



Centre for Research on
the Epidemiology of
Disasters (CRED)



Université Catholique
de Louvain (UCL)



WHO
Collaborating Centre

5th EM-DAT Technical Advisory Group Meeting

Agenda

THURSDAY August 18, 2005

09:00 a.m. to 09.15 a.m.

Welcome and introduction (G. Collins, USAID/OFDA - D. Guha-Sapir, CRED)

The use of EM-DAT : who are the users and for what purposes ?

Chair: D. Guha-Sapir - CRED

9.15 to 10.45

Introduction (D. Guha-Sapir, CRED)

Examples of the use of EM-DAT :

Natural Disaster Hotspots, World Bank (M. Arnold, HMU)

Reducing Disaster Risk report, UNDP (M. Dilley, UNDP)

Using EM-DAT, SMART and conflict data in the project Emergencies Without Borders (D. King, HIU)

Coffee break

11.00 a.m. to 12.30 p.m.

Examples of the use of EM-DAT (continuation):

Country Profiles, Living with Risk (P. Basabe, ISDR)

World Bank (A.Dinar), NOAA (K.Sponberg)

Discussion and conclusion

Economic data on disasters in EM-DAT

Chair: M. Arnold - HMU or C.Clarke - IADB

01:30 p.m. to 03.00 p.m.

Summary of the Expert Consultation on Economic Data, Dec. 2004 (M.Arnold, HMU)

Progress achieved in EM-DAT (D. Sapir - CRED)

Global analysis of economic data in EM-DAT (V. Teran – CRED)

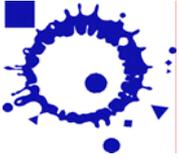
Comments and discussion (lead by R. Zapata, ECLAC)

Coffee break

03.15 p.m. to 04.30 p.m.

Methodology issues and action to be taken: how can we do better?

Presentations and discussion: World Bank, A. Wirtz (MünichRe), C.Clarke/K.Keipi (IADB)



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DAY 2: Friday, August 19, 2005

Drought and famine data in EM-DAT

Chair: M. Dilley - UNDP

09:00 a.m. to 09.15 a.m.

Introduction and objectives (M.Dilley, UNDP)

09:15 a.m. to 10:30. a.m.

Gaps, inaccuracies and new EM-DAT methodology (R. Below - CRED)
Comments and discussion (lead by E. Grover, IRI)

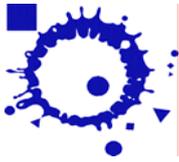
Coffee break

11.00 a.m. to 13.30 p.m.

Hazard Index Development: Options, methods and initial results (E. Grover, IRI)
Creation of a hazard index : Overview of the Hotspots methodology (P. Buys, World Bank)
International Drought Mitigation Center (M. Svoboda)

Discussion

Recommendations and conclusions



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List of Participants

Margaret Arnold

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UN Secretariat International Strategy for Disaster Reduction (ISDR), Geneva, Switzerland

Milan Brahmhatt

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José Briceno

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Maxx Dilley

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Ariel Dinar

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Kari Keipi

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ECLAC, Mexico

CRED Team

Regina Below , Database Manager
Olivier Degomme, Research Fellow
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David Hargitt, Research Project Officer
Barry Meehan, Computer Systems Analyst
Vicente Teran, Research Fellow

Report

Technical Advisory Group (TAG) meeting on

EM-DAT: The International Disaster Database

Organized by the Centre for Research on the Epidemiology of Disasters

Hosted by USAID/OFDA, Washington D.C., August 18-19, 2005

1) Objectives of the meeting

The objectives of the meeting were threefold:

- a) Provide an outline of who uses EM-DAT, how the data is utilized, and for what objectives.
- b) Present the progress achieved following the Expert Consultation on Economic Data held at the World Bank in December 2004, analyze the updated EM-DAT economic data, and propose a plan of action for further improvements of economic data production and compilation.
- c) Give an overview of the recently improved EM-DAT methodology for droughts and famines, of the remaining data gaps, and identify actions to be taken.

2) Summary of the meeting

The two-day TAG meeting started with an overview of EM-DAT uses, with presentations by Centre for Research on the Epidemiology of Disasters (CRED), the World Bank, the International Strategy for Disaster Reduction (ISDR), the United Nations Development Program (UNDP), the National Oceanographic and Atmospheric Administration (NOAA), and the Humanitarian Information Unit (HIU) of the U.S. Department of State.

