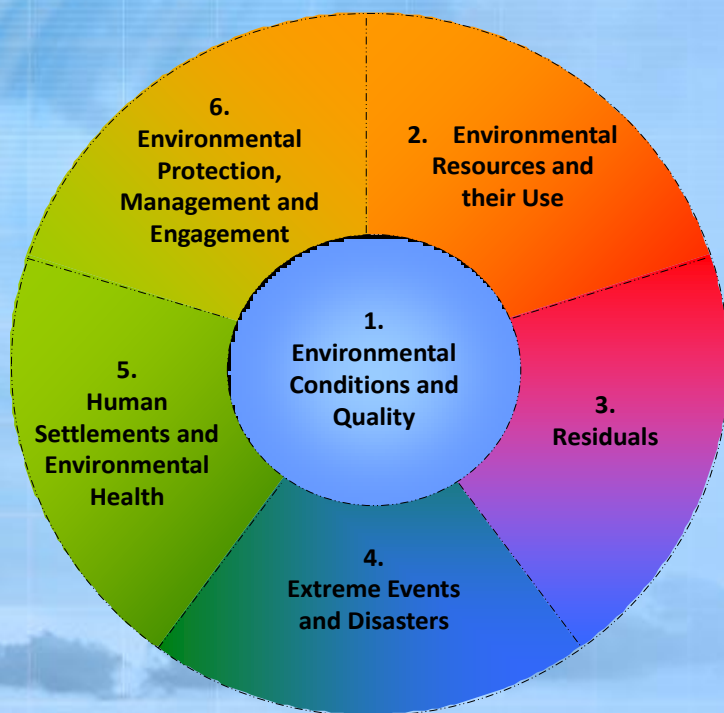
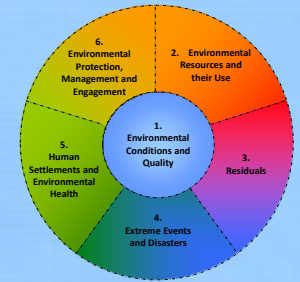


Components, sub-components and statistical topics of the FDES 2013

Component 3: Residuals



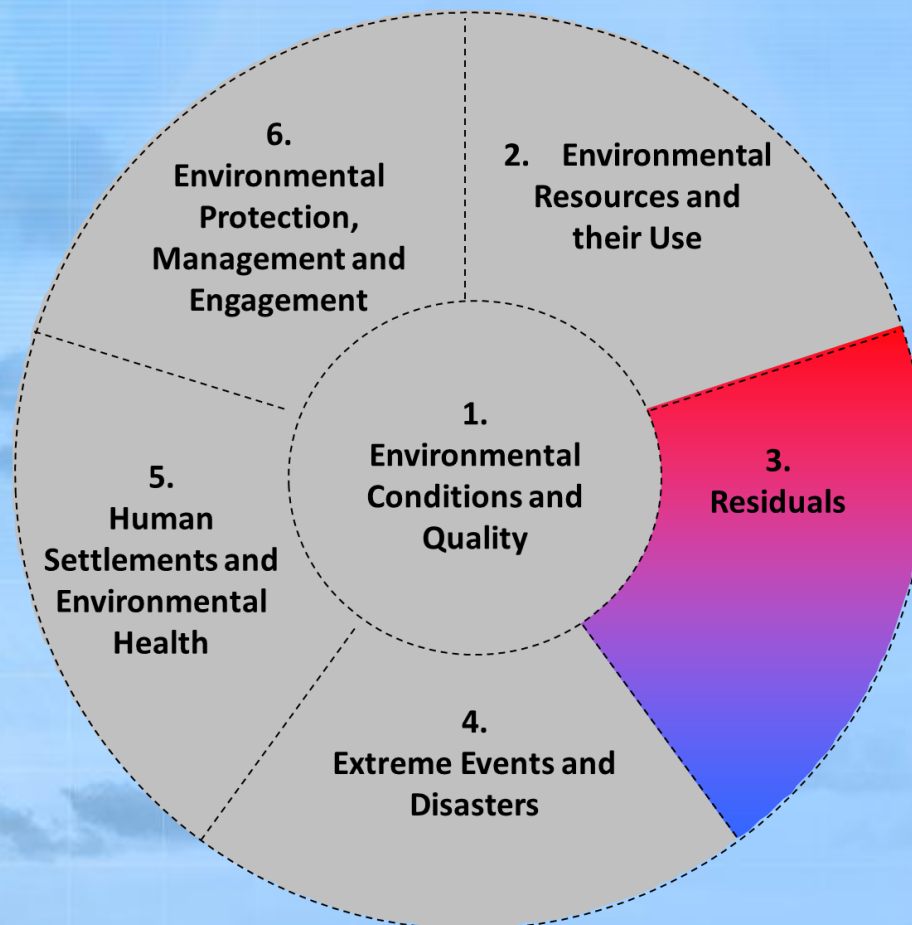
Workshop on Environment Statistics in support of the implementation of the Framework for the Development of Environment Statistics (FDES 2013) (Lomé, Togo, 19-23 October 2015)



