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Disaster Damage and Loss Information System

Based on DesInventar Sendai

Training workshop in Disaster Loss Databases and Sendai Framework Monitoring

Gandhinagar, Gujarat 13-15th November

NATIONAL DISASTER MANAGEMENT AUTHORITY • INDIA •

german cooperation
DEUTSCHE ZUSAMMENARBEIT

SAARC
Disaster Management Centre

Disaster Loss Databases for enhanced risk understanding

Session 2. Afternoon 13rd 15:30 – 16:30

Session Outline

1) **Sendai Framework Priority I** (understanding risk) and risk-informed development
2) **Disaster loss databases contribution to risk understanding**
3) **Risk knowledge for risk-informed development**: past losses, key to understand disaster risks.
4) **Current applications of Disaster Data:**

- Global examples
- Initiatives in India

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Sendai Framework Priorities

- **Priority 1***: Understanding disaster risk.*
- **Priority 2:** *Strengthening disaster risk governance to manage disaster risk.*
- **Priority 3:** *Investing in disaster risk reduction for resilience.*
- **Priority 4:** *Enhancing disaster preparedness for effective response, and to "Build back better" in recovery, rehabilitation and reconstruction.*

Sendai Framework
for Disaster Risk Reduction
2015 - 2030

Priority 1: Understanding Disaster Risk

To achieve this, it is important to:

*(a) Promote the **collection**, **analysis**, **management** and **use** of **relevant data** and practical information. Ensure its dissemination, taking into account the needs of different categories of users*

*(b) To encourage the **use of and strengthening of baselines and periodically assess disaster risks**, vulnerability, capacity, exposure, hazard characteristics and their possible sequential effects at the relevant social and spatial scale on ecosystems, in line with national circumstances;*

*(d) Systematically **evaluate, record, share and publicly account for disaster losses** and **understand** the economic, social, health, education, environmental and cultural heritage **impacts**, as appropriate, in the context of event-specific hazard, exposure and vulnerability information.*

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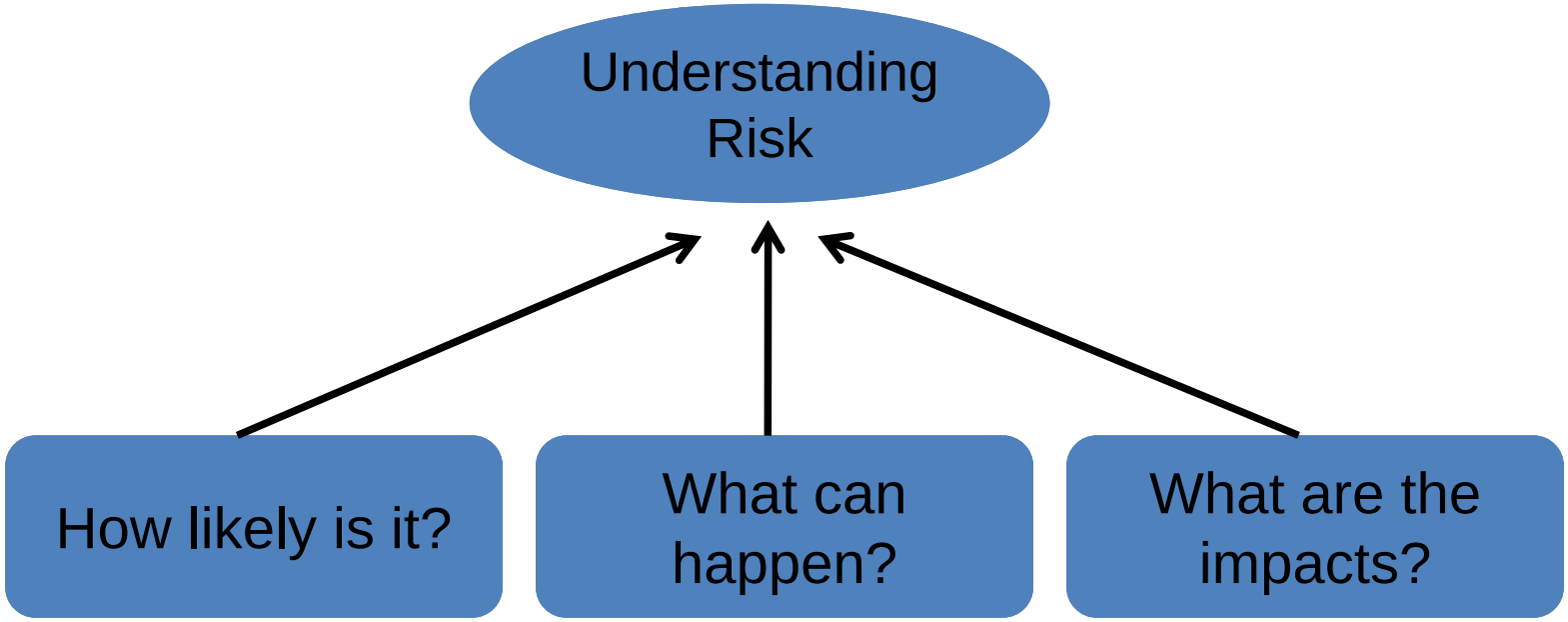
How to Understand Risk?



Risk Assessment Foundation

Historic experience	Analytic methods	Knowledge & intuition

(Source: Mitchell, 2004)

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Understanding disaster risk

Loss accounting is a core step in disaster risk management. It allows to set up the context and take actions that are oriented by reliable information about the historical disasters.

Sendai introduces also a new understanding of Risk based not only on past losses but also on ***evolving*** trends and dynamics

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Exercise 3: Reflect in groups

1. *Why should we collect disaster information?*
2. *What type of disaster data is relevant for each one of your departments/sectors/countries?*
3. *If you have disaster information available, what do you think you could use it for?*

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Disaster Loss information, for what?

- Lack of knowledge about past losses hampers future risk-informed decision-making.

- Provides insight about the **temporal and spatial footprint** of disasters, helping to take action on critical spots where damages and losses are concentrated.

- Shows **where risk construction** should be avoided and DRR measures should be taken and prioritized.
- Allows identification of **changes in trends and patterns** of disaster risk.

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A disaster loss database, for what?

- Functions as a **national/state/city** level disaster loss information system.
- Allows tracking **historical disaster risk** at different geographical scales.
- Shows patterns of **impacts from different hazards** at all levels.
- Serve as the basis for managing data for an **international reporting mechanism** against the Sendai Framework targets.

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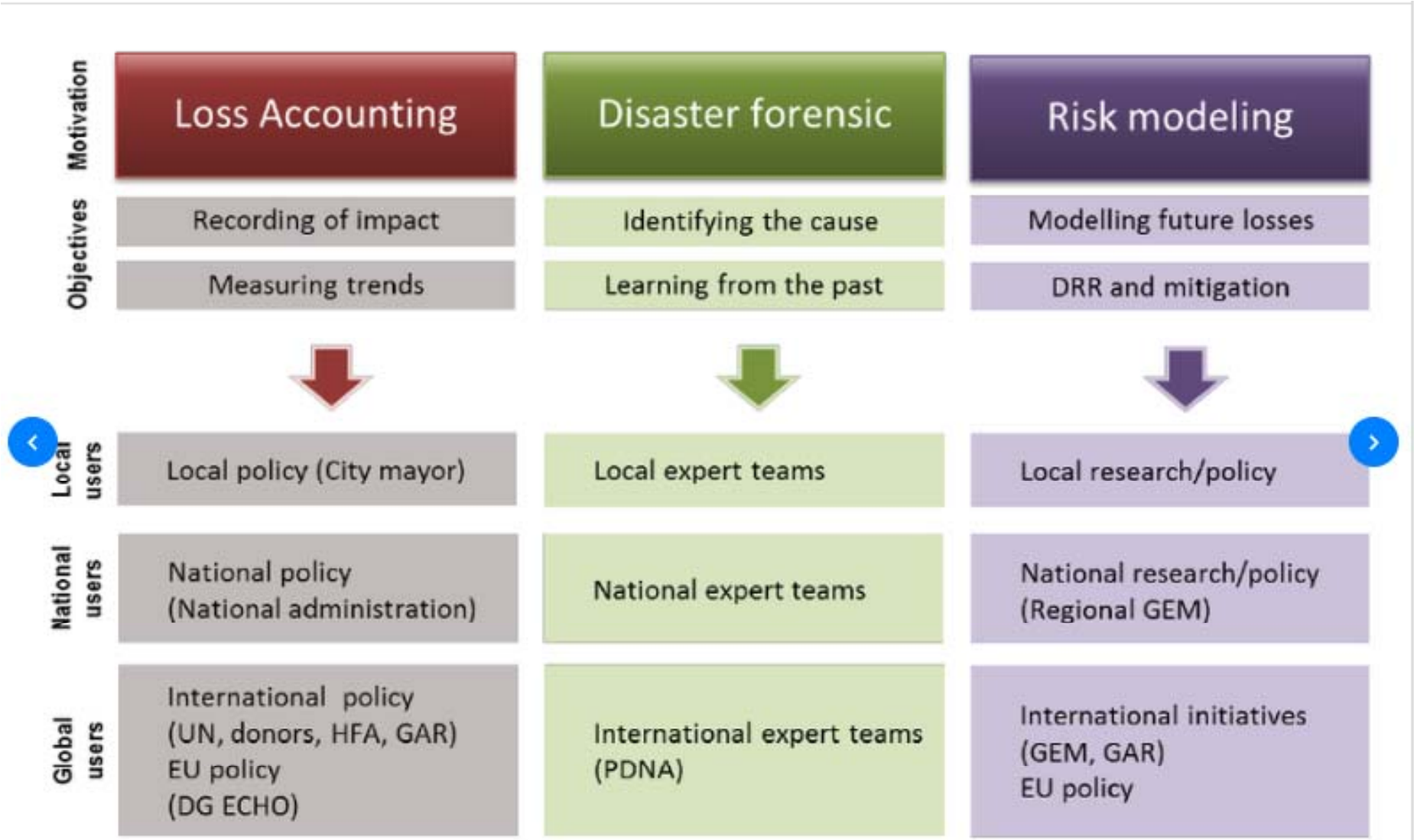
Applications of Disaster Loss Data: EU/JRC vision



Conceptual model of application areas for loss data (JRC, 2013).

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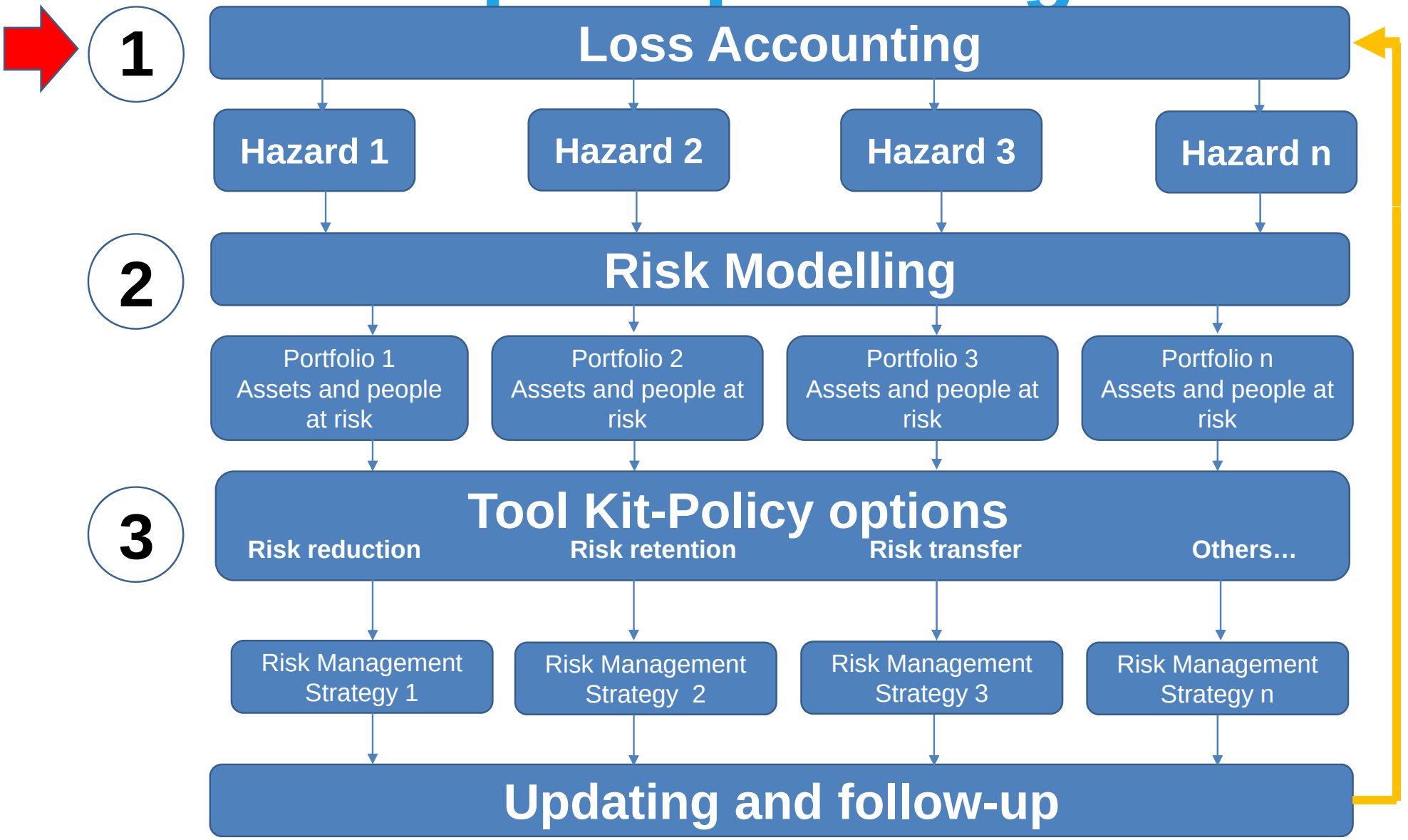
Loss accounting is fundamental first step for planning DRR