These were followed by a session on economic disaster data, with presentations made by CRED, the World Bank, the Economic Commission for Latin America and the Caribbean (ECLAC), Munich Reinsurance Company, and the Inter-American Development Bank (IADB).

The second day of the meeting covered the problematic of drought and famine disasters and included presentations by CRED, the World Bank, the International Research Institute for Climate Prediction of Columbia University (IRI), and the National Drought Mitigation Center of the University of Nebraska-Lincoln (NDMC).

3) Presentations

3.1 The Use of EM-DAT: who are the users and for what purposes?

Natural Disaster Risk Hotspots: Practical applications (World Bank – Hazard Risk Management Team)

Margaret Arnold presented the work of the World Bank's Hazard Risk Management Team and their recent publication 'Natural Disaster Hotspots: A Global Risk Analysis'.

EM-DAT is one of the foundation blocks of the hotspot methodology in analyzing disaster risk worldwide with the objective of providing a scientific underpinning on how to push policies forward at the Bank on risk analysis and mitigation. As disaster management and reconstruction is large part of the Bank's portfolio, it is important to:

- Document the link between poverty, disasters and their economic impact
- Analyze the benefits of investing into mitigation
- Include disaster management in sectoral aspects
- Develop proactive strategies for reducing disaster risk
- Provide incentives for better disaster management

The hotspot methodology used EM-DAT data to estimate vulnerability by looking at hazard-specific mortality and economic loss rates for World Bank regions and country wealth classes within them. From the analyses, 32 countries were found to be highly vulnerable to disasters. This allowed the WB to flag these countries to help them integrate disaster management into their policies and projects, promote sector investment and risk reduction operations. It also highlighted the importance contingency financing mechanisms, advance planning and the pre-identification of risk reduction measures for post-emergency funding.

Reducing Disaster Risk: A Challenge for Development (UNDP)

Maxx Dilley presented the work carried out by the UNDP to assess relative risks and quantify these. The Disaster Risk Index (DRI) was developed by the UNDP to improve the understanding of the relationship between development and disaster risk. The DRI enables the calculation of average risk of death per country in large- and medium-scale disasters associated with earthquakes, tropical cyclones and floods based on data from 1980 to 2000. The EM-DAT data was used to calculate vulnerability, with its mortality figures applied as a proxy indicator of disaster risk.

The aim of the UNDP was to map out an agenda for change in the way disaster risk is perceived within the development community. The analyses led to six recommendations for further action:

- Appropriate governance for disaster risk management is a fundamental requirement if risk considerations are to be factored into development planning, and if existing risks are to be successfully mitigated.
- Development needs to be regulated in terms of its impact on disaster risk
- Building on capacities that deal with existing disaster risk is an effective way to generate capacity to deal with future climate change risk

- Natural hazard is one among many potential threats to life and livelihood
- In addition to reworking the disaster-development relationship, a legacy of risk accumulation exists today and there is a need to improve disaster preparedness and response
- A first step towards more concerted and coordinated global action on disaster risk reduction must be a clear understanding of the depth and extent of hazard, vulnerability and disaster loss.

Emergencies Without Borders - Sub-national and transnational mapping of emergency affected areas in Africa in 2004 (HIU)

Dennis King presented the emergencies without borders project which has the objective of geo-referencing and mapping data on disasters sub- and trans-nationally. His project presently focuses on Africa and uses EM-DAT data for the mapping of natural disaster occurrence on the continent. As emergencies are usually sub-national, in that they affect only specific areas inside a country's boundaries, or trans-national and occur over national borders, there is a need to develop data that is broken down to the smallest administrative level boundary and to move away from being purely applicable to the country-level. He also highlighted the following points:

- UN Consolidated Appeals are often transnational/regional (Darfur/Chad, Great Lakes) or sub-national (Chechnya, Bolivia El Chaco drought)
- Most humanitarian assistance organizations are structured according to country desks/programs and have different entities for refugees and IDPs
- Transnational humanitarian emergencies require coordination, collaboration and information sharing among multiple organizations
- Sub-national mapping of emergencies requires more detailed identification of affected areas (provinces, states, districts) and geo-referencing of locations

Using EM-DAT for weather related services (NOAA – Climate Information Project)

Many activities of the Climate Information Project (CIP) are focused towards information support for OFDA and other disaster or humanitarian collaborating entities. However, its lessons are often applied to more long-term efforts such as documentation of weather and climate-related impacts, development of directories of available products, as well as technical support for international collaborations. NOAA/CIP played such a role in assisting EM-DAT to develop its web-interface and data query mechanisms. CIP uses EM-DAT data on a regular basis to get information on risks to isolated communities and to push local authorities to better analyze disaster risks.

