UNECE

UN Framework for the Development of Environment Statistics (FDES)

A tool for structuring statistics and indicators, data disaggregation and identifying data gaps.

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Regional training on air quality and emissions to air statistics and indicators

Producing, sharing and using high-quality information for Cleaner Air

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This presentation includes material developed by the Environment Statistics Section of the United Nations Statistics Division and the United Nations Economic Commission for Europe

1. Why using the FDES? A single trusted *structure* -multiple purposes

Component 1: Environmental Conditions and Quality

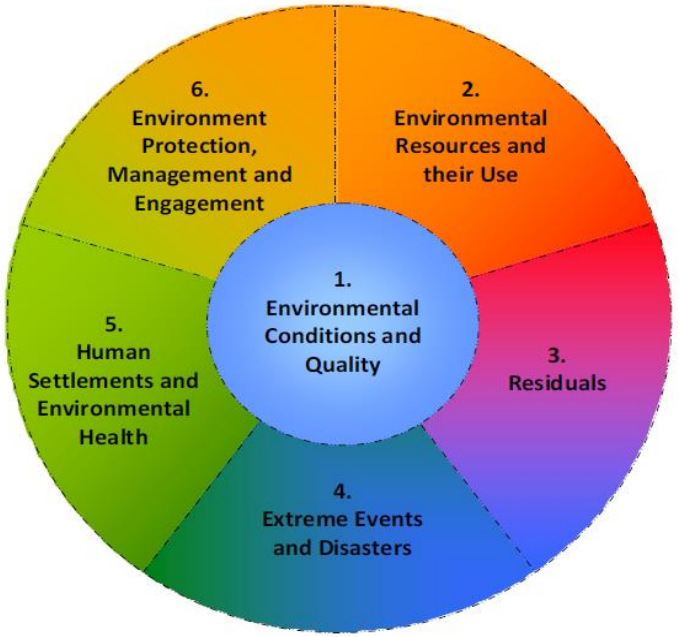
1.1: Physical Conditions
1.2: Land Cover, Ecosystems and Biodiversity
1.3: **Environmental Quality**

Component 2: Environmental Resources and their Use

2.1: Mineral Resources
2.2: **Energy Resources**
2.3: **Land**
2.4: Soil Resources
2.5: Biological Resources
2.6: Water Resources

Component 3: Residuals

3.1: **Emissions to Air**
3.2: Generation and Management of Wastewater
3.3: Generation and Management of Waste
3.4: Release of Chemical Substances



Component 4: Extreme Events and Disasters

4.1: Natural Extreme Events and Disasters
4.2: Technological Disasters

Component 5: Human Settlements and Environmental Health

5.1: Human Settlements
5.2: Environmental Health

Component 6: Environmental Protection, Management and Engagement

6.1: Environmental Protection and Resource Management Expenditure
6.2: Environmental Governance and Regulation
6.3: Extreme Event Preparedness and Disaster Management
6.4: Environmental Information and Awareness

2. The FDES. Structuring air quality data and statistics

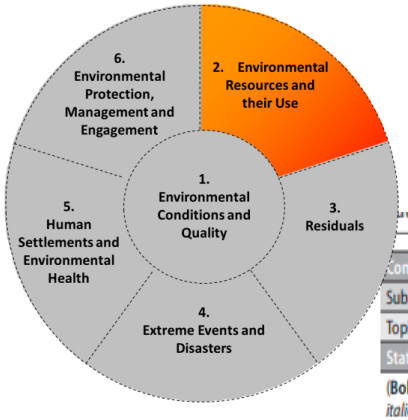
Table 3.1.3.1
Statistics and related information for Topic 1.3.1

