



Third Meeting of the Expert Group on
Disaster-related Statistics in Asia and the Pacific
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*Session 5: Towards a regional guideline for the production of
statistics on the occurrence and immediate, direct impact of disasters*

Introduction to development of a provisional guideline

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What do we need to produce statistics?

- Statistics = **summaries** of millions of data
- **Many types of statistics**, for many purposes (research, QA/QC in industry, market studies for business, polls for politicians, risk assessment for insurance...)
- **“Official statistics”** to inform policy makers:
 - Produced by NSO in close relation to operational Ministries or Agencies
 - Some consistency across domains: e.g. **Classification** of industries, commodities, **definition** of households and enterprises (registers) ... to allow cross analysis (e.g. morbidity by income groups, impacts of disaster on agriculture)
 - Statistical total can be used for **indicators**: e.g. GDP, Health Expenditure/GDP, GDP/Capita
 - Standardised statistics allow comparisons between countries, regions, in time (trends...)

Example of Tourism

Data collected by Ministry of Tourism

→ Database

→ Some data forwarded to Stat. Office

→ Compilation of statistics and accounts following agreed frameworks →





Sketching a statistical framework (1)

Tourism Statistics

- Definition of tourists vs. visitors
- Classification of tourists by origin
- Classification of tourists by purpose
- Classification of industries & assets
- Variables to measure

Disaster Related Statistics

- Definition of a disaster
- Classification of disasters by types
- Classification of impacts by types
- Classification of industries & assets
- Variables to measure

Physical

Monetary

- Valuation of tourism services
- Valuation of tourism facilities
- Investment in tourism infrastructures

- Valuation of direct impacts on human (costs)
- Valuation of direct impacts on activities & assets
- Risk management expenditures



Sketching a statistical framework (2)

Physical

Tourism Statistics

- Definition of tourists vs. visitors
 - **Tourists vs. Visitors:** A visitor is a traveller taking a trip to a main destination outside his/her usual environment, for less than a year, for any main purpose (business, leisure or other personal purpose) other than to be employed
 - A visitor (domestic, inbound or outbound) is classified as a tourist if his/her **trip includes an overnight stay**
- Classification of tourists by origin
 - Domestic / International
- Classification of tourists by purpose
 - Purpose: Business / Leisure
- Classification of industries & assets
 - Accommodation, food & beverage, Recreation, culture and sporting activities, passengers transportation, “tourism packages”...
 - Hotels, restaurants,
- Variables to measure
 - Number of tourists, nights in hotels/ duration of stay, travels, origin of visitors
 - Visits (Recreation, culture and sporting activities)
 - Number of hotels, of beds

Disaster Related Statistics

- Definition of a disaster
 - **Impact:** direct socio-economic impacts of hazards
 - **Discrete:** the occurrence of the disaster has a beginning and an ending; direct impacts are triggered during the occurrence period
 - Indirect impacts are not recorded in the core DRSF
- Classification of disasters by types of hazards
 - Bridged to IRDR classification,
- Classification of impacts by disaster
 - Bridged to DesInventar...
- Classification of industries & assets
 - Economic sectors affected by disasters
 - Assets: Houses, buildings, Hospitals, Education facilities, Roads, Crops & Woods (DesInventar)...
- Variables to measure
 - Occurrences
 - Extent of disaster
 - Direct impacts on population, on assets



Sketching a statistical framework (3)

Monetary

Tourism Statistics

- Valuation of tourism services
 - Hotels, restaurants, “tourism product”...
 - Passengers transportation...
- Valuation of tourism facilities
- Investment in tourism infrastructures

Disaster Related Statistics

- Valuation of direct impacts on human (costs)
 - During the occurrence time
 - Triggered by direct impacts (medical...)
- Valuation of direct impacts on activities & assets
 - During the occurrence time (loss of asset)
 - Triggered by direct impacts (loss of growing crop...)
- Risk management expenditures



A DRAFT Annotated Outline: Basic Range of Disaster-related Statistics for Asia and Pacific

- Draft prepared by the ESCAP Secretariat, based on comments and discussion on documents presented to the Expert Group at its previous meetings.
- Takes into account previous discussion of the EG and a survey to countries on their current practices
- This document was prepared for discussion at the 3rd Meeting of the Asia and Pacific Expert Group on Disaster-related Statistics;
- a revised Outline and complete draft for the Guideline will be completed following the discussion by the Expert Group.