But…

- Without information it is very difficult to establish the context.
- Registering disaster losses is therefore a key aspect to know what is happening.
- Data availability and accessibility are key pillars for developing informed decision-making for reducing future impacts.

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From facts to wisdom: where does risk knowledge sits?

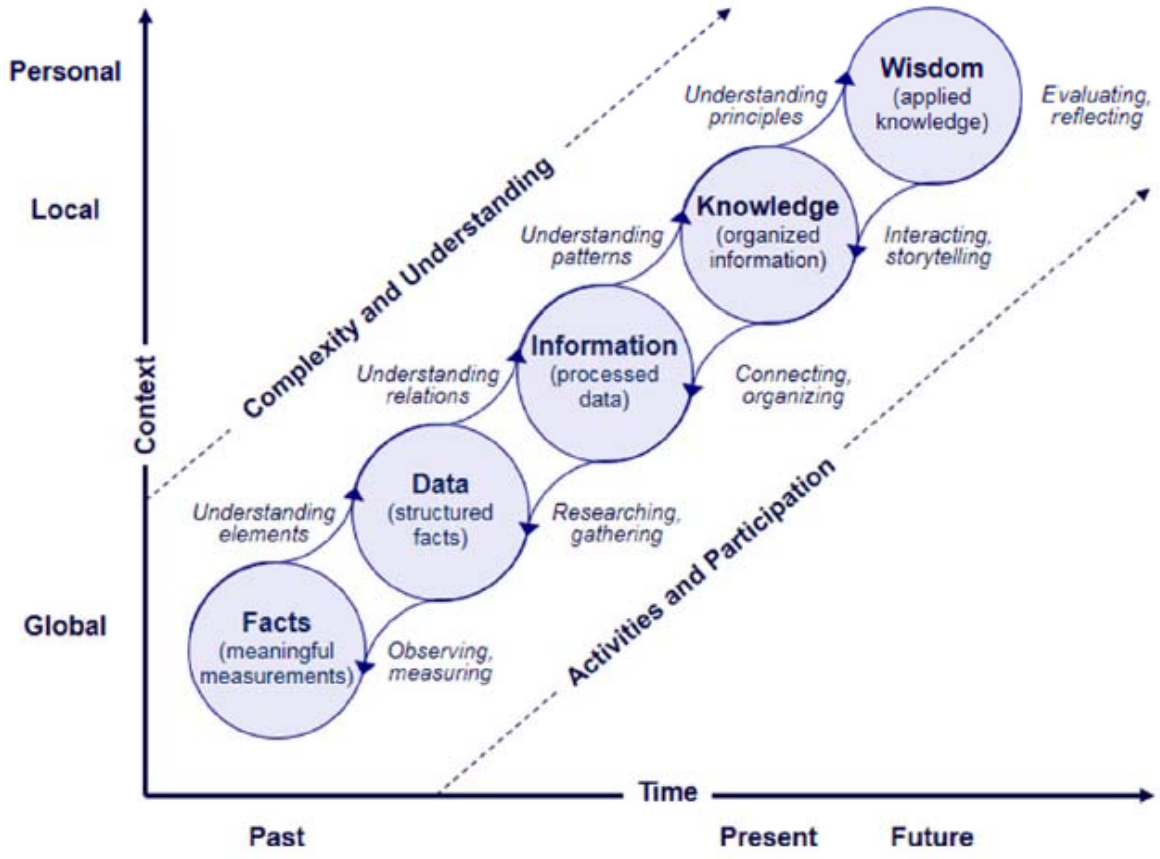

Fig. 1 The continuum of understanding

Source: Weichselgartner J., Pigeno, P.

Priority 1 of Sendai emphasizes the need for transformation of data and scientific information into *usable information* for decision--making.

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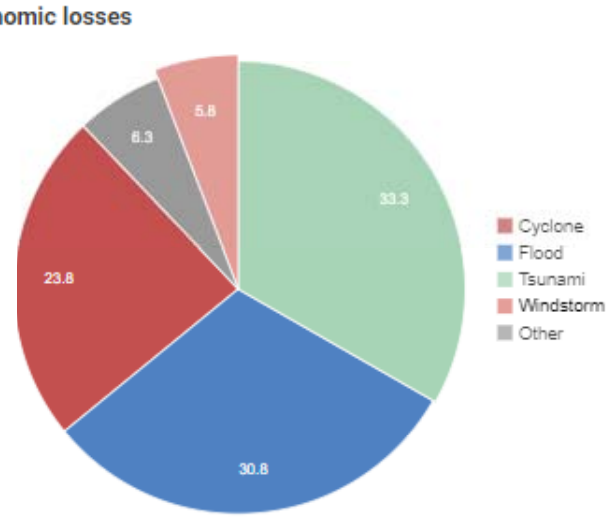
Risk profiles informing the development of national and local DRR strategies

Information on the extent of the potential losses (in human, economic and infrastructure terms) will help refine the high level objectives of the DRR strategy, allowing for goals to be directly linked to the most significant types of impacts

Average Annual Loss (AAL) by hazard

Hazard	Absolute [Million US$]	Capital stock [%]	GFCF [%]	Social exp [%]	Total Reserves [%]	Gross Savings [%]
Earthquake	0.77	0.000	0.004	0.024	0.012	0.005
Wind	1.70	0.001	0.009	0.052	0.026	0.012
Storm Surge	18.57	0.009	0.095	0.569	0.281	0.132
Tsunami	1.75	0.001	0.009	0.054	0.026	0.012
Flood	143.75	0.069	0.732	4.403	2.174	1.023
Multi-Hazard	166.54	0.080	0.848	5.101	2.519	1.185



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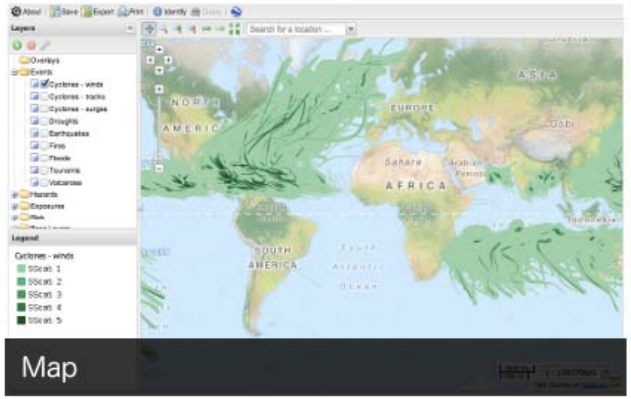
Global sources of risk and disaster data

Global Assessment Report on Disaster Risk Reduction 2015

Making development sustainable: The future of disaster risk management

Home | Pocket GAR | GAR 2015 Main Report | Documents | **Data** | Download | Press centre | Previous GAR

Country Profiles



Global Risk Data Platform

Risk Data Platform →

Disaster Data Platform →

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Disaster Loss Data Sources

EM-DAT

- **Global coverage**
- **Mortality**: more than 10 people
- **Number of affected:** more than 100 people
- **Economic losses:** are present in less than 30% of the records
- **Global level of observation, national level resolution**

Private Insurance and Re-insurance companies

- **Global coverage**
- **Data is not freely available**
- **Only Analysis reports are shared**
- **Developed for the insurance market**

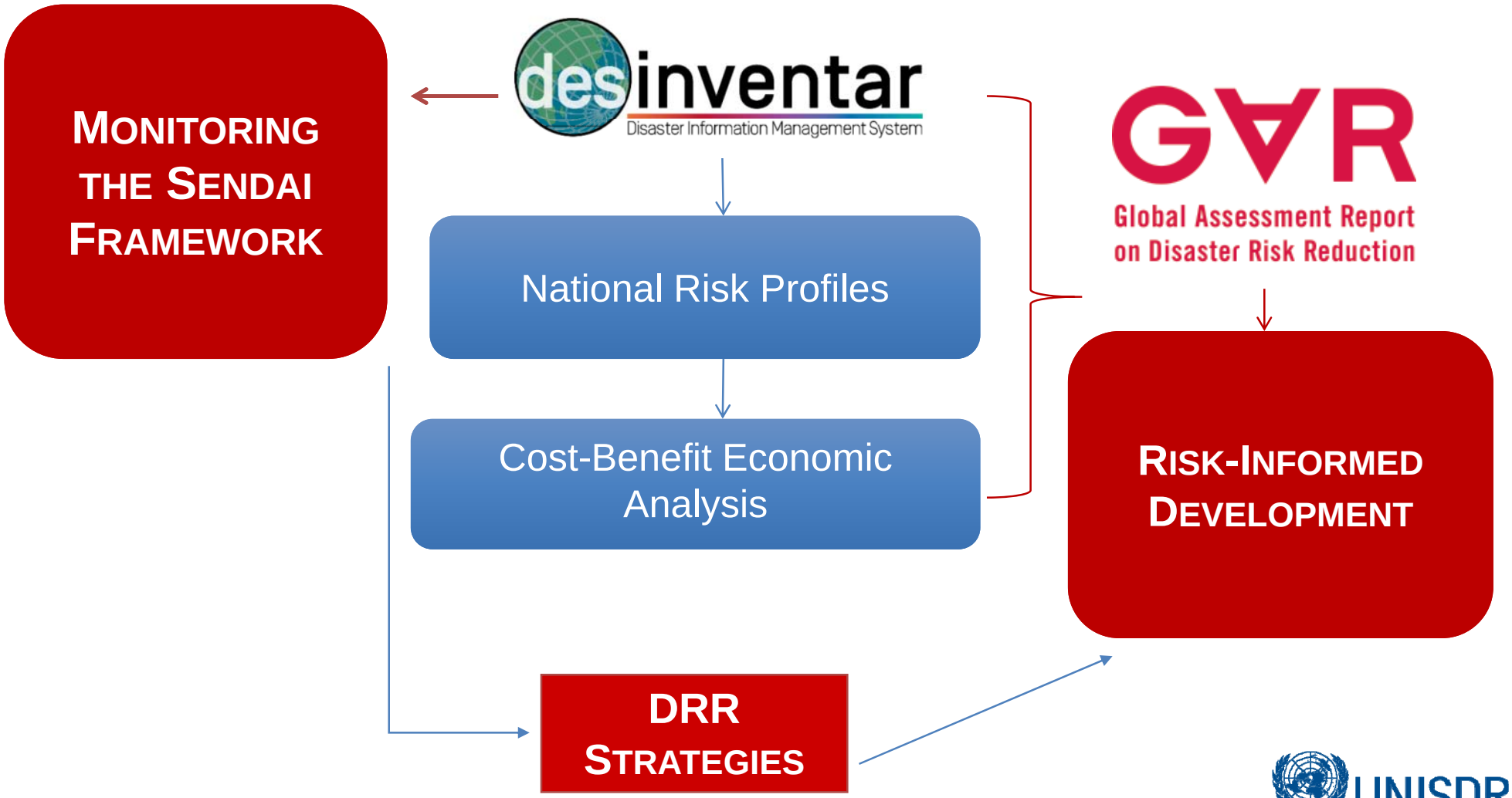
ECLAC-WB: Damage and Loss Assessment methodology (DaLA)