Disaster reduction information and country profiles (ISDR)

ISDR has used and is using EM-DAT data and information to elaborate statistics, tables and graphics, useful for awareness raising, publications and dissemination of information. Some examples are:

- Living with Risk and other publication
- Recent World Conference on Disaster Reduction
- Reports, media information
- Country profiles

This collaboration between CRED and ISDR is also contributing to the implementation of the Hyogo Framework for Action, through stimulating the exchange, compilation, analysis, summary and dissemination of best practices, lessons learned, available technologies and programs, to support disaster risk reduction. Dr. Basabe of ISDR also outlined the next steps in the collaboration with CRED for the use of EM-DAT data. This will include a joint analysis of data and tables and the creation of a standard web page with tables and graphics which will be filled out dynamically by SQL queries from the EM-DAT database. This will allow the automatic update of EM-DAT products.

Water scarcity and cooperation among countries (World Bank)

Ariel Dinar presented his research into how scarcity affects cooperation. Looking at the 200 water basins around the world that are shared, the research looked at the factors behind the existence of cooperation treaties between countries sharing these basins. The hypothesis of the research was that the level of scarcity of a resource would be the explanatory variable on how well countries cooperate. EM-DAT water-related data (droughts, floods) were used in the analyses.

The results showed a quadratic, inversed u-shaped relationship between scarcity and bilateral cooperation. One difficulty that was highlighted during the research was the need to EM-DAT data to be more complete in providing exact localization of disasters (regions, river basins, and polygonal coordinates).

3.2 Economic Data on Disasters in EM-DAT

Summary and Follow-up of the Expert Consultation on Economic Data on Natural Disasters (World Bank, Hazard Risk Management Team)

Margaret Arnold summarized the First EM-DAT Expert Consultation on Economic Data on Natural Disasters held at the World Bank in Washington D.C. in December 2004. The objectives of the meeting were to improve economic and aid contribution data for natural disasters, compile and data mine sources not examined before and establish best practical procedures for these data. The conclusions from that consultation were as follows:

- Inclusion in EM-DAT of new additional fields for economic data
- Better reporting of sources
- Need to establish a clear methodology
- Better field methodology for damage assessment
- Better exchange of information and enhanced co-operation between partners

Economic Data in EM-DAT: Overview of Recent Progress (CRED)

Regina Below presented the progress made in EM-DAT with regards to the above conclusions of the Expert Consultation on Economic Data on Natural Disasters. The following enhancements were made:

- Inclusion of new economical fields in EM-DAT
 - Economical damage
 - Reconstruction cost
 - Insured losses
 - Aid contribution
 - Disaster impact and sectors affected
- New sources compiled and added
 - ECLAC
 - World Bank studies
 - Mexico Data (CENAPRED)

Regina Below then summarized a review that was conducted of common EM-DAT sources to assess whether they provided any information for the new economic data fields that were added to the database. 50 large disasters were analyzed, and out of these 13 provided total economic damage, with only 2 providing a breakdown between direct and indirect damages.

The identification of problems from the review of economic data in EM-DAT was as follows;

- Lack of information
- Variations in figures according to sources reporting data
- Coverage of the damage figures (Difficulty in identifying the types of losses that are included in the economic data)

From these identified problems, the following solutions were proposed.

- Reinforce collaborations between partners
- Establishment of a strict methodology for entering economic data
- Give access to specific users to figures given by different sources with inclusion of a reliability score

Economic Impact of Natural Disasters: A Global Analysis of Natural Disasters 2000-2005 (CRED)

Three topics were analyzed: First, the reporting of the economic damage caused by disasters. Second, the distribution of economic damage from disasters that does get reported. Finally, the international assistance and aid received for natural disasters over the last five years

With regards to the reporting of economic damages, the review showed that only 20.4% of disasters report total economic damage, 2.9% report total insured losses and 6.8% report international assistance received. Disaster types were broken into following three groups according to the level of reporting of economic damages.

