GEO WEEK & MINISTERIAL SUMMIT 2023

Showcase

#TheEarthTalks
Leveraging big Earth data and exploring non-satellite data to enhance assessment on climate induced losses and damages

Tuesday 07.11.2023 8:00 GMT

Alexia Tsouni, National Observatory of Athens / IAASARS / BEYOND Center

Gensuo Jia, CAS Institute of Atmospheric Physics / CBAS/ China-GEO / GEO CC WG

Michele Melchiorri, Project Officer - Copernicus GHSL, European Commission - Joint Research Centre

Orestis Speyer, National Observatory of Athens (NOA)/ Greek GEO Office
Losses & Damages, a timely affair

In 2022, the Emergency Event Database EM-DAT recorded 387 natural hazards and disasters worldwide, resulting in the loss of 30,704 lives and affecting 185 million individuals. Economic losses totaled around US$223.8 billion. Heat waves caused over 16,000 excess deaths in Europe, while droughts affected 88.9 million people in Africa. Hurricane Ian single-handedly caused damage costing US$100 billion in the Americas. The human and economic impact of disasters was relatively higher in Africa, e.g., with 16.4% of the share of deaths compared to 3.8% in the previous two decades. It was relatively lower in Asia despite Asia experiencing some of the most destructive disasters in 2022.

Economic costs of weather-related disasters soars but early warnings save lives

https://reliefweb.int/report/world/2022-disasters-numbers
https://public.wmo.int/en/resources/atlas-of-mortality
# TheEarthTalks

## Losses & Damages, a countable affair?

### SENDAI FRAMEWORK
FOR DISASTER RISK REDUCTION 2015-2030

<table>
<thead>
<tr>
<th>A-1 (compound)</th>
<th>Number of deaths and missing persons attributed to disasters, per 100,000 population.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1 (compound)</td>
<td>Number of directly affected people attributed to disasters, per 100,000 population.</td>
</tr>
<tr>
<td>B-2</td>
<td>Number of injured or ill people attributed to disasters, per 100,000 population.</td>
</tr>
<tr>
<td>B-3</td>
<td>Number of people whose damaged dwellings were attributed to disasters.</td>
</tr>
<tr>
<td>B-4</td>
<td>Number of people whose destroyed dwellings were attributed to disasters.</td>
</tr>
<tr>
<td>B-5</td>
<td>Number of people whose livelihoods were disrupted or destroyed, attributed to disasters.</td>
</tr>
</tbody>
</table>

### Indicators

<table>
<thead>
<tr>
<th>C-1 (compound)</th>
<th>Direct economic loss attributed to disasters in relation to global gross domestic product.</th>
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</thead>
<tbody>
<tr>
<td>C-2</td>
<td>Direct agricultural loss attributed to disasters. Agriculture is understood to include the crops, livestock, fisheries, agriculture, aquaculture and forest sectors as well as associated facilities and infrastructure.</td>
</tr>
<tr>
<td>C-3</td>
<td>Direct economic loss to all other damaged or destroyed productive assets attributed to disasters. Productive assets would be disaggregated by economic sector, including services, according to standard international classifications. Countries would report against those economic sectors relevant to their economies. This would be described in the associated metadata.</td>
</tr>
<tr>
<td>C-4</td>
<td>Direct economic loss in the housing sector attributed to disasters. Data would be disaggregated according to damaged and destroyed dwellings.</td>
</tr>
<tr>
<td>C-5</td>
<td>Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters. The decision regarding those elements of critical infrastructure to be included in the calculation will be left to the Member States and described in the accompanying metadata. Protective infrastructure and green infrastructure should be included where relevant.</td>
</tr>
<tr>
<td>C-6</td>
<td>Direct economic loss to cultural heritage damaged or destroyed attributed to disasters.</td>
</tr>
</tbody>
</table>
Losses & Damages, an attributable affair?

The establishment of a Loss and Damage Fund was, for many, the highlight of COP 27 and the culmination of decades of pressure from climate-vulnerable developing countries. The fund aims to provide financial assistance to nations most vulnerable and impacted by the effects of climate change. While the historic decision was welcomed, this is but the first step, and success will depend on how quickly this fund gets off the ground. Representatives from 24 countries (Transitional Committee) will work together over the next year to decide what form the fund should take, which countries should contribute, and where and how the money should be distributed.