A DRAFT Annotated Outline: Basic Range of Disaster-related Statistics for Asia and Pacific

1. Scope and Rationale for Guideline
 - Alignment with Post-2015 Framework for Disaster Risk Reduction
 - Alignment with sustainable development goals
2. Defining Disaster Occurrences for Statistics Purposes
3. Immediate/direct impacts of disasters
4. Time and geography scales of a discrete disaster occurrence
5. Integration of disaster statistics with national and international policy frameworks
6. Way forward, supplementary components...



Chapter 1: Rationale for Scope of Guideline

- Sendai Framework:
 1. Reduce global disaster mortality
 2. Reduce the number of affected people
 3. Reduce direct disaster economic loss
 4. Reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities
 5. Increase the number of countries with national and local disaster risk reduction strategies
 6. enhance international cooperation
 7. Increase the availability of and access to multi-hazard early warning systems and disaster risk information
- SDG Target 11.5 calls for making cities and human settlements inclusive, safe, resilient and sustainable

“By 2030 significantly reduce the number of deaths and the number of affected people and decrease the economic losses relative to GDP caused by disasters, including water-related disasters, with the focus on protecting the poor and people in vulnerable situations”

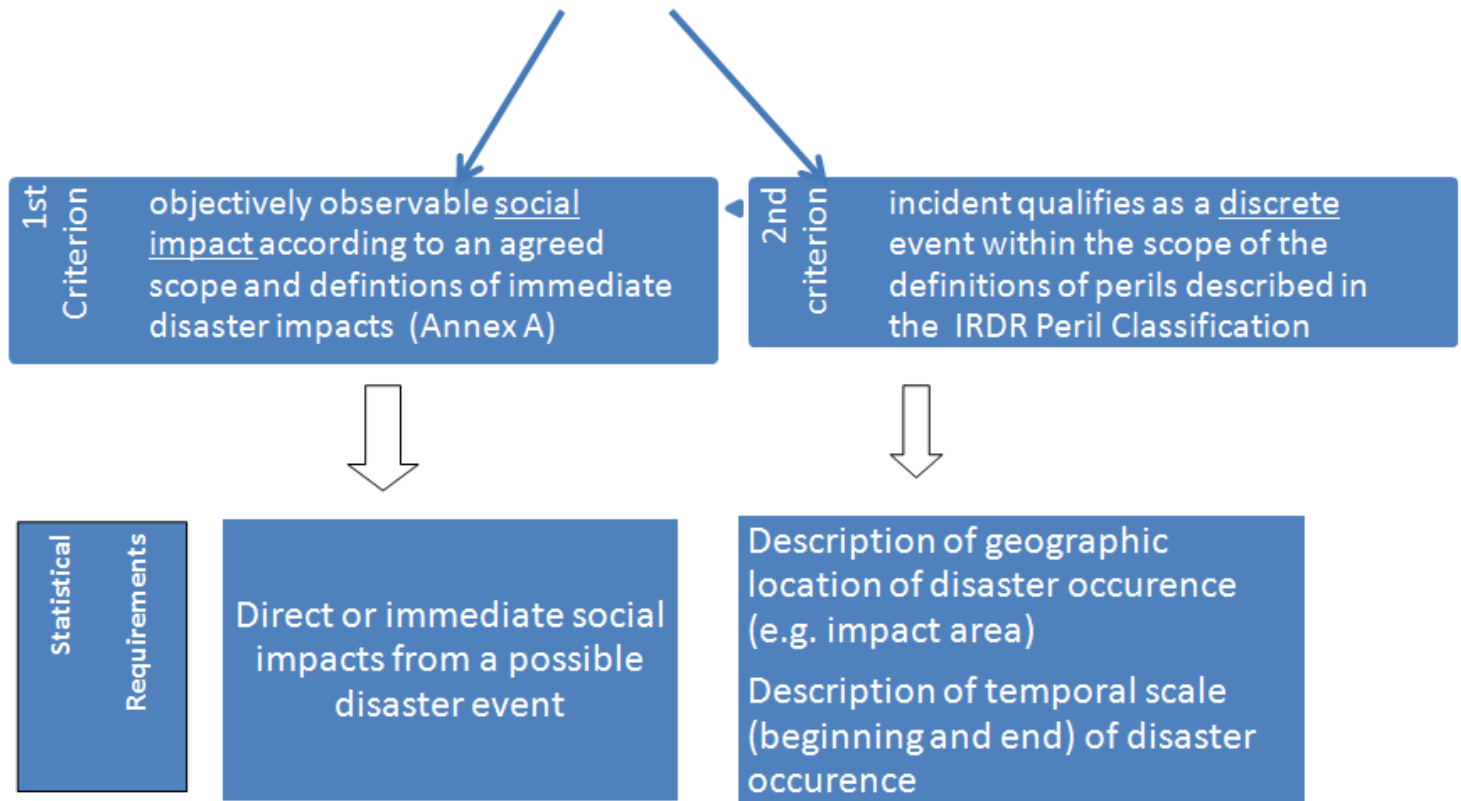
➔ The DR Statistics framework is based on occurrences and direct (immediate) impacts as agreed by the DRS EG in Sendai 2014