- **National level of observation, data with sub-national level of resolution.**
- **Consistent methodology**
- **Only assesses losses from large scale (intensive) disasters**
- **Does not have global coverage**

National databases

- **National level of observation, data with sub-national level of resolution.**
- **Methodologies are heterogeneous, hampering global comparison.**
- **Not frequently updated.**

The model: vision by UNISDR



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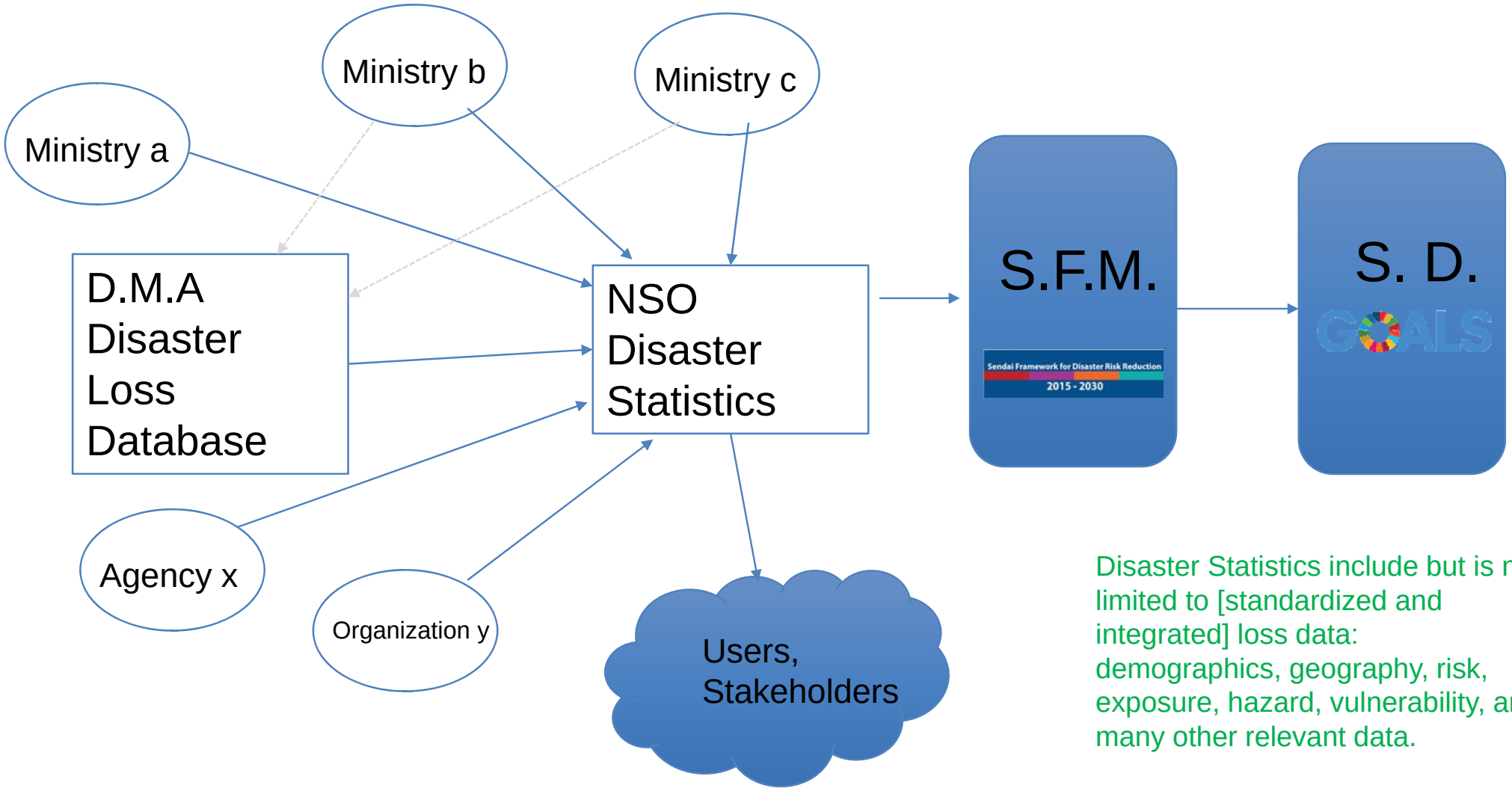
Sendai Framework | 2030 Agenda for Sustainable Development

Multi-Purpose Data, Integrated Monitoring & Reporting

Information Flow (Loss data->statistics)



Disaster Statistics include but is not limited to [standardized and integrated] loss data: demographics, geography, risk, exposure, hazard, vulnerability, and many other relevant data.

Trends and patterns in disaster effects

Extensive disasters

Upwards trend on disaster mortality and economic losses from extensive risk in ***middle and low income countries****.*

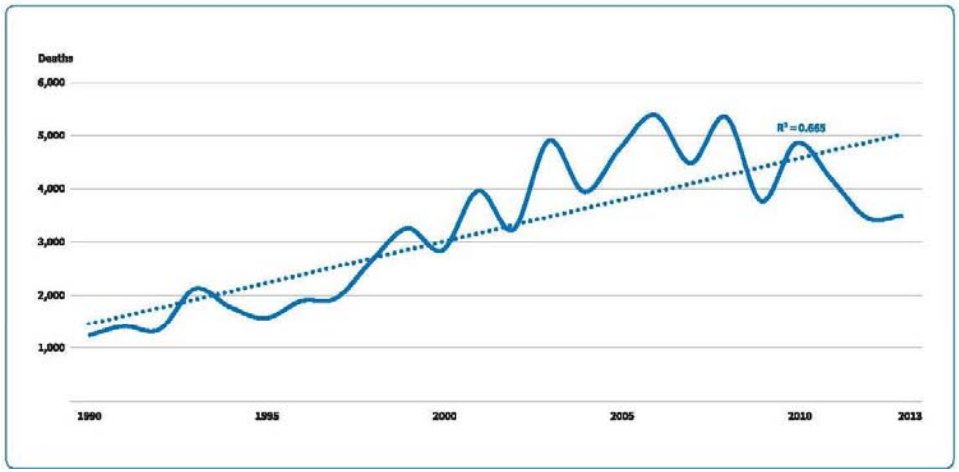
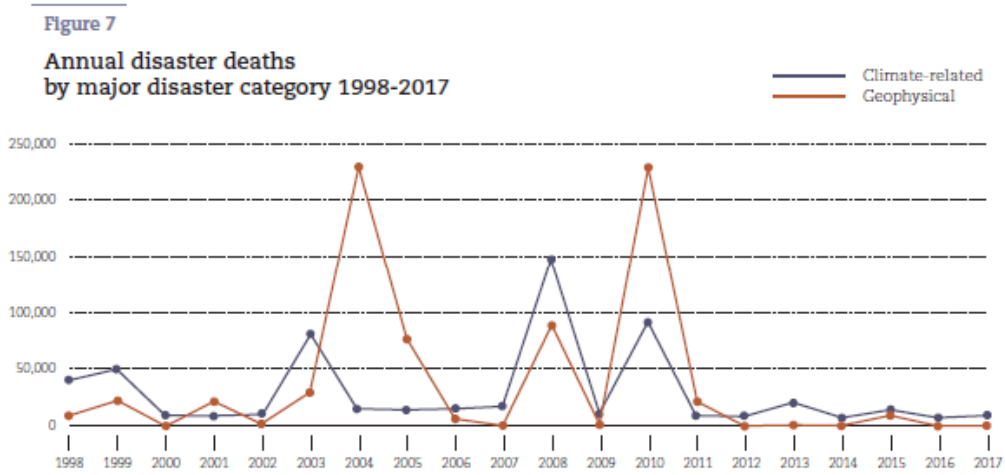


Figure 12

Climate-related and Geophysical Disasters 1998-2017

Intensive disasters

Global mortality concentrated in few intensive disaster events



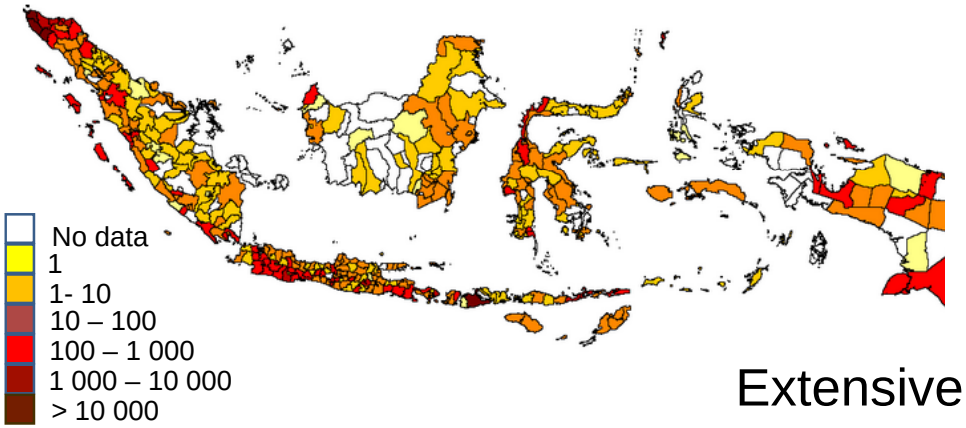
Return times' are long and unpredictable, so low mortality in the recent past is not an indicator of future risk

Identifying disaster footprint for Extensive and Intensive disasters

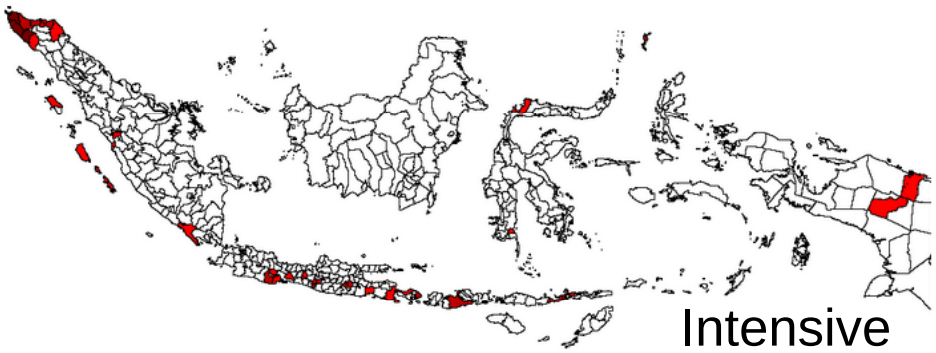
Intensive disasters: *is used to describe high-severity, mid to low-frequency disasters, mainly associated with major hazards* (i.e. earthquakes, active volcanos, tsunamis)

Extensive disasters: *is used to describe low-severity, high-frequency disasters, mainly but not exclusively associated with highly localized hazards* (i.e. flash floods, landslides, droughts, etc.)

