FDES

Framework for the Development of Environment Statistics

- FDES 2013
- Developed by United Nations Statistics Division with guidance of national & international experts

Scope: biophysical aspects of environment & aspects of socio-economic system that directly influence & interact with environment

- Scope of environment, social & economic statistics overlap

Structure

- Components
  - Sub-components
    - Statistical topics
      - Statistics

FDES components

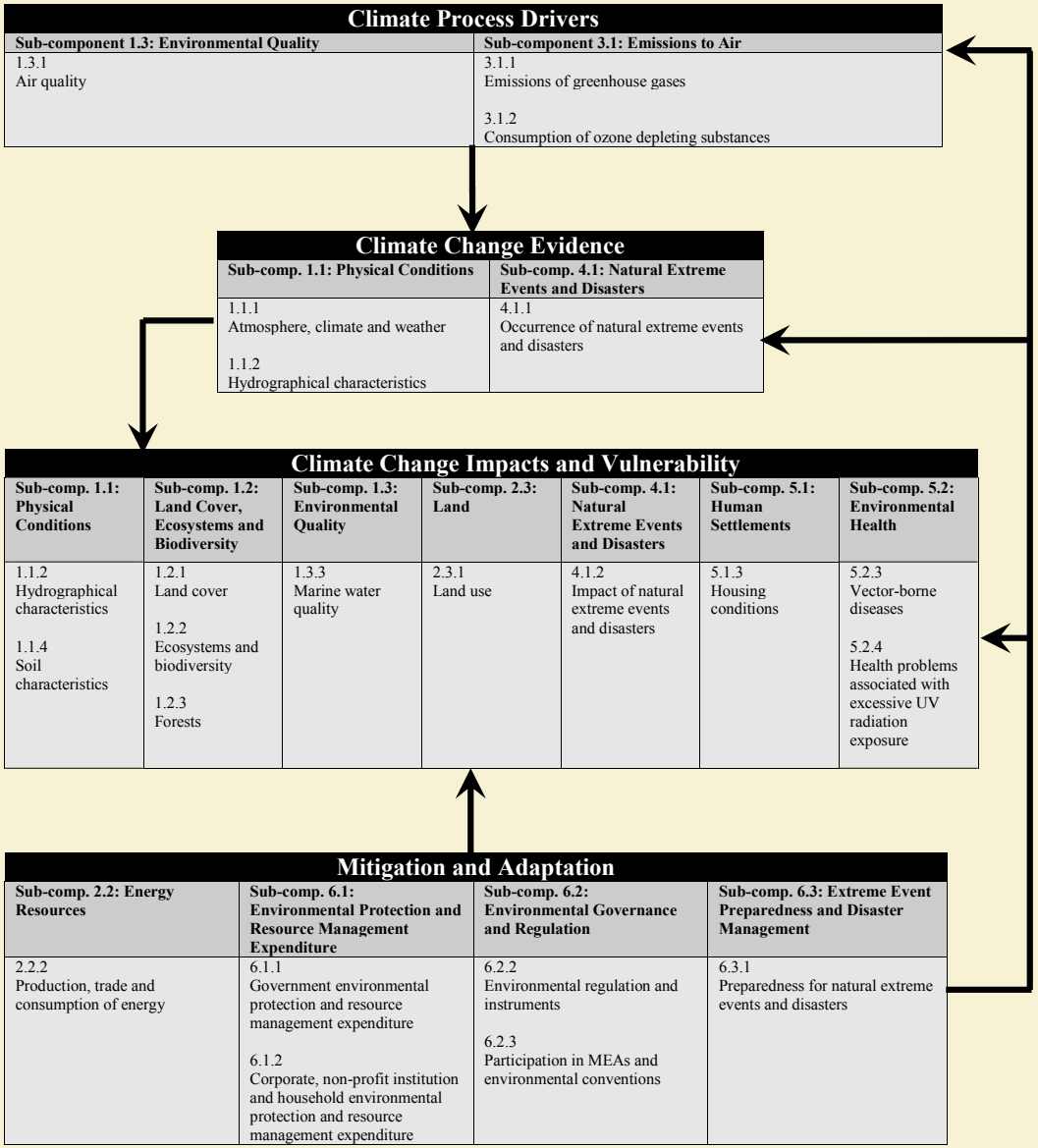
FDES (cont.)