Chapter 2: Defining Disaster Occurrences for Statistics

Purposes: Proposed criteria and data requirements for a statistical definition for disaster occurrence

Disaster: “a serious disruption of the functioning of society causing widespread human material or environmental losses which exceed the ability of the affected society to cope using only its own resources”





To be considered a disaster occurrence, an observed event or incident must simultaneously meet two criteria:

- The first criterion is a **threshold of social impact**. This is an objectively observable social impact according to an agreed scope and definition of immediate disaster impacts. A social impact criterion is already commonly utilized in many national and international databases on disaster losses or damage and the concept is consistent with a distinction used in disaster risk reduction literature between use of the terms disaster occurrences and hazards. The UNISDR definition cited above already implies an impact threshold ("exceeding the ability of the affected society to cope"), though it is has not been precisely defined for statistical purposes;
- The second criterion is that the **incident be discrete**, i. e. should have specific date or time of beginning and end (i.e. a discrete time period) and, a (discrete, mappable ?) geographic location (geographic area of impact)

Y / N



Defining DRS Framework Concepts

[A] Beginning of the generation of direct impacts: **disaster occurrence**

Beginning [A]

End [B]

[B] Ending of the generation of direct impacts: **end of the emergency period**

Recorded losses from direct/immediate impacts

Impacts generated by [C] Sudden hazards & [D] Slow risks

Sudden hazard [C]

Flood impact
Earthquake impact
Fire impact
...

Direct impacts triggered by the disaster [E]

[E] Losses due to direct impacts (loss of growing crops) & medical costs

e.g. Famine

Occurrence period of disaster (emergency)

Indirect impacts subsequent to the disaster [F]

[F] Losses from indirect impacts (e.g. due to assets degradation) They are not recorded in Core DRS

Slow developing catastrophic risk (e.g. drought ...) [D]