Different footprints of extensive and intensive disasters (# of deaths)



Extensive



Intensive

Usage of Historical Loss Data in Risk Assessments

- Provide **historical vulnerability** indexes: allows developing vulnerability or fragility curves
- Provide **Empirical Loss Exceedance Curves** (GAR)
- Historical data can help **validating** Risk Assessments
- Historical data can be use **calibrating** Risk Assessments
- Generate proxy indicators of Risk (for hard-to-model risks or when no data is available)
- Allow **monitoring of DRR** measures
- Provide a **dynamic vision** of historic risk evolution over time
- Provide **evidence-based** support to decision makers

Relevance of registering extensive disaster effects for allowing analysis

Global Assessment Report on Disaster Risk Reduction

Main results and recommendations from the GAR:

- *New data allows to have a more complete picture of disaster losses.*
- *Direct losses are at least 60% more than the ones registered internationally.*
- *Low-scale disasters hamper local development and countries' competitiveness.*
- ***Extensive risks** are increasing with urbanization and economic development.*

Economic Loss data is unavailable or incomplete for 63% of the disaster events internationally reported (source: EM-DAT)

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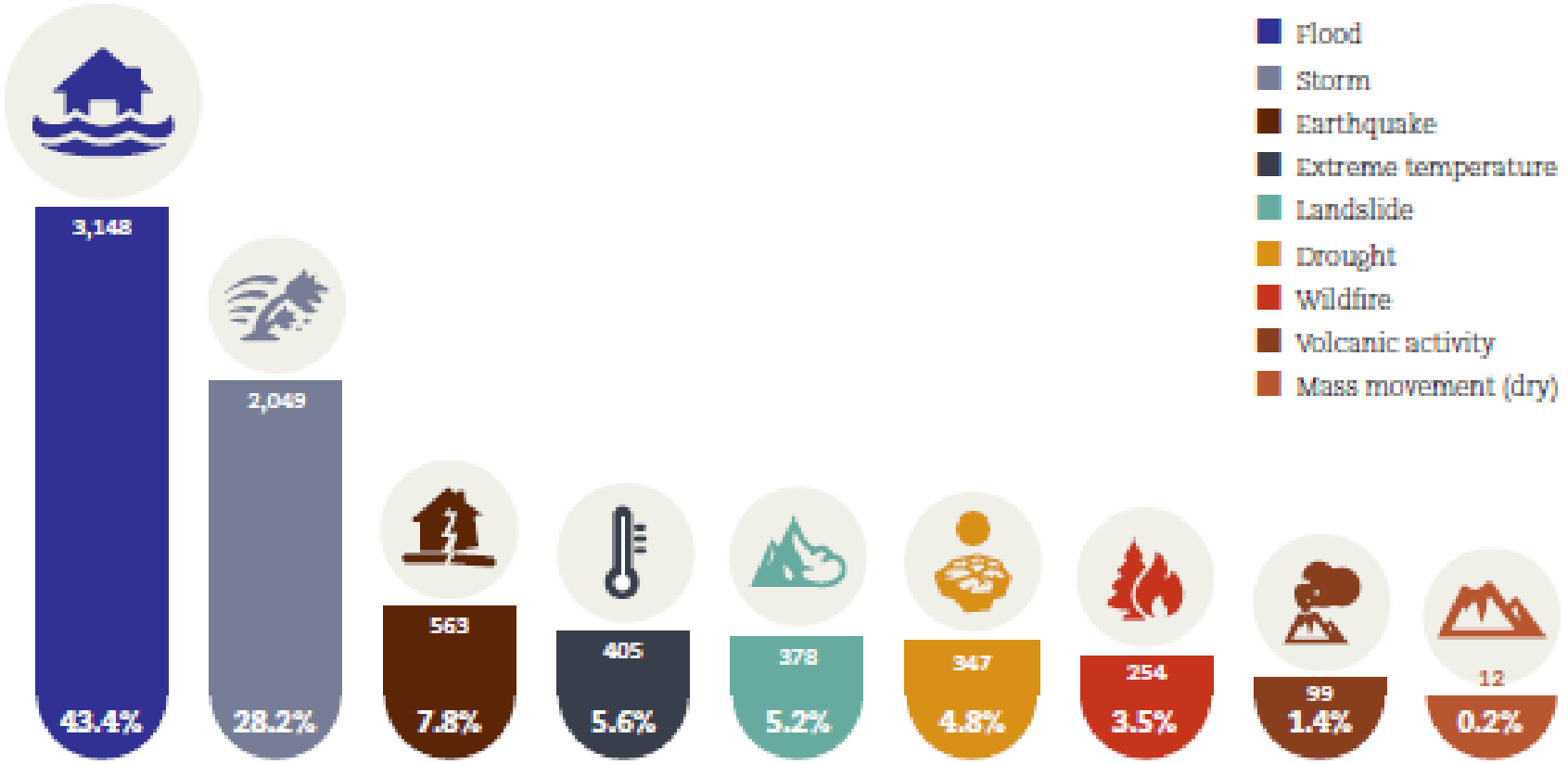
Disasters: global and local knowledge gaps

Figure 3

Numbers of disasters per type 1998-2017



EM-DAT/UNISDR report: Economic losses, poverty and disasters (1998-2017)

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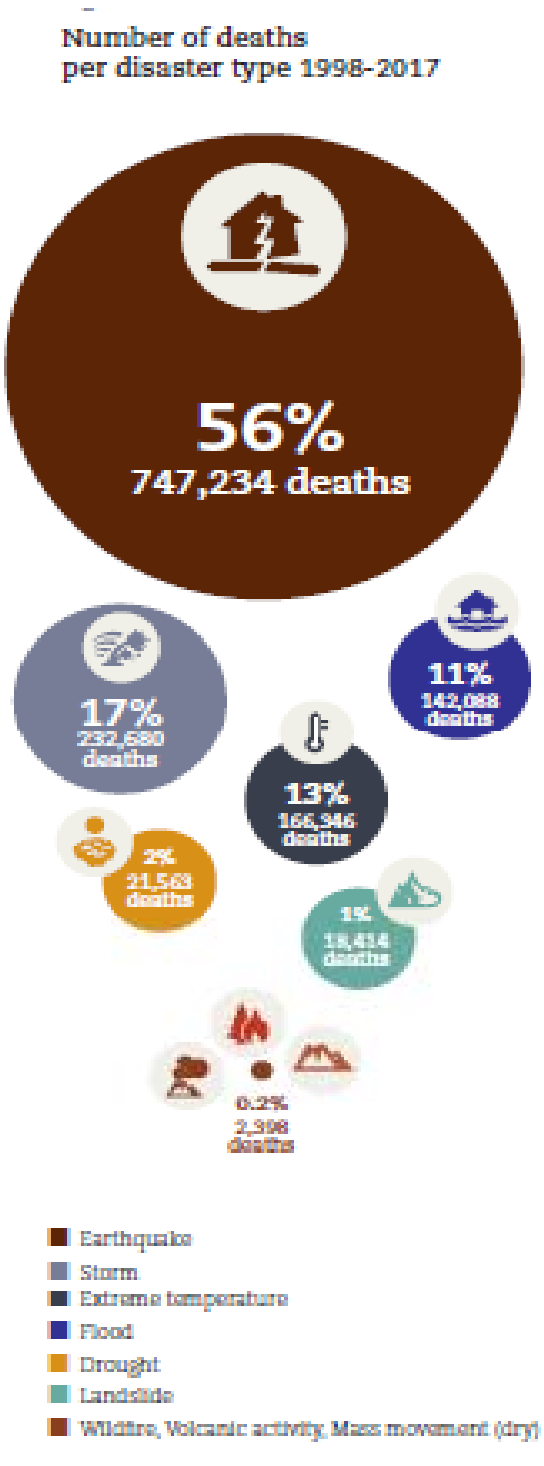
Global disaster mortality per disaster type

Intensive type of disaster account for the majority of deaths (global level)



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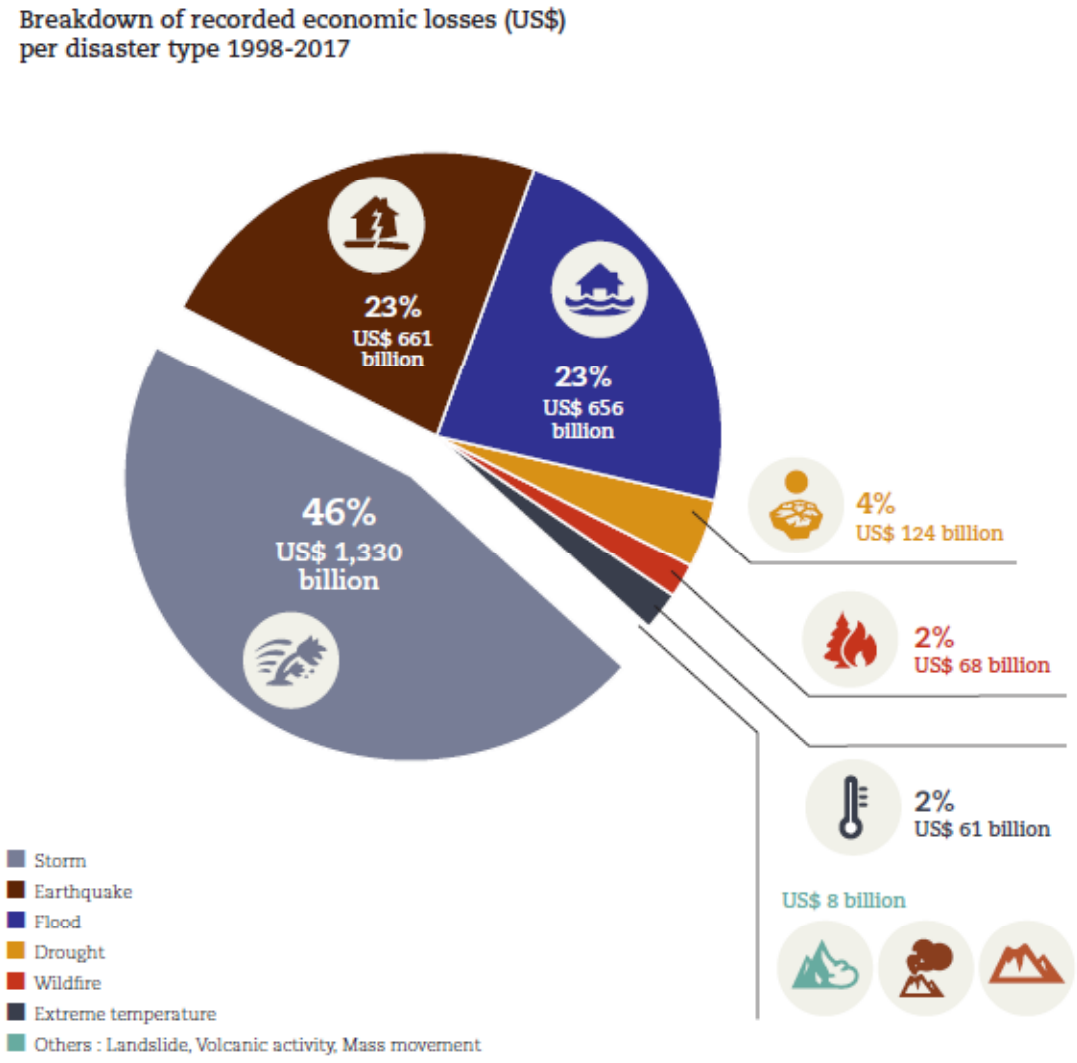
Internationally recorded economic losses by hazard

Extensive risk account for the majority of economic losses



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Economic losses are commonly underreported…

Table 3

Reporting of economic losses per disaster type (climate-related)

	% reported
Storm	55
Wildfire	41
Flood	32
Drought	29
Landslide	13
Extreme temperature	11

Table 4

Reporting of economic losses per disaster type (geophysical)