- Seeks to be compatible with **related frameworks & systems**, e.g.:
  - System of Environmental-Economic Accounting (SEEA)
  - Driving-force Pressure-State-Impact-Response (DPSIR)
  - Sustainable Development Goals (SDGs) indicators
- Contains a **Core Set of Environment Statistics**
  - with 3 tiers

Climate change in FDES

- Recognized as a critical issue that cuts across **all topics**

Topics in FDES that relate to climate change



Climate Process Drivers

Sub-component 1.3: Environmental Quality	Sub-component 3.1: Emissions to Air
1.3.1 Air quality	3.1.1 Emissions of greenhouse gases 3.1.2 Consumption of ozone depleting substances

Climate Change Evidence

Sub-comp. 1.1: Physical Conditions	Sub-comp. 4.1: Natural Extreme Events and Disasters
1.1.1 Atmosphere, climate and weather 1.1.2 Hydrographical characteristics	4.1.1 Occurrence of natural extreme events and disasters

Climate Change Impacts and Vulnerability

Sub-comp. 1.1: Physical Conditions	Sub-comp. 1.2: Land Cover, Ecosystems and Biodiversity	Sub-comp. 1.3: Environmental Quality	Sub-comp. 2.3: Land	Sub-comp. 4.1: Natural Extreme Events and Disasters	Sub-comp. 5.1: Human Settlements	Sub-comp. 5.2: Environmental Health
1.1.2 Hydrographical characteristics 1.1.4 Soil characteristics	1.2.1 Land cover 1.2.2 Ecosystems and biodiversity 1.2.3 Forests	1.3.3 Marine water quality	2.3.1 Land use	4.1.2 Impact of natural extreme events and disasters	5.1.3 Housing conditions	5.2.3 Vector-borne diseases 5.2.4 Health problems associated with excessive UV radiation exposure

Mitigation and Adaptation

Sub-comp. 2.2: Energy Resources	Sub-comp. 6.1: Environmental Protection and Resource Management Expenditure	Sub-comp. 6.2: Environmental Governance and Regulation	Sub-comp. 6.3: Extreme Event Preparedness and Disaster Management
2.2.2 Production, trade and consumption of energy	6.1.1 Government environmental protection and resource management expenditure 6.1.2 Corporate, non-profit institution and household environmental protection and resource management expenditure	6.2.2 Environmental regulation and instruments 6.2.3 Participation in MEAs and environmental conventions	6.3.1 Preparedness for natural extreme events and disasters

Set of core climate change-related statistics & indicators using SEEA

- Agreed to as basis for pilot testing by United Nations Economic Commission for Europe **Conference of European Statisticians** on 21 Jun 2017
  - UNECE: sister regional commission of ESCAP
  - SIAP is a regional institution of ESCAP
  - Kyrgyzstan & Tajikistan are member of both ESCAP & UNECE
- Part of ongoing work of CES **Task Force** on a set of core climate change-related statistics using SEEA
  - Established in 2014
  - With the objective to define an internationally comparable set of core climate change-related statistics & indicators that can be derived from SEEA & FDES

Scope of climate change-related statistics

> "Environmental, social and economic data that measure the human causes of climate change, the impacts of climate change on human and natural systems, the efforts of humans to avoid the consequences as well as their efforts to adapt to the consequences"

To narrow scope in context of **the statistical system**, focus is on statistics that measure 5 climate change-related areas:

a. **Drivers**: human causes of climate change that deal with sources of emissions

b. **Emissions**: greenhouse gas (GHG) emissions and their human causes

c. **Impacts**: impacts of climate change on human and natural systems

d. **Mitigation**: efforts of humans to avoid the consequences

e. **Adaptation**: efforts to adapt to the consequences

Related global policy initiatives

- 2030 Agenda for Sustainable Development, including the Sustainable Development Goals (SDGs)
- Sendai Framework for Disaster Risk Reduction 2015 – 2030
- Paris Agreement