Time axis

t-n

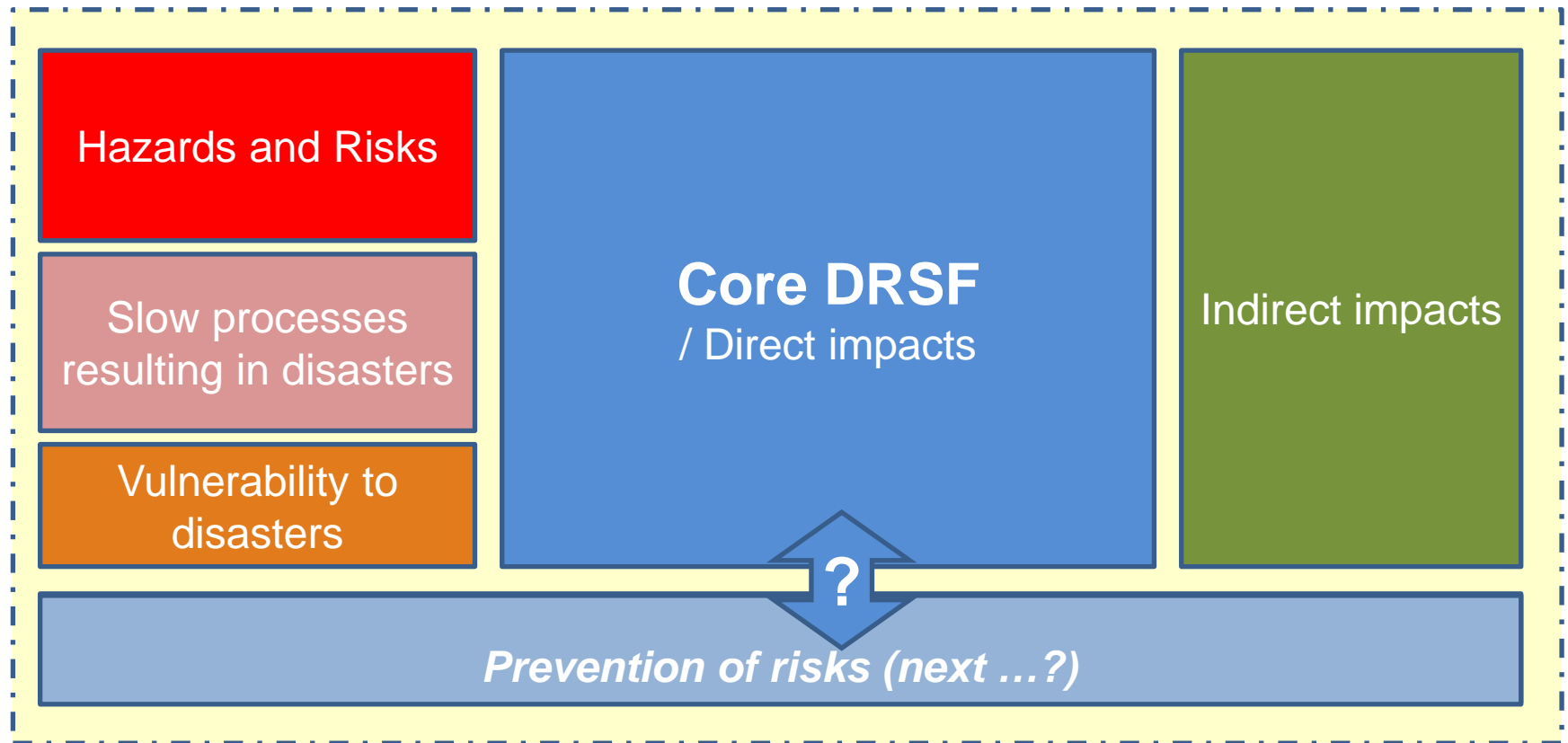
t0

t1

t+p



« Complete » Disaster-Related Statistics Framework





Classification of disasters

- The first principle of a disaster related statistics database is to assign to each incident reported to the agency with a unique identifier (e.g. numeric code), which can then be linked via a relational database structure to the available information on location, temporal scale, and observed immediate or direct impacts of the incident.
- Relative importance of classification issues: examples from the survey
- Classifying disaster occurrences by disaster types: new Disasters classification, bridged to the IRDR Peril classification. ???
- Suggested bottom-up approach??? YES if national classifications are provided shortly...
- EG next work: check other references like WMO (wind...), IPCC (forest fires...), UNCCD (droughts/famines)

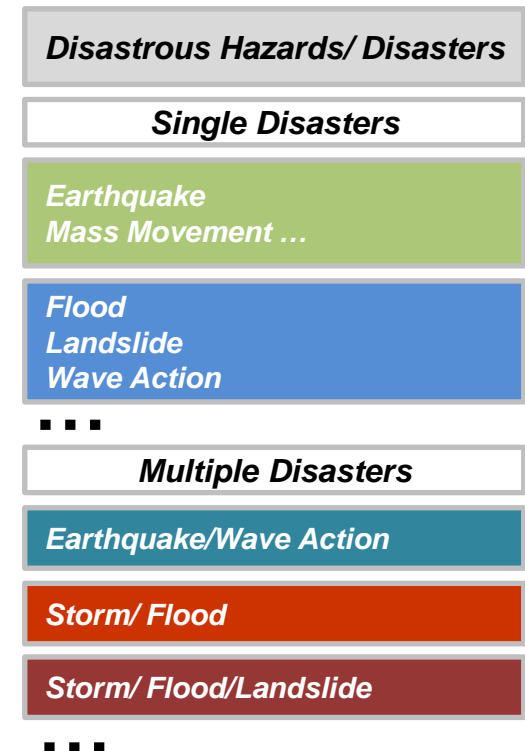


Hazards: IRDR Perils classification

Main Event	Family
Earthquake Mass Movement Volcanic Activity	Geophysical
Flood Landslide Wave Action	Hydrological
Convective Storm Extratropical Storm Extreme Temperature Fog Tropical Cyclone	Meteorological
Drought Glacial Lake Outburst Wildfire	Climatological
Animal Incident Disease Insect Infestation	Biological
Impact Space Weather	Extraterrestrial

IRDR « Main Event » is a classification by nature of hazards. Should we **add a new grouping by « Disastrous hazards » or « Disasters »** when Events are closely related in time (overlap of emergency periods) ?

Discussion/Questions to the EG:
is there sufficient consensus on higher classification levels of disaster occurrence?





Chapter 3: Direct (or Immediate) impacts of disasters

- Direct (or immediate impacts): what happens during the period of the disaster; 5 categories of damages or losses, of which (i) to (iv) are direct or immediate, and (v) indirect
 - (i) observed damages or losses to assets in volume terms (e.g. number of building or road destructions),
 - (ii) observed damages to humans (deaths, wounds...)
 - (iii) monetary valuation of the observed losses to assets (and to in-process production)
 - (iv) monetary costs of direct damages to humans
 - (v) *future impacts to economic activity (e.g. future production or consumption) beyond recorded direct losses or damages.*
- Classification(s) of impacts : new draft classification(s) bridged to DesInventar lists...???