	% reported
Earthquake	43
Volcanic activity	11
Mass movement (dry)	8

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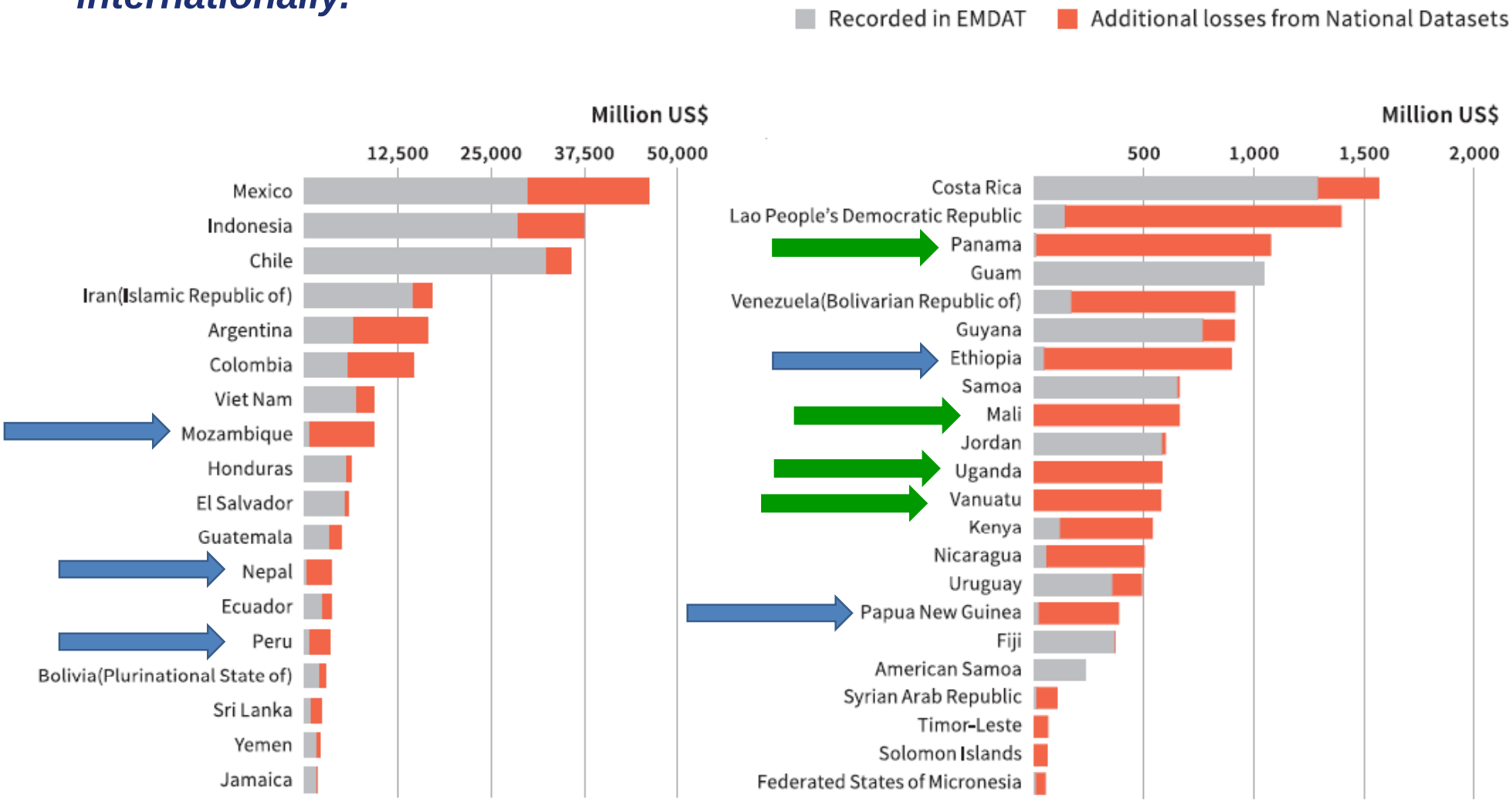
Global Assessment Report on Disaster Risk Reduction

Global Assessment Report on Disaster Risk Reduction

- ***Direct losses are <u>at least</u> 60% more than the ones registered internationally.***



Potential applications of Disaster Data: a recap

- *Inputs for risk profiling*
- *Development of vulnerability curves*
- *Calibrations of disaster risk assessments*
- *Thematic analysis*
- *Monitoring effectiveness of DRR measures*
- *Enable preparation of cost-benefit analysis*

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Asia Pacific examples on best practices and applications of disaster data

Contributions by UNDP (Rajesh Sharma)

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Highlighted applications in India

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DATABASES FOR DRM

Data on Hazards: *various hydrological, geological, meteorological and manmade threats*

Disaster Data *: Database of all the events happened with the damages and losses*

Vulnerability Indicators *: Social and economic factors*

Resource Databases *: data on material and skilled human resources*

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Orissa Pilot – Indis Data

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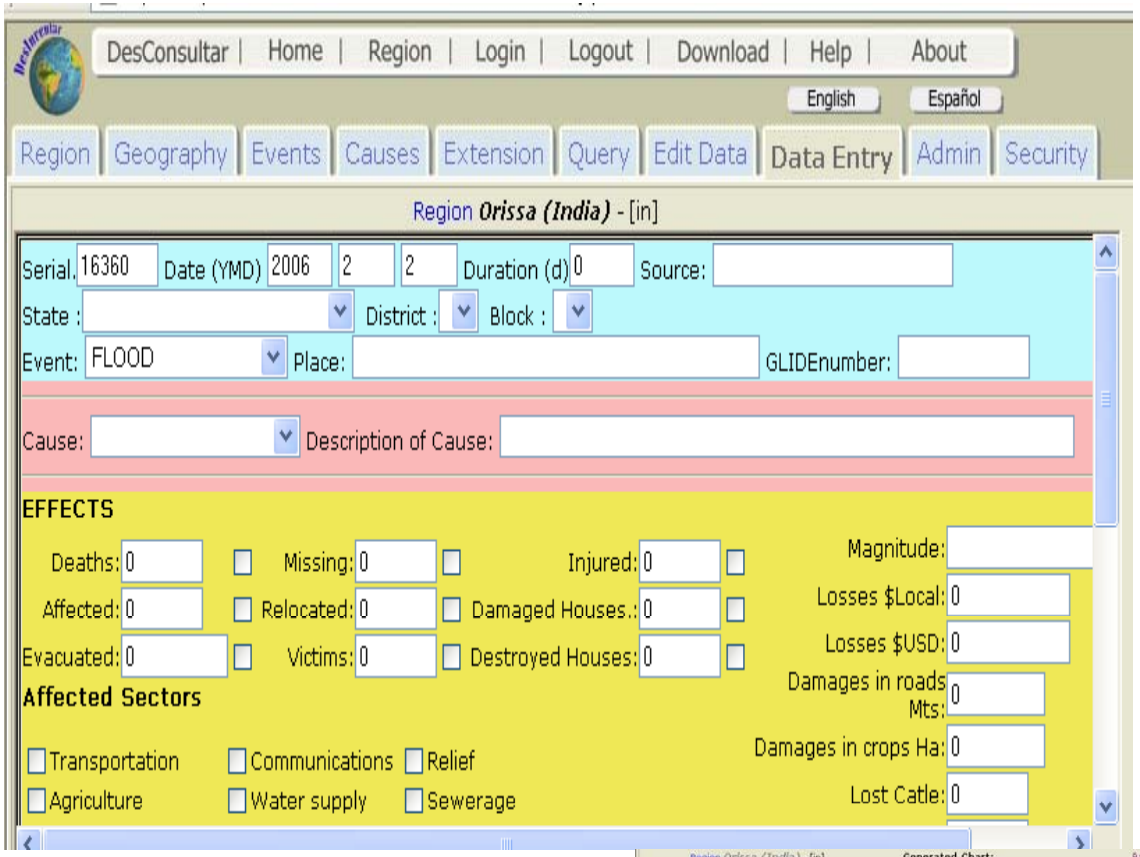
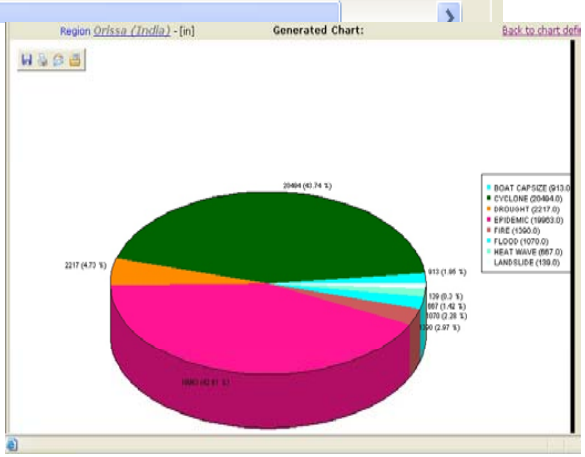
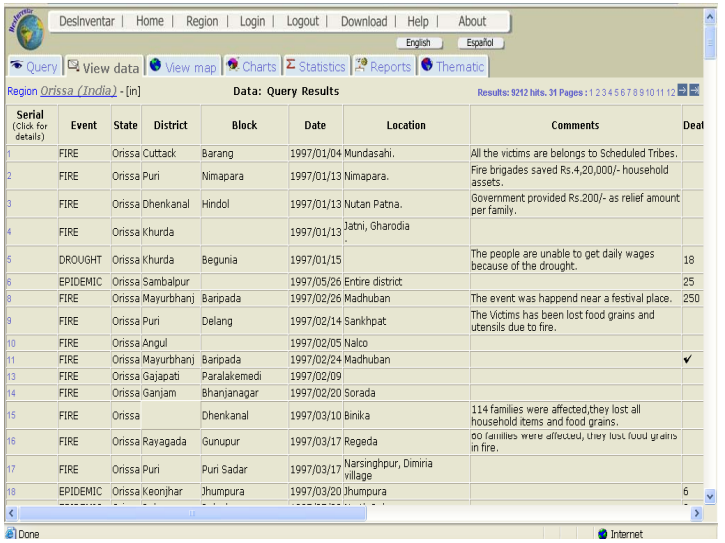
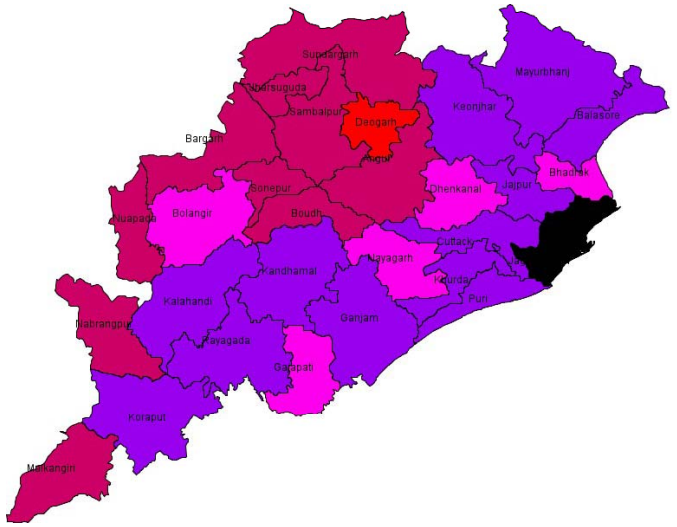
DATA ENTRY FORMAT





DATA CARD





http://www.desinventar.org

Orissa Indis Data

- A pilot project (Indis data) completed to test and adapt DesInventar methodology in Orissa (2002-2004).
- Data collected for 30 districts and 314 blocks
- 32 years data (1970-2002) collected from media & Government records.
- Institutionalization with Government (OSDMA) for sustainability was done in 2004.
- Orissa Vulnerability report based on disaster inventory and other related datasets was prepared in the year 2005.