- High reporting: Waves/surges, windstorms, earthquakes, floods
- Medium reporting: Wildfires, droughts, volcanoes
- Low reporting: Slides, insect infestations, extreme temperatures, epidemics, famines.

Similarly, regions of the world were broken down into three groups according to the level of economic damage from disasters being reported

- High reporting: North America, East Asia
- Medium reporting: Oceania, South-east Asia, Russian Federation, Caribbean, European Union, Rest of Europe
- Low reporting: Central America, North Africa, South Asia, South America, Southern Africa, West Asia, East Africa, West Africa, Central Africa

Disasters that occurred in the European Union, East Asia and North America had considerably higher economic damages than disasters in other regions. In relation to the size of a country's economy (GDP), the most affected countries for economic damages reported are small Caribbean countries, followed by developing countries with bigger economies.

Disaster damages and disaster mortality were then analyzed in relation to countries' Human Development Index (HDI) ranking and the World Bank income classification.

Human Development Index	Proportion of total deaths	Proportion of total economic damages reported
High Human Development	12%	65%
Medium Human Development	78%	34%
Low Human Development	10%	1%

World Bank Income classification	Proportion of total deaths	Proportion of total economic damages reported
High Income	19%	61%
Medium Income	44%	28%
Low Income	37%	11%

Finally, international assistance was analyzed by region and by disaster type. Excluding the December 26, 2004 tsunami, floods receive the largest share of international assistance, followed by earthquakes, droughts, windstorms, insect infestations and volcanoes. Slides, wildfires, epidemics, extreme temperatures, waves/surges and famines all receive less than 1% of total international assistance. If we include the tsunami, then waves/surges 81.3% of the total assistance reported.

The breakdown of international assistance by region, with the tsunami being excluded, shows that South Asia has received 36.5% of it, East Africa 12.3%, West Africa 10.3%, Central America 9.3%, the Caribbean 9.1% and Southeast Asia 4.5%.

Münich Re Group, NatCatSERVICE

Angelika Wirtz first presented the Geo Risks Research Department and its main tasks within the Munich Re Group. She introduced the Munich Re Risk Model for natural disasters that combines different inputs (scientific input on hazards, individual exposure distributions, insured loss experience, etc...) to calculate expected loss or the loss occurrence probability. She identified some of the same difficulties for Munich Re that EM-DAT has also been confronted to, such as differing data values according to the sources. Furthermore, she reviewed the loss estimation models that, when there are no loss figures available, use the ratio of economic losses to insured losses, the estimation catalogue and expert opinion for calculations.

Indicators of Disaster Risk – Information Needs (Inter-American Development Bank)

Kari Keipi first highlighted the important impact of natural disasters on development, with their having caused annual physical losses equal to half or more of the total annual loan commitments of the IDB. Using in part the EM-DAT data, the IDB expanded its Disaster Risk Management indicators. The IDB developed its Disaster Deficit Index which looks at the relationship between macroeconomic loss and supply of funding. He also introduced the Local Disaster Index which evaluates risks from the accumulated damage caused by recurrent, small-scale disasters and the Prevalent Vulnerability Index that averages out three composite indicators, namely exposure and susceptibility; socio-economic fragility and lack of resilience. Methodology and data issues were then identified, and questions brought forth on the extent to which indicators represent reality and are relevant to development policy.

Discussions on Economic Data on Disasters in EM-DAT

Discussions were held on the topic of economic damages from disasters and on how to improve and standardize the compilation methodologies, identify new sources of data, promote and disseminate the use of such statistics at national and international. The conclusions from these discussions are included in the section on data gaps and actions to be taken.

3.3 Drought and famine data in EM-DAT

Drought and Famine data in EM-DAT (CRED)

Regina Below introduced droughts and famines in EM-DAT and the following difficulties associated with these disaster types:

- They are long-term and multi-country events
- There are no clear definitions of drought and famine events
- Gaps in data exist (direct and indirect deaths, affected)
- Difficult to assess the reliability of the data
- There is no existing database on droughts and famines
- A lack of a clear methodology to enter drought and famine events
- Famines are problematic (not a hazard, complex causal factors)

These problems were identified in previous consultations and solutions were proposed for implementation in the EM-DAT methodology for droughts and famines.