Discussion/Questions to the EG:

- Direct/ indirect impacts distinction
 - Direct: immediate humans and material effects
 - Indirect: impacts subsequent to the occurrence of the disaster
 - Triggering factor rule: all direct impacts are **generated during the occurrence of the disaster** Y/N ???
 - Included: immediate losses (persons, assets...) + losses of growing crops + medical costs...
 - Not included: indirect losses from damages to economic assets , including impacts of soil losses on future crops → indirect
- Distinction between SDCR and disaster occurrence
 - **In DRSF, record effect of SDCR** in event of a disaster occurrence, but not information on the SDCR (e.g. causes/factors) Y/N ???
- Additional question: What about degradation of the environment (ecosystem functions/ loss of biodiversity) ?
 - Loss of future services... → Direct (as for loss of economic asset) or Indirect impact ???

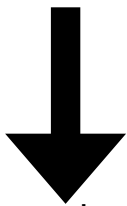


Categories/classifications for direct impacts

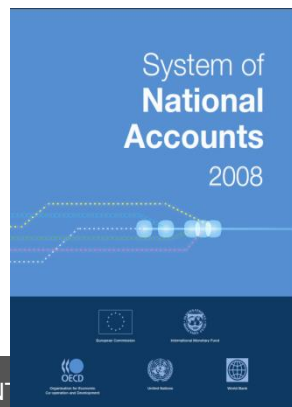
- Human: Survey of practices/e.g. DesInventar →
- Physical/material
e.g. DesInventar →
- Monetary: Human & Material

Houses damaged
Houses destroyed
Crops and woods (Hectares)
Livestock
Educational centres
Hospitals
Roads Affected (Mts)
Other losses

Deaths
Missing
Injured, sick
Evacuated
Relocated
Affected
Victims



Correspondence to the SNA 2008 ????
May help...



Next:

1. Integrate results from EG discussion, revise...
2. Bridge to SNA classification of assets
3. Add impacts to the environment ???

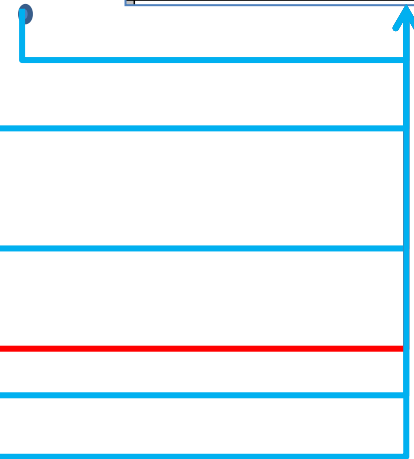


Correspondence between SNA & DesInventar ASSET classes

Non-financial assets

- **Fixed assets** (*Produced assets*)
 - Dwellings
 - Other buildings and structures
 - Machinery and equipment
 - Weapons systems
 - Cultivated biological resources
(*yielding repeat products; animal resources, fruit/nut trees, crops, vines...*)
- **Inventories** (*Produced assets, for use at a later date*)
- **Valuables** (*Produced assets, not for production, held as stores of value over time*)
- **Natural resources** (*Non-produced assets*)
 - Land (*incl. Soil*)
 - Mineral and energy reserves
 - Non-cultivated biological resources
 - Water resources
 - Other natural resources

Houses damaged
Houses destroyed
Crops and woods (Hectares)
Livestock
Educational centres
Hospitals
Roads Affected (Mts)
Other losses





Questions to EG

- Agree on scope of direct impacts and related losses/costs ?
- Agree on an impact threshold as in... 10 dead, 100 wounded etc...? Or/and “exceed the ability of the affected society to cope using only its own resources”... Surface affected? Consensus on regional threshold ???
- How to assess the size/ importance of direct impacts:
 - Area affected...
 - Population losses (in % of total pop?)
 - Losses of physical assets...
 - Monetary losses, costs...
 - ?? Composite index of severity ???
- Task ???: Propose classification of direct impacts compatible to / bridged with current classifications (DesInventar etc...). Be explicit on definition of deaths...
- Task ???: Propose a classification of assets based on SNA lev. 1, with details capturing priority on key assets (e.g. hospitals, educational facilities, transport infrastructure, water and energy supply facilities...)