Component 1: Environmental Conditions and Quality	
Subcomponent 1.3: Environmental Quality	
Topic 1.3.1: Air quality	
Statistics and related information	**Category of measurement**
(**Bold text—Core Set/Tier 1**; regular text—Tier 2; *italicized text—Tier 3*)	
a. Local air quality	
1. **Concentration level of particulate matter (PM_{10})**	Concentration
2. **Concentration level of particulate matter ($PM_{2.5}$)**	Concentration
3. **Concentration level of tropospheric ozone (O_3)**	Concentration
4. **Concentration level of carbon monoxide (CO)**	Concentration
5. **Concentration level of sulphur dioxide (SO_2)**	Concentration
6. **Concentration levels of nitrogen oxides (NO_x)**	Concentration
7. Concentration levels of heavy metals	Concentration
8. Concentration levels of non-methane volatile organic compounds (NMVOCs)	Concentration
9. *Concentration levels of dioxins*	Concentration
10. *Concentration levels of furans*	Concentration
11. Concentration levels of other pollutants	Concentration
12. Number of days when maximum allowable levels were exceeded per year	Number
b. Global atmospheric concentrations of greenhouse gases	
1. Global atmospheric concentration level of carbon dioxide (CO_2)	Concentration
2. Global atmospheric concentration level of methane (CH_4)	Concentration

1. **FDES provides a list of substances to be measured and a sense of priority (Tier 1: Core Set of Environmental Statistics)**
2. **FDES can be used in several phases of the statistical process**
   - **Specifying needs:**
     - Selecting substances
     - Defining spatial areas of interest (cities –metropolitan areas (exposure), industrial areas (level of emissions)
     - Enables the identification of data/statistical gaps
   - **Design:**
     - Identifying key indicators and its characteristics (units of measurement,
     - Relating other relevant components (Energy use, emissions to air)

     …
   - **Dissemination:**
     - Thematic reference for publications
3. **FDES provides a broad and comprehensive set of environment statistics and data that can be publish or presented for key policies and selected indicators**
   - Global, regional, national, sub-national
   - Environment focused but suited inputs for cross cutting agendas: health, climate change, disaster prevention, competitiveness, regional development and economic valuations

3. The FDES. Disaggregating air emissions data and statistics

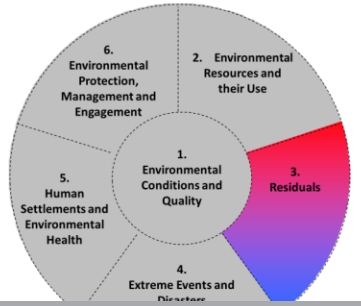


Component 2: Environmental Resources and their Use			
Subcomponent 2.2: Energy Resources			
Topic 2.2.2: Production, trade and consumption of energy			
Statistics and related information			
(**Bold text—Core Set/Tier 1**; regular text—Tier 2; *italicized text—Tier 3*)	Category of measurement	Potential aggregations and scales	Methodological guidance
a. Production of energy		• By non-renewable resource (e.g., petroleum, natural gas, coal, nuclear fuels, non-sustainable firewood, waste, other non-renewables) • By renewable resource (e.g., solar, hydroelectric, geothermal, tidal action, wave action, marine, wind, biomass) • National • Subnational	• UNSD: IRES • IEA Energy Statistics Manual • Joint Wood Energy Enquiry (UNECE-FAO Forestry and Timber Section)
1. **Total production**	Energy unit, mass, volume		
2. **Production from non-renewable sources**	Energy unit, mass, volume		
3. **Production from renewable sources**	Energy unit, mass, volume		
4. **Primary energy production**	Energy unit, mass, volume	By primary energy resource (e.g., petroleum, natural gas, coal, hydroenergy, geothermal, nuclear fuels, cane products, other primary) • By secondary energy product (e.g., electricity, liquefied petroleum gas, gasoline/alcohol, kerosene, diesel oil, fuel oil, coke, charcoal, gases, other secondary) National • Subnational	
5. Imports of energy	Energy unit, mass, volume		
6. Exports of energy	Energy unit, mass, volume		
7. **Secondary energy production**	Energy unit, mass, volume		
b. **Total energy supply**	Energy unit, mass, volume	• By energy product	
c. **Final consumption of energy**	Energy unit, mass, volume	• By households • By ISIC economic activity • By tourists • National • Subnational	