INDIS Data implementation

- *Introductory workshop on disaster inventories and Indis Data (DesInventar) method.*
- *Specific training on the use of the Indis data methods and software - Customization of methods and software for Orissa*
- *Identification of data sources and securing access to them*
- *Selection and training of researchers*
- *Data collection and Data entry by researchers*
- *Data validation followed by overall analysis of patterns*
- *Sector specific analysis of patterns and generation of hypothesis*
- *Use of the information and the inferences as inputs for compiling Orissa vulnerability report*

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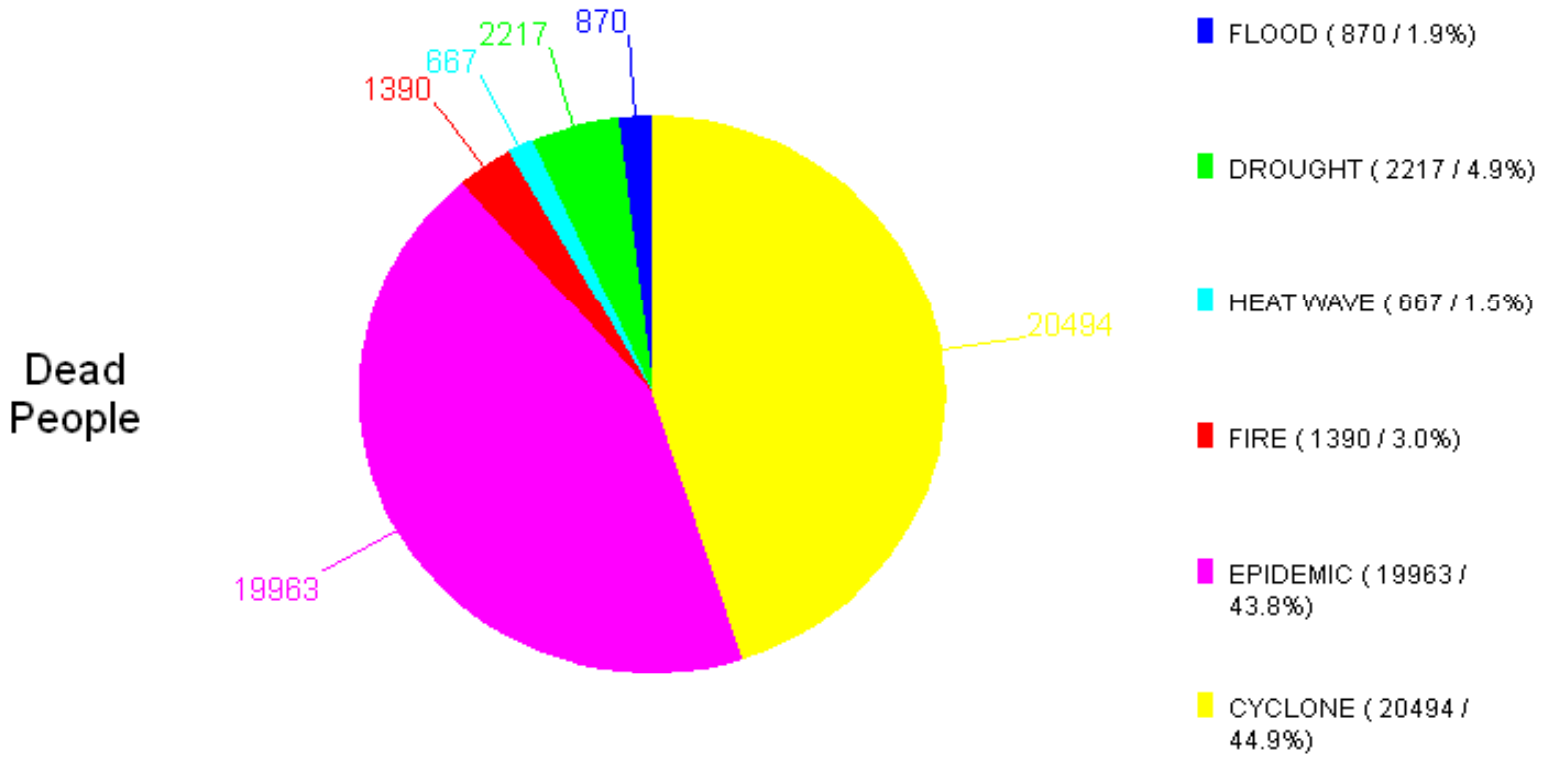
Preliminary Findings

- *Interpretation and analysis of the data shows new dimensions of risk & vulnerabilities of the State.*
- *Cyclones (life) and floods (livelihood) are Orissa's most damaging disasters.*
- *Epidemics are the greatest cause of deaths after cyclones*
- *fire is the greatest cause of household property destruction. Many epidemics follow floods .*
- *Deaths due to epidemics indicates the high human vulnerability and lack of adequate planning and medical facilities.*
- *There has been increasing damages to property showing high degree of physical exposure while the number of deaths are reducing.*

Cont...

Impact of different disasters on life



- **human life lost due to epidemics is comparable with the life lost due to cyclones.**
- **Epidemics following floods shows the low economic level and lack of medical facilities**
- **Death due to drought dep**

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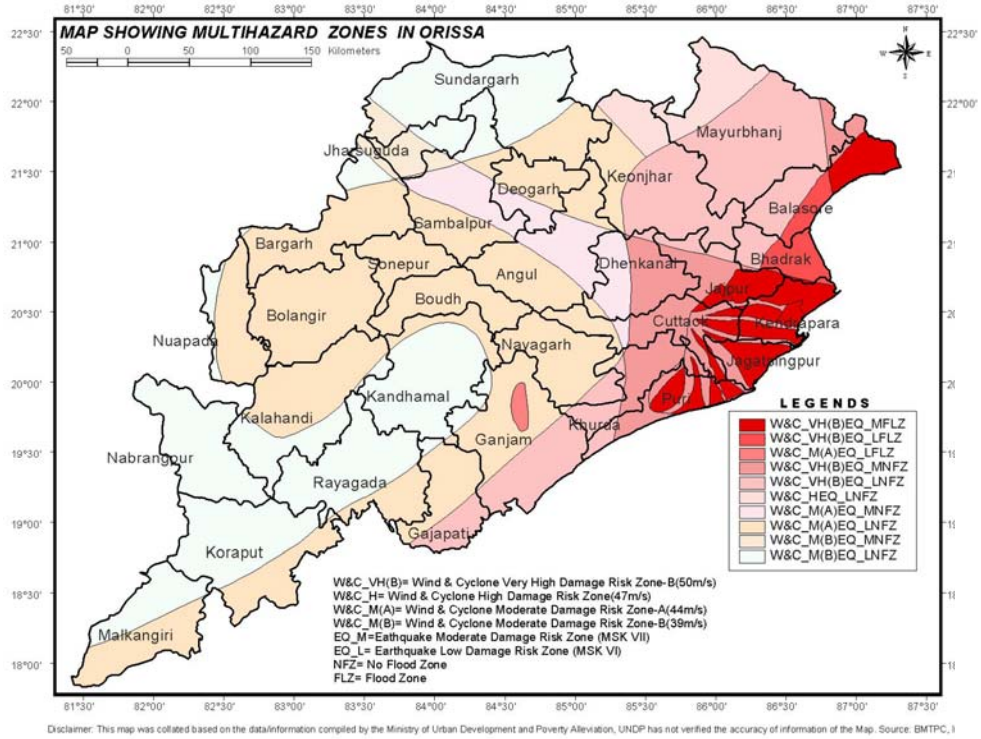
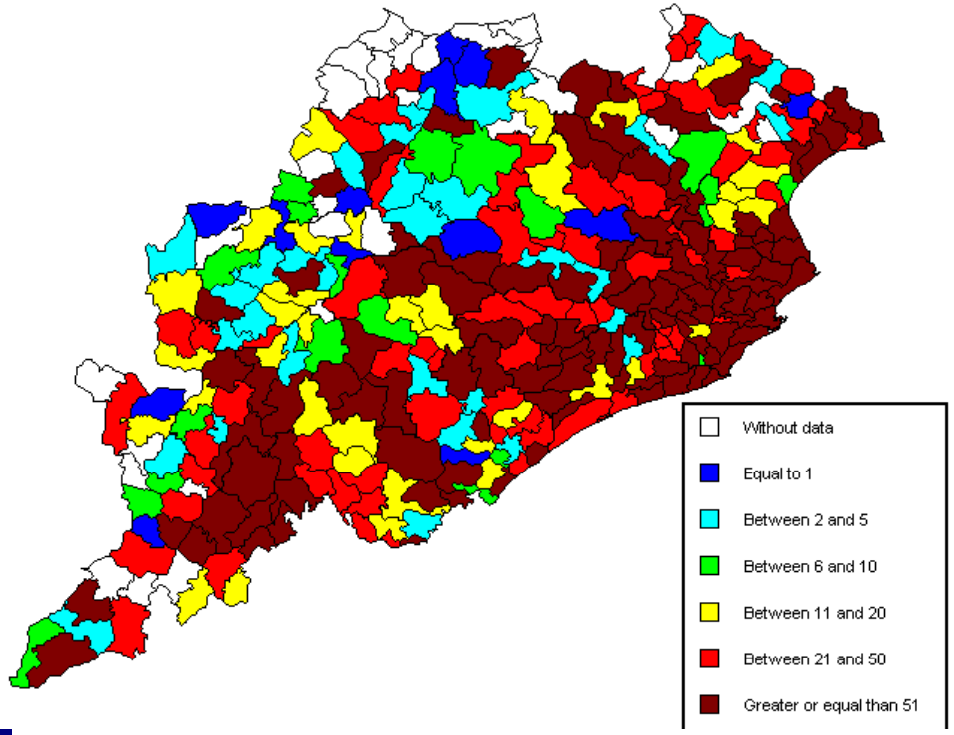
Total Number of Deaths Reported and its comparison with Vulnerability Atlas





Districts like Rayagada , Koraput Kalahandi have low multi-hazard vulnerability (BMTPC ATLAS).
Most of the deaths are due to drought, epidemics etc.

But the lose of life due to various disasters is high in these districts.

This real time data uncover the hidden vulnerabilities like lack of awareness, low economy level, poor health facilities etc.

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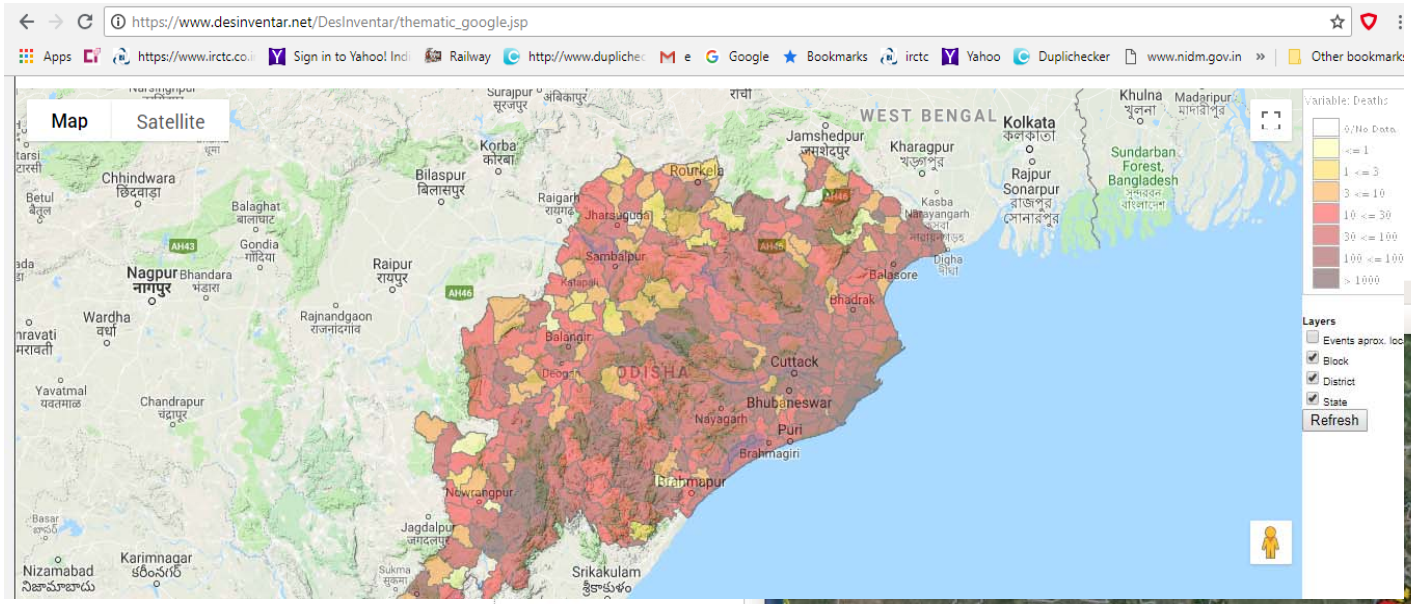
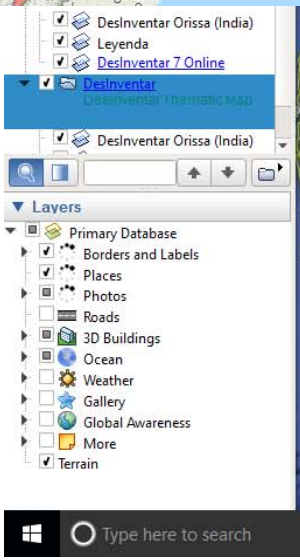
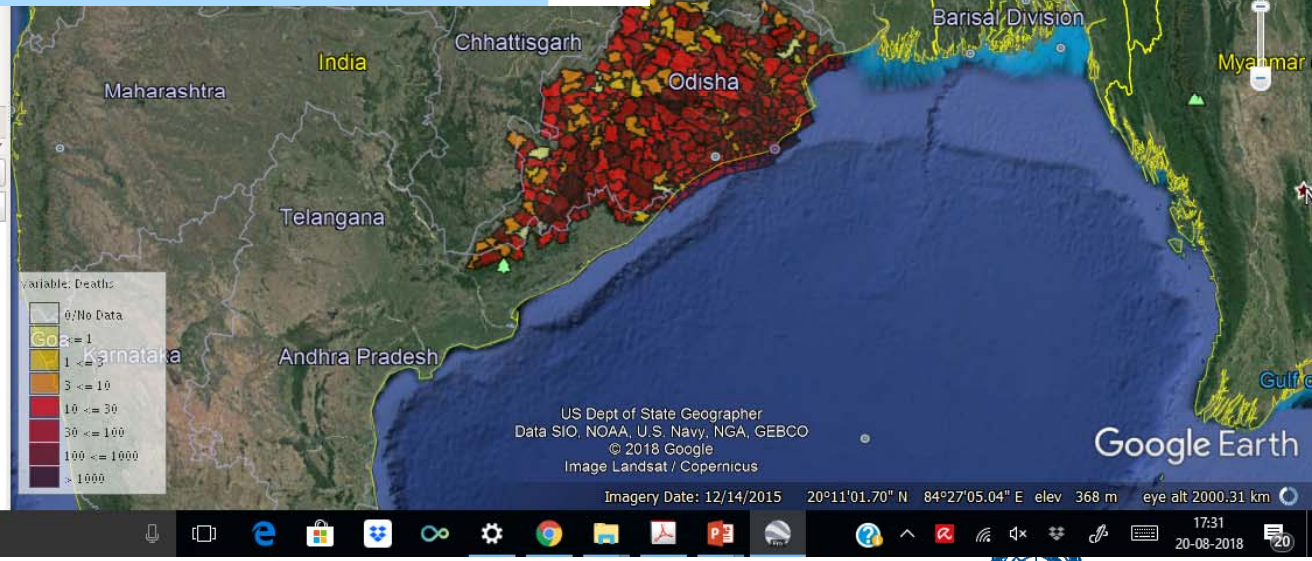
Google maps and Google earth