Chapter 4: Time and geography scales of a discrete disaster occurrence

- Time:
 - Practical definition of disaster occurrence duration (beginning and ending); reference to the emergency period?
 - Occurrence recorded at the beginning; meta data (ID, date, type...)
 - Beginning date related to the occurrence of impact. What about the date of hazard? Case of sudden hazards/ case of SDCR...
 - Ending date defined by whom?
- Geography:
 - Data collection and management, geocoding, mapping, GIS...
 - Issue of multiple zonings
 - Issue of possible double counting of occurrences through boundaries



Time reference, scales of a discrete disaster occurrence

Discussion/ Questions to the EG

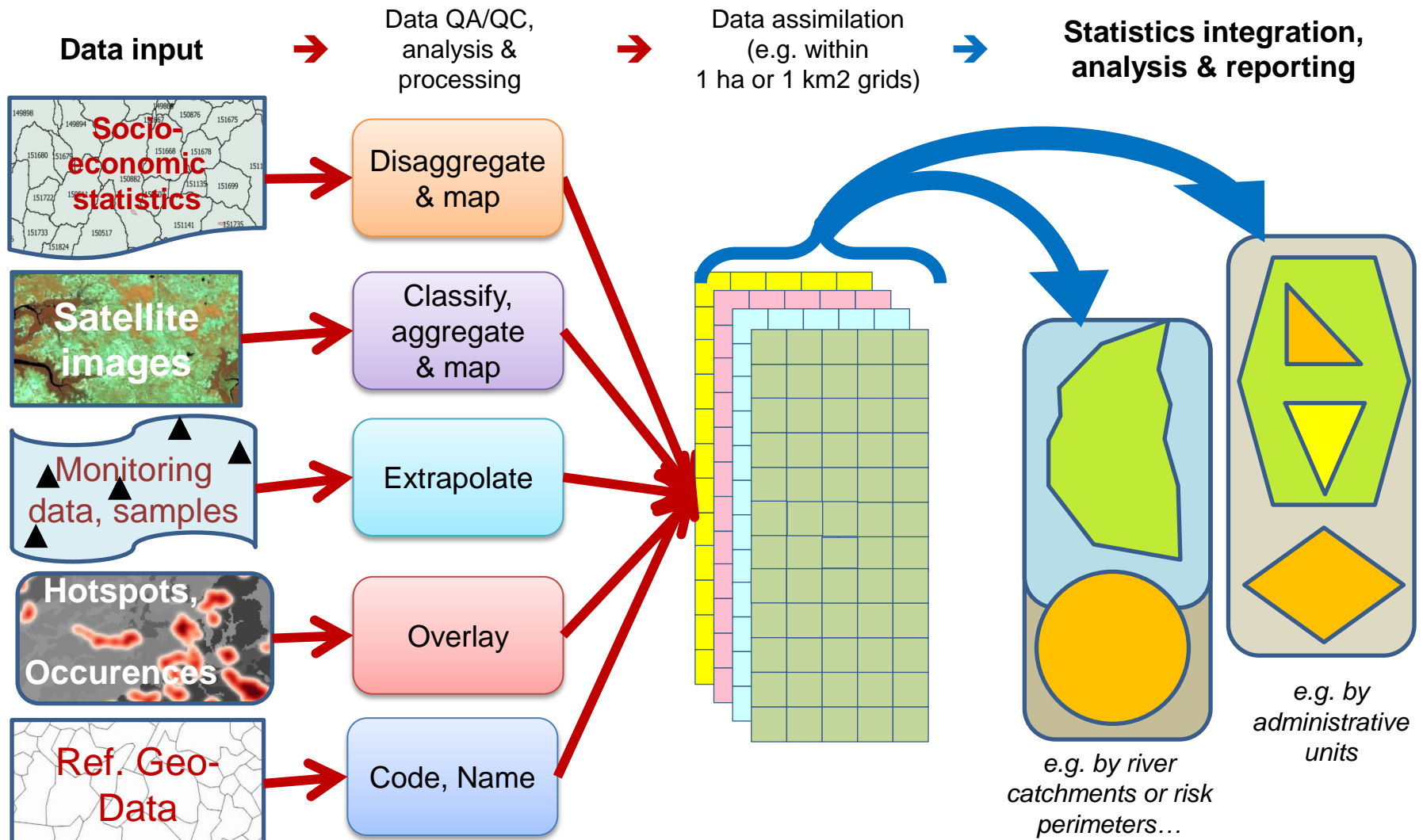
- Practical definition of disaster occurrence duration; reference to the emergency period?
- Occurrence recorded at the beginning; meta data (ID, date, type...)
- Ending date defined by whom?
- Beginning date related to the occurrence of impact. What about date of hazard? Case of sudden hazards/ case of SDCR...