1. **FDES suggests possible disaggregation and flexible to country's needs of disaggregation**
   - **Thematic**
     - primary energy resource (renewables, no renewables)
     - secondary energy production (electricity, gasoline, etc.)
   - **Economic Sector**
   - **Geographical areas**
     - Political- administrative boundaries
     - Natural units
     - Planning units
   - **Sources (of emissions)**
   - **Temporal considerations**
2. **FDES provides guidance on possible categories of measurement**
   - **Physical (umber, area, mass, volume)**
   - **Economical (Currency)**
   - **Temporal (date, time period)**

4. The FDES. Methodological guidance and linkable resources

Component 2: Environmental Resources and their Use				
Subcomponent 2.2: Energy Resources				
Topic 2.2.2: Production, trade and consumption of energy				
Statistics and related information				
(**Bold text—Core Set/Tier 1**; regular text—Tier 2; *italicized text—Tier 3*)		Category of measurement	Potential aggregations and scales	Methodological guidance
c.	**Final consumption of energy**	Energy unit, mass, volume	• By households • By ISIC economic activity • By tourists • National • Subnational	



Component 3: Residuals				
Subcomponent 3.1: Emissions to Air				
Topic 3.1.1: Emissions of greenhouse gases	a. Total emissions of direct greenhouse gases (GHGs), by gas:		• By ISIC economic activity • By tourists • National • Subnational • By IPCC source categories	• IPCC Emission Factor Database • UN Framework Convention on Climate Change (UNFCCC) Reporting Guidelines • UNECE Standard Statistical Classification of Ambient Air Quality (1990) • UNSD: MDG Indicator 7.2 Metadata • WHO
	1. **Carbon dioxide (CO_2)**	Mass		
	2. **Methane (CH_4)**	Mass		
	3. **Nitrous oxide (N_2O)**	Mass		
	4. Perfluorocarbons (PFCs)	Mass		
	5. Hydrofluorocarbons (HFCs)	Mass		
	6. Sulphur hexafluoride (SF_6)	Mass		
	b. Total emissions of indirect greenhouse gases (GHGs), by gas:			
	1. **Sulphur dioxide (SO_2)**	Mass		
	2. **Nitrogen oxides (NO_x)**	Mass		
	3. Non-methane volatile organic compounds (NM-VOCs)	Mass		
	4. Other	Mass		

1. **FDES provides methodological guidance on statistical classifications (Annex D)**
   - **International standard industrial classification of all economic activities (ISIC) Revised 2023**
   - **Classification on environmental activities**

2. **FDES is linkable with socio-demographic, economic statistics and thematic guidelines**
   - **Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution** https://unece.org/DAM/env/documents/2015/AIR/EB/English.pdf
   - **UNECE. Revised Guidelines for the Application of Environmental Indicators**
   - **Recommendations on Climate Change-Related Statistics,** https://unece.org/sites/default/files/2021-08/CES_Set_Core_CCR_Indicators-Report.pdf
   - **WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide**

https://apps.who.int/iris/bitstream/handle/10665/345329/9789240034228-eng.pdf?sequence=1&isAllowed=y

   - **International Statistical Classification of Diseases and Related Health Problems (ICD)**