Drought Disasters in EM-DAT: New Methodology for Documenting Events (CRED)

In collaboration with the International Research Institute for Climate Prediction (IRI) of Columbia University, solutions to resolve the drought and famine disaster issues itemized above were proposed and implemented by CRED. The goals were to develop of a strict methodology for recording date and location of drought and famine disasters in EM-DAT in order to facilitate the verification of drought losses, improve the precision of how loss data are handled and entered and facilitate the use of the data by all users.

The following methodological rules were applied in EM-DAT for droughts and famines:

- Start date of disaster: date at which losses started, of emergency declaration, or date of report
- End date of disasters: use of a placeholder until hazard characterization analysis is completed
- Use of a binary flowchart to determine regional- and time-scale of disaster
- Multi-year, single country events have a single entry and index number (DisNo)
- Multi-country events have a common index number (DisNo), but each country has its own entry
- Drought disasters have a new DisNo (YYYY-9000 to YYYY-9999; e.g. 1960-9001)
- No cumulative date anymore for loss figures
- Famine events that have a drought as one of the causal factor will be reclassified as drought disasters

Following the applications of these methodological enhancements to EM-DAT, 808 drought entries and 76 famine entries from 1900 to 2004 were reviewed and analyzed. New start and end dates were assigned and the events were identified as single, multi-year or multi-country. This review resulted in the following changes:

- Review of multi-year events reduced the number of entries to 446
- Review of multi-country events reduced the number of entries to 389
- 89% of the famine events were reclassified as droughts or assigned to existing drought entries
- 8 famines were reclassified as complex emergency events
- 4 entries were added and 1 was deleted

These changes greatly improved the coherence of drought and famine entries in EM-DAT and the associated methodology. However, the following issues still need to be addressed:

- Need to check heat waves and forest fires entries in EM-DAT to avoid duplication
- Information on location not always precise and sometimes no information available in sources
- Using the IRI Precipitation Data for multi-year, multi-country methodology is not perfect
- Inconsistencies when comparing different sources of information
- Methodological issues to handle loss figures still need work (e.g. Sahel drought 1972-1975, 250000 deaths)

Creation of a Hazard Index: Overview of the Hotspots Methodology (World Bank)

The objectives of the hotspot methodology were to identify natural disaster risk hotspots at sub-national scales. The initial focus was on droughts, floods, tropical cyclones, earthquakes, volcanoes and landslides. Analyzing where these events occur and where the damage might be the most severe in terms of mortality and economic damages would allow for the prioritization for local vulnerability assessments and risk reduction in highest-risk areas and support Bank efforts to engage clients in hazard management activities.

The hotspot methodology looked at three ingredients to identify hotspots: hazard information and event probabilities, elements at risk, and vulnerability of the elements at risk. EM-DAT was used to calculate the vulnerability of the elements at risk through the computation of hazard- and geographical-specific mortality rates. Region-specific mortality rates were then adjusted using a hazard severity weight. Combining the single-hazard exposure analyses, a multi-hazard exposure analysis was performed and the hotspot disaster risk indices were calculated.

The Hotspot analysis provides many implications for development investment planning, disaster preparedness and loss prevention. Among the conclusion of the report, one is of particular interest to EM-DAT - the need to improve the underlying databases for assessing disaster risk and losses. Improvements could be made in characterizing flood, drought and landslide hazards in particular, and in assessing and documenting global economic losses.

Toward the Development of a Drought Hazard Index: Methods and Initial Results (IRI)

The initial analysis of the relationship between hydro-meteorological drought hazards and drought disasters highlighted the need to review EM-DAT documentation methods. This was performed as described in Regina Below's above presentations on the improved EM-DAT drought and famine methodology.

The role of EM-DAT in the development of a drought hazard index was to provide the ground truth to assess and characterize whether an index is able to "predict" a disaster. The research looked at various meteorological (SPI, WASP) and agricultural (NDVI, Soil moisture, PDSI, WRSI) indicators.

Initial results have shows that WASP appears to have a closer relationship with disasters at all but the shortest time-scales. However, further analyses of other indicators are required and there is a need to use additional statistical methods, including the Principal Component Analysis. Furthermore, it is important to apply available information to formulate a single Drought Hazard Index which could then be made available on the internet and used for early warning systems and to trigger disaster preparedness programs.