Geographical reference, scales, data

- Use GIS for data collection and assimilation???
- Geo-coding / mapping of hazards and impacts occurrence
- Unit of measurement: km² of occurrence → avoid double-counting through boundaries
- Pooling some information/ cloud computing (e.g use of satellite images)???
- Typical geo layers for disasters:
 - Disaster protection perimeters, risk areas
 - People access to early warning
 - Typical zonings: catchments, mountains, coastal zones...
 - Population by actual location (census data resampled to land cover maps of urban settlement)
 - More land cover (as background information for statistical analysis...)

Main data flows to compile DRS with GIS





Questions to EG/ GIS

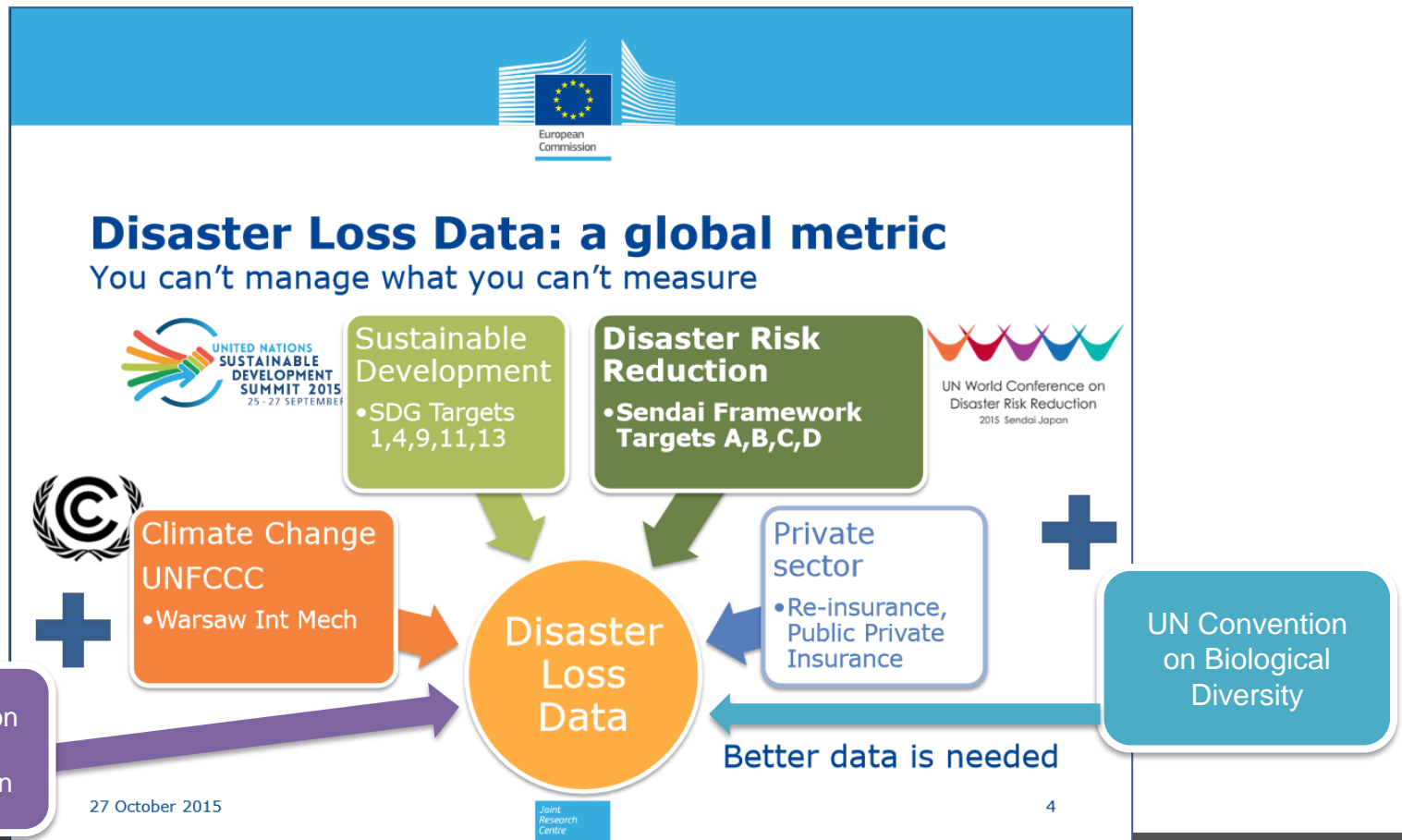
- How far do we go in that way considering:
 - The intrinsic interest of GIS approach for DRSF
 - DMA skills in GIS data management
 - Requirements to NSO to engage in « data revolution » to fill statistical gaps, e.g. in agriculture statistics
 - Use of international datasets as second best in absence of national data?