https://icd.who.int/en

5. The FDES. Identifying data and statistics “gaps”

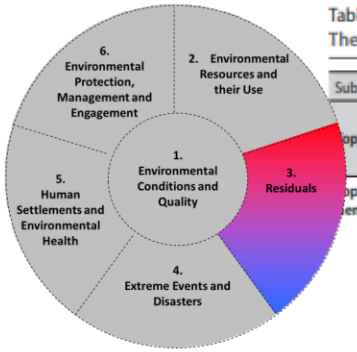


Table A.1
The Basic Set of Environment Statistics *(continued)*

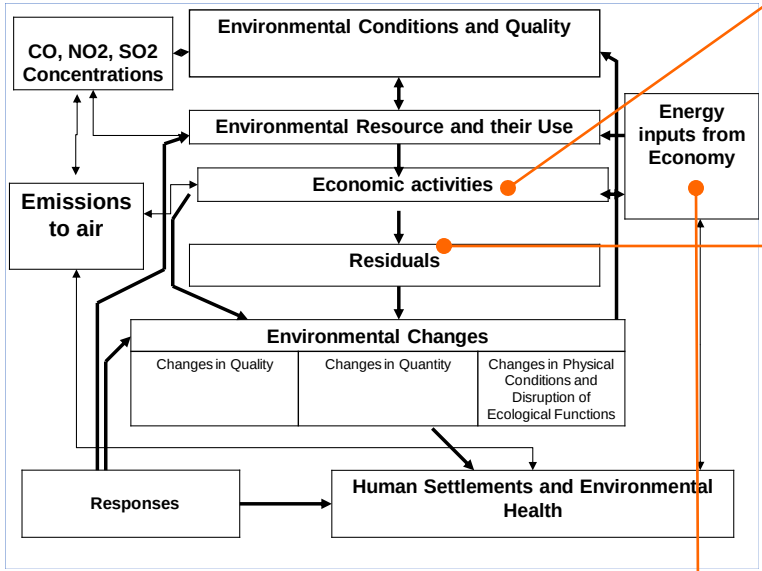
Subcomponent 3.3: Generation and Management of Waste				
Topic	Statistics and related information (**Bold text—Core Set/Tier 1**; regular text—Tier 2; *italicized text—Tier 3*)	Category of measurement	Potential aggregations and scales	Methodological guidance
Topic 3.3.1: Generation of waste	a. **Amount of waste generated by source**	Mass	• By ISIC economic activity • By households • By tourists • National • Subnational	• European Commission: European List of Waste, pursuant to European Waste Framework Directive • Eurostat: Environmental Data Centre on Waste • Eurostat: European Waste Classification for Statistics (EWC-Stat), version 4 (Waste categories) • Basel Convention: Waste categories and hazardous characteristics • Eurostat: Manual on Waste Statistics • Eurostat: Guidance on classification of waste according to EWC-Stat categories • SEEA Central Framework (2012) • UNSD: Environment Statistics Section—Waste Questionnaire
	b. Amount of waste generated by waste category	Mass	• By waste category (e.g., chemical waste, municipal waste, food waste, combustion waste) • National • Subnational	
	c. **Amount of hazardous waste generated**	Mass	• By ISIC economic activity • National • Subnational	
Topic 3.3.2: Management of waste	a. Municipal waste		• By type of treatment and disposal (e.g., reuse, recycling, composting, incineration, landfilling, other) • By type of was • National • Subnational	• Eurostat: Environmental Data Centre on Waste
	1. **Total municipal waste collected**	Mass		
	2. **Amount of municipal waste treated by type of treatment and disposal**	Mass		
	3. **Number of municipal waste treatment and disposal facilities**	Number		
	4. Capacity of municipal waste treatment and disposal facilities	Volume		
	b. Hazardous waste			
	1. **Total hazardous waste collected**	Mass		
	2. **Amount of hazardous waste treated by type of treatment and disposal**	Mass		
	3. **Number of hazardous waste treatment and disposal facilities**	Number		
	4. Capacity of hazardous waste treatment and disposal facilities	Volume		
	c. **Other/industrial waste**			
	1. Total other/industrial waste collected	Mass		

Component 2: Environmental Resources and their Use			
Subcomponent 2.3: Land			
Topic 2.3.2: Use of forest land			
Statistics and related information (**Bold text—Core Set/Tier 1**; regular text—Tier 2; *italicized text—Tier 3*)	Category of measurement	Potential aggregations and scales	Methodological guidance
a. Use of forest land		• By forest type • National • Subnational • By dominant tree species	• FAO FRA • UNFF MAR • UNSD: MDG Indicator 7.1 Metadata • Montreal Process (Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests) • State of Europe’s Forests (Forest Europe/UNECE-FAO Forestry and Timber Section)
1. **Area deforested**	Area		
2. Area reforested	Area		
3. Area afforested	Area		
4. *Natural growth*	Area		
b. Forest area by primary designated function	Area	• Production • Protection of soil and water • Conservation of biodiversity • Social services • Multiple use • Other	• FAO FRA

1. **FDES provide a Basic Set of Environment Statistics (Annex A)**
   - **Three Tiers: Tier 1 includes the Core set**
   - **Statistics in one component can be used as input for other statistics**
2. **Linkable to other classifications:**
   - **Standard International Energy Product Classification (SIEC)**