Sustainable Development Goals

- **SDG 13**: Take urgent action to combat climate change and its impacts
  - With 5 targets & 7 indicators
- Other targets directly related to climate change:
  - 1.5
  - 2.4
  - 3.d
  - 7.2, 7.3, 7.a & 7.b
  - 11.b
  - 12.c
  - 14.3
  - 15.2
- 9 SDG indicators in CES core climate change-related indicators under areas of **impacts** & **adaptation**

Sendai Framework for Disaster Risk Reduction 2015 – 2030

- Adopted at 3rd UN World Conference in Sendai, Japan, in March 2015
- 7 global targets

Sendai Framework targets

a. Substantially reduce global disaster **mortality** by 2030, aiming to lower average per 100,000 global mortality rate in 2020–2030 compared to 2005–2015

b. Substantially reduce number of **affected people** globally by 2030, aiming to lower average global figure per 100,000 in 2020–2030 compared to 2005–2015

c. Reduce direct disaster **economic loss** in relation to GDP by 2030

d. Substantially reduce disaster **damage to critical infrastructure & disruption of basic services**, among them health & educational facilities, including through developing their resilience by 2030

e. Substantially increase number of countries with national & local disaster **risk reduction strategies** by 2020

f. Substantially enhance **international cooperation** to developing countries through adequate & sustainable support to complement their national actions for implementation of present Framework by 2030

g. Substantially increase availability of & access to multi-hazard **early warning systems** & disaster **risk information & assessments** to people by 2030

Sendai Framework indicators

- Developed by Open-ended Intergovernmental Expert Working Group on indicators and terminology relating to disaster risk reduction (OEIWG)
- Report adopted by United Nations General Assembly on 2 Feb 2017
  - Provides definitions of **hazard** & **disaster** linked to context of climate change
  - Contains 32 indicators
  - of which 4 are in CES core climate change-related indicators, all under area of **impacts**

Paris Agreement

- Builds upon United Nations Framework Convention on Climate Change (UNFCC)
- Entered into force on 5 Oct 2016
- Aims to strengthen global response to threat of climate change
- by keeping global temperature rise this century **well below 2 degrees C above pre-industrial levels**
- and to pursue efforts to limit temperature increase even further to 1.5 degrees C
- Also aims to strengthen ability of countries to deal with impacts of climate change through:
  - Appropriate financial flows
  - A new technology framework and
  - An enhanced capacity building framework

Paris Agreement (cont.)

- Parties required to put forward their best efforts through **nationally determined contributions** (NDCs)
  - and to strengthen these over time
- Includes **regular reporting** on **emissions** and implementation efforts
  - To start in 2018, and every 5 years thereafter
- **Data requirements** not yet elaborated
  - But likely to build on existing reporting & review processes under UNFCCC

Statistical frameworks supporting production of climate change-related statistics

- SEEA (evidently)
  - 24 of CES core climate change-related indicators can be produced from System of Environmental-Economic Central Framework (SEEA-CF) accounts
  - And several others from SEEA Experimental Ecosystem Accounts (SEEA-EEA)
- FDES (evidently)

CES core climate change-related indicators

39 indicators under 3 tiers:

- Tier 1: Indicator conceptually clear, established methodology & standards available & data regularly produced by countries
- Tier 2: Indicator conceptually clear, established methodology & standards available but data are not regularly produced by countries
- Tier 3: Indicator for which there are no established methodology and standards or methodology/standards are being developed/tested

Number of core climate change-related indicators per area & sub-area

Sub-areas	Areas				
	Drivers	Emissions	Impacts	Mitigation	Adaptation
National total	4	3			
Production	3	2			
Consumption	1	2			
Physical conditions			2		
Land, land cover, ecosystems and biodiversity			3	0	0
Extreme events and disasters			4		0
Water resources			1		1
Human settlements and environmental health			2	0	1
Agriculture, forestry and fishery			1	0	2
Expenditures				1	1
Energy resources				1	
Environmental governance and regulation				4	0
Total	**8**	**7**	**13**	**6**	**5**