Chapter 5 Integration of disaster statistics with national and international policy frameworks

Approach alongside this slide:

Source: De Groeve, Sixth EU Loss Data Workshop, JRC, Ispra, Italy 21-22 October 2015 (with ref. to SFDRR)





What the DRSF compendium could look like...

Policy driven: Sendai Framework and SDGs (+ Rio Conventions)

Part 1: The DRSF Core Statistics

Part 2: Additional tables (optional?)

Part 3: Indicators (Sendai Framework, SDGs, ...)

Part 4: Maps



What the DRSF compendium could look like...

Part 1: The DRSF Core Statistics

1. **Disasters by DRSF Types** (DDT = DRSF classification, single & multiple events)
 - A. **Count of disaster occurrences**
 1. By Geographical Reporting Units (GRU) : Administrative regions/ River sub-catchments/ Geographic zones (Coastal areas, Mountain areas, etc...) NB: the tables includes a column to eliminate multiple counting s from totals.
 2. Matrix of correspondence DST x IRDS Peril types
 - B. **Area of disaster occurrences** (in km²)
 1. By GRU
 2. By land cover types, LCEU (SEEA-EEA/ENCA classification of Land Cover Ecosystem Units – it includes coastal marine ecosystems)
 3. By ecosystem land units, ELU (USGS classification)
 - C. **Area of disaster periods** (in km², each full or part period is accounted for 1 - NB: need of a column to eliminate multiple recordings in case of aggregation over several years)
 1. By GRU
 2. By land cover types, LCEU
 3. By ecosystem land units, ELU (USGS classification)



What the DRSF compendium could look like...

Part 1: The DRSF Core Statistics (cont'd)

2. Impacts by DRSF Types (IDT) and DDT, in physical units

- A. Human impacts during the occurrence period** (dead/ missing/ injured/ ill/ evacuated-relocated/ otherwise affected...) , numbers, by DDT
 - 1. By GRU
 - 2. By LCEU or by SELU (socio-ecosystem units, urban/ rural context...)
- B. Human direct impacts subsequent to the occurrence period** (dead/ missing/ injured/ ill/ evacuated-relocated/ otherwise affected...) , numbers, by DDT
 - 1. By GRU
- C. Economic direct impacts** (in various physical units)
 - 1. Economic assets (by GRU)
 - a. DRSF classification of economic assets to be produced (derived from SNA non-financial assets, key infrastructures aggregated) DEA
 - 2. Economic assets, detailed table of key infrastructures (by GRU)
 - a. DRSF classification of Key Infrastructures to be defined (hospitals, educational, energy facilities, roads, bridges...) DKI
 - 3. Current production (by GRU)
 - a. Key services (service units = number of beneficiaries deprived of the service) – classification to be defined DKS
 - b. Growing crop (tonnes of expected harvest)



What the DRSF compendium could look like...

Part 1: The DRSF Core Statistics (cont'd)

2. Impacts by DRSF Types (IDT) and DDT, in physical units

D. Environments direct impacts (impacts on ecosystem functions & biodiversity, impacts on water resources dead/ missing/ injured/ ill/ evacuated-relocated/ otherwise affected...), units: weighted hectares, weighted m³

1. By GRU
2. By LCEU or by SELU (socio-ecosystem units)
3. By ecosystem land units, ELU (USGS classification)

3. Economic Impacts by DRSF Types (IDT) and DDT, in money units

A. Human economic costs of direct impacts (rescue/ evacuation-relocation/ medical costs / loss of income/ other losses), by DDT, in money units

1. By GRU

B. Assets economic losses/ direct impacts (in money), DEA classification, in money units

1. Assets economic losses / DEA (by GRU)
 - a. At compensation cost
 - b. At replacement cost
2. Detailed table of losses of key infrastructures/ DEA/DKI (by GRU)
 - a. At replacement cost
3. Current production monetary losses (by GRU)
 - a. Key services (service units = number of beneficiaries deprived of the service) – **DKS** classification to be defined
 - b. Growing crop (tonnes of expected harvest)



What the DRSF compendium could look like...

Part 2: Additional tables (optional?)

1. Disaster prevention and monitoring/ tables in physical units

A. Population warning (by GRU)

1. Population warning : exposure to risks perimeters (by DDT), areas (km²)
2. Population warning : exposure to risks perimeters
3. People access to early warning (by DDT), number of people

B. Protection works and facilities (classification to be defined)

2. Disaster prevention and monitoring/ tables in money

A. Current expenditure

B. Investments

Part 3: Indicators (Sendai Framework, SDGs, ...)

A. Time series

B. International comparisons

Part 4: Maps

A. Thematic maps/ impacts

B. Thematic maps/ prevention

C. Background maps