- This presentation has been elaborated by the Environment Statistics Section of the United Nations Statistics Division.
- It is based on Chapter 3 of the Framework for the Development of Environment Statistics (FDES 2013).



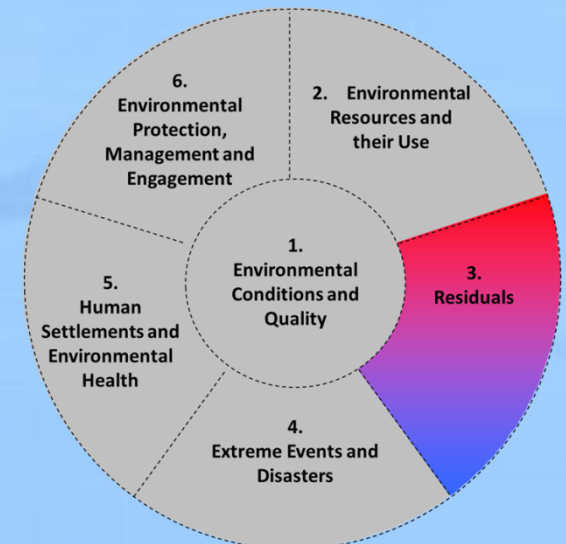
Component 3: Residuals





Contents of Component 3: Residuals

- ❖ Contains statistics on the amount and characteristics of residuals generated by human production and consumption processes, their management, and their final release to the environment.
- ❖ Residuals:
 - are flows of solid, liquid and gaseous materials, and energy, that are discarded, discharged or emitted by establishments and households through processes of production, consumption or accumulation.
 - may be discarded, discharged or emitted directly to the environment or be captured, collected, treated, recycled or reused.





Component 3: Residuals

- ❖ The FDES covers the main groups of residuals that are emissions of substances to air, water or soil, wastewater and waste, and the release of residuals from the application of chemical substances.
- ❖ Generally, emissions are analysed by the type of receiving environment (air, water or soil) and type of substance.
- ❖ Statistics on residuals must be broken down according to the economic activity that generated them, based on ISIC.



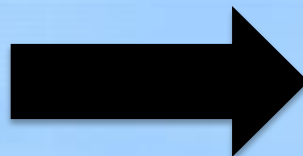
Component 3: Overview

Component 3 Residuals	Sub-Component 3.1 Emissions to Air (3 topics, 20 statistics)	Topic 3.1.1: Emissions of greenhouse gases Topic 3.1.2: Consumption of ozone depleting substances Topic 3.1.3: Emissions of other substances
	Sub-Component 3.2 Generation and Management of Wastewater (3 topics, 11 statistics)	Topic 3.2.1: Generation and pollutant content of wastewater Topic 3.2.2: Collection and treatment of wastewater Topic 3.2.3: Discharge of wastewater to the environment
	Sub-Component 3.3 Generation and Management of Waste (2 topics, 20 statistics)	Topic 3.3.1: Generation of waste Topic 3.3.2: Management of waste
	Sub-Component 3.4 Release of Chemical Substances (1 topic, 7 statistics)	Topic 3.4.1: Release of chemical substances