Drivers

Area	Sub-area	No.	Indicator	Tier	Indicator conceptually identical with		Can be produced from SEEA-CF accounts
					SDGs	SF DRR*	
Drivers	National total	1	Total primary energy supply (TPES)	I			Energy
		2	Share of fossil fuels in total primary energy supply (TPES)	I			Energy
		3	Losses of land covered by (semi-) natural vegetation	III			Land
		4	Total support for fossil fuels / GDP	II			
	Production	5	Total energy intensity of production activities	II			Energy
		6	CO2 intensity of energy for the economy	II			Energy, air emission
		7	Emission intensity of agricultural commodities	II			AFF**
	Consumption	8	Energy consumption by households / capita	I			Energy

Emissions

Area	Sub-area	No.	Indicator	Tier	Indicator conceptually identical with		Can be produced from SEEA-CF accounts
					SDGs	SF DRR*	
Emissions	National total	9	Total GHG emissions	I			Air emission
		10	CO2 emissions from fuel combustion	I			Air emission
		11	GHG emissions from land use	I			AFF
	Production	12	Total GHG emissions of production activities	I			Air emission
		13	GHG emission intensity of production activities	I			Air emission
	Consumption	14	Direct GHG emissions from households	I			Air emission
		15	Carbon footprint	III			Air emission

Impacts

Area	Sub-area	No.	Indicator	Tier	Indicator conceptually identical with		Can be produced from SEEA-CF accounts
					SDGs	SF DRR*	
Impacts	Physical conditions	16	Annual average surface temperature	I			
		17	Percentage of land area suffering from unusual wet or dry conditions (Standard Precipitation Index)	I			
	Water resources	18	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	I	6.4.2 (tier 1)		Water
	Land, land cover, ecosystems and biodiversity	19	Cumulative number of alien species	III			
		20	Carbon stock in soil	III			
		21	Proportion of land that is degraded over total land area	III	15.3.1 (tier 3)		Land
	Extreme events and disasters	22	Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population	III	1.5.1 (tier 2), 11.5.1 (tier 2), 13.1.2 (tier 2)	A-1	
		23	Occurrence of extreme weather events	II			
		24	Direct economic loss attributed to hydro-meteorological disasters in relation to GDP	III	11.5.2 (tier 2)	C-1	
		25	Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters	III		B-4	
	Human settlements and environmental health	26	Distribution of cases of vector-borne diseases	I			
		27	Heat-related mortality	II			
	Agriculture, forestry and fishery	28	Direct agricultural loss attributed to hydro-meteorological disasters	III		C-2	

Mitigation

Area	Sub-area	No.	Indicator	Tier	Indicator conceptually identical with		Can be produced from SEEA-CF accounts
					SDGs	SF DRR*	
Mitigation	Energy resources	29	Renewable energy share in the total final energy consumption	I	7.2.1 (tier 1)		Energy
	Expenditures	30	Share of climate change mitigation expenditure relative to GDP	III			Transactions
	Environmental governance and regulation	31	Share of energy and transport related taxes as percentage of total taxes and social contributions	I			Transactions
		32	Total climate change related subsidies and similar transfers / GDP	III			Transactions
		33	Average carbon price	I			
		34	Mobilized amount of USD per year starting in 2020 accountable towards the USD 100 billion commitment	III	13a.1 (tier 3)		

Adaptation

Area	Sub-area	No.	Indicator	Tier	Indicator conceptually identical with		Can be produced from SEEA-CF accounts
					SDGs	SF DRR*	
Adaptation	Expenditures	35	Share of government adaptation expenditure to GDP	III			Transactions
	Water resources	36	Change in water use efficiency over time	III	6.4.1 (tier 3)		Water
	Human settlements and environmental health	37	Proportion of population living in dwellings with air conditioners or air conditioning	III			
	Agriculture, forestry and fishery	38	Progress towards sustainable forest management	III	15.2.1 (tier 3)		
		39	Proportion of agricultural area under productive and sustainable agriculture	III	2.4.1 (tier 3)		

References (selected)

- United Nations Framework on Climate Change, 1992
- IPPCC, Climate Change 2007: Synthesis Report
- SEEA-CF, 2012
- SEEA-EEA, 2012
- FDES, 2013

SDG global indicator framework

- Paris Agreement
- OEIWG Report, 2017
- CES Task Force on a set of key climate change-related statistics using SEEA final report with the set of indicators, 2017

Time to do some work!

See handout