6. Linking the environment, the economy and the society

The relationship between energy resources, their use and the environment



Economic production	
Sub-component 2.2: Energy Resources	
Topic 2.2.2: Production, trade and consumption of energy	a. Production of energy b. Total energy supply

Residuals	
Sub-component 3.1: Emissions to Air	
Topic 3.1.1: Emissions of greenhouse gases	3.1.1.a: Total emissions of direct greenhouse gases (GHGs), by gas: **3.1.1.a.1: Carbon dioxide (CO_2)** **3.1.1.a.2: Methane (CH_4)**
Topic 3.1.2: Consumption of ozone depleting substances	3.1.2.a: Consumption of ozone depleting substances (ODSs), by substance: 3.1.2.a.6: Methyl bromide
Sub-component 3.2: Generation and Management of Wastewater	
Topic 3.2.1: Generation of waste	**3.3.1.a Amount of waste generated (by source)** **3.3.1.b –Amount of waste generated by waste category** 3.2.1.b: Pollutant content of wastewater
Sub-component 3.3: Generation and Management of Waste	
Topic 3.3.1: Management of waste	**3.3.1.a: Amount of waste generated by source** 3.3.1.b: Amount of waste generated by waste category 3.3.1.c.: **Amount of hazardous waste generated**

Energy Inputs	
Sub-component 2.2 Energy resources	
Topic 2.2.2: Production, trade and consumption of energy	Final consumption of energy

Source: Based on Environment Statistics Section, United Nations Statistics Division

7. FDES structure – SDGs linked

The FDES structure

A. Component “environmental conditions and quality”
B. Component “environmental resources and their use”
C. Component “residuals”
D. Component “human settlements and environmental health”
   - Proportion of population using safely managed drinking water
   - Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene
E. Component “environmental protection, management and engagement”

SDGs linked

Air quality

- SDG Indicator 11.6.2 IAnnual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)