Sub-Component 3.1: Emissions to Air

Sub-Component 3.1
Emissions to Air



Topic 3.1.1:

Emissions of greenhouse gases

Topic 3.1.2:

Consumption of ozone depleting substances

Topic 3.1.3:

Emissions of other substances





Sub-Component 3.1: Emissions to Air

- ❖ The FDES focuses on the emission of pollutants from anthropogenic factors that are socio-economic processes. The statistical description of such emissions covers their sources and the quantities emitted by substances.
- ❖ The groups of different chemicals relevant to statistics on emissions to air include: sulphur compounds; oxidized nitrogen compounds and oxidants; reduced nitrogen compounds; inorganic carbon compounds; halogen and inorganic halogen compounds; volatile organic compounds; heavy metals; and different fractions of particulate matter (PM).



Sub-Component 3.1: Emissions to Air

Topic 3.1.1: Emissions of greenhouse gases

- ❖ GHG emission inventories are compiled based on the guidelines developed by the IPCC, under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC).
- ❖ The source categories of GHG emissions are based on processes.
- ❖ The most important direct GHGs are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O).
- ❖ The most important indirect GHGs are sulphur dioxide (SO₂), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NM-VOCs).
- ❖ While the IPCC guidelines prescribe process-based source categories, sources must be broken down by economic activity based on ISIC, to ensure consistency with and linkages to economic statistics.

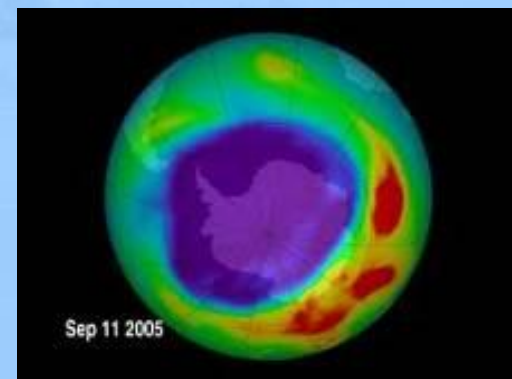




Sub-Component 3.1: Emissions to Air

Topic 3.1.2: Consumption of ozone depleting substances (ODS)

- ❖ ODS is another important category of emissions that is actively monitored by the Montreal Protocol.
- ❖ Reported statistics worldwide have shown this protocol to be very effective in phasing out the use of these substances.
- ❖ Examples of ODS include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), halons, methyl chloroform, carbon tetrachloride and methyl bromide.
- ❖ However, as emissions of these substances are difficult to measure directly, countries report on the apparent consumption [production +imports-exports] of ODS.

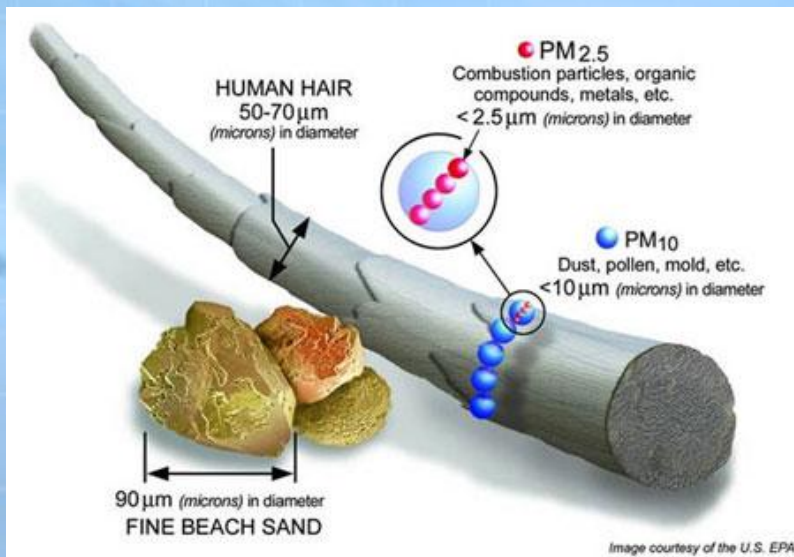




Sub-Component 3.1: Emissions to Air

Topic 3.1.3: Emissions of other substances

- ❖ Other environmentally important polluting substances are emitted to air beyond GHGs and ODS. The most important ones are:
 - different fractions of particulate matter (**PM_{2.5}**, **PM₁₀**).
 - heavy metals and other substances linked to environmental and health problems.
- ❖ Countries may wish to measure or estimate a variety of other emissions, based on national circumstances and priorities.