Losses & Damages, delineating the EO role

Big Earth data assessment of loss & damage

European state-of-the-art and in situ insights

Panel discussion and QA
Leveraging big Earth data and exploring non-satellite data to enhance assessment on climate induced losses and damages

Big Earth data assessment of loss & damage

Tuesday 07.11.2023 8:00GMT

Gensuo Jia
CAS Institute of Atmospheric Physics / CBAS/ China-GEO / GEO CC WG
Global polycrisis, climate change & extremes, loss & damage
CASEarth: Big Earth data science engineering Program
Empowered by digital Earth, data cloud, AI, open science
Facilitate monitoring, assessment, prediction
Slow and fast processes of ecosystem and social impacts
Big Earth data module on climate change **loss & damage**

**Slow process**, e.g. drought, ecosystem degradation and restoration

MIDI water deficit and disturbance index: rainfall + soil water + VPD + EVI

Climate extreme prediction & risks assessment over Africa & Asia

The up-to-date FY-3 monthly MIDI to release soon
Fast process: fire, flood, hurricane, heatwave

Heatwave hotspots and impacts in Africa

Nighttime heatwaves link to urban clusters

Urban population, water and energy footprint
Thank you!
jiong@tea.ac.cn
Leveraging big Earth data and exploring non-satellite data to enhance assessment on climate induced losses and damages

European state-of-the-art and in situ insights

Tuesday 07.11.2023 8:00GMT

Orestis Speyer
National Observatory of Athens/
Greek GEO Office
EEA: Annual EU-wide indicator with caveats

“Based on data from two separate sources (NatCatSERVICE and CATDAT), fatalities during the same period amounted to between 85,000 and 145,000.”

“During 1980-2020, losses amounted to between EUR 450-520 billion in the 32 EEA member countries. Between only one quarter and one third of these losses were insured.”

“Around 3% of all events are responsible for 60% of economic losses.”

As of October 2023: “No coherent mechanism is currently in place for countries to report losses.”

“Economic losses and fatalities from weather- and climate-related events in Europe” by the European Environment Agency.
Openness and harmonization ongoing

RDH: Modules on Risk, Vulnerability, **Losses and Damages**. Harmonization of data sources, Open-source methodologies for risk and vulnerability assessments.

2021 EU Strategy on Climate Adaptation *(more and better climate-related risk and losses data, central recording of this data from the public and private sector)*

Member States **reporting** (Sendai, EU Civil Protection)
Losses and Damages, back to (some) in situ basics

Inventory of L&D Databases

**InCASE**

**L&D Showcases**

**FFEM-DB** - Database of Flood Fatalities from the Euro-Mediterranean region: Research and Academia across Europe.

**DALIH** - Damage and Loss Inventory for Heritage: University of Porto in cooperation with the ICOMOS International Scientific Committee on Risk Preparedness.

Forest fire authoritative data: per event by delegated entities in the Mediterranean countries.
FFEM-DB, from bulk to profiling the circumstances

Coordinates, description, socio-economic profile, contributing circumstances. What is the driver of flood fatalities?

Open, scalable, well structured, gap/duplication estimation

No minimum value for reporting – Leave no One Behind

Data sources: authorities, media, scientific literature

https://www.nature.com/articles/s41597-022-01273-x (@ Katerina Papagiannaki)
DALIH, a structured approach for cultural heritage

Main global databases do not entail CH. No systematic collection exists.

Data is fragmented.

A collaborative database to collect and share, supporting inter alia EU Flood Directive and Sendai reporting.

Scalable, a potential standard for loss and damage recording, supported by ICOMOS.

Impact modeling support.

Call for collaboration.

http://dalih.org/app/#/ @ Xavier Romão
Forest fire, a treasure trove of authoritative data

European variation, >2m events
Remote sensing and in situ data for EFFIS
From minimum requirements to the maximalist Mediterranean
Data for direct and indirect losses and damages
Language barrier, harmonization, best practices
Thank you!
ospeyer@noa.gr