Maps to kml

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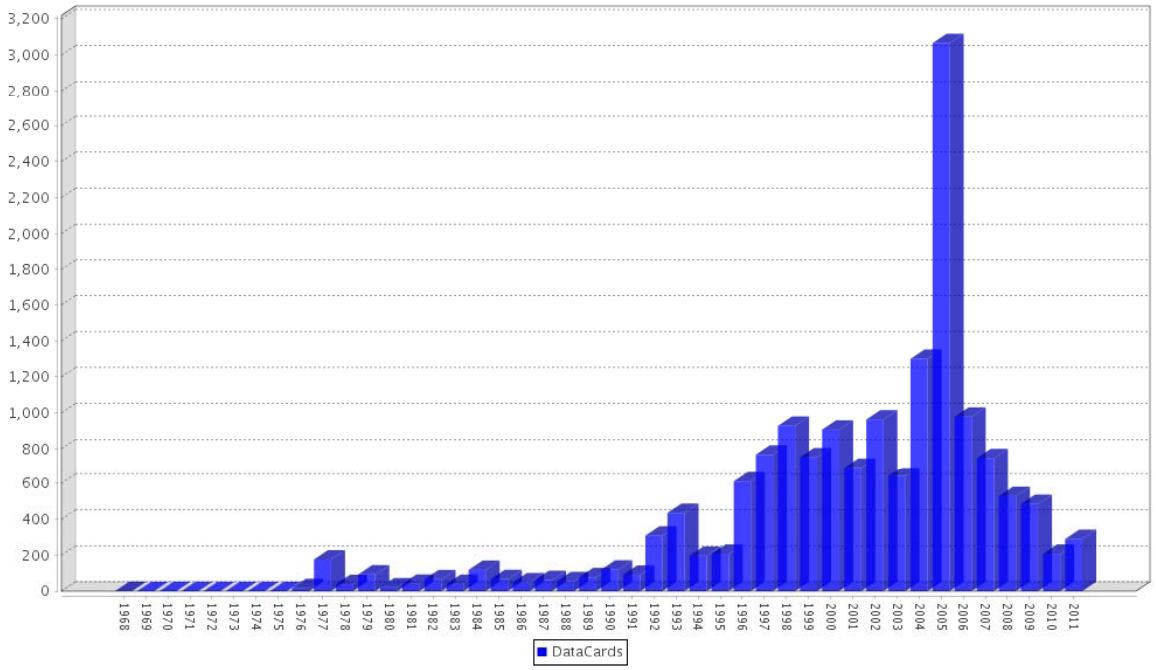
Tamil Nadu – Desinventar Database

- Orissa disaster database was found helpful in understanding the spatio- temporal and typological distribution.
- Under the regional tsunami recovery programme, Indis data initiative was replicated in 3 more states of India (Tamil Nadu, Kerala and Andhra Pradesh)
- Tamil Nadu initial data collection training etc with Anna Institute of Management and the data was hosted in 2007 in revenue department website (1976-2011).
- Other 2 states data collection was done for shorter period but was never institutionalised or hosted in state govt or desinventar server.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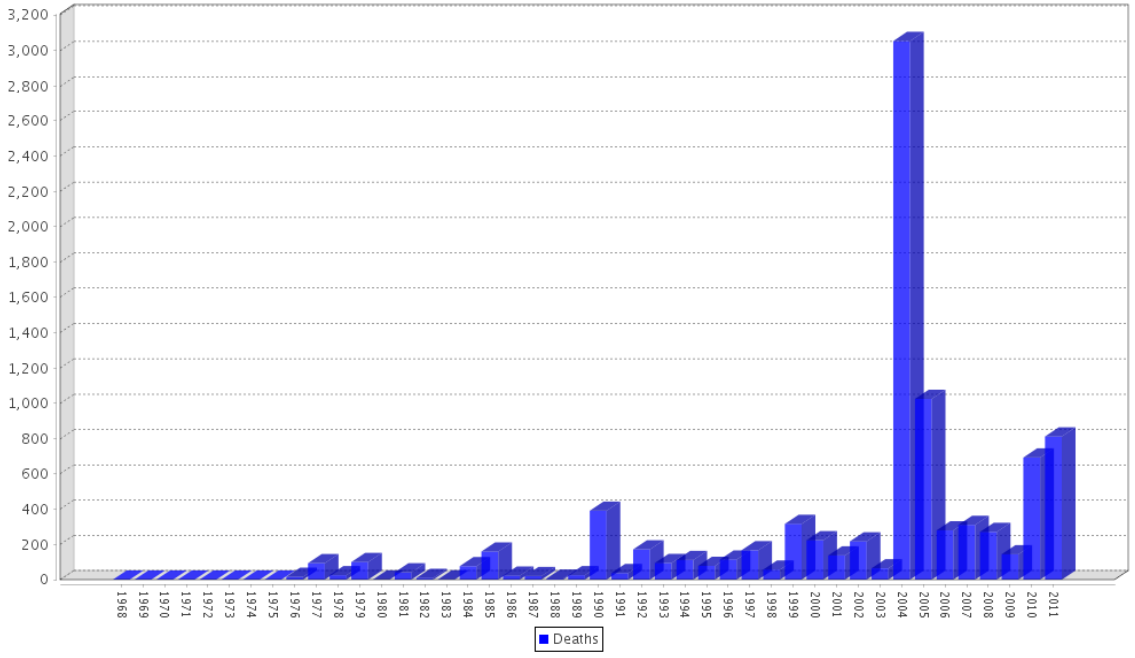
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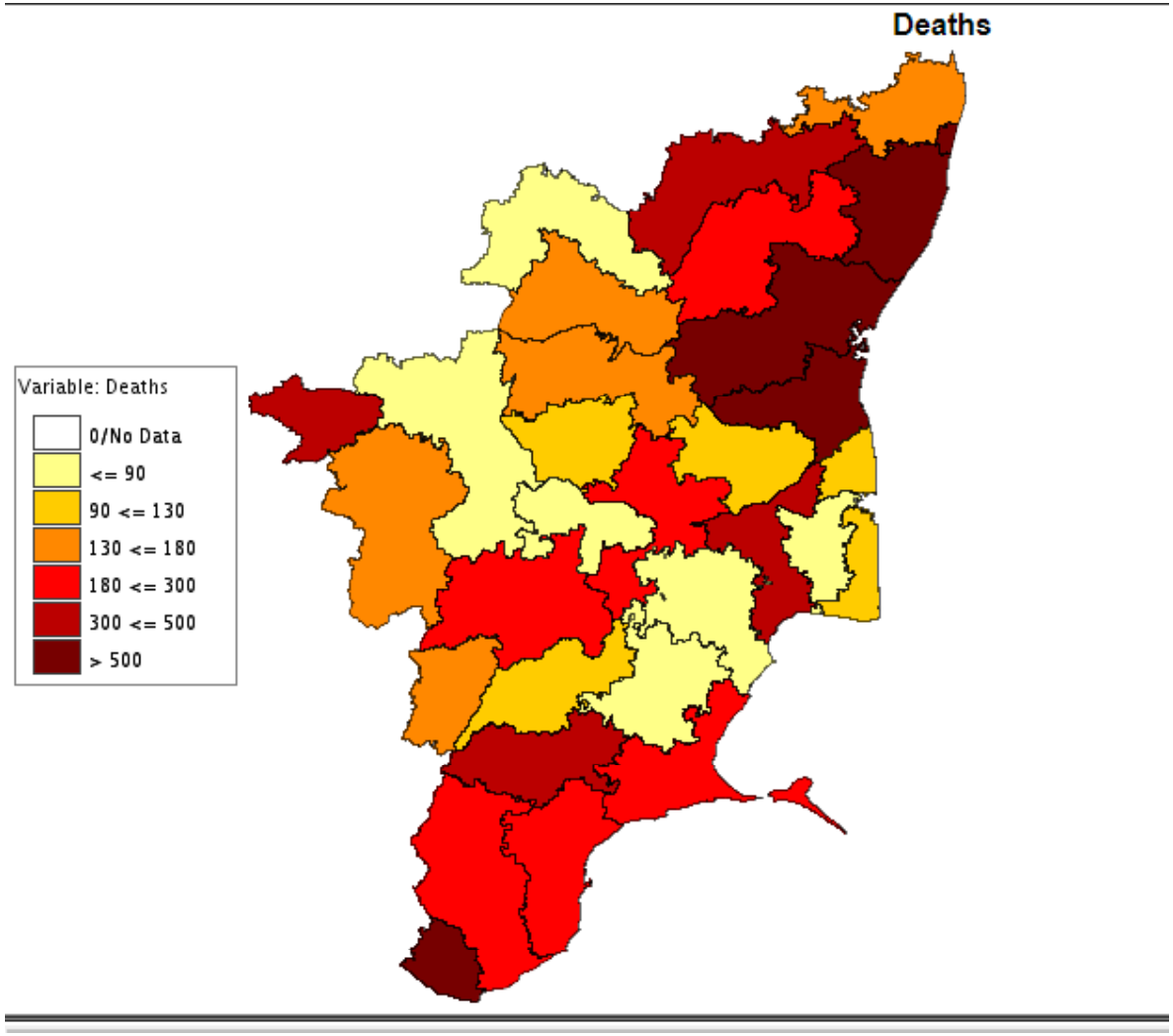
Deaths