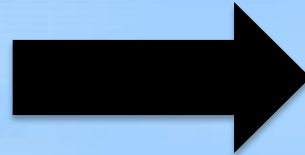




Sub-Component 3.2: Generation and Management of Wastewater

Sub-Component 3.2

Generation and Management of Wastewater



Topic 3.2.1

Generation and pollutant content of wastewater

Topic 3.2.2

Collection and treatment of wastewater

Topic 3.2.3

Discharge of wastewater to the environment





Sub-Component 3.2: Generation and Management of Wastewater

- ❖ Contains statistics on the generation, management and discharge of wastewater, as well as the pollutant content of wastewater (emissions of substances to water).
- ❖ Other policy relevant wastewater statistics include a disaggregation by economic activity of responsibility for its generation, whether the wastewater is being treated, and what is being emitted to the country's water bodies.





Sub-Component 3.2: Generation and Management of Wastewater

Topic 3.2.1: Generation and pollutant content of wastewater

- ❖ Includes statistics on the volume of water that is no longer required and is thus discarded by the user and statistics on the amount of pollutants contained in wastewater (emissions to water) before any collection or treatment.
- ❖ Statistics on the generation of wastewater and emissions to water should be broken down by the economic activity and households that generate them.
- ❖ Wastewater generation is usually estimated based on the volume of water used.
- ❖ The pollutant content of wastewater (emissions to water) can usually be obtained from monitoring at the place of generation or from estimates based on technological parameters.



Sub-Component 3.2: Generation and Management of Wastewater

Topic 3.2.2: Collection and treatment of wastewater

- ❖ Wastewater may be discharged directly to the environment by the generator or may be collected in sewerage systems and treated in wastewater treatment plants.
- ❖ Include statistics describing:
 - (i) volumes of wastewater collected and transported to its final place of discharge or treatment facilities;
 - (ii) volume of wastewater treated by type of treatment (primary, secondary and tertiary);
 - (iii) physical infrastructure related to wastewater collection and treatment (e.g., number of treatment plants, capacities of plants);
 - (iv) pollutant content extracted in the treatment facilities; and
 - (v) other relevant information.
- ❖ Establishments that collect and treat wastewater are grouped under ISIC Rev.4, Section E, Division 37 Sewerage.



Sub-Component 3.2: Generation and Management of Wastewater

Topic 3.2.3: Discharge of wastewater to the environment

- ❖ This topic captures information at the stage of final discharge of wastewater to the environment. It includes:
 - (i) volume of wastewater discharged to the environment without treatment,
 - (ii) volume of wastewater discharged to the environment after treatment, by type of treatment (primary, secondary and tertiary) and type of treatment facility (public, private, municipal, industrial), and
 - (iii) effluent quality.

- ❖ Sources of data:
 - Statistics on the volume of wastewater discharged after treatment can be obtained from administrative records of the treatment plants.
 - Statistics on the volume of wastewater released without treatment can be obtained from economic units and records of sewerage companies or estimated on the basis of water use. The volume of discharged wastewater should also be disaggregated by recipient water body.



Sub-Component 3.2: Generation and Management of Wastewater

Topic 3.2.3: Discharge of wastewater to the environment

Emissions of pollutants to water bodies:

- ❖ In addition to the volume of wastewater returned to the environment, it is also important to measure or estimate the volumes of different pollutants that are emitted with the wastewater or otherwise released to water bodies.
- ❖ Emissions to water are the substances released to water resources by establishments and households as a result of production, consumption and accumulation processes.
- ❖ Statistics on emissions to water should be disaggregated according to the releasing economic activities and should cover the most important substances.