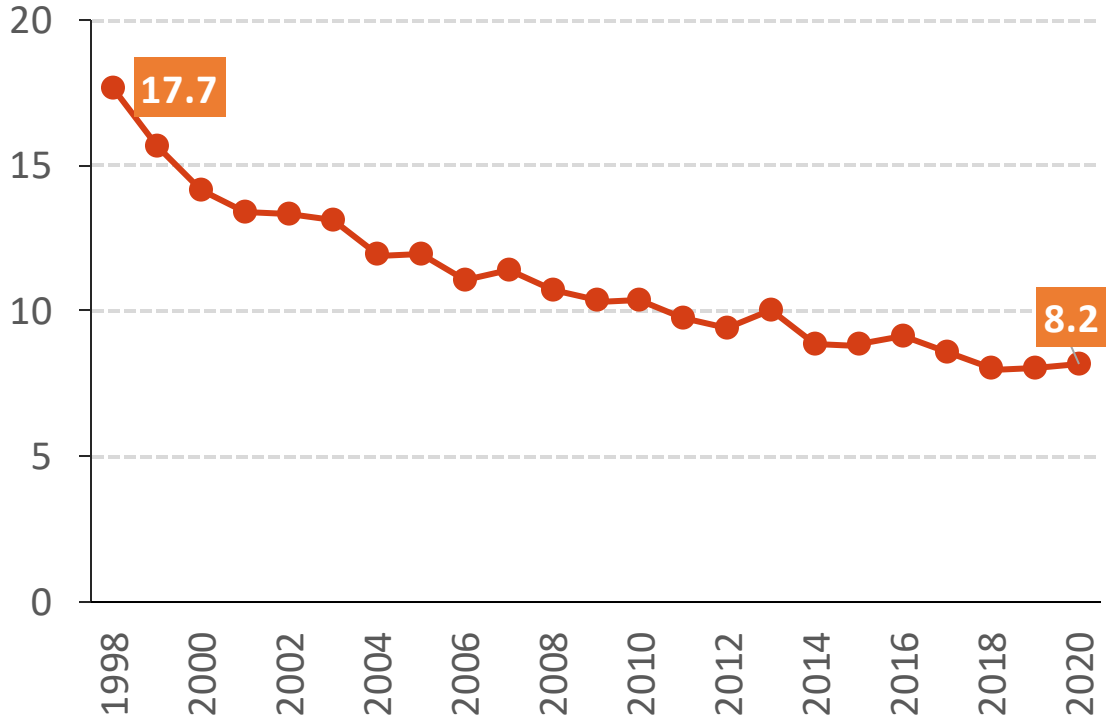
GHG emissions

- SDG Indicator 9.4.1 CO2 emission per unit of value added

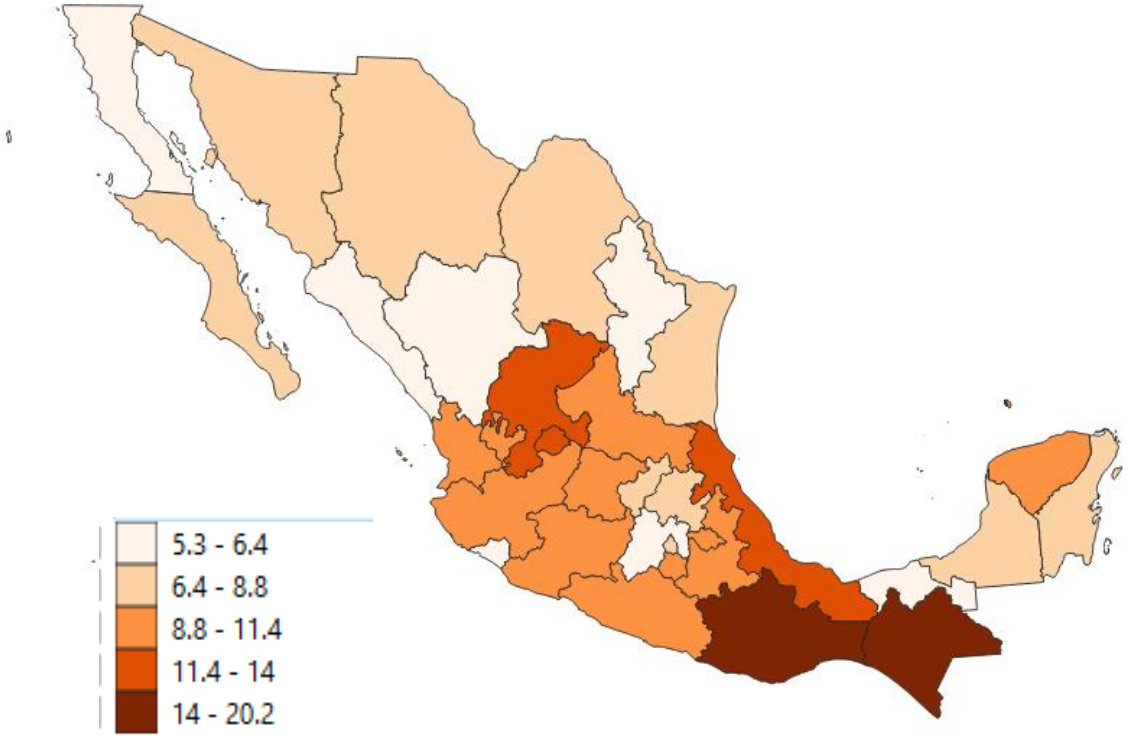
7.1 Granular environmental indicators and targeting areas for interventions.

SDG 3.9.2. Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene. Mexico.