The National Drought Mitigation Center (University of Nebraska-Lincoln)

The mission of the National Drought Mitigation Center (NDMC) is to lessen societal vulnerability to drought by promoting planning and the adoption of appropriate risk management techniques.

Mark Svoboda introduced the objectives of the NDMC and the various projects it works on, including the National Integrated Drought Information System (NIDIS), the US and North America Drought Monitor, the Global Drought Preparedness Network and the Drought Impact Reporter.

4) Identification of data-gaps and actions to be taken

4.1. Data-gaps related EM-DAT disaster data and the economic impact

There are a number of unresolved methodological issues, namely related to concepts, definitions and analysis that warrants further discussion and consensus among the relevant stakeholders and experts.

- i) Concepts: in order to uniformly quantify and compare economic disaster data, the following concepts need to be clearly spelled out:
 - damage
 - losses or incremental costs

- needs
- ii) Definitions: In order to standardize the cataloguing of disastrous events, methods and scales that measure the intensity, magnitude, duration, coverage and recurrence of disasters need to be addressed and accepted for systematic and methodological inclusion into EM-DAT.
- iii) Analysis: Further analyses should include relative scales (e.g. economic damage/losses relative to stock and macroeconomic size, relative area impacted by a disaster) recurrence and type of impact (e.g. composition as to direct or damage vis-à-vis indirect or flows, private verses public, sectoral composition) and correlation between high-impact/low recurrence and low impact/high or seasonal recurrence.

4.2. Actions to be taken

4.2.1. Economic data

Action to be taken are based on the recognition that at present the EM-DAT database appropriately harvests or mines existing data, which allows for limited analysis and comparison among disasters and affected countries. Given this and the current use, reliability, validation and demand of the EM-DAT database, improvement of economic data in it depend on better production of basic data to be fed in the database. This entails a move from mining or harvesting to production and generation of data at the appropriate level (national, event specific). For this data production to be comparable across events, countries and time the following seems to be needed:

- Standardized criteria and concepts, and standardized analytical framework, including basic indicators and indices of damage, vulnerability and risk.
- Dissemination of these among both users and information specialists charged with assessment and data generation.
- Promote case studies where these criteria and agreed framework are tested and used.
- Promote their use and inclusion in ongoing national databases, based on the conviction that this information will illustrate cost-benefit of risk management and risk transfer investment and support disaster and risk management policies and tools.
- Promote standardized data gathering criteria and assessing methodologies, and train relevant stakeholders in their use and implications.
- Move towards greater generation/production of data on economic damages from disasters
- Develop a quick & dirty way to generate economic impact data at a local level
- Use local case studies to fine-tune global datasets
- Incorporate disaster impact indicators in regular statistical national, regional and international databases so updating and database upkeep are seen as routine and not sporadic or casuistic.
- Support ongoing efforts of information gathering and processing (hazard, vulnerability and risk maps/databases) and try to disseminate and adapt them to disaster / country / region specific characteristics.
- Provide a scientific underpinning on how to push policy forward risk analysis & mitigation strategies
- Analyze investments in mitigation strategies to quantify the benefits
- Identify methods to measure changes in adaptive capacities/coping abilities over time
- Develop proactive strategies for reducing disaster risk and provide incentives for better disaster mgmt

4.2.2. Improve the overall quality of EM-DAT

- Reinforce collaborations
- Develop methods to keep track of anecdotal information
- Elaborate more strict methodologies to enter data
- Complete the magnitude/intensity field when this type of data is absent
- Give user access to a reliability index when conflicting economic impact data are available
- Make a conversion tool available on EM-DAT website to update economic losses to current-year values

4.2.3. Creation of task-forces and publications

Task force on floods and river basins: The goal of this task force will be to improve the completeness of EM-DAT data for hydrological disasters through the inclusion of associated information on rivers, river basins and other water-related features.

Task force on the Intensity of hurricanes: The goal of this task force will be to ensure the completeness of EM-DAT data on the intensity of hurricanes. As a benefit, it will allow for loss analyses as a function of intensity.

Publication on disasters and the economic impact: Production of a working paper on the economic impacts of natural disasters. Include impact on national and regional GDPs, and analyses of economic impact in relation to magnitude and other variables.