Sub-Component 3.3: Generation and Management of Waste

Sub-Component 3.3

**Generation and
Management of Waste**



Topic 3.3.1:

Generation of waste

Topic 3.3.2:

Management of waste





Sub-Component 3.3: Generation and Management of Waste

- ❖ Includes statistics on the amount and characteristics of waste, defined as discarded material for which the owner or user has no further use, generated by human activities in the course of production and consumption processes.
- ❖ Relevant statistics cover the amount of waste generated by different sources that are economic activities (by ISIC categories) and households.
- ❖ Policy makers, particularly local governments, require statistics on waste in order to assess how its generation changes over time.



Sub-Component 3.3: Generation and Management of Waste

Topic 3.3.1: Generation of waste

- ❖ This topic includes statistics describing the amount of waste generated before any collection or treatment, by waste type, and by generator (by economic activity (by ISIC) and households).
- ❖ The waste lists that countries and international organizations use for waste statistics are usually based either on the generating process or the material content of the waste, or on the combination of the two.
- ❖ Statistics on waste generation are usually estimated from the records of the economic units engaged in waste collection, treatment and disposal.
- ❖ Hazardous waste is a special group of waste that, due to its toxic or other hazardous character, requires special management and is controlled by law in many countries.
- ❖ The Basel Convention, a multilateral environmental agreement, focuses on the control of transboundary movements of hazardous waste and establishes criteria for the environmentally sound management of such waste.
- ❖ Reporting needs under this convention include the generation of hazardous waste, as well as the imports and exports of hazardous waste covered in Topic 3.3.2: Management of Waste.



Sub-Component 3.3: Generation and Management of Waste

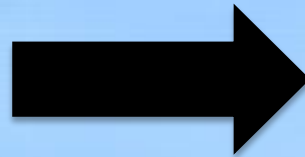
Topic 3.3.2: Management of waste

- ❖ Includes statistics on:
 - (i) the amount of waste collected and transported to treatment facilities or final disposal;
 - (ii) the amount of waste treated and disposed of by type of treatment and disposal (e.g., reuse, recycling, composting, incineration, landfilling, other);
 - (iii) the physical infrastructure for waste treatment and disposal, including the number and capacity of treatment and disposal plants; and
 - (iv) other relevant information.



Sub-Component 3.4: Release of Chemical Substances

Sub-Component 3.4
Release of Chemical
Substances



Topic 3.4.1:
Release of chemical
substances





Sub-Component 3.4: Release of Chemical Substances

Topic 3.4.1: Release of Chemical Substances

- ❖ This topic deals with chemical fertilizers to enrich soils and pesticide use to protect plants and animals from disease. Other chemicals accelerate the growth of biota and preserve and enhance the quality, size and appearance of biological products.
- ❖ Environmental effects are generated by the diffusion of chemicals through cycling systems and build-up of contaminants in water, land and living organisms (through the food chain).
- ❖ Statistics under this topic include the amount of natural and chemical fertilizers, pesticides and other chemicals (hormones and pellets) used by type of active ingredients (see also Sub-component 2.5: Biological Resources), the area under application and the method employed.
- ❖ These statistics serve as a proxy or the basis for estimating the chemicals that remain in the environment and affect environmental quality.



Sub-Component 3.4: Release of Chemical Substances

Topic 3.4.1: Release of Chemical Substances

Multilateral Environmental Agreements (MEAs):

- ❖ The Stockholm Convention on Persistent Organic Pollutants (POPs) aims to eliminate or restrict the production and use of POPs. POPs are defined by the convention as “chemical substances that persist in the environment, bio-accumulate through the food web, and pose a risk of causing adverse effects to human health and the environment”.
- ❖ The Stockholm Convention identified an initial 12 chemicals or chemical groups for priority action, including aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene, PCBs, polychlorinated dioxins and polychlorinated furans.





Questions, comments for Component 3?





Thank you for your attention!

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