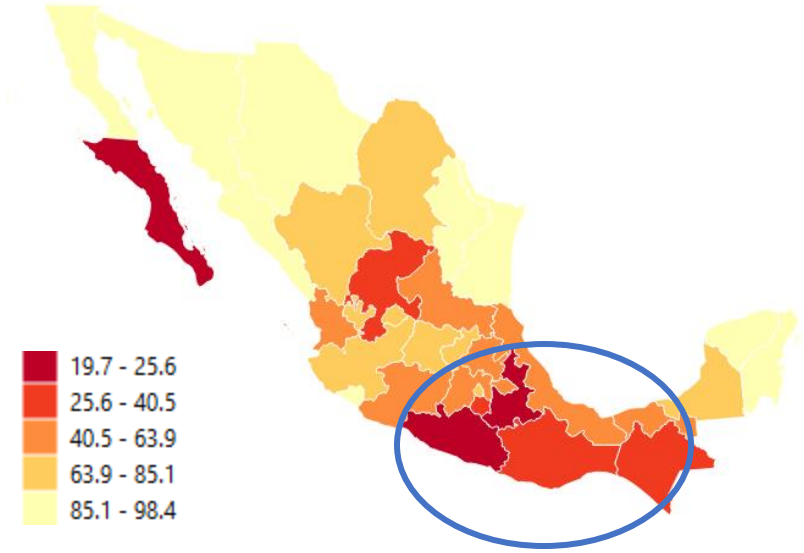
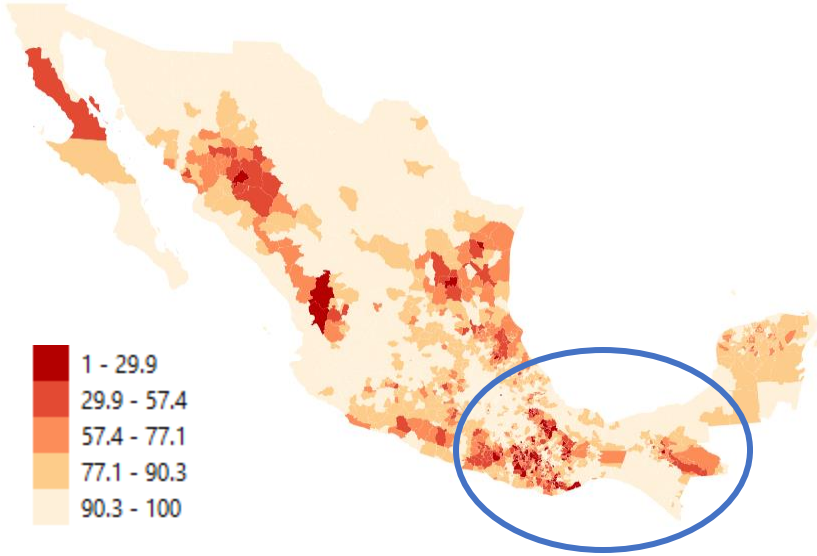
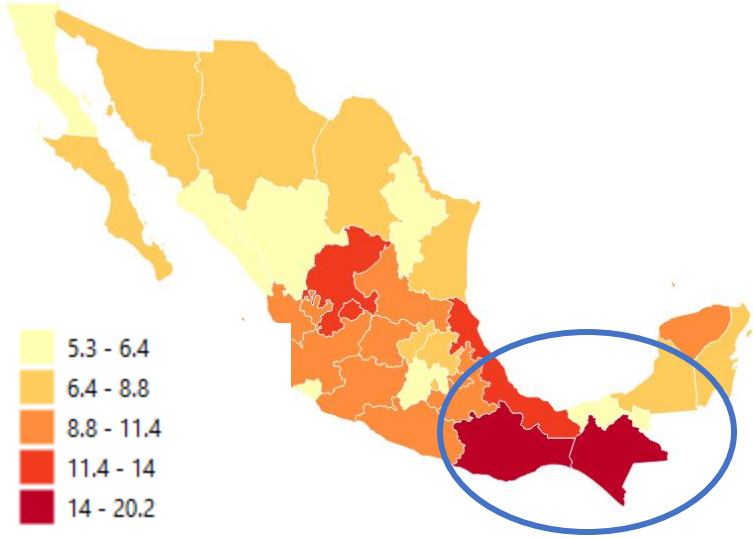
Mortality rate (1998-2020)



Mortality rate by state (2020)



7.2 Geographical disaggregation of environmental indicators and targeting areas for interventions.

6.1.1. "Proportion of population using safely managed drinking water services"	6.2.1 "Proportion of population using (a) safely managed sanitation services and	3.9.2 **Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene. Mexico**
		
Fuente: ENIGH, 2020.	Fuente: CPV 2020.	Fuente: Estadísticas Vitales. Registros de Mortalidad, 2020.

- ✓ In 2020 Mortality rates in Oaxaca y Chiapas have the national performance in 1998.