Mortality at District Level



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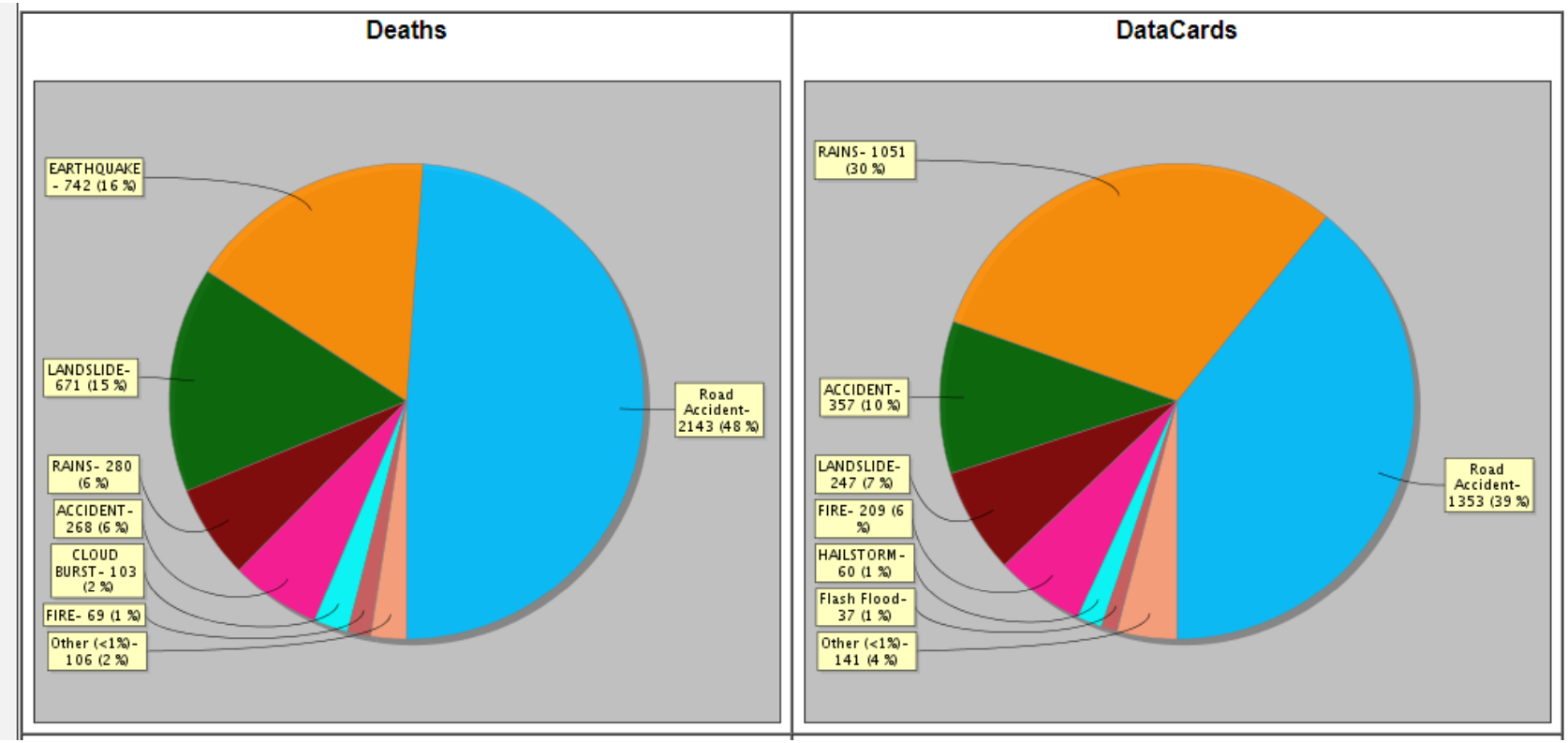
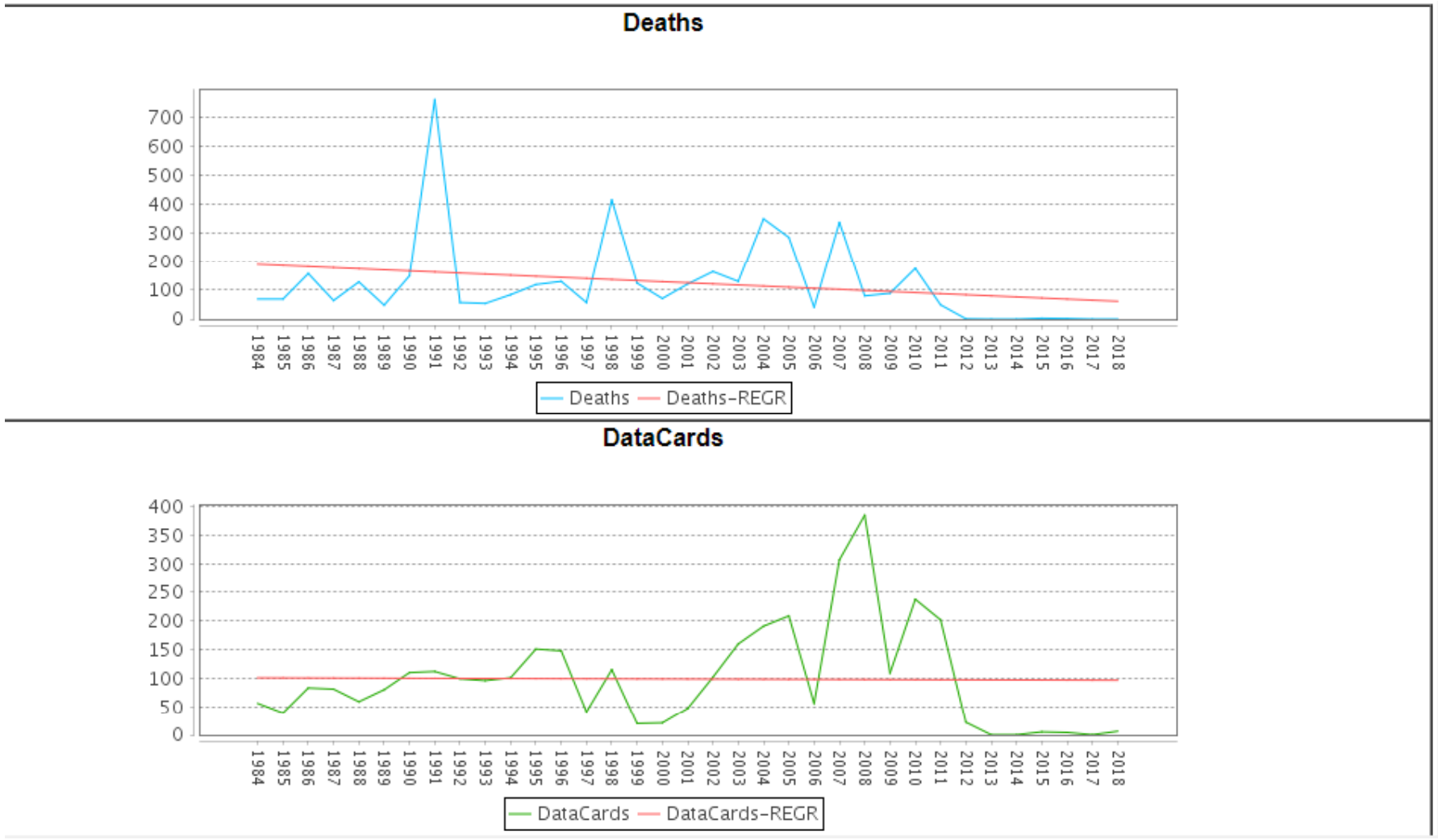
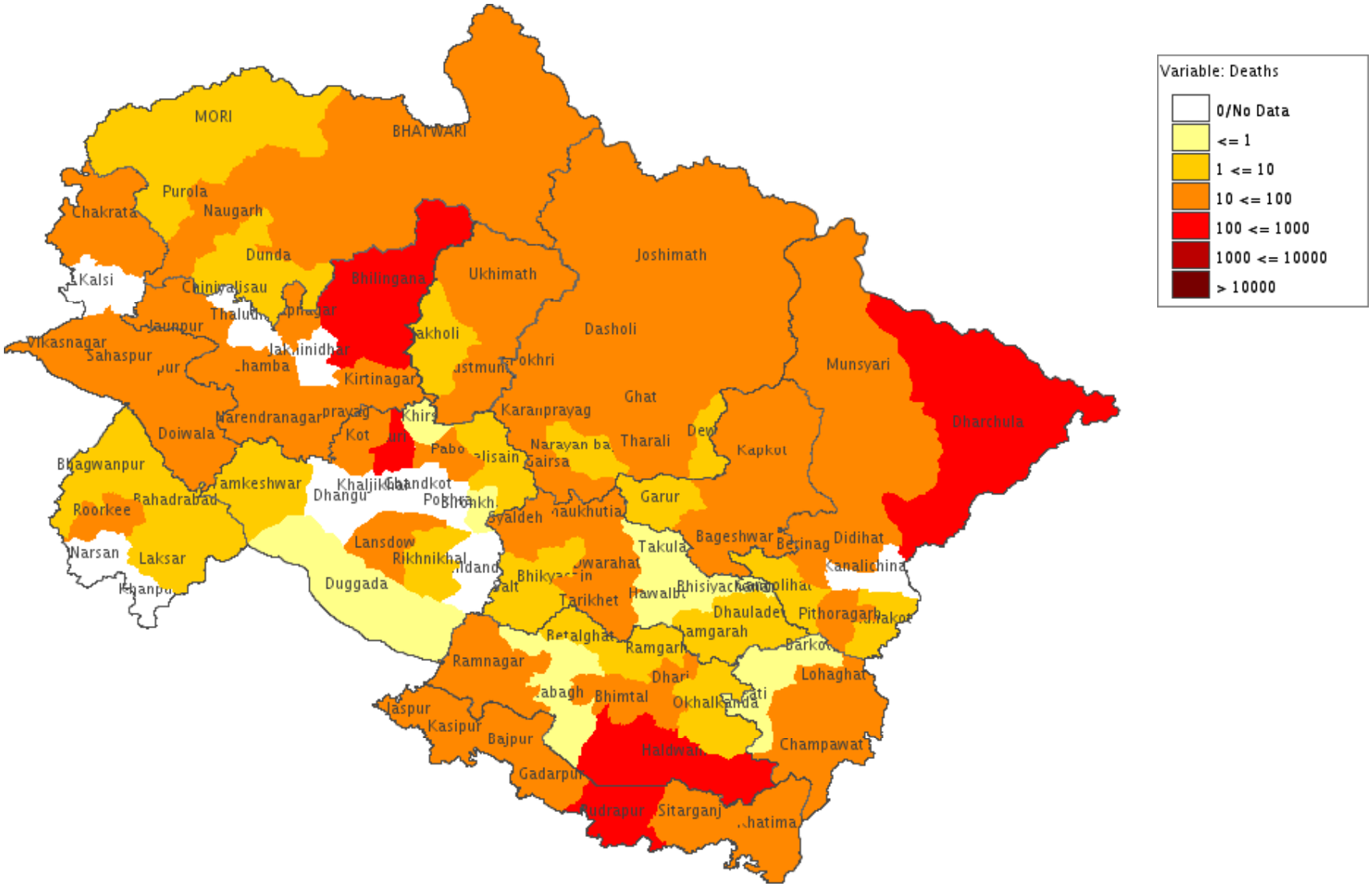
Uttarakhand

- *Started under UNDP DRM*
- *Support for organising workshop, training and technical support was provided in 2006*
- *DMMC owned the database and is up to date.*
- *The data is been updated in the Desinventar server.*
- *Data for the period 1984 – 2018 available*


Deaths
EARTHQUAKE - 742 (16 %)
LANDSLIDE- 671 (15 %)
RAINS- 280 (6 %)
ACCIDENT- 268 (6 %)
CLOUD BURST- 103 (2 %)
FIRE- 69 (1 %)
Other (<1%)- 106 (2 %)
Road Accident- 2143 (48 %)
DataCards
RAINS- 1051 (30 %)
ACCIDENT- 357 (10 %)
LANDSLIDE- 247 (7 %)
FIRE- 209 (6 %)
HAILSTORM- 60 (1 %)
Flash Flood- 37 (1 %)
Other (<1%)- 141 (4 %)
Road Accident- 1353 (39 %)


Deaths
700
600
500
400
300
200
100
0
1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
Deaths
Deaths-REGR
DataCards
400
350
300
250
200
150
100
50
0
1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
DataCards
DataCards-REGR

Deaths due to various disasters



Potential of Disaster Damage and Loss data

- *Assessment of damages and losses for response, immediate relief and compensations*
- *Post disaster needs assessment and formulation of recovery programmes*
- *Identifying the hotspots and spatial, temporal and typological distribution*
- *Prioritising the disaster mitigation and risk reduction programmes*
- *Monitoring and evaluation (Including SFDRR, SDG etc.)*
- *Validating models*
- *Probabilistic Risk Assessments*

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THANK YOU

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